NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING

DESIGN REFERENCE GUIDE & SUBMISSION FORMAT

VERSION 1.01 | MAY 2019

www.greenbuildingindex.org | info@greenbuildingindex.org

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INTRODUCTION

The purpose of the Green Building Index Design Reference Guide is to establish a guidance document to assist project teams in understanding the criteria for each of the main components of the Green Building Index Rating Tool. The project team can use the document as a guide when submitting for the Green Building Index as it clearly identifies examples of how and what is required for completing the submission. Each of the main six criteria are further divided into corresponding sub-sections containing the necessary credit points. This guide is indicative and not an exhaustive/definitive reference to the Green Building Index rating tool.

The basic framework of this document sets out for each subsection the intent, description, requirements, approach & implementation and in some cases, calculations to achieve the credit point for each sub-section. The Green Building Index Design Reference Guide further becomes the base curriculum for the training of facilitators on Green Building Index Rating Tools.

To attain Green Building Index certification, the procedures are as follows:

STAGE 1 | APPLICATION & REGISTRATION
STAGE 2 | DESIGN ASSESSMENT (DA)
STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)

A summary of the stages is described below:

STAGE 1 | APPLICATION & REGISTRATION
Complete and Submit application form with owner’s information, project contact details, project information and any supporting documents to Greenbuildingindex Sdn Bhd (GSB). Upon acceptance & approval of the application documentation, the registration fee will be confirmed dependent on the size of the project. On payment of fees, a GBI registration number will be given, and the terms and conditions duly signed between owner and GSB. A GBI Certifier will then be assigned for the duration of the project.

The schedule of GBI Registration Fees can be obtained from www.greenbuildingindex.org

GBI Terms & Conditions
An agreement setting out the terms and conditions between Project owner and Greenbuildingindex Sdn Bhd is to be duly signed at this stage.

STAGE 2 | DESIGN ASSESSMENT (DA)
Appraisal conducted upon the submission by the Project Design team / Client (Architect/Engineer/ Building Owner or Developer directly or through a GBI Facilitator) of comprehensive design and other necessary documents for Green Building Index Assessment. After acceptance of registration from GBI, the Project Design team & client should proceed to collect information for each of the six criteria completing the submittal requirements described under each detailed sub-section. It is recommended that the information submitted is based on preconstruction information (i.e. tender documentation stage) when all parameters of the design have been finalised. A Provisional Design Assessment certificate is given at this stage. A summary Design Assessment (DA) checklist is provided to determine target scoring.
STAGE 3 | COMPLETION & VERIFICATION ASSESSMENT (CVA)

Appraisal conducted upon CPC of the project when all necessary documents are re-submitted according to as-built information and calculations by the Project Design Team / Client (Architect/Engineer/Building Owner or Developer) directly or through a GBI Facilitator. The Completion & Verification Assessment confirms that the targeted criteria have been properly implemented and achieved, or otherwise, for the intended certification.

GBI verifies the project’s certification within 12 months of CPC (or CCC/OC/OP whichever is the later); or earlier, if occupancy is not less than 50%. The verification process involves verifying the actual measured energy and water use, sustainable measures, indoor comfort survey results and action plan, building manual and sustainable maintenance program. A full Certification is given at this stage. A summary Completion & Verification Assessment (CVA) checklist is provided to determine target scoring.

APPEAL PROCEDURES
Appeals can be submitted (with fee paid) after receiving Design Assessment or Completion & Verification Assessment results.

VALIDITY OF CERTIFICATION
The validity of the certification is limited to three years. This is to encourage sustainable building maintenance management throughout the life of the building.

CERTIFIERS & FACILITATORS
GBI Certifiers perform the detailed assessment and accreditation tasks of building projects submitted to the GBI Accreditation Panel (GBIAP) for final certification.

GBI Facilitators provide services to enable building projects to achieve GBI Accreditation. A GBI Facilitator is a registered person with GSB having completed training and examinations conducted by GSB.

GBI TERMS & CONDITIONS
An agreement setting out the terms and conditions between the Project owner and Greenbuildingindex Sdn Bhd.
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING
PROCEDURES
**STAGE 1
APPLICATION & REGISTRATION**

Complete and submit the Application & Registration Form to GSB with supporting documents

Is the Application complete?

- **INCOMPLETE**
  - GSB requests more information from Applicant

- **COMPLETE**
  - GSB processes application and notifies Applicant of the Registration Fee

  Applicant to make the necessary Registration Fee payment to GSB and submit any other additional required information

  GSB registers the application and gives a GBI Registration Number to the Applicant

  GBI Agreement to be signed between GSB and Applicant

  GSB assigns GBI Certifier at appropriate time

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*GSB = Greenbuildingindex Sdn Bhd*
STAGE 2
DESIGN ASSESSMENT (DA)

Submit to GSB for Design Assessment (DA)
2 Hard Copies, 3 CDs
Request additional documents from Applicant

Is the DA Submission complete?

DA Assessment by Certifier

1st Review

GSIAP Review

GSB notifies Applicant of DA result

Is the DA Submission accepted by Certifier?

To submit appeal form & fees

APPEAL

Appeal by Applicant?

NO APPEAL

Issue letter of success & Provisional GBI Certificate to successful Applicant

GSB records & publishes in GBI Register

COMPLETE

Issue letter of acknowledgement to Applicant

INCOMPLETE

GBI requests information from Applicant

Applicant to resubmit DA

Additional information/documents received

2nd Review

Certifier to finalise DA

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STAGE 3
COMPLETION & VERIFICATION ASSESSMENT (CVA)

Applicant to submit for Completion & Verification Assessment (CVA) upon completion of project

GBI Certifier undertakes CVA

GSB notifies Applicant of CVA result

Appeal by Applicant?

NO APPEAL

GSB records & publishes in GBI register
LAM issues GBI certificate to Applicant

APPEAL

- Fail
- Request review for a higher rating

To submit appeal form & fees

*GSB = Greenbuildingindex Sdn Bhd
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING
CRITERIA CHECKLIST
& SUBMISSION FORMAT
## Non-Residential Existing Building (NREB): Historic Building

### Project Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
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<tr>
<td>Project Name</td>
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<td>Postcode</td>
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<td>State</td>
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<td>Applicant</td>
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<td>Contact Person</td>
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<td>Interior Designer</td>
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<td>Quantity Surveyor</td>
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<td>Landscape Consultant</td>
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<td>Other Specialist Consultant(s)</td>
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<td>Main Contractor</td>
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<td>Local Authority</td>
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<td>Total Gross Floor Area</td>
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<td>Land Area for Landed Property</td>
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### Project Description

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ASSESSMENT CRITERIA
OVERALL POINTS SCORE

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<th>PART</th>
<th>ITEM</th>
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<td>6</td>
<td>Innovation (IN)</td>
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<td>TOTAL SCORE</td>
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GREEN BUILDING INDEX CLASSIFICATION

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<th>POINTS</th>
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<td>86 to 100 points</td>
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The Historic Building Reference Guide is formatted parallel to the Historic Building Tool. This reference guide is envisaged as a live document that from time to time will be updated for the benefit of the end users.

The Historic Building Reference Guide has been formatted to form part of the basic criteria checklist for all documentation submissions for both the GBI Design Assessment (DA) and Completion & Verification Assessment (CVA). The cover sheet for each individual criteria shall be attached with the required documentation drawings, project narratives and technical submissions. All cover sheets shall be signed by the respective Lead Professional.

The table below lists the corresponding signatories required for each criteria.

<table>
<thead>
<tr>
<th>PART</th>
<th>CRITERIA</th>
<th>ITEM</th>
<th>REQUIRED SIGNATORIES</th>
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<td>EE</td>
<td>ENERGY EFFICIENCY</td>
<td>EE1 Minimum EE Performance</td>
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<td>EE2 Lighting Zoning &amp; Control</td>
<td>SP and C</td>
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<td>EE3 Automated Lighting Control</td>
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<td>EE4 Renewable Energy</td>
<td>SP/S and C</td>
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<td>EE5 Advanced EE Performance - BEI</td>
<td>SP/S and C</td>
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<td>EE6 Enhanced or Re-Commissioning</td>
<td>SP/S and C</td>
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<td>EE7 On-going Post Occupancy Commissioning</td>
<td>SP/S and C</td>
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<td>EE8 EE Monitoring &amp; Improvement</td>
<td>SP/S and C</td>
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<td>EE9 Sustainable Maintenance</td>
<td>SP/S and C</td>
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<tr>
<td>EQ</td>
<td>INDOOR ENVIRONMENTAL QUALITY</td>
<td>EQ1 Minimum IAQ Performance</td>
<td>SP and C</td>
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<td>EQ2 Environmental Tobacco Smoke (ETS) Control</td>
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<td>EQ3 Indoor Air Pollutants</td>
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<td>EQ4 Mould Prevention</td>
<td>PSP/SP and C</td>
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<td>EQ5 Thermal Comfort: Controllability of Systems</td>
<td>SP and C</td>
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<td>EQ6 Daylighting</td>
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<td>EQ7 Daylight Glare Control</td>
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<td>EQ8 Electrical Lighting Levels</td>
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<td>EQ9 Visual Comfort</td>
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<td>EQ10 Acoustic Comfort</td>
<td>PSP/SP/S and C</td>
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<td>EQ11 IAQ Before/During Occupancy</td>
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<td>EQ12 Occupancy Comfort Survey: Verification</td>
<td>S and C</td>
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<tr>
<td>SC</td>
<td>SUSTAINABLE CONSERVATION &amp; MANAGEMENT</td>
<td>SC1 GBI Rated Design &amp; Construction</td>
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<td>SC2 Building Exterior Management</td>
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<td>SC3 Integrated Pest Management, Erosion Control &amp; Landscape Management</td>
<td>PSP/SP/S and C</td>
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<tr>
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<td>SC4 Universal Access &amp; Design Facilities</td>
<td>PSP and C</td>
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<tr>
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<td></td>
<td>SC5 Historic Building Conservation Practices &amp; Management</td>
<td>PSP/SP/S and C</td>
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<td>SC6 Hardscape and Greenery Application</td>
<td>PSP/SP and C</td>
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<td>SC7 Roof Application</td>
<td>PSP/SP and C</td>
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<tr>
<td></td>
<td></td>
<td>SC8 Building User Manual</td>
<td>S and C</td>
</tr>
</tbody>
</table>
1. All Drawings, Plans, Sections and Elevations to be formatted on A3 size paper, with respective scale or scales clearly indicated. Should drawings be too small for legibility, provide a key plan with part plans for full clarity of building information.

2. All Perspectives to fit A3 size paper.

3. All Reports to be A4 format. Signature of Qualified submitting professional should form part of the submission.

4. Clearly mark the Design Assessment Checklist or Completion & Verification Checklist on submission of documentations together with a Design Submission form.

5. PSP is defined as Architect, Engineer or Interior Designer (similar to the definition in Certificate of Completion & Compliance, CCC)

6. SP is defined as Engineer, Landscape Architect, Planner or Quantity Surveyor (QS).

7. S is defined as Specialist which includes GBI Facilitator, Project Manager, Facilities Manager, Energy/Sustainable Consultant or Commissioning Specialist.

8. C is defined as Client or Client’s assigned representative.

**SUBMISSION FORMAT**

All required submission information shall be attached to the respective cover sheet along with relevant signatures for each criteria. The criteria checklist is to be marked by the submitter for all project documentation as described under “Required Submission for Design Assessment (DA)” or “Required Submission for Completion & Verification Assessment (CVA)”. Please leave the GBI column blank for the administration of GSB. All documents must be duly verified and signed as part of the procedural requirements. GSB will return documents that are not submitted in full compliance for corrective action.

The following is the recommended format of all documents that will form the Design Assessment (DA) and Completion & Verification Assessment (CVA) submissions:

1. All Drawings, Plans, Sections and Elevations to be formatted on A3 size paper, with respective scale or scales clearly indicated. Should drawings be too small for legibility, provide a key plan with part plans for full clarity of building information.

2. All Perspectives to fit A3 size paper.

3. All Reports to be A4 format. Signature of Qualified submitting professional should form part of the submission.

4. Clearly mark the Design Assessment Checklist or Completion & Verification Checklist on submission of documentations together with a Design Submission form.

All submission to be saved into CDROM in pdf format. Two (2) hard copies and three (3) copies of CDROM are to be submitted to GSB.
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING ASSESSMENT CRITERIA
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING TOOL
ENERGY EFFICIENCY (EE)
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
ENERGY EFFICIENCY (EE)

INTENT
To create energy efficiency (EE) awareness and promote the use of MS 1525.

DESCRIPTION
Establish minimum energy efficiency (EE) performance to reduce energy consumption in buildings, thus reducing CO₂ emissions to the atmosphere. Meet the following minimum EE requirements as stipulated in MS 1525.

REQUIREMENTS
1 Point: Awarded for Overall Thermal Transfer Value (OTTV) ≤ 50 W/m², Roof U-Value ≤ 0.4 (Lightweight) & ≤ 0.6 (Heavyweight) and where applicable, Roof Thermal Transfer Value (RTTV) ≤ 25 W/m². Submit calculations for OTTV and RTTV. Use of the BEIT or other GBI approved software is acceptable.

1 Point: Awarded for Energy Management System.

APPROACH & IMPLEMENTATION
Wall insulation can be achieved in many ways, such as, but not limited to, using autoclaved lightweight concretes, composite insulated walls, double brickwalls and many other construction systems. Glazing should be optimally sized. The use of Insulated Glazing Units and/or performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof should be insulated with suitable insulation materials to prevent heat gain into occupied spaces.

POTENTIAL TECHNOLOGIES & STRATEGIES
Design the building envelope, HVAC, lighting and other systems to maximize energy performance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Appointment letters of qualified professionals.
2. OTTV calculations for each facing wall and roof.
3. Description of specified wall & aperture materials.
4. Calculations of U-values for roof and wall assemblies.
5. Proposed glazing specifications including Shading Coefficient, U-values and Visible Light Transmission.
6. Confirm provision of Energy Management System where air conditioned space ≥ 4000m².

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans and elevations marking out walls & apertures used for the calculation coloured blue; and walls & apertures not used for calculation coloured red.
2. OTTV calculations for each facing wall and roof.
3. Description of built wall & aperture materials with U-value calculation
4. Manufacturer issued glazing specification including shading coefficient, U-values and Visible Light Transmission.
5. Description of as-installed Energy Management System and I/O schedule.
6. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
ENERGY EFFICIENCY (EE)

**EE2 | LIGHTING ZONING & CONTROL | 1 POINT**

**INTENT**
To provide flexible lighting controls so as to optimise energy savings.

**DESCRIPTION**
Encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas.

**REQUIREMENTS**
1 Point: Awarded for all individual or enclosed spaces that are individually switched; and the maximum number of light fittings per circuit shall not exceed 10; with switching clearly labelled and easily accessible by building occupants.

**APPROACH & IMPLEMENTATION**
Decreasing the size of lighting zones allows for more flexible control over lighting giving owners/tenants the ability to reduce energy consumption and costs by only lighting those areas or zones that are occupied or required.

**POTENTIAL TECHNOLOGIES & STRATEGIES**
Design lighting zones by increasing switching flexibility with controls by individual switches.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
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<tbody>
<tr>
<td>1. Drawings of floor plans clearly showing every proposed individually switched lighting zone and its coverage area.</td>
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</tr>
<tr>
<td>2. Electrical schematic drawings showing the locations and extent of switching, the area controlled by the switch.</td>
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<tr>
<td>3. Report to include the areas of all switched zones and confirmation that the proposed area comply with credit requirements.</td>
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**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
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<tr>
<td>1. As-Built Drawings of floor plans clearly showing each individually switched lighting zone and its coverage area.</td>
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<td>2. As-Built Electrical schematic drawings showing the locations and extent of switching and the area controlled by the switch.</td>
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<tr>
<td>3. Report to include the exact areas of all switched zones and confirmation that their total area meets the credit requirements.</td>
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<tr>
<td>4. Describe any deviation or addition to the DA submission.</td>
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**NOTE**
ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To provide automated lighting controls in conjunction with daylighting strategies and occupancy so as to optimise energy savings.

DESCRIPTION
Automated lighting control provides lighting only to those areas that are occupied or require lighting.

REQUIREMENTS
1 Point: Awarded for provision of auto-sensor controlled lighting in conjunction with daylighting strategy for all perimeter zones and daylit areas.

1 Point: Awarded for provision of motion sensors or equivalent to complement lighting zoning areas equal to at least 25% of NLA.

APPROACH & IMPLEMENTATION
Automated lighting control helps to reduce energy consumption and costs by only lighting up those areas or zones that are occupied or required.

POTENTIAL TECHNOLOGIES & STRATEGIES
Lighting zones by means of individual automated sensing devices.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Drawings of floor plans clearly showing every proposed auto controlled lighting zone and its coverage area.
2. Electrical schematic drawings showing the locations and extent of switching area by the automated control sensing system.
3. Report to include the areas of all switched zones and confirmation that the total areas meet the percentage NLA requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. As-Built Drawings of floor plans clearly showing auto controlled lighting zone and its coverage area.
2. As-Built Electrical schematic drawings showing the locations and extent of switching area by the automated control sensing system.
3. Report to include the exact areas of all switched zones and confirmation that the total areas meet the percentage NLA requirements.
4. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
The use of renewable energy systems helps defer the need for power plants and promotes green energy use. Calculate the project performance by expressing the energy produced by renewable energy systems as a percentage of the building’s annual energy use. In the context of Malaysia’s built environment, the most likely form of renewable energy is derived from Solar PV. Other forms of renewable energy are also applicable with their appropriate conversion into equivalent electrical energy for calculation purposes.

**REQUIREMENTS**

1 Point: Awarded where 0.25 % of the Maximum [electricity] Demand (MD) is supplied by Renewable Energy (RE) or 2 kWp RE is installed, whichever is the greater, OR

2 Points: Awarded where 0.5 % or 5 kWp whichever is the greater, OR

3 points: Awarded where 1.0 % or 10 kWp whichever is the greater, OR

4 points: Awarded where 1.5 % or 20 kWp whichever is the greater, OR

5 points: Awarded where 2.0 % or 40 kWp whichever is the greater.

**Notes:**

i) Electricity includes other forms of energy.

ii) Where MD is not available/applicable then calculation shall be based on total energy usage.

**APPROACH & IMPLEMENTATION**

Assess the project for renewable energy potential such as solar, wind, geothermal, low-impact hydro, biomass and other non-polluting technologies. Solar Photo Voltaic (PV) is recommended to generate renewable electricity for buildings in the Malaysian climate. PV systems can be grid connected or stand-alone with or without battery packs to store excess energy production.

**POTENTIAL TECHNOLOGIES & STRATEGIES**

Assess the project’s potential for non-polluting and renewable energy generation such as solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, take advantage of net metering with the local utility.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Plans and elevations marking out areas allocated to house renewable energy equipment.
2. Describe proposed technology to be used, including documentation of total kWp or equivalent to be installed.
3. Demonstrate reduced MD/total electricity consumption by the building and percentage of renewable energy to be generated.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-Built plans and elevations marking out installation and location of renewable energy equipment.
2. Manufacturer’s technical specification of the renewable energy equipment.
3. As-Measured kWp or equivalent renewable energy generated.
4. Describe any deviation or addition to the DA submission.
INTENT
To encourage enhancement of building EE performance thereby reducing CO₂ emissions.

REQUIREMENTS
Up to 8 points are awarded by demonstrating that Energy Efficiency (EE) performance exceeds the baseline minimum to reduce energy consumption in the building. Achieve Building Energy Intensity (BEI) as defined by GBI [use of BEIT Software - limited to GBI Certified or Silver rating only or other GBI approved softwares is acceptable], for award of points as follows:

- **2 Points** where BEI ≤ 150 kWh/m²/year
- **3 points** where BEI ≤ 140 kWh/m²/year
- **4 points** where BEI ≤ 130 kWh/m²/year
- **5 points** where BEI ≤ 120 kWh/m²/year
- **6 Points** where BEI ≤ 110 kWh/m²/year
- **7 points** where BEI ≤ 100 kWh/m²/year
- **8 points** where BEI ≤ 90 kWh/m²/year

Notes: BEI values listed above are applicable to Office Buildings only. Refer to GBI for BEI values for other categories of Non-Residential Buildings.

APPROACH & IMPLEMENTATION
Cutting edge technologies and materials should be fully explored to improve EE performance. For passive design applications, consider use of better insulation materials, such as wall insulation of autoclaved lightweight concrete, composite insulated wall, double brickwalls or other options. Glazing should be optimally sized and the use of performance glazing such as low-e and/or spectrally selective glazing is encouraged. Roof insulation should also be properly addressed. For active design applications, consider EE products for all components and educate users on need to reduce plug loads both in procurement policy and usage.

POTENTIAL TECHNOLOGIES & STRATEGIES
Design the building envelope and systems to maximize energy performance. Adopt the most energy efficient design concepts and strategies. Quantify BEI performance as compared to a baseline building (refer to MS1525) or the existing building with the aid of appropriate simulation software tools.

CONTINUED ON NEXT PAGE
## NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
### ENERGY EFFICIENCY (EE)

<table>
<thead>
<tr>
<th>EE5</th>
<th>ADVANCED EE PERFORMANCE - BEI</th>
<th>8 POINTS</th>
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#### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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1. All documentation provided for EE1 (cross referenced)
2. Submit predicted BEI calculations. (GBI Certified or Silver ratings, may submit static energy calculations using manual method or software programs such as BEIT or other GBI approved software programs; GBI Gold or Platinum ratings, must use dynamic energy simulation using GBI approved software programs with accompanying report.)

#### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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</table>

1. Actual verified BEI achieved for completed building.
2. Actual EMS printouts.
3. Describe any deviation or addition to the DA submission.
INTENT
To ensure the building’s energy related systems are properly commissioned so as to realise their full potential and intent. This will help eliminate the bad practice of not fully commissioning installed systems.

REQUIREMENTS
Appoint an independent GBI recognised Commissioning Specialist (CxS) to ensure a comprehensive commissioning / re-commissioning / retro commissioning is performed for all the building’s energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard/s by:
• Implementing improvements to ensure the building’s major energy using systems are repaired, operated and maintained effectively to optimize energy performance.
• Developing a commissioning or ongoing commissioning plan for the building’s major energy-using systems.
• 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.
• Updating the building operating plan as necessary to reflect any changes in occupancy schedule, equipment runtime schedule, design set points and lighting levels.

APPROACH & IMPLEMENTATION
Appointment of a CxS to provide commissioning advice (including accessibility and maintainability provisions) to the Client and to monitor and verify commissioning of the building’s energy related systems.

POTENTIAL TECHNOLOGIES & STRATEGIES
Installation of state-of-the-art measuring devices and sensors compatible with the installed EMS that will aid in commissioning and enhance EE performance.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)  
1. Confirmation letter from the CxS of their appointment and scope of works in accordance with the GBI CxS requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)  
1. Documentary evidence that the full scope of CxS works have been carried out during the contract administration phase.
2. The final commissioning report including recommendations to the client regarding the performance of the commissioned building energy related systems.
3. A copy of the systems manual as described in the CxS scope of works.
4. Documented evidence of training of building management staff.
5. Describe any deviation or addition to the DA submission.
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
ENERGY EFFICIENCY (EE)

EE7 ON-GOING POST OCCUPANCY COMMISSIONING 1 POINT

INTENT
To ensure up-to-date on-going post occupancy commissioning is carried out for all tenancy areas after fit-out changes are completed, so that the intended EE and IEQ are fully sustained.

REQUIREMENTS
Professional Engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and sign off the completed works, AND
Carry out re-commissioning of the building’s energy related to systems for the affected tenancy areas.

APPROACH & IMPLEMENTATION
Professional engineers must check all fit-out designs and shall carry out the post occupancy commissioning for all tenancy areas after fit-out changes are completed.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Declaration that post occupancy commissioning will be undertaken.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Document what has been approved and constructed for post-occupancy fit-outs.
2. Verify re-commissioning of post occupancy fit-out, if applicable.
3. Describe any deviation or addition to the DA submission.
INTENT
To provide ongoing accountability for the building’s energy consumption over time.

REQUIREMENTS
Use Energy Management System (where mandated) to monitor and trend building system performance especially for HVAC system efficiency including parameters for plant sequencing, etc., OR
If EMS is not mandated, set up an Energy Management team to manually monitor and improve building system performance.
Compile, summarise and submit BEI, Fuel and Water Consumption of the building to GSB on an annual basis during the 3-years validity period or earlier whenever requested by GSB. Submissions shall include monthly energy and water bills.

APPROACH & IMPLEMENTATION
Fully commissioning the maximum demand limiting programme, (if applicable) and utilise EMS to monitor energy consumption, OR
If EMS is not mandated, manually monitor energy consumption.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Declaration of commitment to carry out EE verification upon completion.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

2. Where EMS is installed, comprehensive printouts of EMS results including Maximum Demand Limiting program setting, (if applicable) or if EMS is not mandated, provide comprehensive manual readings.
3. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To ensure the building’s energy related systems will continue to perform as intended with proper and sustainable maintenance.

REQUIREMENTS
1 point: Awarded where at least 50% of the permanent building maintenance team participate in the commissioning of all building energy services, AND
Awarded for providing a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.
1 point: Provision of evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

APPROACH & IMPLEMENTATION
Ensure the maintenance team fully participates in the testing and commissioning stage, understands the design intent and provides a 3-year sustainable maintenance program.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Identify building maintenance room and facilities in the design floor plan.
2. Commitment to deploy at least 50% of permanent building maintenance team to participate in commissioning of all building energy services with organisation chart and staff positions identified.
3. Commitment to provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Documentation evidence that 50% of the maintenance team were involved in the full testing & commissioning of the building energy related systems.
2. Comprehensive list of maintenance tools and instrumentation, and inventory storage items.
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget for facility maintenance (inclusive of staffing and outsourced contracts).
4. Describe any deviation or addition to the DA submission.
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING TOOL

INDOOR ENVIRONMENTAL QUALITY (EQ)
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ1 MINIMUM IAQ PERFORMANCE 1 POINT

INTENT
To provide for minimum IAQ performance in buildings to ensure the comfort and well-being of building occupants.

DESCRIPTION
Meet the minimum requirements of ventilation rate in ASHRAE 62.1 or local building code, whichever is the more stringent.

REQUIREMENTS
Meet the minimum requirements specified in ASHRAE 62.1 or local building code whichever is stricter.

APPROACH & IMPLEMENTATION
Designing the building ventilation system to meet the minimum requirement specified in ASHRAE 62.1 ensures adequate fresh air is available to occupants in the space. The Ventilation Rate Procedure or the Indoor Air Quality Procedure can be used to determine the minimum required ventilation rates for various applications. The Ventilation Rate Procedure is more straight-forward to apply. The IAQ Procedure of ASHRAE 62.1 is a performance-based procedure that addresses designing the ventilation system to maintain acceptable levels of known contaminants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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<tr>
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<tbody>
<tr>
<td>1. Description of the project ventilation design.</td>
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<tr>
<td>2. Schematic to illustrate the project ventilation system design.</td>
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<tr>
<td>3. Summary table with calculations to illustrate how the delivered minimum outdoor airflow to each zone and the outdoor air intake for the system meet the requirements of ASHRAE and/or local code.</td>
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REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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<tr>
<td>1. As built drawings to illustrate the project ventilation system design.</td>
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<tr>
<td>2. Summary report to describe the ventilation design and how it complies with ASHRAE 62.1 and/or the local code including information regarding the fresh air intake volumes and any special conditions that affect the project ventilation design.</td>
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<tr>
<td>3. Detailed calculations or simulations to show how the delivered minimum outdoor airflow to each zone and outdoor airflow air intake for the system meet the requirements in ASHRAE and/or local code.</td>
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<td>4. Describe any deviation or addition to the DA submission.</td>
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NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
### INTENT
To minimize exposure of building occupants to Environmental Tobacco Smoke.

### DESCRIPTION
Avoid health problems associated with tobacco smoke by preventing possible contamination in the building, thereby reducing health risks to occupants linked to "second-hand smoke".

### REQUIREMENTS
Prohibit smoking in the building and locate any exterior designated smoking areas away from entries, outdoor air intakes and operable windows.

### APPROACH & IMPLEMENTATION
Prohibition of smoking in air-conditioned public building is already mandatory under Malaysian Law. This credit can be achieved by strictly enforcing prohibition of smoking in the building, through supervision or signage. If designated smoking areas are provided outside the building, ensure that the tobacco smoke does not enter the rest of the building or the ventilation system.

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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<tr>
<td>1. Description of strategies to be employed in the building to achieve this credit (by means of management policy or signage proposal).</td>
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<tr>
<td>2. Plans showing the location of exterior and/or interior designated smoking areas, if any.</td>
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### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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<tbody>
<tr>
<td>1. As-Built drawings identifying location of exterior designated smoking areas</td>
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<tr>
<td>2. Summary report describing strategies undertaken to ensure prohibition of smoking indoors can be enforced and strategies implemented to ensure that tobacco smoke will not enter the building or ventilation system where exterior smoking area is provided.</td>
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<tr>
<td>3. Photographic evidence of strategies adopted.</td>
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<tr>
<td>4. Describe any deviation or addition to the DA submission.</td>
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**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

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**INTENT**
To minimize detrimental impact on occupant health through the use of materials with minimal volatile organic compounds (VOC) and formaldehyde content.

**DESCRIPTION**
Encourage the use and specification of healthy materials and finishes which contain low volatile organic compounds (VOC) and no formaldehyde.

**REQUIREMENTS**

**1 Point:** 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. Adhesives and sealants to comply with requirements specified in international labelling schemes recognized by GBI.

**1 Point:** Use only products with no added urea formaldehyde. These include:

1. Composite wood and agrifiber products defined as: particleboard, medium density fibreboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores, AND

2. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies, AND

3. Insulation foam, AND

4. Draperies

**APPROACH & IMPLEMENTATION**
The credit requirements should be clearly stated in project specifications. Provide cut-sheets, material safety data sheets, certificates and test reports. Submittal of the compliance documentation is a pre-requisite for product approval.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report identifying areas where the low VOC materials will be installed and how the credit compliance is to be met.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As built drawings showing where low VOC materials or products are used.

2. List of products installed that meet the credit requirements, and their specifications.

3. Manufacturer’s information including data sheets, certificates, test reports etc to demonstrate credit compliance.

4. Photographic evidence of each typical low VOC installation.

5. Describe any deviations or additions to the DA submission.

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
**INTENT**
To prevent microbial contamination in the building to ensure the health and well-being of building occupants.

**DESCRIPTION**
Design system(s) which reduce the risk of mould growth and its associated detrimental impact on occupant health.

**REQUIREMENTS**
Demonstrate that air-conditioning and mechanical ventilation systems 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 primary active reheat system (which consumes additional energy).
Ensure that excessive moisture in building is taken into consideration during the retrofitting exercise, and is controlled and monitored during construction and operation stages by 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

**OR**
The above mentioned measures are not necessary or applicable if the building is fully naturally ventilated.

**APPROACH & IMPLEMENTATION**
The most effective way to control indoor mould growth is through elimination of moisture. It is important to dry water damaged areas and items within 24 to 48 hours to prevent mould growth. Humidity in spaces and ductwork has to be controlled throughout construction and occupation of the building.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**
1. Summary report outlining the strategies adopted to meet the credit requirements.
2. A copy of specifications for the strategies to be carried out.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**
1. As-Built drawings or As-Built specifications confirming that the building has been retrofitted in accordance with the strategies adopted.
2. Manufacturer’s information on all relevant materials specified for mould prevention and/or resistance, to verify credit compliance.
3. Documentation evidence during construction of the precautions taken for mould prevention, e.g. photographs of material storage and protection for items that are susceptible to mould growth as identified in the DA submission stage.
4. Provide 24-hour record (during full occupancy) of Temperature-Relative Humidity measurements for at least two (2) areas acceptable to the GBI Certifier.
5. Describe any deviation or addition to the DA submission.

**NOTE**
ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To provide a thermal environment that is comfortable and supports the productivity and well-being of building occupants.

DESCRIPTION
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.

REQUIREMENTS
1 point: Provide individual comfort control for ≥ 50% of the building occupants to enable adjustments to suit individual task needs and preferences, AND
Provide comfort system control for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.
A totally non air-conditioned building will be deemed to comply with this criterion.

APPROACH & IMPLEMENTATION
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.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Describe how the project will fulfil the requirements on provision of individual control for at least 50% of building occupants and also provision of controls for shared multi-occupant spaces.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Summary report that includes information on the methods used to establish thermal conditions for the project and how the system design addresses the design criteria.
2. Provide 72-hour record (during full occupancy) of temperature measurement for at least two (2) areas acceptable to the GBI Certifier, to verify the specified close thermal comfort condition.
3. Summary report on the individual types of control and the controls for multi-occupant spaces that are provided to achieve the credit compliance.
4. Photographic evidence of each typical type of sensor and control installed.
5. Describe any deviation or addition to the DA submission
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
INDOOR ENVIRONMENTAL QUALITY (EQ)

EQ6  DAYLIGHTING  2 POINTS

INTENT
To ensure provision of good levels of daylighting for building occupants.

DESCRIPTION
Design and implement good levels of diffused daylight into interior of building.

REQUIREMENTS
1 point: Demonstrate that ≥ 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
2 point: Demonstrate that ≥ 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.

Note:
a) Refer to MS1525 for the description and calculation of Daylight Factor.
b) Refer to GBI for non-office applications.

APPROACH & IMPLEMENTATION
Daylight systems for buildings include windows, façade shading/light deflecting devices (e.g. lightshelves), roof lights and atrium spaces. The Daylight Factor is the ratio of indoor light level measured on the working plane to the outdoor light level during overcast conditions with no direct sun as measured at the working plane. For a daylit space, to ensure visual comfort, the lighting level should be fairly uniform with no great contrast.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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<tr>
<td>1. Summary report with diagrams, of the daylight design strategies that will be undertaken to meet the credit requirements include all provisions for glare control.</td>
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REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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<tbody>
<tr>
<td>1. As-Built drawings and specifications demonstrating that the daylighting system has been constructed according to design drawings/specifications.</td>
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<tr>
<td>2. Typical floor plans with Daylight Factor measurement results.</td>
<td>O</td>
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<tr>
<td>3. Site plan incorporating height of existing buildings or planned buildings surrounding the building together with solar diagrams &amp; sun path.</td>
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<tr>
<td>4. Summary of Daylight Factor results.</td>
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<tr>
<td>5. Manufacturer’s Information on the daylighting system used, if custom-made.</td>
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<tr>
<td>6. Furnish photographs of each type of typical device installed.</td>
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<tr>
<td>7. Describe any deviations or additions to the DA submission.</td>
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PROJECT NAME
DATE

SUBMITTING PROFESSIONAL

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NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
Intent
To reduce discomfort of glare from natural light.

Description
Ensure daylighting system is designed with adequate and proper glare control in order not to negate the benefits of daylighting.

Requirements
Where blinds or screens are fitted on glazing and atrium as a base building, incorporate provisions to meet the following criteria;
1. Eliminate glare from all direct sun penetration and keep horizontal workspace luminance level below 2000 lux; AND
2. Eliminate glare from diffused sky radiation for occupant workspace at viewing angles of 15° to 60° from the horizontal at eye level (typically 1.2m from floor level); AND
3. Control with an automatic monitoring system (for atrium and windows with incident direct sun light only - not applicable for fixed blinds/screens); AND
4. Equip with a manual override function accessible by occupants (not applicable for fixed blinds/screens).

Approach & Implementation
Glare issues typically arise during periods of low angle sun (early mornings and late afternoons) and during periods with bright sky. Glare control should therefore be designed to ensure both a view out and some level of daylight when the systems are engaged.

Required Submission for Design Assessment (DA)
1. Typical floor plans and sections showing variable position of glare control system.
2. Brief description of proposed control mechanism to be provided.
3. Summary report to describe how view and daylight is assured when glare control system is engaged.

Required Submission for Completion & Verification Assessment (CVA)
1. As-Built drawings and specifications to confirm that building is constructed according to design drawings and specifications.
2. Typical As-Built floor plans and sections showing position of glare control system.
3. Description of control mechanism installed.
4. Manufacturer’s Information on the blind and control systems provided.
5. Summary report to describe how view and daylight is assured when glare control system is engaged.
6. Furnish photographs of each type of typical glared control system installed.
7. Describe any deviation or addition to the DA submission.
Ensure lighting levels are designed in accordance to MS1525 for different types of spaces.

**REQUIREMENTS**

Demonstrate that (office) 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).

**Note:** For non-office applications, refer to GBI for working plane height.

**APPROACH & IMPLEMENTATION**

The ambient lighting level should be designed in accordance with the luminance levels recommended in MS1525. Task lighting may be provided for occupants who require a higher lighting level either for their own preference or for various task needs.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Summary report of lighting design brief to illustrate how the credit will be met.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-Built drawings showing the lighting layout plans.
2. Photometric measurements to illustrate that the lighting level fulfils the credit requirement.
3. Furnish photographs of typical floor lighting installation.
4. Describe any deviation or addition to the DA submission.

---

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
INDOOR ENVIRONMENTAL QUALITY (EQ)

**INTENT**
To reduce eyestrain for building occupants by providing long distance views and visual connections to the outdoors.

**DESCRIPTION**
Provision of views to the outside for building occupants to achieve benefits of connectivity with the outdoor environment.

**REQUIREMENTS**
1 point: Demonstrating that ≥ 60% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level. **OR**
2 points: Demonstrating that ≥ 75% of the NLA has a direct line of sight through vision glazing at a height of 1.2m from floor level.

**Note:** Refer to GBI for non-office applications.

**APPROACH & IMPLEMENTATION**
Column free spaces and low interior partitions should be designed if possible. Offices should locate open plan areas along the perimeter of the façade, while private offices and areas not regularly occupied should be placed at the core of the building. Maintaining views for spaces located near the core is the primary design objective.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
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<tbody>
<tr>
<td>1. Typical floor plans to identify how external views for occupied spaces are maintained.</td>
<td>☐ ☐</td>
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<tr>
<td>2. Design strategy of the interior layout that will be designed or recommended to maintain views to the outside.</td>
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</tbody>
</table>

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
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</thead>
<tbody>
<tr>
<td>1. As-Built plans including interior layouts confirming there are direct lines of sight to outside through vision glazing between 0.8 and 2.2m above the finish floor level for the required spaces.</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>2. For buildings where fit-out is not done, recommended interior layouts shall be provided to tenants.</td>
<td>☐ ☐</td>
</tr>
<tr>
<td>3. Describe any deviation or addition to the DA submission.</td>
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**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
## INTENT
To ensure building is designed to maintain a comfortable acoustic environment for occupants.

## DESCRIPTION
Maintain internal noise levels at an acceptable and tolerable level.

## REQUIREMENTS
Demonstrate that 90% of the NLA does not exceed the following ambient internal noise levels.

i. Within the entire building general office, space noise does not exceed 40 dBAeq, OR

ii. Within the baseline building office space, sound levels do not exceed 45 dBAeq for open plan offices and do not exceed 40 dBAeq for closed offices.

**Note:** Refer to GBI for non-office applications.

## APPROACH & IMPLEMENTATION
Excessive noise can reduce productivity and cause discomfort to occupants. Some strategies to ensure acceptable noise levels are maintained include:

i. Specify internal acoustics lining up to 5-10m of the AHU discharge duct

ii. Specify use of duct silencers or sound attenuators

iii. Specify acoustical ceiling

iv. Specify furniture with sound absorbing surfaces on both sides

v. Locate photocopiers, fax machines away from the main office areas in a separate area

vi. Insulate partition cavities

vii. Mechanical equipment room to be located away from office and conference rooms

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
<th>GBI</th>
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<tbody>
<tr>
<td>1. Design report on strategies to ensure internal noise levels are maintained at the prescribed levels.</td>
<td>O</td>
</tr>
<tr>
<td>2. Floor plans showing location of Core, M&amp;E, and equipment rooms.</td>
<td>O</td>
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### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
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<tbody>
<tr>
<td>1. Report describing the measured internal and external noise sources and features installed to achieve required noise level.</td>
<td>O</td>
</tr>
<tr>
<td>2. As built drawings showing noise control features.</td>
<td>O</td>
</tr>
<tr>
<td>3. Manufacturer’s data sheets of the acoustic materials used in building.</td>
<td>O</td>
</tr>
<tr>
<td>4. Describe any deviation or addition to the DA submission.</td>
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**NOTE:** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To maintain good Indoor Air Quality conditions both before and during building occupancy.

DESCRIPTION
Reduce indoor air quality problems resulting from the construction process in order to help sustain the comfort and well-being of building occupants.

REQUIREMENTS
1 point: Develop and implement an Indoor Air Quality (IAQ) Management Plan to effect this requirement as follows:

Option 1: Perform a building flush-out by supplying outdoor air to provide not less than 10 air changes/hour (ACH) for at least 30 minutes operation before occupancy and at least 1 ACH continuously during the initial 14 days occupancy of the completed building, OR

Option 2: If low VOC materials and low formaldehyde composite wood products are used (EQ4 is achieved), then building flush-out can be performed by supplying outdoor air to provide not less than 10 ACH for at least 15 minutes operation, OR

Option 3: Conduct IAQ testing to demonstrate maximum concentrations of pollutants do not exceed levels listed in the Indoor Air Quality Code of Malaysia.

1 point: 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

APPROACH & IMPLEMENTATION
Options 1 and 2, flush-out procedure may begin once all retro-fitting work is completed. As the purpose of flushing out is to evacuate air-borne contaminants in the building, the most effective way is to use non-polluting interior materials as a source control.

Option 3, IAQ testing procedure to confirm major contaminants are below recognized acceptable levels. This will help to ensure good indoor air quality for occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Summary report outlining the strategies and procedures to be taken to meet the credit requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Report on building flush-out procedure including the actual dates of the flush-out.
2. If IAQ testing is carried out, a report to outline the procedures undertaken and the results of the testing to verify whether or not credit requirements have been met. If not, corrective measures must be taken.
3. Describe any deviation or addition to the DA submission.
INTENT
To assess the comfort of building occupants.

DESCRIPTION
Conduct a post occupancy comfort survey of building occupants and to undertake measures to rectify any problems identified during the survey.

REQUIREMENTS
Conduct an occupancy comfort survey of building occupants. This survey should collect anonymous responses about thermal, visual and acoustic comfort in the building. It should include an assessment of overall satisfaction with thermal, visual and acoustic performance and identification of thermal, visual and acoustic-related problems, 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. 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 concentrations.

APPROACH & IMPLEMENTATION
Provide a systematic process and system for occupants to provide feedback on their indoor environmental comfort. The survey should collect responses from a significant and representative sample of occupants. The subjective survey should be accompanied with objective measurements of the relevant environmental variables. Short term monitoring or spot measurements should be done if problem areas are identified through the survey. Corrective actions should then be undertaken to rectify the problem areas identified to improve the indoor environmental conditions of the occupants.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Summary report of the strategies to be undertaken to meet credit requirements.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Survey questionnaire used to collect responses from the occupants.
2. Objective measurement plan illustrating the areas and measurements undertaken.
3. Analysis report of the results of the survey and measurements.
4. Corrective action plan and measures undertaken to rectify the problem.
5. Describe any deviation or addition to the DA submission.
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
SUSTAINABLE CONSERVATION & MANAGEMENT (SC)

SC1  GBI RATED DESIGN & CONSTRUCTION  1 POINT

INTENT
To give due recognition to a building with previous green rating or with a valid energy efficiency audit report.

DESCRIPTION
Encourage buildings to subscribe to continuous improvements and maintenance of their green rating and energy efficiency efforts.

REQUIREMENTS
Awarded if the building has been previously GBI (or other GBI approved Green Rating system) rated under any category, OR if a comprehensive Energy Efficiency Audit has been conducted within the last 12 months.

APPROACH & IMPLEMENTATION
Maintain green rating of the building throughout its life span through sustainable practices and compliance with GBI requirements. Continuously monitor the energy efficiency performance of the building by conducting annual energy audits where necessary.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report - (not more than 12 months old)

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Furnish past GBI certificate or other GBI approved Green Building Certificate OR valid Energy Efficiency Audit report - (not more than 12 months old)

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
**NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL**

**SUSTAINABLE CONSERVATION & MANAGEMENT (SC)**

### SC2 BUILDING EXTERIOR MANAGEMENT 1 POINT

**INTENT**
To mitigate pollution to the environment when carrying out maintenance of building exterior.

**DESCRIPTION**
Promote conscious use of environmentally friendly products to carry out building management works.

**REQUIREMENTS**
Employ environmentally sensitive building exterior management plan to reduce pollution; and conscious use of traditional materials, technologies and art forms when carrying out building management works. Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants, **OR**

Employ materials sensitive to the historic nature of the built fabric. Use traditional materials and technologies, locally sourced where possible, for cleaning of building exterior including maintenance equipment, paints and sealants. Where contemporary materials need to be used, ensure compatibility with historic materials.

**APPROACH & IMPLEMENTATION**
Develop a building management plan that identifies environmentally non-polluting and non-wasteful methodology for exterior management plan and specifies environmentally friendly cleaning agents to be used. **OR**

Develop a building management plan that is sensitive to the historic nature of the built fabric.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit building exterior management plan and intended list of non-polluting cleaning agents / products.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. Furnish as implemented building exterior management plan.
2. Comprehensive list of non-polluting cleaning agents / products procured including names of suppliers and eco certificates.
3. Photographic and documentation evidence of actual applications at site.
4. Describe any deviation or addition to the DA submission.

**PROJECT NAME**

**DATE**

**SUBMITTING PROFESSIONAL**

**NAME** **DESIGNATION** **COMPANY** **SIGNATURE**

**CLIENT**

**NAME** **DESIGNATION** **COMPANY** **SIGNATURE**

**NOTE** ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTEGRATED PEST MANAGEMENT, EROSION CONTROL & LANDSCAPE MANAGEMENT

INTENT
To preserve the natural environment of the building exterior through adopting environmentally sensitive management measures.

DESCRIPTION
Promote the awareness and need to use least toxic chemicals for exterior maintenance as well as effect erosion and sedimentation controls.

REQUIREMENTS
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. 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
2. 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.

APPROACH & IMPLEMENTATION
Practise environmentally sensitive management measures for integrated pest management, erosion & sedimentation control and landscape management. When and where possible, use only organic pesticides and fertilizers; and products that solely consist of biodegradable substances that are not passed through the food chain of pests.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit Pest Management Plan
2. Submit Erosion & Sedimentation Control Plan
3. Submit Landscape Management Plan

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Submit as implemented Pest Management Plan and photographic evidence of activity in compliance.
2. Submit as implemented Erosion & Sedimentation Control Plan and photographic evidence of activity in compliance.
4. Describe any deviation or addition from the DA.
INTENT
Promote the accessibility of Historic buildings which are often also tourist attractions to all, especially people with disabilities.

DESCRIPTION
To encourage universal accessibility for people with disabilities, the elderly and the very young. This should not only include wheel chair access but also toilet and related facilities.

REQUIREMENTS
The building shall be designed to meet the following Malaysian Standards
1. MS1184: Code of Practice on access for disabled persons to public buildings
2. MS1183: Specifications for fire precautions in the design and construction of buildings. Part 8 Code of practice for means of escape for disabled persons
3. MS1331: Code of practice for access of disabled persons outside buildings

OR
Demonstrate full compliance to by-law 34A : Building requirement for disabled persons

APPROACH & IMPLEMENTATION
Submit plans for the building and the approved planning and building plan approvals where available.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit approved planning and building plans where available
2. Submit relevant details of the universal design strategies and facilities for the proposed building

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Submit as-built building plans and photographs of the building’s universal design strategies and facilities
2. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
ENCOURAGE CONSERVATION OF HISTORICAL BUILDINGS RATHER THAN DEMOLISH AND RE-BUILD AS A MEANS TO MORE SUSTAINABLE DEVELOPMENT. SUPPORT THE CONSERVATION OF HISTORIC AND HERITAGE BUILDINGS IN CONSERVATION ZONES THROUGH CONSERVATION ACCORDING TO RECOGNISED BEST PRACTICES AND THROUGH PROPER AND COMPLETE DOCUMENTATION.

POINTS SHALL BE AWARDED ACCORDING TO THE FOLLOWING CRITERIA:

1 POINT:
Where the historic building is located in a "Conservation Zone".

2 POINTS:
Where the conservation of the historic building is in accordance to recognised best practices.

2 POINTS:
Where the conservation of the historic building is documented.

1 POINT:
Where the conservation of the historic building has been recognised or awarded.

SUBMIT THE NECESSARY ZONE PLANS FOR THE BUILDING CONCERNED AND THE APPROVED PLANNING AND BUILDING PLAN APPROVALS. DEVELOP A BUILDING CONSERVATION PLAN THAT IS IN ACCORDANCE WITH BEST RECOGNISED CONSERVATION PRACTICES AND DOCUMENT THE ENTIRE WORKS CONSERVATION PROCESS.

AND

WHERE THE BUILDING HAS BEEN DESIGNATED AS A HERITAGE BUILDING, SUBMIT THE NECESSARY SUPPORTING DOCUMENTS.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Submit zoning plans, approved planning and building plans where available
2. Submit a method statement for the proposed conservation works to be carried out
3. Submit the supporting documents for Heritage designation for the building and site where relevant

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Submit as-built building plans
2. Submit full construction records of the conservation works carried out
3. Describe any deviation or addition to the DA submission.
**HARDSCAPE & GREENERY APPLICATION**

**SC6**

**2 POINTS**

**INTENT**
To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimize impact on microclimate and human and wildlife habitat.

**DESCRIPTION**
Minimize impact on microclimate and adjacent habitats.

**REQUIREMENTS**

**Hardscape & Greenery Application**
Provide any combination of the following strategies for 50% of the site hardscape (including sidewalks, courtyards, plazas and parking lots):
1. Shade (within 5 years of occupancy);
2. Paving materials with a Solar Reflectance Index (SRI) of at least 29;
3. Open grid pavement system;

**APPROACH & IMPLEMENTATION**
During retro-fit planning stage, ensure landscaping design is incorporated, and choice of materials with preferred SRI is considered. Where possible, introduce landscaping to exposed site areas. Plants used should be of either native or adaptive types.

**REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)**

1. Submit Site plan showing the extent of proposed hardscape and greenery (softscape) (To scale).
2. List of names of native or adaptive vegetation and their characteristics.

**REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)**

1. As-Built plans of completed hardscape and greenery
2. Submit photographs of hardscape & greenery
3. Describe any deviation or addition to the DA submission.

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**NOTE**
ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimize impact on microclimate and human and wildlife habitat.

DESCRIPTION
1. Minimize impact on microclimate and adjacent habitats.
2. Roof application includes roofs over individual parking lots and roofs over parking structures.
3. The use of greenery on rooftops can help alleviate urban heat island effects through shading and evaporative cooling. It also enhances aesthetics to the surrounding and provides a more pleasant working environment, which is also discussed in Indoor Environment Quality.

REQUIREMENTS
2 Points: 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: (Area of SRI Roof / 0.75) + (Area of vegetated roof / 0.5) > Total Roof Area

To reduce heat island effect (thermal gradient difference between developed and undeveloped areas) so as to minimize impact on microclimate and human and wildlife habitat.

APPRAOCH & IMPLEMENTATION
During retro-fit planning stage, ensure landscaping design is incorporated, and choice of materials with preferred SRI is considered. Where possible, introduce landscaping to exposed roof surfaces. Plants used should be of either native or adaptive types.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Submit Roof Plan showing the extent of proposed roof materials and greenery (softscape) (To scale).
2. Section drawing of the rooftop showing details of built-up roof greenery (To scale)
3. List of names of native or adaptive vegetation and their characteristics.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. As-Built plans and sections of roof (to scale). Submit list of materials used and their SRI values
2. Submit photographs of roof and materials.
3. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To document green building design features and strategies for user information and guidance to sustain performance during occupation.

DESCRIPTION
A Building User Manual is intended to inform occupants about the active and passive design features that should be maintained throughout the lifespan of the building.

REQUIREMENTS
Provide a Building User Manual which documents all the passive and active features that are part of the building, and highlights all passive and active features that should not be downgraded.

APPROACH & IMPLEMENTATION
The preparation of the Building User Manual should commence during design concept stage and continue to be developed during all subsequent stages up to and including retro-fitting works. Participation by all consultants and building owner is recommended.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)


REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

2. Describe any deviation or addition to the DA submission.

NOTE
ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
NON-RESIDENTIAL EXISTING BUILDING (NREB):
HISTORIC BUILDING TOOL
MATERIALS AND RESOURCES (MR)
INTENT
To encourage designers to specify the reuse of historic building materials when retrofitting historic buildings.

DESCRIPTION
Reuse historic building materials and products, not to only reduce demand for virgin materials and reduce creation of waste, but also to preserve the cultural social and historical values associated with them. This serves to reduce the environmental impact associated with extraction and processing of virgin resources.

The employment of traditional craft skills and craft persons in the maintenance, restoration and upkeep of the historic built fabric serves to keep alive traditional trades and practices and protect intangible heritage. 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. The restoration and reuse of the original built fabric, which have high inherent embodied energy keeps alive both the values associated with the traditional technologies, the craftsmen practise these skills and the knowledge systems they represent.

REQUIREMENTS

2 points: Where reused products/materials constitute more than 5% of the project’s total retrofit material cost value, OR
3 points: Where reused products/materials constitute more than 10% of the project’s total retrofit material cost value.
1 point: Where traditional local craftsmen and knowledge systems are employed, OR

Where training programs and capacity building are provided to train new tradesmen in traditional materials, skills, technologies and knowledge systems

2 points: Where reused materials/products constitute more than 10% of the total reuse materials sourced within 500km locally, OR
3 points: Where reused materials/products constitute more than 20% of the total reuse materials sourced within 500km locally.

Encourage the reuse of historic objects, their preservation and safe guarding, as an important component of Heritage & Conservation. Where new interventions are necessary, especially in the case of adaptive reuse; then, increase demand for building products that incorporate recycled content materials in their production. (Recycled content shall be as defined in the ISO 14021)

2 points: Where the percentage (%) of conserved and reused (inclusive of objects salvaged from other sites) materials and objects in the heritage building (such as old photographs/ plans/ furniture/ etc.) exceeds 20%, OR
3 points: Where the percentage (%) of conserved and reused (inclusive of objects salvaged from other sites) materials and objects in the heritage building (such as old photographs/ plans/ furniture/ etc.) exceeds 30%
1 point: Where conservation/ restoration process includes training and capacity building programs for the locals or site managers, to enable them to maintain the interior materials and objects.

APPROACH & IMPLEMENTATION
Salvage and use old/disused materials such as columns, beams, wall & floor panelling, bricks, door frames, decorative items, furniture, tiles, etc. in the conservation and refurbishment of historic buildings.

The following approach can achieve this credit by using:

Reused Materials found on site: Fixed components such as doors, cabineries, posts etc. that no longer serve their original function are refurbished, reconditioned and installed for a different use or in a different location.

Reused Materials found off site: Use of salvaged materials found off site. They must be previously used or they may be relocated from another facility.

CONTINUED ON NEXT PAGE
### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Provide a narrative describing the materials reuse strategy for the project.  
2. List of anticipated reused or salvaged materials for the project.  
3. Indicate the cost of each proposed reused or salvaged materials.  
4. Establish the estimated Total Cost of the materials for the project excluding MEP items (or use the 45% default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project.  
5. Traditional Local Craftsmen used, through the employment of local community for restoration and refurbishment. Local community will constitute people residing within the same city/ town as the built premises.  
6. Capacity Building Programs: Where technology and crafts persons who are not local are employed, to train the local community. For example: If timber door restoration requires the importing of skilled crafts persons from China, the creation of a local apprenticeship program where local wood workers can learn the maintenance and upkeep of these components.  
7. An inventory of heritage objects within the Historic Building Fabric including their retention and use.

### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Documentation during the construction stage including photographs of the reused materials.  
2. List of reused or salvaged materials used in the project after completion and their locations in the building.  
3. Cost of each reused or salvaged materials either based on actual cost paid or replacement value of the material.  
4. Provide the Actual Total Cost of the materials in the project.  
5. Describe any deviation or addition to the DA submission.  
6. List of local crafts persons employed along with their contact information and expertise.  
7. Photographic and video documentation of the apprenticeship program and the people registered in the program.  
8. Detailed inventory of objects within the Historic Building Fabric before and after restoration.

**Note:** The National Heritage Department of Malaysia provides references for undertaking a HABS I, II and III and will be the benchmark for Historic Building and Object Documentation.
## INTENT
To encourage designers to specify the usage of recycled content materials when conserving & retrofitting buildings.

## DESCRIPTION
Increase demand for building products that incorporate recycled content materials in their production. (Recycled content shall be defined in accordance with the ISO 14021 document).

## REQUIREMENTS

**1 point:** 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 ≥ 20% (based on cost) of project’s total retrofit material cost value, **OR**

**2 point:** 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 ≥ 30% (based on cost) of project’s total retrofit material cost value.

## APPROACH & IMPLEMENTATION
The goal of using materials with recycled content should be established during the design phase. The project team must identify materials with recycled content and their availability should be coordinated (as early as possible) by the project team with the contractor, subcontractors and suppliers.

The quantum and value of the recycled content of the materials to the total material cost must be documented by the project team.

A recycled content claim may be made only for materials that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).

Formwork submitted as reused material cannot be double accounted under recycled material since wood which is a natural product, will not be considered to have recycled content. However, where recycled wood (pre-or post consumer) fiber is included into another material to form a composite (eg. recycled wood fibre mixed with recycled plastic to form a composite), these will be considered.

## CONTINUED ON NEXT PAGE
REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)  SUBMITTER GBI
1. Calculation of the recycled content value of each material must be provided. ☐ ☐
2. The percentage of post-consumer and/or pre-consumer recycled content to be established by cost: or by weight (converted to cost). ☐ ☐
3. Information on the sources/suppliers on the materials with recycled content must be provided. ☐ ☐
4. Submit estimated value of the materials with recycled content against the estimated total value of the materials for the project. ☐ ☐

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)  SUBMITTER GBI
1. Documentation during the construction stage including photographs of the installed reused materials. ☐ ☐
2. Calculation of the recycled content value of each material must be provided. ☐ ☐
3. Information on the sources/suppliers on the materials with recycled content must be provided. ☐ ☐
4. Calculate the total percentage (based on cost) value of the materials with recycled content against the actual total value of the materials for the project. The percentage of post-consumer and/or pre-consumer recycled content must be established by cost. ☐ ☐
5. Establish the estimated Total Cost of the materials excluding MEP items (or use the 45% default value for materials costs; i.e. Total Materials Cost may be derived by multiplying the total construction cost by 0.45) for the project. ☐ ☐
6. Describe any deviation or addition to the DA submission. ☐ ☐
INTENT
To promote responsible forest management.

DESCRIPTION
Encourage the use of environmentally responsible timber products.

REQUIREMENTS
Where ≥ 75% of wood-based materials and products used in the retrofit works are certified. 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 in the project. Compliance with Forest Stewardship Council or Malaysian Timber Certification Council requirements.

APPROACH & IMPLEMENTATION
Establish the volume and types of wood products used in the project. Check the availability of the wood species and products that complies with FSC or MTCC requirements by making contact with the local vendors, suppliers and manufacturers that provide the required certifications.

Provide a list of certified vendors, suppliers and manufacturers to the contract bidders.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. List all new wood products specified in the project and identify which components are FSC or MTCC certified.
2. Indicate the estimated volume of each wood product.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. List all new wood products used in the project and identify which components are FSC or MTCC certified.
2. The volume of each wood product must be shown.
3. The vendor’s chain-of-custody (COC) number must be shown in the invoice to verify FSC or MTCC certifications.
4. Describe any deviation or addition to the DA submission.
INTENT
To promote the use of sustainable consumer products for building maintenance and operational needs, through the adoption of a sustainable purchasing policy.

DESCRIPTION
It is essential to extend environmental protection to cover the day to day operation of a building through the implementation of a sustainable purchasing policy by the owners and tenants.

REQUIREMENTS
Develop a sustainable purchasing policy that covers product purchases within the building management’s control.

APPROACH & IMPLEMENTATION
Sustainable purchasing policy involves commitment to the environment, economic and social aspects of the society. Procurement of products should consider the sustainability of the raw materials used, production energy consumed, environmental impact, reusable or recyclable contents, biodegradability and so forth.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Submit an outline of the Sustainable Purchasing Policy with its objective, scope and responsibilities, best practices and procurement strategies, etc.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Submit a comprehensive Sustainable Purchasing Policy outlining in details its objectives, scope and responsibilities, best practices and procurement strategies, procedures and staffing.

NOTE: ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
## Storage, Collection & Disposal of Recyclables

### INTENT
To provide dedicated areas and storage bins for non-hazardous materials for recycling during BOTH construction and building occupancy.

### DESCRIPTION
Facilitate reduction of waste generated during retrofit construction and during building occupancy that is hauled and disposed off in landfills.

### REQUIREMENTS

1 point: Provide recycling facilities/infrastructure for sorting and separate collection of waste for recycling during construction (consumables - glass, paper, metal, equipment, addition & alteration construction wastes) and during occupancy.

1 point: Promote and encourage waste minimization and recycling among occupants, tenants and visitors through appropriate strategies.

1 point: Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.

### APPROACH & IMPLEMENTATION
During retrofit construction, designate a dedicated area where on-site sorting of waste materials can be stored in separate skips for collection to recycling facilities.

During Building Occupancy, designate storage areas for recyclable materials that are clearly labelled for recycling, placed within accessible reach of the building occupants and in a location with easy vehicular access to facilitate collection.

The size of the storage space allocated should be adequate to store the recyclable waste volume generated by the building’s occupants/operations.

Identify and include a list of recycling facilities that are able to handle and treat the recyclable waste diverted from landfills by the building occupants/operation.

### REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

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<tr>
<th>REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)</th>
<th>SUBMITTER</th>
<th>OBI</th>
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<tbody>
<tr>
<td>1. Floor plans showing the proposed locations of the storage areas for recyclables and their proximity to the building’s entrance and vehicular access points.</td>
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<tr>
<td>2. Ensure that the space provided for recyclables is in addition to the storage space allocated for general waste.</td>
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<tr>
<td>3. Describe proposed promotional activities to encourage recycling within the building.</td>
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### REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

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<tbody>
<tr>
<td>1. As-built plans showing the locations of the storage area for recyclables. The plans should indicate the proximity of the storage from the building entrance and/or vehicular access point.</td>
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<tr>
<td>2. Photographs showing the location, size, storage provision and labelling of dedicated facilities during construction.</td>
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<tr>
<td>3. Write up of promotional activities to encourage recycling within the building including evidence of such promotional activities carried out.</td>
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<tr>
<td>4. A waste recycling strategy and plan that identifies types of recyclable materials diverted from landfills as well as recycling facilities that have been signed up to handle the recyclable waste.</td>
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<tr>
<td>5. Describe any deviation or addition to the DA submission.</td>
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### NOTE
ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
INTENT
To demonstrate leadership in accelerating phase-out of all Ozone Depleting Substances. Recognise and promote use of low Global Warming Substances.

DESCRIPTION
Use environmentally-friendly Refrigerants and Clean Agents exceeding Malaysia’s commitment to the Montreal & Kyoto protocols.

REQUIREMENTS
1 point: Use zero Ozone Depleting Potential (ODP) products: non-CFC and non-HCFC refrigerants AND clean agents.
1 point: Use non-synthetic (natural) refrigerants AND clean agents with zero ODP and negligible Global Warming Potential.

APPROACH & IMPLEMENTATION
Use synthetic refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP such as HFCs that exceed Malaysia’s commitment to the Montreal & Kyoto protocols.

Use non-synthetic (natural) refrigerants (for HVAC) and clean agents (for fire fighting) with zero ODP and negligible Global Warming Potential (GWP) such as water, hydrocarbon, carbon dioxide, ammonia and etc (for HVAC); and nitrogen, argon, water mist and etc (for fire fighting).

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Submit proposed types of refrigerants and clean agents to be used and/or if no refrigerants or clean agents will be used.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Submit list of as-installed refrigerants and clean agents.
2. Describe any deviation or addition to the DA submission.
RAINWATER HARVESTING

INTENT
To encourage rainwater harvesting that will lead to reduction in potable water consumption.

DESCRIPTION
Maximise rainwater collection from rooftop or runoff rainwater systems for building usage and/or irrigation.

REQUIREMENTS
Rainwater harvesting that achieves the following percentage in reduction of potable water consumption:

1 point: For ≥ 5% or more reduction, OR
2 points: For ≥ 15% or more reduction, OR
3 points: For ≥ 30% or more reduction.

Submit calculation demonstrating reduction in water consumption compared to the existing building's water usage, including potable water used for cooling towers, fountains, pools, etc.

APPROACH & IMPLEMENTATION
The two (2) main approaches to rainwater harvesting are collection of runoff rainwater from surrounding site and roof top rainwater harvesting. Both systems require separate water storage tanks and additional pressure boosting equipment may be required. Gravity fed system are encouraged to avoid additional energy use for pumping. Use rainwater for non-potable applications such as toilet and urinal flushing, landscape irrigation, general cleaning, etc.

Water purifying system may be necessary depending on the application and methodology of harvesting the rainwater. Where rainwater filtration/purification is required, use of ozone or activated oxygen in lieu of chlorine or other GHG chemicals, is preferred to obviate negative environmental impact.

Rainwater harvesting calculation method and parameters adopted using GBI recognized Standards, Codes or Guides are acceptable.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. A technical report describing the concept and details of rainwater collection, conveyance system (gutters/downpipes or equivalent), filtration system (if any), storage facility and distribution system.
   
2. The technical report shall include schematics showing how the rainwater is to be harvested and utilised, including calculation of annual water consumption and reduction achievable from using harvested rainwater based on historical rainfall data.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. Final as-installed calculation of rainwater harvested, storage tank capacity and building usage distribution system.

2. As Built drawings for rainwater harvesting system and storage tank location (Recommended scale 1:200).

3. Furnish photographs of as installed main equipment and components.

4. Describe any deviation or addition to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
## Non-Residential Existing Building (NREB): Historic Building Tool
### Water Efficiency (WE)

<table>
<thead>
<tr>
<th>WE2</th>
<th>WATER RECYCLING</th>
<th>2 POINTS</th>
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### Intent
To encourage water recycling that will lead to reduction in potable water consumption.

### Description
Encourage recycling of greywater and/or blackwater for building and irrigation use to reduce discharge to external sewer thereby reducing the overall building potable water consumption.

Encourage and recognise building design that reduces water flow to sewerage treatment plants.

### Requirements
Treat and recycle the following percentage of wastewater leading to reduction in potable water consumption:

- **1 point:** For ≥ 10% or more wastewater being treated and recycled, OR
- **2 points:** For ≥ 30% or more wastewater being treated and recycled.

### Approach & Implementation
Water treatment systems and re-use technology options are acceptable for treating greywater and blackwater. The treated water is then recycled for use in irrigation, toilet flushing etc. Sand filters can be a cost effective treatment technique.

### Potential Technologies & Strategies
Consider channelling greywater from sinks, showers and other sources to wastewater treatment system.

Options for on-site wastewater treatment including packaged biological nutrient removal systems and high efficiency filtration systems can be considered.

### Required Submission for Design Assessment (DA)

<table>
<thead>
<tr>
<th>SUBMITTER</th>
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<tbody>
<tr>
<td>1. Preliminary calculation to demonstrate the percentage of wastewater to be treated and recycled.</td>
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<tr>
<td>2. A technical report describing the concept and details of the recycling and treatment plant, conveyance system, storage facility and distribution system.</td>
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<tr>
<td>3. The technical report shall include schematics showing how the wastewater is recycled, stored and utilised.</td>
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### Required Submission for Completion & Verification Assessment (CVA)

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<tr>
<th>SUBMITTER</th>
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<tbody>
<tr>
<td>1. Final as-installed calculation of the recycled and treated wastewater, storage tank capacity and distribution system.</td>
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<tr>
<td>2. As Built drawings for wastewater recycling and treatment system, and storage tank location (to scale).</td>
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<td>3. Describe any deviation or addition to the DA submission.</td>
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### Project Name

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<th>SUBMITTING PROFESSIONAL</th>
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**NOTE**: ATTACH ALL SUBMITTALS WITH THIS COVER PAGE.
The main aim is to reduce the consumption of potable water used for landscape irrigation. This may be achieved by harvesting rainwater for irrigation use as well as the use of native or adaptive plants to reduce potable water consumption.

To encourage and recognise the design of landscaping systems that minimise or do not require the use of potable water supply from the local water authority.

**Requirements**

- **1 point:** For reducing potable water consumption for landscape irrigation by 50% or more, **OR**
- **2 points:** For not using potable water at all for landscape irrigation.

**Approach & Implementation**

Design a water-efficient landscape by selecting native or adaptive plants that require minimal water. Reduce or eliminate use of potable water for landscape irrigation system.

**Potential Technologies & Strategies**

Perform soil / climate analysis to determine appropriate plant material and design the landscape with native or adaptive plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high efficiency equipment and/or climate based controllers.

**Required Submission for Design Assessment (DA)**

1. A brief description of the system with references to Guidelines used, calculations, and an explanation of how the system meets the requirement for the credit.
2. A brief report by a landscape architect detailing the selection of native adaptive vegetation and the water efficient irrigation system and demonstrating that it will meet all the requirements for the credit.

**Required Submission for Completion & Verification Assessment (CVA)**

1. As built plans showing the detail location of the planted native adaptive vegetation and installed water efficient irrigation system (to scale).
2. Calculation of the reduction of potable water for landscape irrigation.
3. Furnish photographs of the vegetation installed.
4. Describe any deviations or additions to the DA submission.
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
WATER EFFICIENCY (WE)

WE4  WATER EFFICIENT FITTINGS  2 POINTS

INTENT
To encourage reduction in potable water consumption through use of efficient devices.

REQUIREMENTS
1) With reference to utility calculations:
   1 point: For reduction of ≥ 20% or more annual potable water consumption, OR
   2 points: For reduction of ≥ 50% or more annual potable water consumption.
   OR
2) From existing 3-year average water consumption record, reduce annual potable water use by:
   1 point: For reduction of ≥ 20% or more annual potable water consumption, OR
   2 points: For reduction of ≥ 50% or more annual potable water consumption.

Submit with reference to utility calculations or from existing 3-year average water consumption record to demonstrate that the fittings selected will reduce the potable water consumption compared to the building base condition.

APPROACH & IMPLEMENTATION
The use of water efficient water closets, taps, shower heads or other systems which have the potential to reduce potable water consumption in the building.

Specify the use of automatic self-closing faucets, electronic or otherwise, to eliminate wastage through faucets left running unnecessarily.

Specify the use of waterless urinals.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)  SUBMITTER  GBI
1. A brief description of the systems used and how they meet the requirement for the credit requirements.
2. Submit proposed makes of the intended fittings.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)  SUBMITTER  GBI
1. Actual verified water consumption for the building
2. Tabulation of all as-installed fittings and calculations to verify percentage of water saved to meet the requirement for the credit.
3. Submit manufacturer’s details of the installed fittings.
4. Furnish photographs of each type of water efficient fittings as installed.
5. Describe any deviation or addition to the DA submission.

PROJECT NAME

SUBMITTING PROFESSIONAL
NAME  DESIGNATION  COMPANY  SIGNATURE

CLIENT
NAME  DESIGNATION  COMPANY  SIGNATURE

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE

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NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL
WATER EFFICIENCY (WE)

INTENT
To encourage the design of systems that allow monitoring and management of water consumption.

REQUIREMENTS
1 point: For incorporation of sub-meters to monitor and manage major water usage for cooling towers, irrigation, kitchens and tenancy use.
1 point: For linking sub-meters to EMS to facilitate early detection of water leakage.

APPROACH & IMPLEMENTATION
Specify the provisions of sub-meters for major water consuming systems/equipment. Incorporate EMS monitoring system of sub-meters.

If EMS is not mandated, set up an Energy Management team to manually monitor and detect water leakage on a daily basis.

POTENTIAL TECHNOLOGIES & STRATEGIES
To incorporate provisions of analogue or digital flow water sub-meters.

Incorporation of EMS monitoring will enable early detection of water leakage and reduce water wastage.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)
1. Describe proposed provision of sub-meters of all major water consuming system/equipment and interface with EMS.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)
1. Submit tabulated inventory of as-installed sub-meters.
2. As built plans of the building showing the location of sub-meters.
3. Furnish photographs of typical sub-meter installed.
4. Sample of actual EMS report recording consumption and simulated leakage.
5. Describe any deviations or additions to the DA submission.

NOTE ATTACH ALL SUBMITTALS WITH THIS COVER PAGE
NON-RESIDENTIAL EXISTING BUILDING (NREB): HISTORIC BUILDING TOOL

INNOVATION (IN)
INNOVATION (IN)

 INTENT
To provide opportunity for the project to be awarded points for exceptional performance above the requirements set by GBI rating system.

 DESCRIPTION
Reward innovation and initiatives.

 REQUIREMENTS
Encourage project team to score points for exceptional building design and performance:

1 point for each approved innovation and environmental design initiative up to a maximum of 13 points, for innovative ideas such as, but not limited to:

1. Demonstrate significant vernacular environmental features
2. Demonstrate high level of Architectural significance of the era
3. Show significant Engineering advancement of the era
4. Seamless integration of new into old building
5. Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc;
6. Recycling of fire sprinkler system water during regular testing;
7. Light pipes accounting for at least 1% of NLA ;
8. Central vacuum system (serving at least 50% of NLA);
9. QLASSIC compliance
10. Electric sub-meters for major energy uses to facilitate energy efficiency management Carbon Dioxide (CO₂) monitoring and control system
11. Carbon Dioxide(CO₂) monitoring and control system”
12. Herbs Garden
13. IBS compliance
14. On-site Composting
15. External Shading
16. Vertical Greenery
17. LED Façade lighting
18. Educational Green Display
19. Bicycle Facilities
20. Maximum Demand Limiting (MDL) programing

Project team may submit any innovation not listed above to GBI for consideration and approval of credit point.

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APPROACH & IMPLEMENTATION
During Concept Design Stage, commence discussions on all possible innovation ideas to be incorporated into the building early. Late incorporation of innovation ideas may be difficult and costly.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA) SUBMITTER GBI
1. Report on each innovation, how it is derived, and how it would assist in reducing energy consumption and/or improving sustainable design.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA) SUBMITTER GBI
1. Full documentation and photographic evidence of each innovation, and the process from commencement to commissioning, complete with drawings, manuals and maintenance write-up.
2. Describe any deviations or additions to the DA submission.
INTENT
To support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process.

DESCRIPTION
Encourage and promote green technology service providers.

REQUIREMENTS
Support and encourage the design integration required for Green Building Index rated buildings and to streamline the application and certification process, where:

At least one principal participant of the project team shall be a Green Building Index Facilitator who is engaged at the onset of the design process until completion of construction and Green Building Index certification is obtained. Name of the GBI Facilitator shall be inserted in GBI Application & Registration Form.

APPROACH & IMPLEMENTATION
Appoint a Green Building Index Facilitator early to assist in the concept design stage, and ensure that the Facilitator follows through the entire project.

REQUIRED SUBMISSION FOR DESIGN ASSESSMENT (DA)

1. Proof of appointment of the named GBI Facilitator.
2. GBI Facilitator to present DA submission to GBI Certifier.

REQUIRED SUBMISSION FOR COMPLETION & VERIFICATION ASSESSMENT (CVA)

1. GBI Facilitator to present CVA submission to GBI Certifier.
GSB would like to thank all contributors for efforts in preparing the Non-Residential Existing Building (NREB): Historical Building Design Reference Guide Version 1.0. The following are the main contributors to the formation of this document:

**GBI Non-Residential Existing Building (NREB): Historical Building DESIGN REFERENCE GUIDE**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Ar. Chan Seong Aun</td>
<td>GBI / Malaysia GBC Chair</td>
</tr>
<tr>
<td>Mr. Baylon Tham Wai Leong</td>
<td>GBI / Malaysia GBC Co-chair</td>
</tr>
<tr>
<td>Mr. Mitchell Gelber</td>
<td>GBI</td>
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<tr>
<td>Mr. BK Sinha</td>
<td>Malaysia GBC</td>
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<tr>
<td>Mr. Lim Vincent</td>
<td>Malaysia GBC</td>
</tr>
<tr>
<td>Ar. Bee Sui Yeng</td>
<td>Malaysia GBC</td>
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<td>Ar. Ooi Sze Meng</td>
<td>Malaysia GBC</td>
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<td>Ms. Elizabeth Cardosa</td>
<td>Badan Warisan Malaysia</td>
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<td>Ar. Dr. Helena Aman Hashim</td>
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<td>Ms. Virajitha Chimalapati</td>
<td>George Town World Heritage Incorporated</td>
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<td>Mr. Muhammad Hijas Sahari</td>
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<td>Ms. Noorhanis Noordin</td>
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<tr>
<td>Ass Prof. Dr. Siti Norlizaiha Harun</td>
<td>UiTM Perak</td>
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