

## **BPD\_GM02**

### **(For Non-Residential Building As-Built Submission)**

**Attached are the sample forms for viewing only**

All these forms and calculations are to be generated from the Green Mark (GM) e-filing system.

The forms spell out all the elective requirements which the QPs and the other practitioners can choose for their design to meet the environmental sustainability requirement.

QPs are only required to provide salient information pertaining to the items that are relevant to their design and the GM e-filing system will automatically compute the score to be allocated for the items selected.

Documentary evidences need not be submitted together with these forms. However, QPs are advised to maintain such records. BCA may require such evidences to be submitted for auditing purpose.

<b>SUBMISSION OF AS-BUILT GREEN MARK SCORE CALCULATIONS</b> <b>Regulation 9 of the Building Control (Environmental Sustainability) Regulations 2008 (Cap. 29)</b>	
Commissioner of Building Control Building & Construction Authority 5 Maxwell Road #02-00 Tower Block, MND Complex Singapore 069110	<b>INSTRUCTIONS</b> (1) Please refer to the Explanatory Notes attached before completing these forms via Green Mark (GM) e-Filing system. (2) Submit one copy of this form together with Form BPD_GM02_Appendix 1 (for residential building) and/or Form BPD_GM02_Appendix 2 (for non-residential building) before making an application for TOP or CSC (if TOP is not applied for).
<b>Section I (To be completed by Qualified Person)</b>	
1. Project Reference No. : _____ GM e-Filing No.: _____ Description of building works: _____ _____	
2. I hereby declare that the completed building works or parts thereof assessed and the numerical scores assigned to these building works or parts thereof using the scoring methodology specified in the Code for Environmental Sustainability of Buildings are correct. I further declare that the as-built Green Mark score submitted herewith complies with the minimum environmental sustainability standard under the Building Control (Environmental Sustainability) Regulations and the Green Mark score calculations are as stated in Form BPD_GM02_Appendix 1 and/or Form BPD_GM02_Appendix 2. The as-built Green Mark score for the completed building works is _____ for residential buildings and/or _____ for non-residential buildings respectively.	
Name & Address of Professional Firm	Name & Signature of Qualified Person
Date:	Tel No.:
<b>Section II (To be completed by Appropriate Practitioners)</b>	
3. We hereby declare that the completed building works or parts thereof assessed and the numerical scores assigned to these building works or parts thereof using the scoring methodology specified in the Code for Environmental Sustainability of Buildings are correct.	
Name & Address of Professional Firm	Name & Signature of Practitioner for mechanical works
Date:	Tel No.:
Name & Address of Professional Firm	Name & Signature of Practitioner for electrical works
Date:	Tel No.:

<b>CALCULATIONS OF AS-BUILT GREEN MARK SCORE FOR NON-RESIDENTIAL BUILDINGS</b> <b>Regulation 9 of the Building Control (Environmental Sustainability) Regulations 2008 (Cap. 29)</b>														
<b>SECTION I : SUMMARY</b>														
Project Reference No. : _____ GM e-Filing No.: _____														
The Gross Floor Area (GFA) for the building works, where applicable : <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 30%;">Building Works</th> <th style="width: 35%;">New GFA in m<sup>2</sup></th> <th style="width: 35%;">Existing GFA in m<sup>2</sup> (Major Retrofitting)</th> </tr> </thead> <tbody> <tr> <td>Residential</td> <td></td> <td style="text-align: center;">Not Applicable</td> </tr> <tr> <td>Non-Residential</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </tbody> </table>			Building Works	New GFA in m <sup>2</sup>	Existing GFA in m <sup>2</sup> (Major Retrofitting)	Residential		Not Applicable	Non-Residential			Total		
Building Works	New GFA in m <sup>2</sup>	Existing GFA in m <sup>2</sup> (Major Retrofitting)												
Residential		Not Applicable												
Non-Residential														
Total														
Please indicate Non-Residential Floor Area & Percentage (%), where applicable : <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 30%;">Non-Residential Floor Area</th> <th style="width: 35%;">Floor Area in m<sup>2</sup></th> <th style="width: 35%;">% Floor Area</th> </tr> </thead> <tbody> <tr> <td>Air-conditioned spaces</td> <td></td> <td></td> </tr> <tr> <td>Non Air-conditioned spaces excludes car parks</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> </tr> </tbody> </table>			Non-Residential Floor Area	Floor Area in m <sup>2</sup>	% Floor Area	Air-conditioned spaces			Non Air-conditioned spaces excludes car parks			Total		
Non-Residential Floor Area	Floor Area in m <sup>2</sup>	% Floor Area												
Air-conditioned spaces														
Non Air-conditioned spaces excludes car parks														
Total														
<b>Category Items</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>												
<b>(I) Energy Related Requirements</b>														
<b>Part 1 : Energy Efficiency</b>														
NRB 1-1    Building Envelope – ETTV	15													
NRB 1-2    Air-Conditioning System	27													
<b>Sub-Total (A) - For Items NRB 1-1 to 1-2 :</b>	<b>42</b>													
<b>Prorate Sub-Total (A) :</b>														
NRB 1-3    Building Envelope – Design/Thermal Parameters	29													
NRB 1-4    Natural Ventilation (exclude car parks)	13													
<b>Sub-Total (B) - For Items NRB 1-3 to 1-4 :</b>	<b>42</b>													
<b>Prorate Sub-Total (B) :</b>														
NRB 1-5    Artificial Lighting	12													
NRB 1-6    Ventilation in Car parks	5													
NRB 1-7    Ventilation in Common Areas	5													
NRB 1-8    Lifts and Escalators	3													
NRB 1-9    Energy Efficient Practices & Features	12													
<b>Sub-Total (C) - For Items NRB 1-5 to 1-9 :</b>	<b>37</b>													
<b>Sub-Total for Part 1 - Prorate Sub-Total (A) + Prorate Sub-Total (B) + Sub-Total (C) :</b>	<b>79</b>													
<b>Sub-Total for Part 1 - Prorate Sub-Total (A) + Prorate Sub-Total (B) + Sub-Total (C) ; (Max 50 points) :</b>														
NRB 1-10    Renewable Energy ( <i>Bonus Points</i> )	20													
<b>Category Score for Part 1 – {Sub-Total for Part 1 (Max 50 points) + Item NRB 1-10 (Bonus Points)}; (Min 30 points) :</b>														

Project Reference No. : _____ GM e-Filing No.: _____		
<b>Category Items</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>(I) Energy Related Requirements</b>		
<b>Part 1 : Energy Efficiency</b>		
<b>Category Score for Part 1 - {Sub-Total for Part 1 (Max 50 points) + Item NRB 1-10 (Bonus Points)}; (Min 30 points) :</b>		
<b>(II) Other Green Related Requirements</b>		
<b>Part 2 : Water Efficiency</b>		
NRB 2-1 Water Efficient Fittings	8	
NRB 2-2 Water Usage and Leak Detection	2	
NRB 2-3 Irrigation System	2	
NRB 2-4 Water Consumption of Cooling Tower	2	
<b>Category Score for Part 2 - For Items NRB 2-1 to 2-4</b>	<b>14</b>	
<b>Part 3 : Environmental Protection</b>		
NRB 3-1 Sustainable Construction	14	
NRB 3-2 Greenery	6	
NRB 3-3 Environmental Management Practice	8	
NRB 3-4 Public Transport Accessibility	2	
NRB 3-5 Refrigerants	2	
<b>Category Score for Part 3 - For Items NRB 3-1 to 3-5</b>	<b>32</b>	
<b>Part 4 : Indoor Environmental Quality</b>		
NRB 4-1 Thermal Comfort	2	
NRB 4-2 Noise Level	2	
NRB 4-3 Indoor Air Pollutants	2	
NRB 4-4 High Frequency Ballast	2	
<b>Category Score for Part 4 - For Items NRB 4-1 to 4-4 :</b>	<b>8</b>	
<b>Part 5 : Other Green Features</b>		
NRB 5-1 Green Features & Innovations	7	
<b>Category Score for Part 5 - For Item NRB 5-1 :</b>	<b>7</b>	
<b>Sub-Total for Part 2 to Part 5 :</b>	<b>61</b>	
<b>Sub-Total for Part 2 to Part 5 (Max 50 points; Min 20 points) :</b>		
<b>Green Mark Score - {Sub-Total for Part 1 (Max 50 points) + Item NRB 1-10 (Bonus Points) + Sub-Total for Part 2 to Part 5 (Max 50 points)} :</b>		

The as-built Green Mark score for the completed building works is \_\_\_\_\_ for non-residential buildings.

SECTION II : GREEN MARK SCORE CALCULATIONS DETAILS											
Project Reference No. : _____ GM e-Filing No.: _____											
<b>(I) Energy Related Requirements</b>											
<b>Part 1 : Energy Efficiency</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>									
<b>Section (A) Applicable to Air-Conditioned Building Areas (with an aggregate air-conditioned areas &gt; 500 m<sup>2</sup>)</b>											
Air-conditioned spaces and percentage area if applicable : <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Area in m<sup>2</sup></td> <td style="background-color: yellow; width: 100px;"></td> </tr> <tr> <td style="padding: 2px 5px;">Percentage Area</td> <td style="background-color: #90ee90; width: 100px;"></td> </tr> </table>	Area in m <sup>2</sup>		Percentage Area								
Area in m <sup>2</sup>											
Percentage Area											
<b>NRB 1-1 Building Envelope – ETTV</b>	<b>15</b>										
ETTV value = <span style="background-color: yellow; display: inline-block; width: 60px; height: 1.2em; vertical-align: middle;"></span> W/m <sup>2</sup> <i>Green Mark Points : Points scored = 100 – (2 x ETTV);            Maximum Permissible ETTV=50 W/m<sup>2</sup>; Max 15 points</i>											
<b>NRB 1-2 Air-Conditioning System</b>	<b>27</b>										
<i>Note : Where there is a combination of centralized air-con system with unitary air-con system, the computation is based on the air-conditioning system with the larger aggregate capacity - centralized air-con system or unitary air-con system.</i>											
(a) (i) Air-Conditioned Plant. <span style="float: right; background-color: #90ee90; width: 60px; height: 1.2em;"></span>  <table border="1" style="margin: 5px auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 2px 5px;">Description</th> <th style="padding: 2px 5px;">Percentage Improvement</th> <th style="padding: 2px 5px;">Points per % Improvement</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px 5px;">Equipment efficiency for chiller and Pumps</td> <td style="background-color: yellow;"></td> <td style="text-align: center; padding: 2px 5px;">1.45</td> </tr> <tr> <td style="padding: 2px 5px;">Equipment performance for cooling tower</td> <td style="background-color: yellow;"></td> <td style="text-align: center; padding: 2px 5px;">0.05</td> </tr> </tbody> </table> <i>Green Mark points - Max 20 points.</i>	Description	Percentage Improvement	Points per % Improvement	Equipment efficiency for chiller and Pumps		1.45	Equipment performance for cooling tower		0.05		
Description	Percentage Improvement	Points per % Improvement									
Equipment efficiency for chiller and Pumps		1.45									
Equipment performance for cooling tower		0.05									
(a) (ii) Air Distribution System <span style="float: right; background-color: #90ee90; width: 60px; height: 1.2em;"></span> % improvement in efficiency of air distribution System = <span style="background-color: yellow; display: inline-block; width: 60px; height: 1.2em; vertical-align: middle;"></span> %  <i>Green Mark points - 0.5 points for every percentage improvement;            Max 5 points.</i>  <i>For buildings using <u>district cooling system</u>, prorate (a)(ii) =</i> <span style="float: right; background-color: #90ee90; width: 60px; height: 1.2em;"></span> <i>Note : No need to compute plant efficiency in item (a)(i), points obtained will be prorated based on the air distribution system efficiency under item (a)(ii).</i>											
<b>OR</b>											
(b) Unitary Air-Conditioners/Condensing Units <span style="float: right; background-color: #90ee90; width: 60px; height: 1.2em;"></span>  Average % improvement in efficiency of unitary Air-conditioners/condensing Units = <span style="background-color: yellow; display: inline-block; width: 60px; height: 1.2em; vertical-align: middle;"></span> %  <i>Green Mark points - 1.5 points for every percentage (average) improvement; Max 25 points.</i>											

Project Reference No. : _____ GM e-Filing No.: _____						
<b>(I) Energy Related Requirements</b>						
<b>Part 1 : Energy Efficiency</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>				
<b>NRB 1-2 Air-Conditioning System</b> cont'd						
(c) Sensors or similar automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of carbon dioxide below 1000ppm (2 points). <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span>						
<b>Sub-Total (A) – For items NRB 1-1 to 1-2 :</b>	<b>42</b>					
<b>Prorate Sub-Total (A) -by percentage of air-conditioned areas where applicable:</b>						
<b>Section (B) -Applicable to Non Air-Conditioned Building Areas (with an aggregate non air-conditioned areas &gt; 10% of total floor area excluding carparks)</b>						
Non Air-conditioned spaces and percentage area if applicable :						
<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">Area in m<sup>2</sup></td> <td style="background-color: yellow;"></td> </tr> <tr> <td>Percentage Area</td> <td style="background-color: lightgreen;"></td> </tr> </table>	Area in m <sup>2</sup>		Percentage Area			
Area in m <sup>2</sup>						
Percentage Area						
<b>NRB 1-3 Building Envelope – Design / Thermal Parameters</b>	<b>29</b>					
<p>(a) Minimum direct west facing façade through building design orientation. <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span></p> <p>Percentage of west facing facade areas over total façade areas = <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span> %</p> <p><i>Green Mark Points : Points = 10 – [0.2 x (% of west facing external facade areas)]; Max 10 points.</i></p> <p style="text-align: center;"><b>OR</b></p> <p><i>Where there is <u>no west facing façade</u>, the total points for this item will be 24 points; the items NRB 1-3 (b)(i), (b)(ii) and (c) as listed below will be not applicable.</i> <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span></p> <p>(b) (i) Minimum west facing window openings <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span></p> <p>Percentage of west facing window areas over total west facing façade areas = <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span> %</p> <p><i>Green Mark Points : Points = 10 – [0.1 x (% of west facing window areas)].</i></p> <p>(b) (ii) Effective sunshading provision for windows on the west façade with minimum shading of 30%. <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span></p> <p>Percentage of west facing window areas with sunshading devices over total west facing facade areas = <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 50px; height: 15px; vertical-align: middle;"></span> %</p> <p><i>Green Mark Points : Points = 0.1 x (% of west facing window areas with sunshading devices); Max 10 points for items NRB 1-3(b)(i) and NRB 1-3(b)(ii).</i></p>						

Project Reference No. : _____		GM e-Filing No.: _____									
<b>(I) Energy Related Requirements</b>											
<b>Part 1 : Energy Efficiency</b>		<b>Max Points Allocated</b>	<b>Points Scored</b>								
<b>NRB 1-3 Building Envelope – Design / Thermal Parameters</b> cont'd											
<p>(c) Better Thermal Transmittance (U-value) of external west facing walls. <span style="float: right;">[ ]</span></p> <p>Percentage of external west facing walls areas with U-value of 2 W/m<sup>2</sup>K or less over total west facing façade areas = <span style="float: right;">[ ]</span> %</p> <p><i>Green Mark Points : Points = 0.04 x (% of external west facing walls areas that meet the criteria); Max 4 points.</i></p> <p>(d) Better Thermal Transmittance (U-value) of roof <span style="float: right;">[ ]</span></p> <p>Average U-value reduction = <span style="float: right;">[ ]</span> W/m<sup>2</sup>K</p> <p><i>Green Mark Points : 2 points for every 0.1 W/m<sup>2</sup>K reduction; Max 5 points.</i></p>											
<b>NRB 1-4 Natural Ventilation (exclude carparks)</b>		<b>13</b>									
<p>(a) Proper design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation. <span style="float: right;">[ ]</span></p> <p>* <u>Building Layout Design</u></p> <table border="1" style="width: 100%;"> <tr> <th rowspan="2">Total no. of units/rooms in the development</th> <th colspan="2">Units/Rooms with windows facing north and south directions</th> </tr> <tr> <th>Total no.</th> <th>Percentage</th> </tr> <tr> <td style="background-color: yellow;">[ ]</td> <td style="background-color: yellow;">[ ]</td> <td style="background-color: yellow;">[ ]</td> </tr> </table> <p><i>Green Mark Points : 0.8 points for every 10%; Max 8 points.</i></p> <p>(b) Use of ventilation simulation software or wind tunnel testing and recommendations for design (5 points). <span style="float: right;">[ ]</span></p>		Total no. of units/rooms in the development	Units/Rooms with windows facing north and south directions		Total no.	Percentage	[ ]	[ ]	[ ]		
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	Total no.	Percentage									
[ ]	[ ]	[ ]									
<b>Sub-Total (B) – For items NRB 1-3 to 1-4 :</b>		<b>42</b>									
<b>Exception : For existing building, item NRB 1-3(a) may be excluded in computation ; Prorate Sub-Total (B) accordingly.</b>											
<b>Prorate Sub-Total (B) - by percentage of non air-conditioned areas where applicable:</b>											
<b>Section (C) General</b>											
<b>NRB 1-5 Artificial Lighting</b>		<b>12</b>									
<p>Use of better efficient lighting to minimise energy consumption from lighting usage while maintaining proper lighting level. <span style="float: right;">[ ]</span></p> <table border="1" style="width: 100%;"> <tr> <td colspan="3">Percentage improvement in lighting power budget (as compared with SS530 requirements) (0.5 points for every percentage improvement)</td> </tr> <tr> <td>Include tenants' lighting provision (Max 12 points)</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">OR</td> <td>Exclude tenants' lighting provision (Max 5 points)</td> </tr> <tr> <td style="background-color: yellow;">[ ]</td> <td style="background-color: yellow;">[ ]</td> </tr> </table>		Percentage improvement in lighting power budget (as compared with SS530 requirements) (0.5 points for every percentage improvement)			Include tenants' lighting provision (Max 12 points)	OR	Exclude tenants' lighting provision (Max 5 points)	[ ]	[ ]		
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Project Reference No. : _____ GM e-Filing No.: _____																				
<b>(I) Energy Related Requirements</b>																				
<b>Part 1 : Energy Efficiency</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>																		
<b>NRB 1-6 Ventilation in Carparks</b>	<b>5</b>																			
<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="width: 40%;">Mode of Ventilation</th> <th style="width: 20%;">Max Points (A)</th> <th style="width: 20%;">Area ( m<sup>2</sup> ) (B)</th> </tr> <tr> <td>Natural ventilation</td> <td style="text-align: center;">5</td> <td></td> </tr> <tr> <td>Fume extract with CO sensors</td> <td style="text-align: center;">4</td> <td></td> </tr> <tr> <td>Mechanical ventilation with CO sensors</td> <td style="text-align: center;">3</td> <td></td> </tr> </table> <p><i>Green Mark Points : Max 5 points.</i></p>	Mode of Ventilation	Max Points (A)	Area ( m <sup>2</sup> ) (B)	Natural ventilation	5		Fume extract with CO sensors	4		Mechanical ventilation with CO sensors	3									
Mode of Ventilation	Max Points (A)	Area ( m <sup>2</sup> ) (B)																		
Natural ventilation	5																			
Fume extract with CO sensors	4																			
Mechanical ventilation with CO sensors	3																			
<b>NRB 1-7 Ventilation in Common Areas</b>	<b>5</b>																			
<p>Use of energy efficient design and control ventilation systems in common areas with at least 90% of each applicable area.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <th style="width: 40%;">Common Areas</th> <th style="width: 20%;">Natural Ventilation (1.5 points)</th> <th style="width: 20%;">Mechanical Ventilation (0.5 points)</th> </tr> <tr> <td>(a) Toilets</td> <td></td> <td></td> </tr> <tr> <td>(b) Staircases</td> <td></td> <td></td> </tr> <tr> <td>(c) Corridors</td> <td></td> <td></td> </tr> <tr> <td>(d) Lift lobbies</td> <td></td> <td></td> </tr> <tr> <td>(e) Atriums</td> <td></td> <td></td> </tr> </table> <p><i>Green Mark Points : Max 5 points.</i></p>	Common Areas	Natural Ventilation (1.5 points)	Mechanical Ventilation (0.5 points)	(a) Toilets			(b) Staircases			(c) Corridors			(d) Lift lobbies			(e) Atriums				
Common Areas	Natural Ventilation (1.5 points)	Mechanical Ventilation (0.5 points)																		
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(e) Atriums																				
<b>NRB 1-8 Lifts and Escalators</b>	<b>3</b>																			
<p>(a) Lifts with the following energy efficient features :</p> <p style="margin-left: 20px;">(i) AC variable voltage and variable frequency (VVVF) motor drive or equivalent (1 point). <span style="float: right; border: 1px solid black; display: inline-block; width: 60px; height: 20px;"></span></p> <p style="margin-left: 20px;">(ii) Sleep mode features or equivalent (1 point). <span style="float: right; border: 1px solid black; display: inline-block; width: 60px; height: 20px;"></span></p> <p style="margin-left: 20px;">(b) Escalators with energy efficient features such as motion sensors (1 point). <span style="float: right; border: 1px solid black; display: inline-block; width: 60px; height: 20px;"></span></p>																				



Project Reference No. : _____ GM e-Filing No.: _____		
<b>(I) Energy Related Requirements</b>		
<b>Part 1 – Energy Efficiency</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>NRB 1-9 Energy Efficient Practices &amp; Features</b>	<b>12</b>	
<p>(a) Computation of energy consumption based on design load in the form of Energy Efficiency Index (EEI) (1 point)</p> <p>EEI = <input type="text"/> kWh/m<sup>2</sup>/year <input type="text"/></p> <p>(b) The following energy efficient features are deemed acceptable (indicate where applicable) <input type="text"/></p> <p>(i) Thermal storage system <input type="text"/></p> <p>(ii) Heat recovery devices <input type="text"/></p> <p>(iii) Light shelves <input type="text"/></p> <p>(iv) Motion sensors for staircases half landing <input type="text"/></p> <p>(v) Motion sensors for toilets <input type="text"/></p> <p>(vi) Sun pipes for natural lighting <input type="text"/></p> <p>(vii) Ductless fan for basement ventilation <input type="text"/></p> <p>(viii) Auto-condenser tube cleaning system <input type="text"/></p> <p>(ix) Photo sensors to maximise the use of daylighting <input type="text"/></p> <p>Items that are not listed above but with clearance from BCA</p> <p>(i) _____</p> <p>(ii) _____</p> <p>(iii) _____</p> <p>Based on the energy efficient features selected, the percentage of energy savings over the total building energy consumption = <input type="text"/> %</p> <p><i>Green Mark Points : 3 points to 1% energy saving ; Max 11 points.</i></p>		
<b>Sub-Total (C) – For items NRB 1-5 to 1-9 :</b>	<b>37</b>	
<b>Prorate Sub-Total (A) - by % of air-conditioned areas where applicable :</b>		
<b>Prorate Sub-Total (B) - by % of non air-conditioned areas where applicable:</b>		
<b>Sub-Total for Part 1 - Prorate Sub-Total (A) + Prorate Sub-Total (B) + Sub-Total (C) :</b>	<b>79</b>	
<b>Sub-Total for Part 1 - Prorate Sub-Total (A) + Prorate Sub-Total (B) + Sub-Total (C) ; (Max 50 points) :</b>		

Project Reference No. : _____ GM e-Filing No.: _____																	
<b>(I) Energy Related Requirements</b>																	
<b>Part 1 – Energy Efficiency</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>															
<b>NRB 1-10 Renewable Energy (Bonus Points)</b>	<b>20</b>																
<p>Application of renewable energy sources in buildings. <span style="float: right; border: 1px solid black; width: 60px; height: 20px; background-color: #90EE90;"></span></p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr> <td colspan="3" style="padding: 5px;">Percentage of replacement of electricity by renewable energy (based on total electricity consumption)</td> </tr> <tr> <td style="padding: 5px;">Include tenants' usage (5 points for every 1% replacement)</td> <td style="padding: 5px; width: 30px;">OR</td> <td style="padding: 5px;">Exclude tenants' usage (3 points for every 1% replacement)</td> </tr> <tr> <td style="background-color: yellow; height: 20px;"></td> <td></td> <td style="background-color: yellow; height: 20px;"></td> </tr> </table> <p style="margin-top: 10px;"><i>Green Mark Points : Max bonus points = 20 points.</i></p>	Percentage of replacement of electricity by renewable energy (based on total electricity consumption)			Include tenants' usage (5 points for every 1% replacement)	OR	Exclude tenants' usage (3 points for every 1% replacement)											
Percentage of replacement of electricity by renewable energy (based on total electricity consumption)																	
Include tenants' usage (5 points for every 1% replacement)	OR	Exclude tenants' usage (3 points for every 1% replacement)															
<b>Category Score for Part 1 - {Sub-Total for Part 1 (Max 50 points) + Item NRB 1-10 (Bonus Points)}; (Min 30 points) :</b>																	
<b>(II) Other Green Requirements</b>																	
<b>Part 2 : Water Efficiency</b>																	
<b>NRB 2-1 Water Efficient Fittings</b>	<b>8</b>																
<p>Use of water fittings that are certified under the Water Efficiency Labelling Scheme (WELS).</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 5px;">WELS Rating</td> <td style="padding: 5px;">Excellent</td> <td style="padding: 5px;">Very Good</td> <td style="padding: 5px;">Good</td> <td style="padding: 5px;">No Approved Rating</td> </tr> <tr> <td style="padding: 5px;">No. of Fittings (A)</td> <td style="background-color: yellow;"></td> <td style="background-color: yellow;"></td> <td style="background-color: yellow;"></td> <td style="background-color: yellow;"></td> </tr> <tr> <td style="padding: 5px;">Weightage (B)</td> <td style="padding: 5px;">8</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">0</td> </tr> </table> <p style="margin-top: 10px;"><i>Green Mark Points : Max 8 points.</i></p>	WELS Rating	Excellent	Very Good	Good	No Approved Rating	No. of Fittings (A)					Weightage (B)	8	6	4	0		
WELS Rating	Excellent	Very Good	Good	No Approved Rating													
No. of Fittings (A)																	
Weightage (B)	8	6	4	0													
<b>NRB 2-2 Water Usage and Leak Detection</b>	<b>2</b>																
<p>(a) Provision of sub-meters for major water uses which includes irrigation, cooling tower and tenants' usage (1 point). <span style="float: right; border: 1px solid black; width: 60px; height: 20px; background-color: yellow;"></span></p> <p>(b) Linking all sub-meters to the Building Management System (BMS) for leak detection (1 point). <span style="float: right; border: 1px solid black; width: 60px; height: 20px; background-color: yellow;"></span></p>																	
<b>NRB 2-3 Irrigation System</b>	<b>2</b>																
<p>(a) Use of non potable water including rainwater for landscape irrigation (1 point). <span style="float: right; border: 1px solid black; width: 60px; height: 20px; background-color: yellow;"></span></p> <p>(b) Use of water efficient irrigation system (served at least 50% of the landscape areas) (1 point). <span style="float: right; border: 1px solid black; width: 60px; height: 20px; background-color: yellow;"></span></p>																	

Project Reference No. : _____		GM e-Filing No.: _____																
<b>(II) Other Green Requirements</b>																		
<b>Part 2 : Water Efficiency</b>		<b>Max Points Allocated</b>	<b>Points Scored</b>															
<b>NRB 2-4 Water Consumption of Cooling Tower</b>		<b>2</b>																
(a) Use of cooling tower water treatment system which can achieve 6 or more better cycles of concentration at acceptable water quality (1 point). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span>																		
(b) Use of NEWater or on-site and recycled water from approved sources (1 point). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span>																		
<b>Category Score for Part 2 - For Items NRB 2-1 to 2-4 :</b>		<b>14</b>																
<b>Part 3 : Environmental Protection</b>																		
<b>NRB 3-1 Sustainable Construction</b>		<b>14</b>																
(a) More efficient concrete usage for building components. % reduction in the prescribed Concrete Usage Index (CUI) limit for the respective building categories = <input style="width: 50px; height: 20px;" type="text"/> % <i>Green Mark Points : 0.1 point for every percentage in reduction;          Max 4 points.</i>		<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>															
(b) At least 50% of the existing structural elements or building envelopes (by areas) are conserved during redevelopment. (2 points) <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span>																		
(c) Use of sustainable materials and products in building construction such as : (i) Environmental friendly products that are certified under The Singapore Green Labelling Scheme (SGLS). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span> <i>Green Mark Points : 1 point for high impact, 0.5 point for low impact, capped at 4 points.</i>																		
(ii) Products with at least 30% recycled content by weight or volume (applicable to only non-structural elements). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span> <i>Green Mark Points : 1 point for high impact, 0.5 point for low impact, capped at 4 points.</i>																		
<b>NRB 3-2 Greenery</b>		<b>6</b>																
(a) Greenery Provision <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">           GnP value = <input style="width: 80px; height: 20px;" type="text"/> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <th colspan="5" style="text-align: left; padding: 2px;">Green Mark Points (Max 4 points) :</th> </tr> <tr> <td style="width: 20%; padding: 2px;">GnP</td> <td style="width: 20%; padding: 2px;">0.5 to &lt;1.0</td> <td style="width: 20%; padding: 2px;">1.0 to &lt;1.5</td> <td style="width: 20%; padding: 2px;">1.5 to &lt;3.0</td> <td style="width: 20%; padding: 2px;">≥3.0</td> </tr> <tr> <td style="padding: 2px;">Points Allocated</td> <td style="text-align: center; padding: 2px;">1</td> <td style="text-align: center; padding: 2px;">2</td> <td style="text-align: center; padding: 2px;">3</td> <td style="text-align: center; padding: 2px;">4</td> </tr> </table>		Green Mark Points (Max 4 points) :					GnP	0.5 to <1.0	1.0 to <1.5	1.5 to <3.0	≥3.0	Points Allocated	1	2	3	4	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>
Green Mark Points (Max 4 points) :																		
GnP	0.5 to <1.0	1.0 to <1.5	1.5 to <3.0	≥3.0														
Points Allocated	1	2	3	4														
(b) Restoration of trees on site, conserving or relocating of existing trees on site (1 point). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span>																		
(c) Use of compost recycled from horticulture waste (1 point). <span style="float: right;"><input style="width: 50px; height: 20px;" type="text"/></span>																		

Project Reference No. : _____ GM e-Filing No.: _____		
<b>(II) Other Green Requirements</b>		
<b>Part 3 : Environmental Protection</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>NRB 3-3 Environmental Management Practice</b>	<b>8</b>	
<div style="display: flex; justify-content: space-between;"> <div> <p>(a) Implement effective environmental management programmes (1 point).</p> <p>(b) Building quality assessed under Construction Quality Assessment System (CONQUAS) (1 point).</p> <p>(c) Firms ISO 14000 certified (0.25 point for each firm)</p> <div style="margin-left: 20px;"> <p>(i) Developer</p> <p>(ii) Main builder</p> <p>(iii) M&amp;E consultant</p> <p>(iv) Architect</p> </div> <p>(d) Project team comprises :</p> <div style="margin-left: 20px;"> <p>(i) One Certified Green Mark Manager (GMM) (1 point)</p> <p>(ii) One Certified Green Mark Professional (GMP) (2 points)</p> </div> <p>(e) Provision of building users' guide (1 point).</p> <p>(f) Provision of facilities or recycling bins for collection and storage of different recyclable waste such as paper, glass, plastic, etc. (1 point).</p> </div> <div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: lightgreen; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: lightgreen; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> </div> </div>		
<b>NRB 3-4 Public Transport Accessibility</b>	<b>2</b>	
<div style="display: flex; justify-content: space-between;"> <div> <p>(a) Good access to nearest MRT/LRT stations or bus stops. (1 point)</p> <p>(b) Adequate bicycles parking lots (1 point).</p> </div> <div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> </div> </div>		
<b>NRB 3-5 Refrigerants</b>	<b>2</b>	
<div style="display: flex; justify-content: space-between;"> <div> <p>(a) Refrigerants with ozone depletion potential (ODP) of zero or with global warming potential (GWP) of less than 100 (1 point).</p> <p>(b) Use of refrigerant leak detection system at critical areas of plant rooms containing chillers and other equipments with refrigerants (1 point).</p> </div> <div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> <div style="background-color: yellow; width: 40px; height: 20px; margin-bottom: 5px;"></div> </div> </div>		
<b>Category Score for Part 3 - For Items NRB 3-1 to 3-5 :</b>	<b>32</b>	

Project Reference No. : _____ GM e-Filing No.: _____		
<b>(II) Other Green Requirements</b>		
<b>Part 4 : Indoor Environmental Quality</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>NRB 4-1 Thermal Comfort</b>	<b>2</b>	
Air-conditioning system is designed to ensure consistent indoor conditions for thermal comfort.  Indoor temperature between 22.5 to 25.5 ° C Relative Humidity < 70%.		
<b>NRB 4-2 Noise Level</b>	<b>2</b>	
Occupied spaces in buildings are designed with good ambient sound levels as recommended in SS CP13.		
<b>NRB 4-3 Indoor Air Pollutants</b>	<b>2</b>	
(a) Use of low volatile organic compounds (VOC) paints certified under The Singapore Green Labelling Scheme (1 point). <input type="text"/>		
(b) Use of adhesive certified under The Singapore Green Labelling Scheme for composite wood products (1 point). <input type="text"/>		
<b>NRB 4-4 High Frequency Ballasts</b>	<b>2</b>	
Use of high frequency ballasts in the fluorescent luminaries in at least 90% of all applicable areas.		
<b>Category Score for Part 4 - For Items NRB 4-1 to 4-4 :</b>	<b>8</b>	
<b>Part 5 : Other Green Features</b>		
<b>NRB 5-1 Green Features and Innovations</b>	<b>7</b>	
(a) The following green features are deemed acceptable : <b><u>Water Efficiency</u></b> (i) Use of self cleaning façade system <input type="text"/> - for more than 75% of the external walls (2 points) - for more than 50% of the external walls (1 point) - for at least 25% of the external walls (0.5 point) (ii) Use of grey water recycling system <input type="text"/> - for all blocks (2 points) - for at least 1 block (1 point) (iii) Recycling AHU condensate <input type="text"/> - more than 75% of AHU condensate (1 point) - for at least 50% of AHU condensate (0.5 point) (iv) Use of membrane filtration system to recycling water during construction (0.5 point) <input type="text"/> (v) Use of non-chemical water treatment for cooling tower (0.5 point) <input type="text"/>		

Project Reference No. : _____		GM e-Filing No.: _____	
<b>(II) Other Green Requirements</b>			
<b>Part 5 : Other Green Features</b>		<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>NRB 5-1 Green Features and Innovations cont'd</b>			
<p><b><u>Environmental Protection</u></b></p> <p>(i) Provision of green roof and roof top garden <input type="text"/>          - for more than 50% of the roof areas (1 point)          - for at least 25% of the roof areas (0.5 point)</p> <p>(ii) Provision of vertical greening <input type="text"/>          - for more than 50% of the external wall areas (1 point)          - for at least 25% of the external wall areas (0.5 point)</p> <p>(iii) Provision of double refuse chutes to separate recyclable from non-recyclable waste (1 point) <input type="text"/></p> <p>(iv) Use of non-chemical termite treatment system such as termite baiting system, anti-termite mesh, etc. (0.5 point). <input type="text"/></p> <p>(v) Use of at least 5 nos. of compost bins to recycle organic waste (0.5 point). <input type="text"/></p> <p>(vi) Use of non-chemical water treatment for swimming pools (0.5 point). <input type="text"/></p> <p>(vii) Use of approved recycled products to replace at least 10% of the fine and/or coarse aggregate used for concrete production of structural application in at least 50% of all structural elements of the superstructures - 0.5 point for each approved recycled product used (Up to 1 point). <input type="text"/></p> <p>- replacement of fine and coarse aggregate <input type="text"/></p> <p>- replacement of fine aggregate (0.5 point) <input type="text"/></p> <p>- replacement of coarse aggregate (0.5 point) <input type="text"/></p> <p><b><u>Indoor Air Quality</u></b></p> <p>(i) Use of Titanium Dioxide solutions to remove odour of the toilets <input type="text"/>          - for more than 50% of the toilets (1 point)          - for at least 25% of the toilets (0.5 point)</p> <p>(ii) Use of pneumatic waste collection system.(1 point) <input type="text"/></p> <p>(iii) Use of UVC emitters in all AHUs to improve indoor air quality (0.5 point). <input type="text"/></p>			

Project Reference No. : _____ GM e-Filing No.: _____		
<b>(II) Other Green Requirements</b>		
<b>Part 5 : Other Green Features</b>	<b>Max Points Allocated</b>	<b>Points Scored</b>
<b>NRB 5-1 Green Features and Innovations</b> cont'd		
<u><b>Others</b></u> (i) Provision of landscape drainage and infiltration trenches <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> (run-off & ground water) - for at least 25% of the landscape areas ( <i>1 point</i> ) - for less than 25% of the landscape areas ( <i>0.5 point</i> ) (ii) Provision of system to recycle runoff from vertical <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> green wall and sky garden - for at least 25% of the green areas ( <i>1 point</i> ) - for less than 25% of the green areas ( <i>0.5 point</i> ) (iii) Use of siphonic rainwater discharge system at roof <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> ( <i>0.5 point</i> ). (iv) Provision of eco pond ( <i>0.5 point</i> ) <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> (v) Provision of carpark guidance system ( <i>0.5 point</i> ) <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> (b) Items that are not listed above but with clearance from BCA : (i) _____ <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> (ii) _____ <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/> (iii) _____ <input style="width: 50px; height: 15px; background-color: yellow;" type="text"/>		
<b>Category Score for Part 5 - For Item NRB 5-1</b>	<b>7</b>	
<b>Sub-Total for Part 2 to Part 5 :</b>	<b>61</b>	
<b>Sub-Total for Part 2 to Part 5 (Max 50 points; Min 20 points) :</b>		
<b>Green Mark Score - {Sub-Total for Part 1 (Max 50 points) + Item NRB 1-10 (Bonus Points) + Sub-Total for Part 2 to Part 5 (Max 50 points)} :</b>		

## Explanatory Notes :

### Forms BPD\_GM02, BPD\_GM02\_Appendix 1 and BPD\_GM02\_Appendix 2

- 1) On completion of building works that are subject to the Building Control (Environmental Sustainability) Regulation 2008, the Form BPD\_GM02 must be completed, accompanied with 1 set of Form BPD\_GM02\_Appendix 1 and/or 1 set of Form BPD\_GM02\_Appendix 2 where applicable. These forms are to be generated using the **Green Mark (GM) e-Filing System** and submitted before making an application for temporary work permit (TOP) or certificate of statutory completion (CSC) if TOP is not applied for.
- 2) For building works that involve mixed-use building which comprises both residential and non-residential buildings, the as-built Green Mark score calculation as in Form BPD\_GM02\_Appendix 1 and Appendix 2 will have to be submitted together with the Form BPD\_GM02 unless the following condition apply :
  - Where any part of the building works that related to a non-residential building or residential building involve a gross floor area (GFA) of less than 2000m<sup>2</sup> and that of the other part of these building works, only the Green Mark score calculation of the larger part of these building works (Form BPD\_GM02\_Appendix 1 OR Appendix 2) are required to be submitted together with the Form BPD\_GM02.
  - For example, if the gross floor area (GFA) of the non-residential buildings is less than 2000m<sup>2</sup> and that of the residential buildings, only the Green Mark score calculation for the residential buildings that is Form BPD\_GM02\_ Appendix 1 will need to be submitted together with Form BPD\_GM02. An illustration is shown in Table 2-1 below.

**Table 2-1 – Applicable Criteria for Mixed-Use Buildings with New GFA  $\geq 2000\text{m}^2$**

Project Type	Total New GFA Residential (m <sup>2</sup> )	Total New GFA Non-Residential (m <sup>2</sup> )	Form BPD_GM02_ Appendix 1	Form BPD_GM02_ Appendix 2
Mixed-use building	$\geq 2000$	$\geq 2000$	1 set	1 set
	$\geq 2000$	$< 2000$	1 set	Not applicable
	$< 2000$	$\geq 2000$	Not applicable	1 set
	$< 2000$	$< \text{GFA for Residential}$	1 set	Not applicable
	$< \text{GFA for Non-Residential}$	$< 2000$	Not applicable	1 set