GREEN STAR SA Botswana

LOCAL CONTEXT REPORT

Applying Green Star SA in Botswana

Revision 1 – 27 October 2017


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Report Acknowledgement		
Revision 1		
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EXECUTIVE SUMMARY

Overview of the Botswana Local Context Report

This report applies to the Green Star SA – Office (V1.1) tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1, and considers the applicability of the tool in Botswana. Included in the report is a background analysis of Botswana, as well as a credit by credit analysis. This considers the applicability of each credit to the local context.

The Green Building Council South Africa (GBCSA) is currently licensed by the Green Building Council of Australia (GBCA) to allow certification using the Green Star SA rating tools (Office v1.1, Retail Centre v1, Multi Unit Residential v1 & Public & Education Building v1) only in South Africa, Ghana, Botswana, Uganda, Nigeria, Kenya and Rwanda. Through this local context assessment, the GBCSA will allow for certification in Botswana using all the Green Star SA rating tools (Office v1.1) tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1 (with some minor adaptations recommended in this report).

The GBCSA would manage and allow the certification through its existing established processes, but call the certification Green Star SA - Botswana. The GBCSA will then use the opportunity to allow capacity to grow in Botswana through the prospective Botswana GBC, by allowing selected Botswana professionals to be trained as Green Star SA - Botswana assessors who would join the GBCSA assessor teams on Botswanan projects. In addition, the GBCSA would deliver the Green Star SA Accredited Professional – New Buildings course in Botswana, in collaboration with the Botswana Green Building Council, which would allow professionals in Botswana to take the Green Star SA Accredited Professional online examination. The details would be agreed upon in a Green Star license agreement between the GBCSA and the Botswana GBC.

Where projects wish to apply other standards than those in the Green Star SA tool, a CIR must be submitted to the GBCSA.

RECOMMENDATIONS

A summary of recommended credits requiring Credit Interpretation Requests (CIR's), Technical Clarifications (TC's) or adaptations can be found below (all other credits are proposed to remain unchanged, but where projects do want to propose changes these must be applied for through the TC/ CIR process on the GBCSA website):

	CREDIT	REQUIREMENT
1	MAN-14 Life Cycle Costing - PEB	Man-14 credit is omitted. Credit should be allowed to be targeted as an innovation point.
2	IEQ-02 Air Change Effectiveness	IEQ-2 credit is omitted.
3	IEQ-06 High Frequency Ballasts	IEQ-6 credit is omitted.
4	ENE-00 Conditional Requirement	Conditional Requirement, therefore all projects must submit a CIR and receive a final ruling before Round 1 can be submitted to the GBCSA.□Office v1.1 rating tool be applied to all other credits, calculations and protocols except the Energy modelling protocol for the ENE-0 and ENE-1: Greenhouse Gas Emissions credit, where the Office v1 Energy modelling protocol will be applicable to Botswanan projects. Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African equivalent Climatic zone OR Provide applicable data to the GBCSA for localised Climatic Zone to update the Calculator.
5	ENE-01: Greenhouse Gas Emissions	Office v1.1 rating tool be applied to all other credits, calculations and protocols except the Energy modelling protocol for the ENE-0 and ENE-1: Greenhouse Gas Emissions credit, where the Office v1 Energy modelling protocol will be applicable to Botswanan projects. Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African equivalent Climatic zone OR Provide applicable data to the GBCSA for localised Climatic Zone to update the Calculator.
6	ENE-7: Hot Water Energy Use - MULTI UNIT RES	For ENE-7, the Green Star SA Multi Unit Residential v1 Hot Water Calculator would need to be adapted to reflect the relevant fuel factors in Botswana. This would be project-specific and a mandatory CIR would need to be submitted prior to Round 1 to confirm applicability.
7	TRA-01 Provision of Car Parking	The "alternative requirements" criteria of the technical manual may be used where there no car parking guidelines available to the project team. Tra-01 should be kept in its current form and project should be allowed to use the South African standards reference the DOT parking guidelines or 4 bays per 100m2 for the ''alternative requirements''.
8	WAT-01: Occupant Amenity Water	Wat-01 should be kept in its current form. Due to the shortage of water, a **new conditional requirement** has been incorporated into this category**. Project teams must achieve**

		at least 1 point in the potable water calculator in Wat-1 to be eligible for a Green Star SA rating. Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African area equivalent for Rain fall OR Provide applicable data to the GBCSA for localised rainfall data to update the Calculator Action only required by projects targeting Rain water harvesting or Storm Water harvesting.
9	WAT-03: Landscape Irrigation	It is recommended that the first available point for 50% reduction be removed and 2 points be awarded for a 90% reduction of water for irrigation. The additional point should remain as in the SA Office V1.1.
10	MAT-07: PVC Minimisation	Mat-07 credit is omitted.
11	MAT-11: Local Sourcing	It is recommended to adapt the credit so that: • One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC and SADC regions as defined by the EAC and SADC respectively. • An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Botswanan borders.
12	ECO-00: Conditional Requirement	ECO-00 should be kept in its current form. A mandatory CIR will be required to rule on the local equivalent to the "suitably qualified registered ecologist"
13	ECO-04: Change of Ecological Value	ECO-04 should be kept in its current form but adaptions to the bio-regions in the calculator are required to correctly represent the Botswanan environment. A mandatory CIR is required. Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African area equivalent for bio-regions OR Provide applicable data to the GBCSA for the local-bioregion to update the Calculator.

Table 1: Credits requiring Credit Interpretation Requests (CIR's), Technical Clarifications (TC's) or adaptations

The weighting system should remain the same as Green Star SA – Tools with further adaption and discussion in the future with the Botswana Green Building Council.

ACRONYMS

ACRONYM	TERM
BS	British Standard
BREEAM	Building Research Establishment Environmental Assessment Method
CIBSE	Chartered Institute of Building Services Engineers
CIR	Credit Interpretation Request
ECO	Land Use and Ecology category
EMI	Emissions category
EMP	Environmental management Plan
ENE	Energy category
EPA	Environmental Protection Agency
ETC	Environmental Tobacco Smoke
FSC	Forest Stewardship Council
GBCA	Green Building Council of Australia
GBCM	Green Building Council of Botswana
GBCSA	Green Building Council of South Africa
GS	Green Star
GSAP	Green Star Accredited Professional
GWP	Global Warming Potential
IEQ	Indoor Environmental Quality category
INN	Innovation category
LEED	Leadership Energy and Environmental Design
MAN	Management
MAT	Material category
NGO	Non-Government Organisation
ODP	Ozone Depleting Potential
OH+S	Occupational Health and Safety
PVC	Polychlorinated Vinyl Chloride
SANS	South African National Standards
TRA	Transport category
VOC	Volatile Organic Compounds
WAT	Water category
WMP	Waste Management Plan

INTRODUCTION

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2 INTRODUCTION

2.1 Overview of the Creation of a Botswana Green Building Council

The Botswana Green Building Council was launched at the end of 2016 with the main objective of promoting sustainable buildings.

2.2 Overview of the Development of the Green Star SA- Botswana Environmental Rating Tool

As a member of the World Green Building Council and its Africa Network of Green Building Councils (ANGBC), the Green Building Council South Africa (GBCSA) allows the rating of Botswanan buildings under the Green Star SA rating system.

The Green Star SA rating system is a natural touch point for green building movements and councils in other parts of Africa. The Green Building Council South Africa works in collaboration with emerging green building councils throughout Africa and allows the adaptation of the Green Star SA tools for certification in the respective countries. To date, Local Context Reports have been developed for Nigeria, Kenya, Uganda, Ghana, Rwanda, Namibia, Mauritius and Tanzania

It is important that the environmental rating tool best reflects the local context of the country therefore, as intellectual property owners of the Green Star brand, it is a prerequisite that consent from the Green Building Council South Africa (GBCSA) must be obtained for the use of Green Star SA in Botswana through contextualisation.

2.3 Objective of the Botswana Local Context Report – New Buildings

This report applies to the Green Star SA – Office v1.1 tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1, and considers the applicability of the tool in Botswana. Included in the report is a background analysis of Botswana, as well as a credit by credit analysis. This considers the applicability of each credit to the local context.

2.4 Methodology

The context report therefore addresses climatic conditions and ecology, water and energy patterns, building regulations and any other Botswana -specific circumstances which may conflict with certain Green Star SA requirements. The context report also analyses the Green Star SA Design and As Built rating tools credit-by-credit, identifying any ramifications that may result from the application of the Green Star SA rating tools to the Botswanan context.

BACKGROUND

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3 BACKGROUND

3.1 Overview of Botswana

Botswana, a landlocked country in Southern Africa, has a landscape defined by the Kalahari Desert and the Okavango Delta, which becomes a lush animal habitat during the seasonal floods.

The massive Central Kalahari Game Reserve, with its fossilized river valleys and undulating grasslands, is home to numerous animals.

The capital of Botswana is the city of Gaborone. It has a lands area of 581,730 km^2 and a population of 2,038,228 (2011 census) making it one of the most sparsely populated countries in the world.

Most building materials and products are imported through South Africa.

3.2 Local Environment

3.2.1 Topography

The country is predominantly flat, tending toward gently rolling tableland. Botswana is dominated by the Kalahari Desert, which covers up to 70% of its land surface. The Okavango Delta, one of the world's largest inland deltas, is in the northwest. The Makgadikgadi Pan, a large salt pan, lies in the north.
The Limpopo River Basin, the major landform of all southern Africa, lies partly in Botswana, with the basins of its tributaries, the Notwane, Bonwapitse, Mahalapswe, Lotsane, Motloutse and the Shashe, located in the eastern part of the country. The Notwane provides water to the capital through the Gaborone Dam. The Chobe River lies to the north, providing a boundary between Botswana and Botswana's Zambezi Region (Wikipedia, 2017).

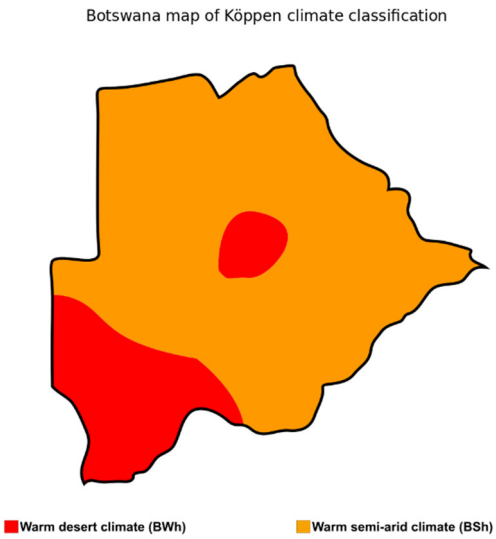
3.2.2 Climate

Botswana's climate is semi-arid. Though it is hot and dry for much of the year, there is a rainy season, which runs through the summer months. Rainfall tends to be erratic, unpredictable and highly regional. Often a heavy downpour may occur in one area while 10 or 15 kilometres away there is no rain at all.

The summer season begins in November and ends in March. It usually brings very high temperatures. However, summer is also the rainy season, and cloud coverage and rain can cool things down considerably, although only usually for a short period of time.

The winter season begins in May and ends in August. This is also the dry season when virtually no rainfall occurs. Winter days are invariably sunny and cool to warm; however, evening and night temperatures can drop below freezing point in some areas, especially in the southwest.

The in-between periods - April/early May and September/October - still tend to be dry, but the days are cooler than in summer and the nights are warmer than in winter. (Botswana Tourism, 2013)

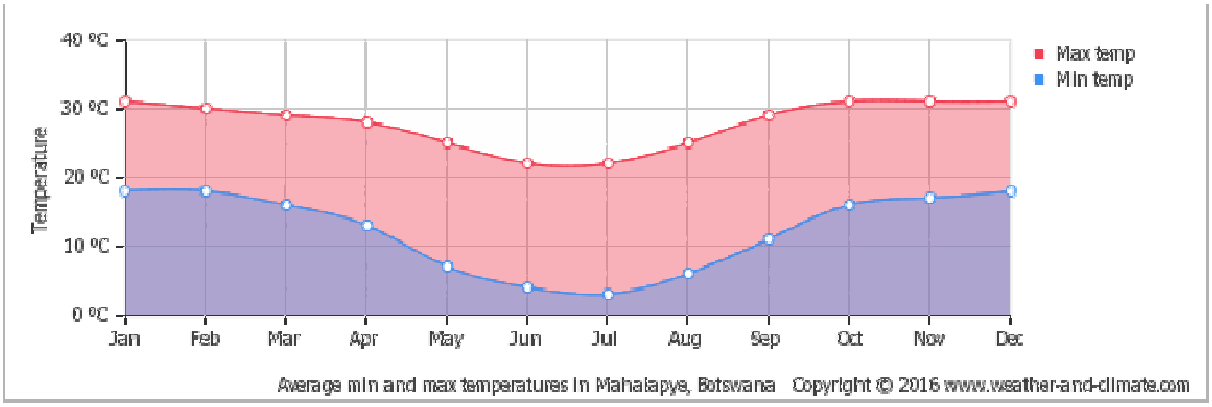


(Zifan, 2017)

(Maps, 2009)

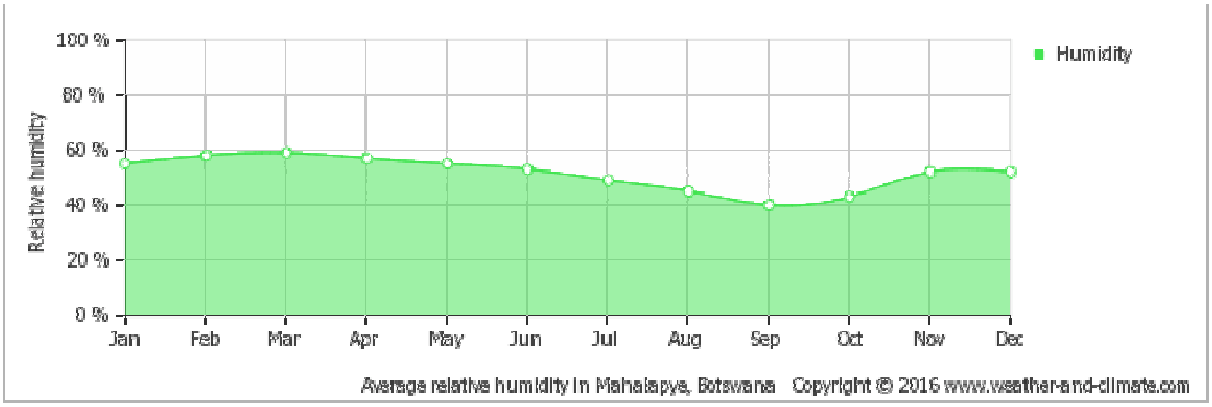
3.2.2.1 Temperature

Summer days are hot, especially in the weeks that precede the coming of the cooling rains, and shade temperatures rise to the 38°C mark and higher, reaching a blistering 44°C on rare occasions. Winters are clear-skied and bone-dry, the air is warm during the daylight hours but, because there is no cloud cover, cold at night and in the early mornings. Sometimes bitterly so - frost is common and small quantities of water can freeze. (Botswana Tourism, 2013)



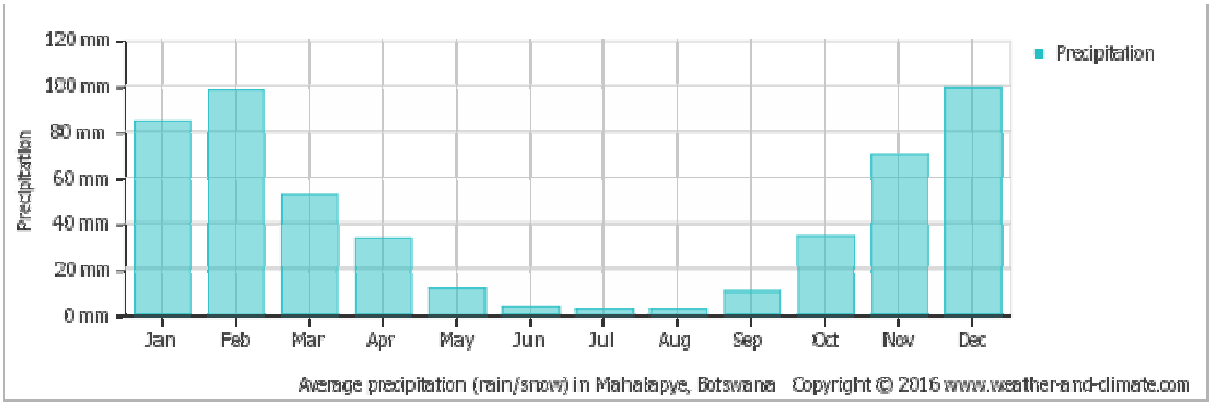
3.2.2.2 Relative Humidity

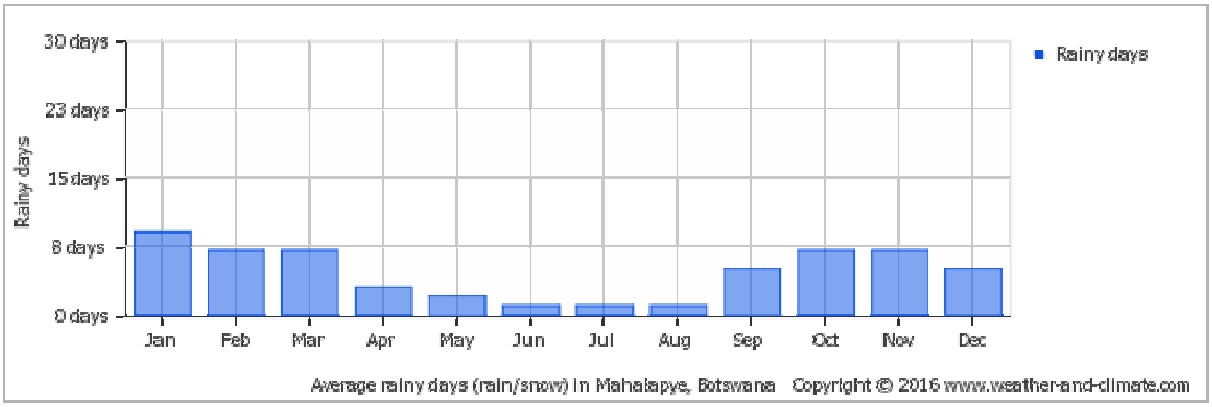
In summer during the morning period humidity ranges from 60 to 80% and drops to between 30 and 40% in the afternoon. In winter humidity is considerably less and can vary between 40 and 70% during the morning and fall to between 20 and 30% in the afternoon. (Botswana Tourism, 2013)



3.2.2.3 Rainfall

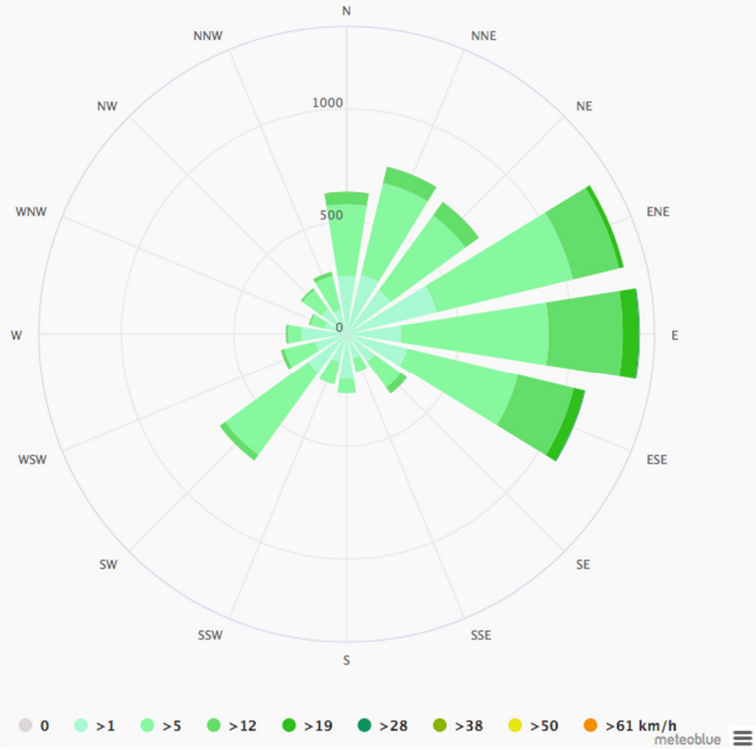
The rainy season is in the summer, with October and April being transitional months. January and February are generally regarded as the peak months. The mean annual rainfall varies from a maximum of over 650mm in the extreme northeast area of the Chobe District to a minimum of less than 250mm in the extreme southwest part of Kgalagadi District (see the map for districts). Almost all rainfall occurs during the summer months while the winter period accounts for less than 10 percent of the annual rainfall. Generally, rainfall decreases in amount and increases in variability the further west and south you go. (Botswana Tourism, 2013)





3.2.2.4 Wind

The south of the country is most exposed to cold winds during the winter period from the west, carrying sand and dust, which can obscure visibility.



(Meteoblue, 2017)

LOCAL CONTEXT REPORT

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4 LOCAL CONTEXT REPORT

4.1 Applying Green Star SA to Botswana

4.1.1 General

This section outlines the application of Green Star SA to Botswana from a general perspective.

It considers the typical project delivery, relevant building codes and standards, the eligibility requirements in Green Star SA, the conditional requirements and the environmental weightings of the tool

4.1.2 Eligibility Requirements

No adaptations shall be made to the Spatial Differentiation, Space Use and Timing of Certification eligibility criteria of the Green Star SA rating tools. Conditional Requirements eligibility criterion are included in the credit by credit review.

4.1.3 Conditional Requirements

There are currently two conditional requirements in Green Star South Africa. If projects do not achieve these conditional requirements then they cannot achieve a Green Star rating. These are Eco-0, which prescribes the minimum ecological constraints for the building and Ene 0, which prescribes the minimum energy efficiency which the building must achieve.

It is recommended that Green Star SA – Botswana include a minimum water efficiency requirement.

Details on how they can be adapted for Botswana can be found in Section 3.3.5 of this report.

4.1.4 Environmental Weightings and Applicability to Botswana

The category weighting system should remain the same as that of the Green Star SA rating tools, until such a time as the Botswana Green Building Council has the capacity to facilitate a revision of the category environmental weighting system.

4.2 Applying GREEN STAR SA – Credit by Credit

This report applies to the Green Star SA – Office v1.1 tool v1.1 tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1, and considers the applicability of the tool in Botswana. Each credit's applicability to the Botswanan context is discussed and recommendations are made of where the project team must submit a Credit Interpretation Request (CIR) to the GBCSA where an alternative standard may be better suited.

4.3 Credit by Credit Review

Botswanan projects would also be required to use the latest Green Star SA TCs, CIRs and Errata relevant to rating tools, published on the GBCSA's website, which represent the current version of that specific tool.

Each credit is reviewed in the following way:

- Aim of the credit,
- Discussion, which outlines the views of the Batswana professionals contacted as part of this research,

- Requirements for the adoption of the Green Star SA tool,
- Resources, which includes changes to the references listed in the technical manual as well as relevant Botswanan manufacturers, suppliers and consultants.

The details of each credit have not been provided. This section must be read in conjunction with the Green Star SA – Office v1.1 tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1Technical Manuals (available by order from www.gbcsa.org.za.)

The Green Star SA – Office v1.1 tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1Technical have been assessed for relevance on a credit by credit basis. Each credit's applicability to the Botswanan context is discussed and requirements are made of where the project team must submit a Credit Interpretation Request (CIR) to the GBCSA where an alternative standard may be better suited.

For each credit reviewed as part of this report, the credits are colour coded in accordance with the changes required for applicability to the local context:

	The credit should be kept in its current form and no adjustments need to be made.
	The credit requires a mandatory CIR or TC or adaptation to ensure relevance to the Botswanan context.
	The credit should be omitted and made 'not applicable' for the Botswanan application of the tool.

All credits for new building tool credits have been included within the table below. All credits applicable to Green Star SA Office v1.1 tool as well as rating tools for Green Star SA - Retail Centre v1, Green Star SA – Multi Unit Residential v1 & Green Star SA - Public & Education Building v1Technical have been included within revision 1 of the local context report.

Botswanan projects would also be required to use the latest Green Star SA TCs, CIRs and Errata relevant to rating tools, published on the GBCSA's website, which represent the current version of that specific tool.

Local Context Reports are working documents and will be updated from time to time to reflect the current understanding at that point. Projects can submit TCs/CIRS for any credit.

4.3.1 MANAGEMENT

	AIM OF CREDIT	DISCUSSION	RECOMMENDATION
	MAN-01: Green Star SA Accredited Professional To encourage and recognise the engagement of professionals who can assist the project team with the integration of Green Star aims and processes throughout design and construction phases.	It is vital that project members understand the intricacies of the Green Star SA and its process - so until such time that the Botswana Green Building Council establishes a rating tool and course delivery system it is recommended that professionals be trained under the current South African system. It is possible that Green Star SA courses can be given in Botswana by the GBCSA, as has been done elsewhere in Africa already. The credit is relevant in its current form. Presently, there are 2 Green Star Accredited Professionals in Botswana. **Resources** Green Building Council SA, "Accredited Professionals". Available at: GBCSA Directory (accessed 18/04/2017)	MAN-01 should be kept in its current form and no adjustments need to be made.
	MAN-02: Commissioning Clauses To encourage and recognise commissioning and handover initiatives that ensure that all building services can operate to optimal design potential.	The Chartered Institute of Building Services Engineers (CIBSE) is a standard setter and authority on building services engineering in the UK and globally. CIBSE publishes Guidance and Codes which are internationally recognised as authoritative, setting the standards for best practice in the profession. CIBSE commissioning codes are an ideal tool for making sure that Green Star certified buildings are among the best commissioned buildings in the world. For mechanical systems, ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) is a worldwide building technology society with more than a century of experience advancing the arts and sciences of HVAC&R and related human factors. This makes ASHRAE a suitable alternative for the commissioning of mechanical systems that are in line with Green Star's aim of cutting edge practice. As in South Africa, Botswana does not strictly adhere to CIBSE and ASHRAE commissioning codes as standard practice, and adoption of these codes put	MAN-02 should be kept in its current form and no adjustments need to be made.

		Green Star SA certified buildings ahead of the rest. However, adoption of these standards has been proven to be achievable in this context. **Resources** None.	
	MAN-03: Building Tuning To encourage and recognise commissioning initiatives that ensure optimum occupant comfort and energy efficient services performance throughout the year.	Very few buildings are designed / built to allow building tuning, to the exception of some new projects integrating a BMS. There is a defects and liability period of one year during which contractors can be called in to rectify any malfunctioning of the system. The scope of works during the defects and liability period can be expanded to include building tuning. A re-commissioning schedule will be required to ensure minimum disruption. Moreover, for shell and core buildings, which are now tenanted, tenants should be informed of the building tuning process. A thorough analysis needs to take place with regards to building tuning, i.e., not only using feedback from the Facilities Manager, but also and foremost the building occupants. **Resources** None.	MAN-03 should be kept in its current form and no adjustments need to be made.
	MAN-04: Independent Commissioning Agent To ensure buildings are designed regarding future maintenance and are correctly commissioned before	Many projects do not use the services of a commissioning agent and it is important that this be a requirement for leading projects. This is equally relevant and applicable in Botswana as it is in South Africa. **Resources** None.	MAN-04 should be kept in its current form and no adjustments need to be made.

	MAN-05: Building User's Guide To encourage and recognise information management that enables building users to optimise the building's environmental performance.	Building user guide is not produced per se. A combined document is not received but several specialist contractors will submit their commissioning report and the manuals. Training is provided mainly to maintenance staff to explain the operation of the building **Resources** None.	MAN-05 should be kept in its current form and no adjustments need to be made.
	MAN-06: Environmental Management To encourage and recognise the adoption of a formal environmental management system in line with established guidelines during construction.	Environmental management in construction should not be a region-specific practice but should be practiced globally to minimise the disturbance to the environment. **Resources**	MAN-06 should be kept in its current form and no adjustments need to be made.
	Man-07: Waste Management To encourage and recognise management practices that minimise the amount of construction waste going to disposal.	Basic waste management processes are generally followed by some projects in Botswana to generate some cash. Waste recycling is an income source for contractors and it is environmentally beneficial. Although limited, there are recycling possibilities in Botswana this credit will encourage the development of these facilities and encourage growth in the area. Botswana imports most of its construction material. Recycled material can substitute part of the importations. For example, mineral debris can be recycled and used as aggregate in concrete, substituting sand and gravel. It is possible for the contractor to produce a waste management plan. It may be necessary to rework minimum percentage of waste recycled or reused depending on opportunities for recycling. **Resources** None.	MAN-07 should be kept in its current form and no adjustments need to be made.

	MAN-8: Airtightness Testing To encourage and recognise measures to reduce uncontrolled air leakage in buildings, and reward the testing and achievement of good air tightness testing levels.	Many projects in Botswana due to the adoption of the South African code, do not conduct an air tightness test. Botswana winter temperatures often reach low temperatures causing a significant difference between inside and outside temperatures. In such cases, air leakage can cause serious energy losses. An alternative to an air tightness test may be to use a thermographic camera to identify the key leakage points. **Resources** None.	MAN-08 should be kept in its current form and no adjustments need to be made.
	MAN-9: Waste Recycling Management Plan – RETAIL CENTRE To encourage and recognize management systems and building infrastructure that facilitate the reduction of the overall operational waste generation and disposal.	It is believed that through the development of management systems that facilitate the reduction of the overall operational waste generation and disposal, this credit will encourage the development and growth of these facilities in retail centres in the country.	MAN-09 should be kept in its current form and no adjustments need to be made.
	MAN-10: Building Management System – RETAIL CENTRE & PEB To encourage and recognize the incorporation of Building Management Systems to actively control and maximize the effectiveness of building services.	Building Management Systems are computer based control systems installed in buildings to control and monitor the building's mechanical and electrical equipment as well as the water systems. Ideally the BMS, especially on large building projects, is a central integrated system monitoring and controlling the building. However, on smaller projects where a single BMS system is not appropriate there is still benefit in installing smaller separate control systems that are linked to a central location to enable effective monitoring and control by the building facilities management team. Although BMS's are not commonly installed in retail centres, public and education buildings in Botswana, it is believed that the expertise exist within the country to incorporate Building Management Systems to actively control and maximize the effectiveness of building services.	MAN-10 should be kept in its current form and no adjustments need to be made.

	MAN-11: Green Lease - RETAIL CENTRE To encourage and recognise initiatives taken by the building owner to encourage improved environmental behaviour by tenants of the retail centre	Through the establishment of a contractually-binding tenancy lease agreement that requires the tenants of a retail centre to participate in the following environmental initiatives: • Electrical energy monitoring and reporting (minimum quarterly) and have submitted an energy management plan at the beginning of each year; • Water monitoring and reporting (minimum quarterly) and have submitted a water management plan at the beginning of each year; • Waste reduction/recycling monitoring and reporting (minimum quarterly) and have submitted a waste management plan at the beginning of each year; • The preparation of a procurement policy at the beginning of each year regarding the use of environmentally friendly consumables (cleaning products, toiletry products, paper and plastic consumable products) and the building owner being required to report back to the tenants on the buildings' performance relating to energy, water, waste and procurement policies on an annual basis, market transformation within retail centres in Botswana would occur through this credit.	MAN-11 should be kept in its current form and no adjustments need to be made.
	MAN-12: Common Property Rules – MULTI UNIT RES To encourage and recognize developers who embed legal and contractual environmental management initiatives within the formal management structures of the development.	Through the establishment of legal and contractual environmental management initiatives embedded within the formal management structures of the development, it is believed that within the rules of the development, the Management Entity committing to environmental initiatives would be beneficial to the common property areas of multi-unit residential developments.	MAN-12 should be kept in its current form and no adjustments need to be made.
	MAN-13: Learning Resources - PEB To encourage and recognise sustainability initiatives implemented in the development as learning resources for building users and visitors	This credit has been developed to educate building occupants on how the sustainability initiatives implemented in the building work, and the associated environmental benefits of these initiatives. Making sustainable building initiatives and features visible and interactive can provide a valuable education and learning opportunity for building users to develop awareness about the building's impacts on the natural environment and resources. By incorporating important concepts such as energy, water and material efficiency, public and education buildings can become interactive learning tools in public and education buildings.	MAN-13 should be kept in its current form and no adjustments need to be made.

	MAN-14: Life Cycle Costing - PEB To recognise and encourage the development of a Life Cycle Cost (LCC) analysis to consider environmentally sustainable attributes in assessing improved design, specification and Through-life maintenance and operation.	This credit even in South Africa is a stretch and as such the credit is omitted for projects in Botswana, however projects could choose to target the credit under the Innovation category.	Man-14 credit is omitted. Credit should be allowed to be targeted as an innovation point.
	MAN-15: Maintainability - PEB To encourage and recognise building design that facilitates on-going maintenance, and minimises the need for on-going building maintenance throughout a building's lifecycle.	Public buildings can be complex structures with a variety of attributes which require a significant amount of maintenance. The design of these types of buildings should reflect the need for such maintenance by providing suitable access to facilities managers. When designed and managed accordingly, public buildings can minimise maintenance and operational costs, while also minimally impacting their occupants.	MAN-15 should be kept in its current form and no adjustments need to be made.

4.3.2 INDOOR ENVIRONMENTAL QUALITY

	AIM OF CREDIT	DISCUSSION	RECOMMENDATION
	IEQ-01: Ventilation Rates To encourage and recognise designs that provide ample amounts of outside air to counteract build-up of indoor pollutants.	Botswana makes use of the South African building code, SANS 10400. The ventilation rates for office spaces have been modified in the SANS 10400 and points will be earned for minimum fresh air rates of 10 litres/second/person. **Resources** - SANS 10400-O	IEQ-1 should be kept in its current form and no adjustments need to be made.
	IEQ-02: Air Change Effectiveness To encourage and recognise systems that effectively deliver optimum air quality to any occupant throughout the occupied area.	IEQ-2: Air Change Effectiveness credit omitted from Office v1.1.	IEQ-2 credit is omitted.
	IEQ-03: Carbon Dioxide Monitoring and Control	CO2 monitoring has not been installed in any known projects. **Resources**	IEQ-03 should be kept in its current form and no

	To encourage and recognise the provision of response monitoring of Carbon Dioxide levels to ensure delivery of optimum quantities of outside air.	None.	adjustments need to be made.
	IEQ-04: Daylight To encourage and recognise designs that provide good levels of daylight for building users.	Although buildings allow for daylight, there are no requirements / targets for daylighting. Electrical engineers are usually proficient in lighting software such as Dialux from which daylight factor and illuminance can be obtained. **Resources** None.	IEQ-04 should be kept in its current form and no adjustments need to be made.
	IEQ-05: Daylight Glare Control To encourage and recognise buildings that are designed to reduce the discomfort of glare from natural light.	Glare can easily be controlled through louvers, blinds or types of glass. This should be considered good practice in Botswana. **Resources** None	IEQ-05 should be kept in its current form and no adjustments need to be made.
	IEQ-06: High Frequency Ballasts To encourage and recognise buildings that increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting.	IEQ-6 High Frequency Ballasts credit omitted from Office v1.1	IEQ-6 credit is omitted.
	IEQ-07: Electric Lighting Levels To encourage and recognise base building provided office lighting that is not over designed.	Very few projects use light modelling to eventually design accordingly. An office with ample daylighting will have the same light fittings as another office with lesser exposure to daylighting. **Resources** None.	IEQ-07 should be kept in its current form and no adjustments need to be made.

	IEQ-08: External Views To encourage and recognise designs that provide occupants with a visual connection to the external environment.	There are no specific requirements from building regulations with regards to the need of access to external views. **Resources** None.	IEQ-08 should be kept in its current form and no adjustments need to be made.
	IEQ-09: Thermal Comfort To encourage and recognise buildings that achieve a high level of thermal comfort.	Consultants are generally not too concerned with the use of either ASHRAE 55 or PMV and use standard benchmarks for the building type. **Resources** None	IEQ-09 should be kept in its current form and no adjustments need to be made.
	IEQ-10: Individual Comfort Control To encourage and recognise designs that facilitate individual control of thermal comfort.	The extent of control depends on cost and system type. **Resources** None.	IEQ-10 should be kept in its current form and no adjustments need to be made.
	IEQ-11: Hazardous Materials To encourage and recognise actions taken to reduce health risks to occupants from the presence of hazardous materials.	SA OHS Act is more stringent than the Botswana OHS Acts. **Resources** LEGOSH	IEQ-11 should be kept in its current form and no adjustments need to be made.
	IEQ-12: Internal Noise Levels To encourage and recognise buildings that are designed to maintain internal noise levels at an appropriate level.	Unknown **Resources** None.	IEQ-12 should be kept in its current form and no adjustments need to be made.

	IEQ-13: Volatile Organic Compounds To encourage and recognise specification of interior finishes that minimise the contribution and levels of Volatile Organic Compounds (VOCs) in buildings.	Architects and designers are generally aware of VOCs and motivated to minimise the use of products with high VOCs contents. Paint and carpet suppliers offer low VOCs / no VOCs products. Most products are imported from South Africa No information is available on adhesives, although it is though most of them originate in South Africa also. **Resources** None	IEQ-13 should be kept in its current form and no adjustments need to be made.
	IEQ-14: Formaldehyde Minimisation To encourage and recognise the specification of products with low formaldehyde emission levels.	At present, wood products are imported without any reference to Formaldehyde content. **Resources** None	IEQ-14 should be kept in its current form and no adjustments need to be made.
	IEQ-15: Mould Prevention To encourage and recognise the design of services that eliminate the risk of mould growth and its associated detrimental impact on occupant health.	Dehumidification is carried out by the AC system itself. There is no evidence that humidity sensors have been installed in any building ductwork. As Botswana is mostly a dry region it has very low relative humidity levels throughout the year. However, there are areas within the country that receive relatively high levels of humidity at certain periods of the year and therefore mould prevention would be relevant in these areas. **Resources** None.	IEQ-15 should be kept in its current form and no adjustments need to be made.
	IEQ-16: Tenant Exhaust Riser To encourage and recognise the design of buildings with a general exhaust riser that can be used by tenants to remove indoor pollutants from printing and photocopy areas	Many projects are not aware of the pollutants emitted by printing equipment and hence do not provide a means to exhaust the pollutants. **Resources** None.	IEQ-16 should be kept in its current form and no adjustments need to be made.

	IEQ-17: Environmental Tobacco Smoke (ETS) Avoidance To encourage and recognise the air quality benefits to occupants by prohibiting smoking inside the building.	Botswana became a Party to the WHO Framework Convention on Tobacco Control on May 1, 2005. **Smoke Free Places:** Designated smoking rooms are permitted in most indoor public places and indoor workplaces, and on many forms public transport. **Resources** Tobacco Control Laws	IEQ-17 should be kept in its current form and no adjustments need to be made.
	IEQ-18: Places of Respite and Connection to Nature – RETAIL CENTRE To encourage and recognise developments that create approximately designed areas where retail centre staff and visitors can relax in a place of respite which has a connection to nature.	Places of respite which have a connection to nature provide retail centre staff and visitors with approximately designed areas in which to relax and decrease stress levels commonly induced by excessive time spent confined indoors. Where the place of respite is outdoors, the area should have low noise exposure (from traffic and building services, shading to at least 35% of its area; and be screened from significant prevailing winds. Where the place of respite is indoors, the area should have a Daylight Factor (DF) of at least 2.5% and meet the credit criteria of IEQ-01.	IEQ-18 should be kept in its current form and no adjustments need to be made.
	IEQ-19: Private Outdoor Space - MULTI UNIT RES To encourage and recognize dwelling designs which improve the health and wellbeing of the occupants by providing private outdoor space.	Private outdoor spaces accessible for private use by the dwelling occupants only, directly adjacent to, and accessible from, the associated dwelling and at least 1m2 per occupant or at least 6m2 improve the health and wellbeing of the occupants in multi-unit residential developments as it provides the occupants with private places of respite in nature.	IEQ-19 should be kept in its current form and no adjustments need to be made.
	IEQ-22: Universal Access - MULTI UNIT RES To recognize design that provides universal access, to and within dwellings, to meet the changing needs of occupants.	Facilities for persons with disabilities within multi-unit residential developments are often neglected resulting in difficulties for occupants within the developments who have differing needs.	IEQ-22 should be kept in its current form and no adjustments need to be made.
	IEQ-23: Stairs - PEB To encourage and recognise designs that promotes the wellbeing of occupants by encouraging the use of stairs as an alternative to vertical transportation by lift.	Lifts in multi storey buildings is often the main form of vertical transport. This can largely be attributed to the fact that stairs are 'hidden' away and used for emergencies only. By making stairs more prominent their use could be more attractive with added health benefits as a result.	IEQ-23 should be kept in its current form and no adjustments need to be made.

		Provision of attractive stairs promotes the use of stairs and thereby giving occupants the option to improve their physical wellbeing. If cognisance is made for the provision for persons with disabilities, designs that promote the use of stairs within public and education buildings can easily be achieved within the Botswanan context.	

4.3.3 ENERGY

AIM OF CREDIT	DISCUSSION	RECOMMENDATION
ENE-0: Conditional Requirement To encourage and recognise designs that minimise the greenhouse gas emissions associated with operational energy consumption, and maximise potential operational energy efficiency of the base building.	Few professionals are competent in modelling, but as was the case in South Africa, market transformation is needed in this regard in Botswana and can be achieved through this credit. The ASHRAE guide is achievable and easily understood by most projects. Compliance route 3 following the SANS 204 Deemed to comply clauses is another way that Botswanan project teams can achieve compliance because of their familiarity with the South African code. **Resources** None.	Conditional Requirement, therefore all projects must submit a CIR and receive a final ruling before Round 1 can be submitted to the GBCSA. Office v1.1 rating tool be applied to all other credits, calculations and protocols except the Energy modelling protocol for the ENE-0 and ENE-1: Greenhouse Gas Emissions credit, where the **Office v1 Energy modelling protocol will be applicable to Botswanan projects.** Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African equivalent Climatic zone OR Provide applicable data to the GBCSA for localised Climatic Zone to update the Calculator.

	ENE-01: Greenhouse Gas Emissions To encourage and recognise designs that minimise the greenhouse gas emissions associated with operational energy consumption	See above (Ene-00). Further to this, on-site energy generation has not been commonly adopted due to the cost and legalities with regards to grid connections. SANS 204 specifies the reduction of energy consumption in buildings. The building codes also specify passive design systems that help reduce the energy demand. **Resources** None.	Refer to ENE 0.
	ENE-02: Energy Sub-metering To encourage and recognise the installation of energy sub-metering to facilitate on-going management of energy consumption.	Sub-metering is not a very common practice in Botswana. Most buildings meter consumption per tenant and not necessary per major energy use. This credit should remain to encourage responsible energy use. **Resources** None.	ENE-02 should be kept in its current form and no adjustments need to be made.
	ENE-03: Lighting Power Density To encourage and recognise designs that provide artificial lighting with minimal energy consumption.	Lighting power density as prescribed in the technical manual is achievable but in many cases in Botswana buildings are not designed as low as 1.5W/m2. **Resources** None.	ENE-03 should be kept in its current form and no adjustments need to be made.
	ENE-04: Lighting Zoning To encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas.	Lighting zones are usually defined on a case by case basis. Advanced lighting system has been installed in some buildings. **Resources** None.	ENE-04 should be kept in its current form and no adjustments need to be made.

	ENE-05: Peak Energy Demand Reduction To encourage and recognise designs that reduce peak demand on energy supply infrastructure.	Standby generator sets are commonly used for back-up power in case of power outages. On-site energy generation is not a common system. Solar thermal collectors are not installed in office buildings due to low demand. The standard used to calculate the peak energy demand for the base building should be similar to ENE 0 and 1. **Resources** None.	ENE-05 should be kept in its current form and no adjustments need to be made.
	ENE-06: Thermal Energy Sub-Metering – RETAIL CENTRE To encourage and recognise the installation of thermal energy sub metering to facilitate ongoing management of thermal energy consumption.	Sub-metering of thermal energy consumption is not a very common practice. Most retail buildings meter energy consumption per tenant and not all substantive thermal energy uses where flow temperature, return temperature and mass flow rate are measured. This credit should therefore remain to encourage responsible thermal energy monitoring.	ENE-06 should be kept in its current form and no adjustments need to be made.
	ENE-7: Hot Water Energy Use - MULTI UNIT RES To encourage and recognise dwelling designs that reduce greenhouse gas emissions associated with domestic hot water production.	Several designs within multi-unit residential developments can be incorporated to reduce greenhouse gas emissions associated with domestic hot water production. This could include the use of more efficient domestic hot water fixtures and fittings, the installation of solar or other forms of renewable energy hot water geysers or heat recovery plants. The reduction of greenhouse gas emissions associated with domestic hot water production should be a priority irrespective of region, such that the credit in its current form is equally relevant and applicable in Botswana as it is in South Africa. The Green Star SA Multi Unit Residential v1 Hot Water Calculator would however need to be adapted to reflect the relevant fuel factors in Botswana. This would be	For ENE-7, the Green Star SA Multi Unit Residential v1 Hot Water Calculator would need to be adapted to reflect the relevant fuel factors in Botswana. This would be project-specific and a mandatory CIR would need to be

		project-specific and a mandatory CIR would need to be submitted to confirm applicability	submitted prior to Round 1 to confirm applicability.
	ENE-8: Common Property Energy Use - MULTI UNIT RES To encourage and recognise designs that reduce energy use associated with common property lifts, car park ventilation and lighting.	It is important that the energy use associated with common property lifts, car park ventilation and common property lighting in multi-unit residential developments is reduced.	ENE-08 should be kept in its current form and no adjustments need to be made.
	ENE-9: Low Emission Energy Generation - MULTI UNIT RES To encourage and recognise designs that incorporate on-site energy generation systems utilising renewable or low emission energy sources.	It is encouraged that designs incorporate on-site energy generation systems utilising renewable or low emission energy sources.	ENE-09 should be kept in its current form and no adjustments need to be made.
	ENE-10: Energy Efficient Appliances - MULTI UNIT RES To encourage and recognise initiatives which reduce energy consumption associated with major appliances.	It is encouraged that initiatives are implemented which reduce energy consumption associated with major appliances. As such, points are awarded where a minimum of two applicable appliances are provided within the scope of the main contract; and applicable appliance provided is certified with a minimum 'B' rating of the European "Energy Rating" labelling system.	ENE-10 should be kept in its current form and no adjustments need to be made.
	ENE-11: Unoccupied Spaces - PEB To encourage and recognise designs that minimise or eliminate energy use for spaces when unoccupied.	Depending on the climate of the location, HVAC systems use between 10% and 30% of the total electricity used in buildings. Therefore, by reducing the amount of energy spent on heating and cooling in a building, users can reduce both greenhouse gas emissions and operational costs significantly.	ENE-11 should be kept in its current form and no adjustments need to be made.

4.3.4 TRANSPORT

	AIM OF CREDIT	DISCUSSION	RECOMMENDATION
	TRA-01: Provision of Car Parking To encourage and recognise developments that facilitate the use of alternative modes of transportation for commuting to work.	The parking guidelines are about the same as those in South Africa or unavailable. Public transport is available either formally in larger cities or informally in other areas. **Resources** Standards: South African standards reference the DOT parking guidelines or 4 bays per 100m2.	The "alternative requirements" criteria of the technical manual may be used where there no car parking guidelines available to the project team. Tra-01 should be kept in its current form and project should be allowed to use the South African standards reference the DOT parking guidelines or 4 bays per 100m2 for the ''alternative requirements''.

	TRA-02: Fuel-Efficient Transport To encourage and recognise developments that facilitate the use of more fuel efficient vehicles for work commuting.	Carpooling is rarely used as an alternative to public transport by people who own a private means of transport. It is, also, more common where company provide company cars to some of their employees. There is no requirement for parking allocation for car pool vehicles. **Resources** None.	TRA-02 should be kept in its current form and no adjustments need to be made.
	TRA-03: Cyclist Facilities To encourage and recognise developments that facilitate the use of bicycles by occupants and visitors.	Cycling is mostly a leisure activity in Botswana. There are no cycling paths and cycling may not be a safe way to travel especially over the long distances from home to work. Bicycle racks are difficult to find, which creates a further obstacle to the frequent and daily use of this mean of transport. Botswana has a relatively flat topography well suited to bicycles, but the general high year round temperatures could be an issue for cyclists. **Resources** None.	TRA-03 should be kept in its current form and no adjustments need to be made.
	TRA-04: Commuting Mass Transport To encourage and recognise developments that facilitate the use of mass transport for work commuting.	Public transport is available to the main business hubs. Although the frequency of buses and mini-buses increases during peak hours, often there is long period of waiting at the bus stop due to the buses being unable to accommodate more passengers Traffic pattern and constant increase in congestions and pollution can be observed. There are no urban trains in Botswana for public transport, the calculator may need to be adjusted.	Tra-04 should be kept in its current form and no adjustments need to be made.

		Resources None.	
	TRA-05: Local Connectivity To encourage and recognise office buildings that are integrated with or built adjacent to community amenities and/or dwellings to reduce the overall number of automobile trips taken by building users.	As above, the choice of site often depends on the availability of a suitable site. When faced with multiple options for a site, projects should be encouraged to choose sites that contribute to fuel-efficiency by being in close proximity to amenities thus allowing the tenants the option to walk instead of drive. **Resources** None.	Tra-05 should be kept in its current form and no adjustments need to be made.
	TRA-06: Trip Reduction – Mixed Use – RETAIL CENTRE To encourage & recognise retail centres that are built in mixed use areas to reduce the overall number of car trips taken by patrons.	Similar to TRA-5, the choice of site often depends on the availability of a suitable site. When faced with multiple options for a site, this credit aims to encourage retail developments that incorporate effective car-based trip reduction measures such as the provision of quality pedestrian, cycling and public transport access. Mixed use development or retail centres within mixed use areas, and within walking distance, encourage shoppers and retail employees living nearby, to made a modal switch from using cars to walking or cycling. Besides reducing congestion and pollution, walking and cycling can also bring health benefits to the public and should be encouraged.	TRA-06 should be kept in its current form and no adjustments need to be made.
	TRA-07: Vehicle Operating Emissions – RETAIL CENTRE & PEB To encourage & recognise retail centres that reduce vehicular emissions resulting from traffic congestion by upgrading road infrastructure around the centre.	Usually, 'delay' and 'number of stops' are used to determine the existing, existing plus development and post road improvements operational condition of an intersection. The higher the delay and number of stops the higher the CO 2 emissions per vehicle will be. Car emissions are a major source of air pollutants, such as oxides of nitrogen, particles and ozone. Poor air quality has been shown to aggravate asthma, bronchitis and cardiac problems. Carbon dioxide from vehicle emissions is also known as a	TRA-07 should be kept in its current form and no adjustments need to be made.

		contributing factor to global climate change. Road infrastructure improvements are necessary to reduce the traffic impact of the development to acceptable levels.	

4.3.5 WATER

AIM OF CREDIT	DISCUSSION	RECOMMENDATION
WAT-1: Occupant Amenity Water / WAT-1: Potable Water – PEB To encourage and recognise designs that reduce potable water consumption by building occupants. 4.3.6	Water efficient fixtures are available and have been used in some projects. Office projects typically do not have any greywater or blackwater recycling facilities. On some projects, rainwater harvesting has been proposed mainly for irrigation purposes. Botswana has very limited rainfall and in prone to droughts. **Resources** None.	Wat-01 should be kept in its current form. Due to the shortage of water, a **new conditional requirement** has been incorporated into this category**. Project teams must achieve at least 1 point in the potable water calculator in Wat-1 to be eligible for a Green Star SA rating.** Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African area equivalent for Rain fall OR Provide applicable data to the GBCSA for localised rainfall data to update the Calculator Action only required by

			projects targeting Rain water harvesting or Storm Water harvesting.
	WAT-02: Water Meters To encourage and recognise the design of systems that both monitors and manages water consumption	Generally, for single occupant building, a main meter is installed. For multiple tenants, one meter is allowed per tenant. It is possible to install additional meters. Botswana is a water stressed country and this will encourage responsible water use. **Resources** None.	WAT-02 should be kept in its current form and no adjustments need to be made.
	WAT-03: Landscape Irrigation To encourage and recognise the design of systems that aim to reduce the consumption of potable water for landscape irrigation.	Due to the water shortage in Botswana, the use of potable water for irrigation should be strongly discouraged. Xeriscaping, stormwater harvesting, or recycled water for irrigation can be possible routes for compliance. **Resources** None.	It is recommended that the first available point for 50% reduction be removed and 2 points be awarded for a 90% reduction of water for irrigation. The additional point should remain as in the SA Office V1.1.
	WAT-04: Heat Rejection Water To encourage and recognise design that reduces potable water consumption from heat rejection systems.	As in South Africa, cooling towers are used in Botswana as air-cooled systems. Cooling towers use a lot of water during their operation, as this is normally potable water the use of this method should be discouraged. **Resources**	WAT-04 should remain in its current form and no adjustments need to be made.

		None.	
	WAT-05: Fire System Water Consumption To encourage and recognise building design which reduces consumption of potable water for the building's fire protection and essential water storage systems.	Potable water is often used for building's fire protection **Resources** None.	WAT-05 should be kept in its current form and no adjustments need to be made.
	WAT-07: Potable Water Efficient Appliances - MULTI UNIT RES To encourage and recognise initiatives which reduce water consumption associated with major appliances.	Various initiatives can be implemented in multi-unit residential developments to reduce the water consumption associated with major appliances. These initiatives could include the provision of clothes washes for a minimum of 90% of dwellings or the provision of communal laundry area(s). These initiatives could also include the provision of dishwashers where all dishwashers provided achieve a minimum water efficiency of 7.2 litres/kg.	WAT-07 should be kept in its current form and no adjustments need to be made.
	WAT-08: Swimming Pool / Spa Water Efficiency - MULTI UNIT RES To encourage and recognise designs that reduce potable water consumption associated with swimming pools and spas.	Swimming pools lose water through evaporation and through filter cleaning and backwashing. Therefore, to achieve this credit, for any pool within the multi-unit residential development, a pool blanket is provided; and the pool filtration system avoids the requirement for backwashing; and for any spa within the development, a spa cover is provided. Alternatively, no pool(s) and or spa(s) are provided in the development.	WAT-08 should be kept in its current form and no adjustments need to be made.

5.1.1 MATERIALS

AIM OF CREDIT	DISCUSSION	RECOMMENDATION
MAT-01: Recycling Waste Storage To encourage and recognise the inclusion of storage space that facilitates the recycling of resources used within buildings to reduce waste going to disposal.	Sorting of waste is not a common practice in Botswana. The sorting of waste is common practice for most large corporates as part of their corporate identity and remains an important component of resource efficiency, but not too many other tenants in Botswana. This should be encouraged in the design and operation of all commercial buildings. **Resources** None.	MAT-01 should be kept in its current form and no adjustments need to be made.
MAT-02: Building Reuse To encourage and recognise developments that reuse existing buildings to minimise materials consumption.	Few projects are refurbishments but many other projects prefer to completely do away with the old and bring in the new. The prevention of the production waste that occurs during the demolition of buildings should be encouraged. **Resources** None.	MAT-02 should be kept in its current form and no adjustments need to be made.
MAT-03: Reused Materials To encourage and recognise designs that prolong the useful life of existing products and materials.	Globally, projects should strive to reuse materials as much as possible. Most products used in Botswana are from virgin materials **Resources** None.	MAT-03 should be kept in its current form and no adjustments need to be made.
MAT-04: Shell and Core or Integrated Fit-out To encourage and recognise base building delivery mechanisms that eliminate the need for immediate tenant refits.	For shell and core buildings, common areas are fitted out while tenant's areas are fitted-out as a white-box. Most new buildings are delivered as integrated fit-outs **Resources** None.	MAT-04 should be kept in its current form and no adjustments need to be made.

	MAT-05: Concrete To encourage and recognise the reduction of embodied energy and resource depletion occurring through use of concrete.	The fact that engineers and contractors in Botswana rarely recycle aggregate or use concrete with a fly ash mix is reason enough to encourage them to consider the options available and the environmental benefits associated with them. **Resources** None.	MAT-05 should be kept in its current form and no adjustments need to be made.
	MAT-06: Steel To encourage and recognise the reduction in embodied energy and resource depletion associated with reduced use of virgin steel.	As with South Africa, most structural steel is virgin material and reinforcing tends to have a high recycled content. A large amount of steel is imported from South Africa. **Resources** None.	MAT-06 should be kept in its current form and no adjustments need to be made.
	MAT-07: PVC Minimisation To encourage and recognise the reduction in use of Poly Vinyl Chloride (PVC) products in buildings.	MAT-7: PVC Minimisation credit omitted from Office v1.1	Mat-07 credit is omitted.
	MAT-8: Sustainable Timber To encourage and recognise the specification of reused timber products or timber that has certified environmentally-responsible forest management practices.	Most timber is imported into Botswana and FSC certification is not a requirement. **Resources** Forest Stewardship Council principles and criteria. Available at: www.fscus.org	MAT-08 should be kept in its current form and no adjustments need to be made.
	MAT-9: Design for Disassembly To encourage and recognise designs that minimise the embodied energy and resources associated with demolition.	Most projects area designed with traditional infill walls and glazing. This credit provides an incentive for project teams to be more creative in the design of the building while understanding the environmental benefits of this credit. **Resources** None	MAT-09 should be kept in its current form and no adjustments need to be made.

	MAT-10: Dematerialisation To encourage and recognise designs that produce a net reduction in the total amount of material used.	This credit is achievable but very few projects focus on the net reduction of materials used. **Resources** None.	MAT-10 should be kept in its current form and no adjustments need to be made.
	MAT-11: Local Sourcing To encourage and recognise the environmental advantages gained, in the form of reduced transportation emissions, by using materials and products that are sourced within close proximity to the site.	Many of the building components, materials and finishes used in Botswana are imported from South Africa. Local materials should be explored and awareness should be raised of the embodied energy in materials sourced from far away. However, as Botswana is so sparsely populated the sourcing of local materials within the current Green Star SA distances may prove difficult to achieve. To encourage the growth of industry in Botswana the sourcing of products made internally should be encouraged. It is recommended to amend the credit so that One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC and SADC regions as defined by the EAC and SADC respectively. An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Botswanan borders. **Resources** None.	It is recommended to adapt the credit so that: • One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC and SADC regions as defined by the EAC and SADC respectively. • An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Botswanan borders.

	MAT-12: Efficient Dwelling Size - MULTI UNIT RES To encourage and recognise multi-unit residential developments with efficiently sized dwelling units and reduced material consumption.	This credit aims to encourage more efficient use of space in dwelling unit design, and to discourage the over-sizing of residential units. Through designing more efficient spaces, various benefits can be achieved. These include reduction in the use of materials and resources, densification, efficiencies of space use and smarter design. All the benefits listed above are key in moving the residential market forward towards better design principles and more efficiently sized residential developments. The credit in its current form, therefore, is equally relevant and applicable in Botswana as it is in South Africa, with the availability of building resources and compliance with the credit criteria completed automatically by the 'Efficient Dwelling Size Calculator" within the rating tool spreadsheet.	MAT-12 should be kept in its current form and no adjustments need to be made.
	MAT-13: Masonry - MULTI UNIT RES & PEB To encourage and recognise designs that minimise the embodied energy and resources associated with a reduction of virgin material in masonry units.	Reducing the mass of a masonry unit reduces the embodied energy of the product and reduces transport related greenhouse gas emissions. It also loads to reduced loading on structures, which can lead to reductions in the size of structural members. This would have a significant impact on the masonry used in multi residential and public and educational buildings as thus the credit in its current form is equally relevant and applicable in Botswana as it is in South Africa.	MAT-13 should be kept in its current form and no adjustments need to be made.

5.1.2 LAND USE AND ECOLOGY

	AIM OF CREDIT	DISCUSSION	RECOMMENDATION
	ECO-: Conditional Requirement To encourage and recognise development on land that has limited ecological value and to discourage development on ecologically valuable sites.	Most development in Botswana are on greenfield sites. The conditions required for compliance that particularly affect Botswana are water courses and prime agricultural land due to the scarcity of water and the dry-arid regions across most of the country **Resources** None.	ECO-00 should be kept in its current form. A mandatory CIR will be required to rule on the local equivalent to the "suitably qualified registered ecologist"
	ECO-01: Topsoil To encourage and recognise construction practices that preserve the ecological integrity of topsoil.	There is limited productive topsoil as 70% of the country is covered by the Kalahari Desert. Most topsoil from greenfield sites is cleared off and dumped. **Resources** None.	ECO-01 should be kept in its current form and no adjustments need to be made.
	ECO-02: Reuse of Land To encourage and recognise the reuse of land that has previously been developed and where the site is within an existing municipally approved urban edge.	Most new projects are on greenfield sites, especially in Gaborone in the new CBD development zone. **Resources** None.	ECO-02 should be kept in its current form and no adjustments need to be made.
	ECO-03: Reclaimed Contaminated Land To encourage and recognise developments that reclaim contaminated land that otherwise would not have been developed.	There are not as many contaminated sites as in developed countries, but the rehabilitation of certain sites is still worth considering. **Resources** None.	ECO-03 should be kept in its current form and no adjustments need to be made.

	ECO-04: Change of Ecological Value To encourage and recognise developments that maintain or enhance the ecological value of their sites.	The credit should be updated to adequately reflect the various bioregions in Botswana. **Resources** None.	ECO-04 should be kept in its current form but adaptions to the bio-regions in the calculator are required to correctly represent the Botswanan environment. A mandatory CIR is required. Each project is to, prior to Round 1 provide a mandatory CIR to the GBCSA providing justification for using a South African area equivalent for bio-regions OR Provide applicable data to the GBCSA for the local-bioregion to update the Calculator.
	ECO-05: Urban Heat Island – RETAIL CENTRE To recognise and reward initiatives taken to reduce the heat island effect of the buildings which impact on microclimates, human and wildlife habitats.	The Urban heat island negatively impacts not only residents of urban related environs, but also humans and their associated ecosystems located far away from cities. In fact, UHI's have been indirectly related to climate change due to the contribution to the greenhouse effect, and therefore, to global warming.	ECO-05 should be kept in its current form and no adjustments need to be made.

	ECO-06: Outdoor Communal Facilities - MULTI UNIT RES To encourage and recognise designs which enable residents to engage in a broad range of outdoor activities in common areas.	There is a growing body of evidence that demonstrates how communal green spaces can offer lasting economic, social, cultural and environmental benefits. Projects catering for resident's assembly type activities offer a unique opportunity to promote the concept of shared land use by providing such communal facilities thus encouraging multi-unit residential developments with real character and a sense of place.	Eco-06 should be kept in its current form and no adjustments need to be made.
	ECO-07: Urban Consolidation - MULTI UNIT RES To encourage and recognise designs which make use of compact development patterns to increase land utilisation efficiency.	Urban consolidation is the process of increasing or maintaining the density of housing in established residential areas, with the aim of urban consolidation to reduce development on the fringe areas of the city. By making use of compact development patterns, land utilisation efficiency is increased as well as local connectivity (refer to TRA-5), trip reductions within mixed use developments (TRA-6) and the sharing of precinct bulk infrastructure, mass commuting transport systems and local amenities. The credit aims to encourage and recognise the efficient use of land by multi-unit residential developments.	Eco-07 should be kept in its current form and no adjustments need to be made
	ECO-08: Community Facilities - PEB To encourage and recognise integrated planning and shared land use in developments through the provision of on-site outdoor facilities for use by the local community.	This is relevant for the Botswana context as it is for the South African context, as such ECO-08 should be kept in its current form and no adjustments need to be made.	Eco-08 should be kept in its current form and no adjustments need to be made

5.1.3 EMISSIONS

	AIM OF CREDIT	DISCUSSION	RECOMMENDATION
	EMI-01: Refrigerants/Gaseous Ozone Depleting Potential (ODP) To encourage and recognise the selection of refrigerants and other gases that do not contribute to long-term damage to the Earth's stratospheric ozone layer.	Many mechanical engineers in Botswana are familiar with the different refrigerants available and generally use those with an ozone depleting potential of zero. **Resources** None.	EMI-01 should be kept in its current form and no adjustments need to be made.
	EMI-02: Refrigerants/Gaseous Global Warming Potential (GWP) To encourage and recognise the selection of refrigerants that reduce the potential for increased global warming from the emission of refrigerants to the atmosphere.	Although the engineers are aware of low GWP refrigerants, these are not specified and used as they are not always available locally. **Resources** None.	EMI-02 should be kept in its current form and no adjustments need to be made.
	EMI-03: Refrigerant Leaks To encourage and recognise building systems design that minimises environmental damage from refrigerant leaks.	There is an awareness of the monitoring systems, but these are not commonly used. **Resources** None.	EMI-03 should be kept in its current form and no adjustments need to be made.
	EMI-04: Insulant ODP To encourage and recognise the selection of insulants that do not contribute to long-term damage to the Earth's stratospheric ozone layer.	Consulting engineers and contractors are aware of such products and they are used as most of them are imported from South Africa. **Resources** None.	EMI-04 should be kept in its current form and no adjustments need to be made.

	EMI-05: Watercourse Pollution To encourage and recognise developments that minimise storm water run-off to, and the pollution of the natural watercourses.	Botswana has limited year round surface water and these need to be protected as much as possible. **Resources** None.	EMI-05 should be kept in its current form and no adjustments need to be made.
	EMI-06: Discharge to Sewer To encourage and recognise developments that minimise discharge to the municipal sewerage system.	Typically, grey and black water treatment is not carried out in office buildings due to costs and availability of municipal sewer lines. **Resources** None	EMI-06 should be kept in its current form and no adjustments need to be made.
	EMI-07: Light Pollution To encourage and recognise developments that minimise light pollution into the night sky.	This credit is achievable as the professionals in Botswana are familiar with the standards. The CIBSE standard referred to can be easily understood and referenced by the Botswanan professionals. **Resources** None.	EMI-07 should be kept in its current form and no adjustments need to be made.
	EMI-8: Legionella To encourage and recognise building systems design that eliminates the risk of Legionnaires' disease (Legionellosis).	Evaporative cooling systems are as common in Botswana as they are in South Africa. **Resources** None.	EMI-08 should be kept in its current form and no adjustments need to be made.
	EMI-9: Boiler and Generator Emissions To encourage and recognise the use of boilers and generators that minimise harmful emissions.	Many projects do not comply with this credit because of the high cost associated with the type of generator. **Resources** None.	EMI-09 should be kept in its current form and no adjustments need to be made.

	EMI-10: Kitchen Exhaust Emissions – RETAIL CENTRE To encourage and reward designs that avoid kitchen exhaust fumes being expelled directly into the adjacent spaces that people occupy.	Kitchen exhaust emissions expelled by retail tenants directly into the adjacent spaces have a negative and unhealthy impact on the people occupying these spaces.	EMI-10 should be kept in its current form and no adjustments need to be made.

5.1.4 **INNOVATION**

The innovation credits should remain as they are except reference must be made to Botswana and not South Africa. This is an important category because it addresses what could possibly be important factors not addressed by the tool while encouraging innovation.

Projects can achieve up to a total of 10 Innovation points for the below:

- Office v1.1
- CUSTOM

Projects can achieve up to a total of 5 Innovation points for the below:

- Retail v1
- PEB v1
- MUR v1

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