

# SBAT

for stadia

## Sustainable Building Assessment Tool for Stadia

**- Manual for the assessment of the  
sustainability performance of sports stadia**

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Developed as part of South Africa's preparations to  
host the 2010 FIFA World Cup



**1. Green Point Stadium**



**2. Moses Mabhida Stadium**



**3. Athlone Stadium**



**4. Royal Bafokeng Stadium**



**5. Peter Mokaba Stadium**

## **5 stadia assessed**

The performance of five of South Africa's 2010 FIFA World Cup match and training venues was measured in accordance with the Sustainable Building Assessment Tool (SBAT). The assessments were undertaken by the sustainability review team comprising GREEN by DESIGN WSP, PJ Carew Consulting and the CSIR. Subsequently, five booklets, as well as an executive summary were published to showcase the results. These were:

1. Green Point Stadium, Cape Town
2. Moses Mabhida Stadium, Durban
3. Athlone Stadium, Cape Town
4. Royal Bafokeng Stadium, Rustenburg
5. Peter Mokaba Stadium, Polokwane

Apart from these five booklets, an executive summary on all five stadia, as well as a booklet that covers the "lessons learned" from South Africa's World Cup experience, are also available.

# Assistance for stadium designers

As host of the 2010 FIFA World Cup, South Africa has embarked on an extensive stadium construction and refurbishment programme. With the world's eyes firmly focused on South Africa, the emphasis has not only been on cutting-edge design and rolling out world-class infrastructure but also on the sustainability of the sports facilities in every regard – specifically in terms of social, economic and environmental performance.

It is this drive towards sustainability that has prompted the South African government, through the Department of Environmental Affairs Urban Environmental Management Programme (UEMP), to review greening interventions in five 2010 stadia. Funded by the Royal Danish Embassy, the UEMP has tasked the CSIR with the adaptation of its Sustainable Building Assessment Tool (SBAT) for the design and operation of stadia.

Now the designers of sports stadia across the world can benefit from South Africa's 2010 experience by adopting the SBAT tool for their projects. This document unpacks how SBAT can be utilised in this way. It provides case-study examples of the five 2010 venues that participated in the UEMP's review process. It also includes detailed spreadsheets for a designer to determine the performance of a facility in terms of sustainability. By using this manual a designer can learn how to use SBAT effectively as an aid in the design of a stadium.



**In the case of Green Point Stadium, significant energy and water savings have been achieved through the adoption of sustainable building technologies and solutions.**

# SBAT for stadia

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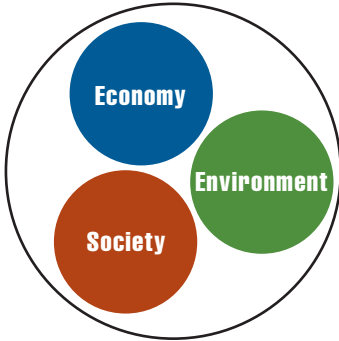
# 3 key measurables

The *SBAT for Stadia* differs from other similar tools in that it follows a triple-bottom-line approach to sustainability rather than the more usual emphasis on environmental or green performance only. In the case of the 2006 FIFA World Cup in Germany, the Green Goal initiative focused exclusively on environmental issues. However, in the review of the performance on South Africa's 2010 stadia, the focus was spread equally between economic, environmental and social considerations.

Making use of *SBAT for Stadia*, the potential influence of any design or specification decision on the overall sustainability performance of the stadium can be evaluated. In this way, adjustments can be made to ensure a positive outcome.

For a successful SBAT outcome, a stadium should perform equally well in the three key areas of economy, environment and society. A stadium that performs exceptionally in terms of environmental measurements but fails to score well in terms of social and economic aspects would be deemed less sustainable than one that performs equally across the board.

Stadium designers and developers should take cognisance of the fact that sustainability needs to be considered in every stage of the design, construction and operation processes. Sustainability cannot be considered at the end of the process as it is impossible to achieve such an outcome in retrospect. Sustainability is not a "plug-in" element. For the outcome to be most successful, sustainable-building experts should be involved from the outset – even at the stage of writing the brief for the professional team.



Equal but good performance is required in each of the three key areas for a stadium to be truly sustainable.

### Economy (EC)

- EC1.** Impact on the local economy
- EC2.** Efficiency
- EC3.** Adaptability
- EC4.** Ongoing or operational costs
- EC5.** Capital costs

### Environment (EN)

- EN1.** Water
- EN2.** Energy
- EN3.** Waste
- EN4.** Site
- EN5.** Materials and components

### Society (SO)

- SO1.** Occupant comfort
- SO2.** Inclusiveness
- SO3.** Access to facilities
- SO4.** Participation and control
- SO5.** Education, health and safety

### Targets set

In order to achieve sustainability, stadium designers need to set targets for each key performance area. How well these targets are met can be measured through the methods and calculations supplied in the SBAT tables.

# Key performance areas

## Economy (EC)

**Of importance in terms of the economic performance of the stadium is a positive impact on the local economy and long-term viability. Economic indicators that need to be monitored and evaluated are:**

### EC1. Impact on the local economy

The use of locally-sourced labour, building materials, components, equipment, furniture, fittings and maintenance teams must be considered.

### EC2. Efficiency

Is the stadium used and operated effectively? Capacity, occupancy, space occupied by each spectator, shared parking and multiple use must be considered.

### EC3. Adaptability

How flexible is the stadium in accommodating multiple use? Aspects to evaluate include alternative use, external space, services, media flexibility and suite flexibility.

### EC4. Ongoing or operational costs

How do water and energy consumption, as well as maintenance and cleaning, impact on the long-term viability of the stadium? Account-cost centres and facilities management need to be considered.

### EC5. Capital costs

Assess the allocation of capital costs in terms of training, labour intensity, support for small businesses and sustainable technology. Also appraise support in terms of private-sector funding.

## Environment (EN)

**Minimising pollution and conserving natural resources are top priorities from an environmental perspective.**

### EN1. Water

How efficiently is the stadium utilising water as a scarce resource? Is it recycled and reused?

### EN2. Energy

Is the stadium using energy efficiently and how clean is the energy it consumes?

### EN3. Waste

Is the reduction of waste a priority for the design and operational teams? In terms of construction, is waste recycled and waste avoided?

### EN4. Site

Is the stadium design suitable for its context? What is the impact on its neighbours and has the site been improved sufficiently – for instance, through landscaping?

### EN5. Materials and components

Are the specified materials and components “green” in terms of embodied energy, recycled content and pollutants?

## Society (SO)

**Not only the economic and environmental impact of the stadium should receive attention. The way society is affected is equally important.**

### S01. Spectator comfort

Does the stadium ensure the comfort of spectators?

### S02. Inclusive environments

Does the facility cater for the needs of people with disabilities?

### S03. Access to facilities

Does the stadium provide easy and quick access to support services such as accommodation, banking and food/drinks?

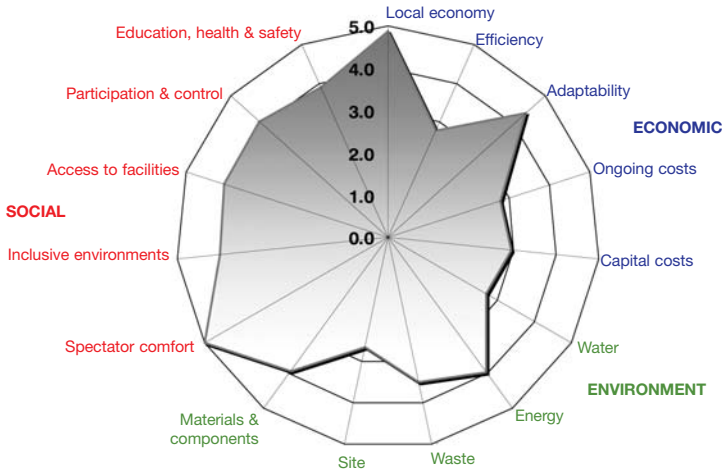
### S04. Participation and control

Are spectators and the surrounding community involved in the operation of the stadium?

### S05. Education, health and safety

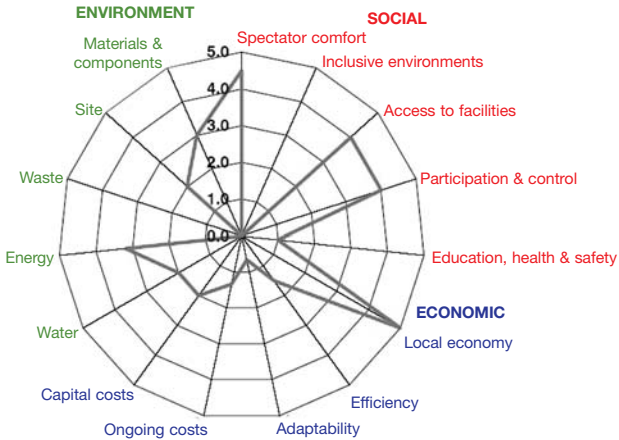
Are visitors and staff/site workers sufficiently educated about the stadium to safeguard their health and safety?

# Objective measurement



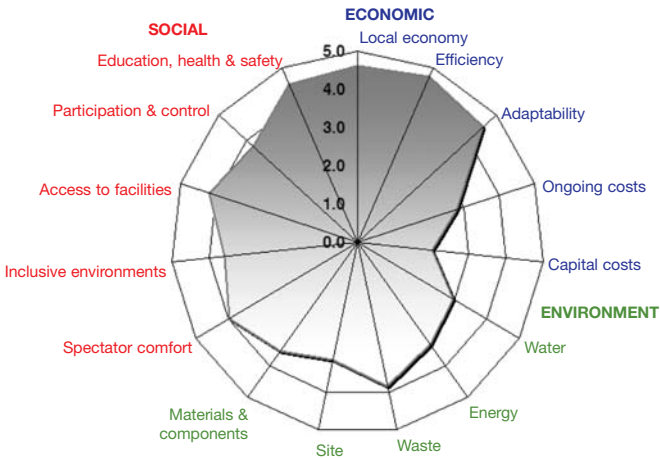
## Green Point example

For a stadium to achieve a good measure of sustainability, it needs to score equally well in the three main areas evaluated by SBAT: economy, environment and society. By completing the SBAT questionnaire, a designer or stadium operator can determine a stadium's sustainability performance objectively. In the case of Green Point Stadium in Cape Town, the SBAT result indicated "good sustainability performance, well-balanced across the three measured areas." The stadium scored very well in terms of social aspects while lower but acceptable scores were recorded for economic and environmental criteria.



## Athlone example

An SBAT evaluation of the Athlone Stadium in Cape Town (a 2010 FIFA World Cup training venue) proves it is more effective to consider sustainability issues prior to the design and construction of a stadium. As would be expected of an existing and already-established stadium, Athlone's sustainability performance was unbalanced with lower scores awarded for adaptability, waste management and inclusive environments while it scored high in terms of local economy and spectator comfort



## Moses Mabhida example

A review of the sustainability performance of Moses Mabhida Stadium in Durban found higher scores for social criteria and lower scores for economic criteria. However the overall sustainability performance was deemed good as scores were well-balanced across the three measured areas.

# Series of **spreadsheets**

**The *SBAT for Stadia* comprises a series of linked and programmed worksheets:**

## **1. Questionnaire**

The stadium designer or operator supplies data for all the sub-categories listed under each key performance area (economy, environment and society).

**<TO SBAT QUESTIONNAIRE>**

## **2. Targets**

Targets are listed for each sub-component of the key performance areas. The targets are determined by the CSIR, based on precedent studies, FIFA guidelines and criteria stipulated by bodies such as the South African Department of Public Works and the 2010 FIFA World Cup Local Organising Committee.

**<TO SBAT TARGETS>**

### 3. Performance results

Once the questionnaire has been populated with data, an automatic calculation is made; awarding points in order of 0 to 5 to indicate the rate of achievement of targets. A score of 5 indicates absolute achievement while a 0 or 1 implies poor performance.

An overall score for each sub-category of a key performance area is automatically calculated by *SBAT for Stadia*.

**<TO ECONOMIC PERFORMANCE>**

**<TO ENVIRONMENTAL PERFORMANCE**

**<TO SOCIAL PERFORMANCE>**

### 4. Sustainability outcome

The results for each of the sub-categories of the key performance areas has been translated onto a graph to show whether or not the stadium design caters equally for economic, environmental and social criteria.

**<TO OUTCOME>**

# Answering the questionnaire

Key performance area:  
**economy**  
 Category: EC1 Local economy

*SBAT for Stadia* uses a questionnaire to determine the degree to which set targets are met. In the case of local economy, the targets are:

<b>EC1.1</b>	<b>Local labour force</b>	<b>80%</b>
<b>EC1.2</b>	<b>Local building materials</b>	<b>80%</b>
<b>EC1.3</b>	<b>Local components and equipment</b>	<b>80%</b>
<b>EC1.4</b>	<b>Local furniture and fittings</b>	<b>80%</b>
<b>EC1.5</b>	<b>Maintenance</b>	<b>40%</b>

Now answer the questionnaire for “local economy” criteria. *SBAT for Stadia* will convert the answers to the percentage of the target met and, in turn, to a point score. If 100% of each sub-component was met, the total score for this category would be 5.

## EC1.1 Local labour force

**Measurable: number of workers**

Enter the number of workers originating within 50 km of the site as well as the total number of workers on site. *SBAT for Stadia* will convert the answer to determine the percentage of local labourers on site. If the target of 80% is met, 5 points will be allocated to this criterion; if less than 80% local labour is employed, a proportionally-lower score will be awarded.

### Example

*In the case of Green Point Stadium, 1 900 of the 2 000 workers are sourced within 50 km of the site.*

<b>Labourers from within 50km of the site</b>	<b>1 900</b>
<b>Total number of labourers on site</b>	<b>2 000</b>

*This amounts to 95% compared to the target of 80%. SBAT for Stadia has calculated a score of 1.0 for this aspect – see page 19 (scores of more than 1.0 are not awarded even though a target has been exceeded).*

The SBAT questionnaire requires detailed data. It is essential that enough effort is spent on research to ensure the data is accurate. When answering the questionnaire, be sure to take careful note of the kind of information requested – in some cases, proportions or percentages are required while, in other instances, the actual monetary values must be entered. The tool will automatically transcribe the captured data to a point out of 5.

## EC1.2 Local building materials

### **Measurable: local currency value of materials (ZAR)**

Enter the value of local materials (concrete, steel, bricks and cement) measured in terms of the local currency (ZAR in the case of South Africa). *SBAT for Stadia* will calculate the total value of local materials. Now enter the total value of all materials used on the stadium. *SBAT for Stadia* will automatically calculate the percentage of local materials used and compare this to the target of 80% in order to award a point out of 5.

This section can also be populated with percentages by indicating the percentage of the cost represented by each material rather than the actual currency value.

### **Example**

*In the case of Green Point Stadium, values were completed in terms of percentages.*

Concrete	R	10.00
Steel	R	50.00
Bricks	R	20.00
Cement	R	20.00
Rand value of building materials sourced within the country	R	95.00
Total rand value of building materials	R	100.00

*This amounts to 95% compared to the target of 80%. SBAT for Stadia has calculated a score of 1.0 for this aspect – see page 17 (scores of more than 1.0 are not awarded even though a target has been exceeded).*

## EC1.3 Local components and equipment

### **Measurable: local currency value of components and equipment (ZAR)**

First enter the value of all components and equipment respectively – measured in terms of the local currency. *SBAT for Stadia* will calculate the total value of all local components and equipment. Now enter the local currency value of LOCAL components and equipment. *SBAT for Stadia* will automatically calculate the percentage of local components and equipment in order to compare this to the target of 80%. The result will be converted to a score out of 5.

This section can also be populated with percentages by indicating the percentage of the total cost represented by local components and equipment rather than the actual currency value.

### **Example**

*In this example, 75% of components and equipment are sourced locally.*

Components	R	50.00
Equipment	R	50.00
Rand value of components and equipment sourced within the country	R	75.00
Total rand value of components and equipment	R	100.00

*In this case, the target of 80% has not been met and SBAT for Stadia awards a score of less than 1.0 – see page 17.*

Key performance area:  
**economy**  
 Category: EC1 Local economy

### EC1.4 Local furniture and fittings

**Measurable: local currency value of components and equipment (ZAR)**

First enter the total value of local furniture and fittings respectively in terms of the local currency. *SBAT for Stadia* will calculate the total value of local furniture and fittings. Now enter the total value of locally-sourced furniture and fittings. *SBAT for Stadia* will automatically calculate the percentage of local furniture and fittings in order to compare this to the target of 80%. The result will be converted to a score out of 5.

This section can also be populated with percentages by indicating the percentage of the total cost represented by local furniture and fittings rather than the actual currency value.

#### Example

*In this example, 75% of furniture and fittings have been sourced locally.*

Furniture	R	50.00
Fittings	R	50.00
Rand value of furniture and fittings sourced within the country	R	75.00
Total rand value of furniture and fittings	R	100.00

*In this case, the target of 80% has not been met and SBAT for Stadia awards a score of less than 1.0 – see page 17.*

### EC1.5 Maintenance

**Measurable: local currency value of maintenance contracts for SMMEs (ZAR)**

First enter the value of potential annual maintenance contracts that will be awarded to local small, medium and micro enterprises (SMMEs) – businesses with an annual turnover of less than R5-million. Now enter the total value of all potential annual maintenance contracts. *SBAT for Stadia* will automatically calculate the percentage of potential annual maintenance contracts that can be awarded to local SMMEs. The result is compared automatically to the target of 40% and converted to a score out of 5.

This section can also be populated with percentages by indicating the percentage of the total cost of maintenance contracts that will be awarded to SMMEs rather than the actual currency value.

#### Example

*In this example, 90% of maintenance and repairs is undertaken by SMMEs.*

Maintenance and repairs to be undertaken by SMMEs	R	90.00
Annual estimated maintenance and repair cost	R	100.00

*This amounts to 90% compared to the target of 40%. SBAT for Stadia has calculated a score of 1.0 for this aspect (scores of more than 1.0 are not awarded even though a target has been exceeded) – see page 17.*

## Overall score for local economy (EC1)

The individual scores of each of the five sub-categories under local economy are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for local economy criteria is 4.9 – a very high score considering 5 is the highest achievable in this category.

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EC1</b>	<b>LOCAL ECONOMY</b>				<b>4.9</b>
<b>EC1.1</b>	Local labour force	Proportion of local (within 50 km of the site) workers	80%	95%	1.0
<b>EC1.2</b>	Local building materials	Proportion of building materials (concrete, cement, bricks, steel, etc), by value, sourced within the country	80%	95%	1.0
<b>EC1.3</b>	Local components and equipment	Proportion of components and equipment, by value, sourced within the country	80%	75%	0.9
<b>EC1.4</b>	Local furniture and fittings	Proportion of loose/ built-in furniture and fittings, by value, sourced within the country	80%	75%	0.9
<b>EC1.5</b>	Maintenance	Proportion of maintenance and repairs, by value, required by the finished stadium that can be undertaken by local SMMEs (turnover of <R5-million).	40%	90%	1.0

Key performance area:  
**economy**  
 Category: EC2 Efficiency

In the case of efficiency, the targets set by *SBAT for Stadia* are:

<b>EC2.1</b>	Capacity	60.00%
<b>EC2.2</b>	Occupancy	60.00%
<b>EC2.3</b>	Space per spectator	1.05%
<b>EC2.4</b>	Shared parking	40.00%
<b>EC2.5</b>	Multiple use	100.00%

## EC2.1 Capacity

**Measurable: number of spectators**

Enter the average number of visitors expected to attend events in the stadium as well as the total capacity of the stadium. *SBAT for Stadia* will calculate the percentage of average attendance and award a score out of five in accordance.

### Example

*In this example, the stadium is expected to be filled to capacity for all events.*

Number of spectators expected to attend events after 2010	55 000
Total number of spectators	55 000

*This amounts to 100% compared to the target of 60%. SBAT for Stadia has calculated a score of 1.0 for this aspect (scores of more than 1.0 are not awarded even though a target has been exceeded) – see page 21.*

## EC2.2 Occupancy

### **Measurable: number of days**

*SBAT for Stadia* assumes a stadium can be used throughout the weekend. Enter the total number of days when events are expected to take place in a year as well as the total number of weekend days in that year. *SBAT for Stadia* will calculate the percentage of weekend days when the stadium is occupied. The result is converted to a score out of 5.

### **Example**

*In this example, 30 events are planned per year out of 104 possible weekend days per year.*

<b>Total number of planned days</b>	<b>30</b>
<b>Number of weekend days</b>	<b>104</b>

*This amounts to 29% compared to the target of 60%. SBAT for Stadia has calculated a score of 0.5 for this aspect – see page 21.*

## EC2.3 Space per spectator

### **Measurable: number of spectators per square metre**

Enter the floor area of the stadium and the number of spectators. *SBAT for Stadia* will compare the result to the standard of 1,05 m<sup>2</sup>/spectator and award a proportional score out of 5.

### **Example**

*In the case of Green Point Stadium, the total floor area is 108 168 m<sup>2</sup> while 55 000 spectators are accommodated.*

<b>Total stadium floor area</b>	<b>108 168</b>
<b>Total number of spectators</b>	<b>55 000</b>

*In the Green Point Stadium, the space per spectator is 1.97 m<sup>2</sup>, which is substantially more than the target of 1.1. A score of 0.5 is awarded to indicate less-than-optimum efficiency in terms of space utilisation – see page 21.*

Key performance area:  
**economy**  
 Category: EC2 Efficiency

### EC2.4 Shared parking

**Measurable: number of parking bays shared with another facility or the municipality**

First enter the number of parking bays shared with another facility or the municipality. Now enter the total number of parking bays. Also enter the number of days the shared parking bays would be used and the total number of working days when the bays could be utilised. SBAT for Stadia will convert this data to a score out of 5.

#### Example

*In this example, none of the 1 626 parking bays will be shared with another facility.*

Number of shared parking bays	0
Total number of parking bays	1 626

*(multiplied by)*

Number of days parking is used	0
Total number of working days	5

*This amounts to 0% compared to the target of 40%. SBAT for Stadia has calculated a score of 0 for this aspect – see page 21.*

### EC 2.5 Multiple use

**Measurable: number of alternative uses/facilities**

Simply answer “yes” or “no” to the questions on the types of facilities/uses accommodated within the stadium.

#### Example

*In this example, the stadium incorporates offices and multi-purpose halls but not retail outlets.*

The following additional (non-stadium) functions have been incorporated:

Retail	No
Offices	Yes
Multi-purpose halls	Yes
Kitchens	Yes

*As only three of the four alternative uses are accommodated in this example, only 75% of the target of 100% is achieved. SBAT for Stadia awards a score of 0.8 in this case – see page 21.*

## Overall score for efficiency (EC2)

The individual scores of each of the five sub-categories under efficiency are automatically added up by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for efficiency criteria is 2.8 – an average score, considering 5 is the highest achievable.

	<b>Criteria</b>	<b>Indicative performance measure</b>	<b>Target</b>	<b>Measured</b>	<b>Points</b>
<b>EC2</b>	<b>EFFICIENCY</b>				<b>2.8</b>
EC2.1	Capacity	Average capacity of stadium when in use (post-2010) in % of full occupancy.	60%	100%	1.0
EC2.2	Occupancy	Number of days per year the stadium will be used when operational (post-2010).	60%	29%	0.5
EC2.3	Space per spectator	Total area of the stadium (excluding parking) per spectator.	1.1	1.97	0.5
EC2.4	Shared parking	Proportion of parking shared when stadium is not in use	40%	0%	0.0
EC2.5	Multiple use	Number of additional (non-stadium) facilities (retail and offices) incorporated into the stadium	100%	75%	0.8

Key performance area:  
**economy**  
 Category: EC3 Adaptability

In the case of adaptability, the targets set by *SBAT for Stadia* are:

<b>EC3.1</b>	Alternative uses	67%
<b>EC3.2</b>	External space	80%
<b>EC3.3</b>	Services	80%
<b>EC3.4</b>	Media flexibility	100%
<b>EC3.5</b>	Suite flexibility	100%

### EC3.1 Alternative uses

**Measurable: number of activities**

Simply indicate activities accommodated within the stadium.

#### Example

*In this example, the stadium does not have an athletics track but can accommodate soccer, rugby and other events.*

The following activities will be accommodated in the stadium:

Soccer/Rugby	Yes
Athletics	No
Entertainment/Cultural events	Yes

*As the target of 67% has been reached, SBAT for Stadia calculates a score of 1.0 – see page 25.*

## EC3.2 External space

**Measurable: proportion of flat, multi-functional floor space**

Indicate square metres of external space that is flat and multi-functional as well as the total floor area of the stadium.

### Example

*In this example, 33 900 m<sup>2</sup> of the total floor space of 108 168 m<sup>2</sup> has a flat surface and can be used in a multi-functional way – for instance, to accommodate events and hospitality tents.*

Area of flat external space within site	33 900
Stadium Gross Floor Area (m <sup>2</sup> )	108 168

*As only 31% of the external space is flat and multi-functional, while the target is 80%, SBAT for Stadia awards a score of 0.4 – see page 25.*

## EC3.3 Services

**Measurable: mixture of services provided**

Answer “yes” or “no” to indicate services provided.

### Example

*In this example, all essential services are provided.*

**The following services have been provided:**

Electricity	Yes
Water	Yes
Sewerage	Yes
Stormwater management	Yes
Communication points	Yes

*100% of services are provided whereas the target has been set at 80%. However SBAT for Stadia awards 1.0 as the maximum score for any category even though targets have been exceeded – see page 25.*

Key performance area:  
**economy**  
 Category: EC3 Adaptability

### EC3.4 Media flexibility

**Measurable: proportion of media space that can be adapted for other use.**

Indicate square metres of multi-functional media space as well as the total floor area of media space.

#### Example

*In this example, the actual square-metre measurement was not available but it was clear the total media area could be adapted for other uses.*

Potential addition to media spaces	1
Area of media spaces	1

*As 100% of the target has been met, SBAT for Stadia awards a score of 1.0 – see page 25.*

### EC3.5 Suite flexibility

**Measurable: proportion of space dedicated to suites that can be adapted for other uses.**

Indicate square metres of suites that can be adapted for other uses as well as the total floor area of suites.

#### Example

*In this example, the actual square-metre measurement was not available but it was clear the entire area dedicated to suites could be adapted for other uses.*

Potential addition to VIP suite spaces	1
Area of VIP suites	1

*As 100% of the target has been met, SBAT for Stadia awards a score of 1.0 – see page 25.*

## Overall score for adaptability (EC3)

The individual scores of each of the five sub-categories under adaptability are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for adaptability is 4.4 – a very high score considering 5 is the highest achievable.

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EC3 ADAPTABILITY</b>					<b>4.4</b>
<b>EC3.1</b>	<b>Alternative uses</b>	Number of different activities the stadium has been designed to accommodate (athletics, music concerts, etc).	67%	67%	1.0
<b>EC3.2</b>	<b>External space</b>	Proportion of flat external space (as a proportion of stadium floor area) that has been designed to extend the functionality (support ancillary functions such as catering etc) of the stadium.	80%	31%	0.4
<b>EC3.3</b>	<b>Services</b>	Services (i.e. electrical, water, sewage, communication points) for which provision has been made in and around the stadium to support temporary accommodation / events (i.e. catering during World Cup)	80%	100%	1.0
<b>EC3.4</b>	<b>Media flexibility</b>	Proportion of media spaces (by floor area) that can be adapted and expanded easily.	100%	100%	1.0
<b>EC3.5</b>	<b>Suite flexibility</b>	Proportion of VIP spaces (by floor area) that can be adapted and expanded easily.	100%	100%	1.0

Key performance area:  
**economy**  
 Category: EC4 Ongoing costs

In the case of ongoing costs, the targets set by *SBAT for Stadia* are:

<b>EC4.1</b>	Water consumption per zone (pitch, toilets, VIP spaces, retail)	4.0
<b>EC4.2</b>	Energy consumption per zone (lighting, HVAC, VIP spaces, retail)	4.0
<b>EC4.3</b>	Cost centres	80%
<b>EC4.4</b>	Maintenance & cleaning	100%
<b>EC4.5</b>	Facilities management	100%

### EC4.1 Water consumption

**Measurable: number of meters/  
sub-meters to measure consumption.**

Indicate the number of meters installed to measure and control water consumption.

#### Example

*In this example, only one meter has been installed to measure water consumption for the entire stadium – no sub-meters are provided.*

Number of water meters	1
------------------------	---

*As the target stipulates at least four meters, SBAT for Stadia awards a score of 0.3 – see page 29.*

## EC4.2 Energy consumption

**Measurable: number of meters/  
sub-meters to measure consumption.**

Indicate the number of meters installed to measure and control electricity/energy consumption.

### Example

*In this example, only one meter has been installed to measure energy consumption for the entire stadium – no sub-meters have been provided.*

Number of water meters	1
------------------------	---

*As the target stipulates at least four meters, SBAT for Stadia awards a score of 0.3 – see page 29.*

## EC4.3 Cost centres

**Measurable: proportion of tenanted areas  
that will be billed individually for electricity**

Indicate whether or not tenants will be billed individually for energy consumption.

### Example

*In this example, it is likely tenants will be billed individually.*

Will the tenants of these spaces be charged for energy consumption?	Possibly
---	----------

*The target is set at 80% but with a 50% chance of tenants being billed individually. SBAT for Stadia awards a score of 0.6 – see page 29.*

Key performance area:  
**economy**  
 Category: EC4 Ongoing costs

### EC4.4 Maintenance and cleaning

**Measurable: cleaning methods required**

Indicate whether or not certain aspects of the stadium need cleaning. If so, what method of cleaning will be used?

**Example**

*In this example, complicated cleaning methods that would rely on specialist equipment are not required.*

**How are the following building elements cleaned?**

Roof	No cleaning
Façade	No cleaning
Seating	Basic cleaning

*As the target has been met, SBAT for Stadia awards a score of 1.0 – see page 29.*

### EC4.5 Facilities management

**Measurable: Involvement of facilities-management specialists**

Indicate whether or not facilities managers have been appointed and whether or not they are involved in the design and maintenance tenders of the stadium.

**Example**

*In this example, no facilities manager has yet been appointed for the stadium. However facilities-management specialists have been involved in the design and tender documentation of the stadium.*

Has a facilities manager been appointed?	No
Has a facilities manager been consulted in the design of the stadium?	Yes
Has a facilities manager been consulted in the development of the tender for the stadium?	Yes

*As facilities managers are only involved in two of the three criteria, only 67% of the 100% target has been met. SBAT for Stadia, therefore, awards a score of 0.7 – see page 29.*

## Overall score for ongoing costs

The individual scores of each of the five sub-categories under ongoing costs are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

*Adding up the results of the examples mentioned above, the total score for ongoing costs is 2.8 – an average score considering 5 is the highest achievable.*

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EC4</b>	<b>ONGOING COSTS</b>				<b>2.8</b>
<b>EC4.1</b>	Water consumption	Number of meters/ sub-meters to monitor water consumption.	4	1	0.3
<b>EC4.2</b>	Energy consumption	Number of meters/ sub-meters to monitor energy consumption.	4	1	0.3
<b>EC4.3</b>	Cost centres	Privately-used/tenanted areas (retail, VIP suites) to be charged for energy consumption.	80%	50%	0.6
<b>EC4.4</b>	Maintenance and cleaning	Methods for cleaning the stadium are easy and do not require specialist equipment.	100%	100%	1.0
<b>EC4.5</b>	Facilities management	Measures taken to ensure operation of the stadium is efficient and sustainable.	100%	67%	0.7

Key performance area:  
**economy**  
 Category: EC5 Capital costs

In the case of capital costs, the targets set by *SBAT for Stadia* are:

<b>EC4.1</b>	Water consumption per zone (pitch, toilets, VIP spaces, retail)	4
<b>EC4.2</b>	Energy consumption per zone (lighting, HVAC, VIP spaces, retail)	4
<b>EC4.3</b>	Cost centres	80%
<b>EC4.4</b>	Maintenance & cleaning	100%
<b>EC4.5</b>	Facilities management	100%

### EC5.1 Training

**Measurable: expenditure of construction budget on training**

Indicate the local-currency value expended on training labour as well as the total construction budget for the project.

#### Example

*In this example, R5-million has been spent on training of labourers and the total construction cost is R2,49-billion.*

Rand value labourer of training	R 5 000 000.00
Total rand value of construction	R 2 490 000 000.00

*The target stipulates 1% of the construction budget should be used for training labour but, in this example, only 0.2% is expended on it. SBAT for Stadia, therefore, awards a score of 0.2 – see page 33.*

## EC5.2 Labour intensity

**Measurable: person years of labour compared to currency spent**

Indicate the number of labourers on site, the total number of working days they will work on this project, the number of working days in a year and the total cost of construction.

### Example

*In this example, 2.4 person years are created for each R1-million spent on the stadium.*

#### PERSON YEARS

Number of labourers on site	2 000.00
	x
Total working days	679.90
Working days	230.00
	=
	5 912.30

#### MILLIONS OF RAND SPENT

Cost of construction	R	2 490 000 000.00
R1-million	R	1 000 000.00
		=
		2 490.00
Person years per million rand spent		2.40

*As the target is set at 2.4, SBAT for Stadia awards a perfect score of 1.0 – see page 33.*

## EC5.3 SMME support

**Measurable: proportion of project value awarded to small and medium enterprises**

Indicate the local-currency value of work awarded to small, medium and micro enterprises (SMMEs) as well as the total construction budget.

### Example

*In this example, the actual local-currency values have not been entered but it was known that 30% of the total cost was expended on SMMEs.*

Rand value of SMMEs used for construction and procurement	R	3.00
Rand value of construction and procurement	R	10.00

*As the target is set at 40%, SBAT for Stadia awards a score of 0.8 – page 33.*

Key performance area:  
**economy**  
 Category: EC5 Capital costs

### EC5.4 Sustainable technology

**Measurable: proportion of construction budget expended on sustainable technologies.**

Indicate the local-currency value expended on sustainable technologies as well as the total construction budget of the stadium.

#### Example

*In this example, specific sustainable technologies, such as solar geysers for example, are not included in the stadium.*

Rand value of sustainable technologies used	R -
Total rand value of construction	R 2 490 000 000.00

*The target is set at 3% but, as 0% has been achieved, SBAT for Stadia awards a score of zero – see page 33.*

### EC5.5 Private-sector funding

**Measurable: Proportion of construction budget financed by the private sector**

Indicate the local-currency value of private-sector funding as well as the total construction cost of the stadium.

#### Example

*In this example, R185-million of the construction cost has been funded by the private sector.*

Rand value of private-sector funding	R 185 000 000.00
Total rand value of construction	R 2 490 000 000.00

*The target is 2% but as much as 7% of the total cost in this example has been funded by the private sector so SBAT for Stadia awards the maximum score of 1.0 – see page 33.*

## Overall score for capital costs

The individual scores of each of the five sub-categories under capital costs are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for capital costs is 2.9 – slightly above average considering 5 is the highest achievable.

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EC5</b>	<b>CAPITAL COSTS</b>				<b>2.9</b>
EC5.1	Training	Budget allowance for site-worker training.	1%	0.2%	0.2
EC5.2	Labour intensity	Number of person days of direct employment (on site for construction) created through the construction of the stadium.	2.4	2.37	1.0
EC5.3	SMME support	Proportion of capital value of the project undertaken by SMME contractors.	40%	30%	0.8
EC5.4	Sustainable technology	Budget allowance for sustainable/innovative technologies.	3%	0%	0.0
EC5.5	Private sector funding	Private-sector funding/support leveraged for the project.	2%	7%	1.0

Key performance area:

# environment

Category: EN1 Water

In the case of water, the targets set by  
*SBAT for Stadia* are:

EN1.1	Rainwater	100%
EN1.2	Water efficiency	100%
EN1.3	Run-off	50%
EN1.4	Greywater	100%
EN1.5	Planting	100%

## EN1.1 Rainwater

**Measurable: Provision for  
harvesting rainwater**

Indicate whether or not the stadium has been designed to capture rainwater off the roofs and structure.

### Example

Rainwater-harvesting system	Yes
-----------------------------	-----

As the target for capturing rainwater has been met, SBAT for Stadia awards a score of 1.0 – see page 37.

## EN1.2 Water efficiency

### **Measurable: Use of water-efficient devices**

Indicate whether or not certain types of water-efficient devices are used in the stadium.

#### **Example**

*The following water-efficient devices have been provided:*

Waterless urinals	No
Dual-flush toilets/Reduced-flush toilets	Yes
Self-closing metering valves and demand taps	No
Low-flow showers	Yes
Flow regulators and flow-controller aerators	Yes
Baths in place of jacuzzis	No

*As only half of the targeted water-efficient devices is used in this example, SBAT for Stadia awards a score of 0.5 – see page 37.*

## EN1.3 Run-off

### **Measurable: proportion of site surfaces that are permeable**

Indicate the total surface area of the site as well as the square metres that are permeable or form part of the pitch.

#### **Example**

*In this example, the entire site area is 125 000 m<sup>2</sup> – 3 060 m<sup>2</sup> is permeable and 1 200 m<sup>2</sup> made up by the pitch.*

Stadium site area (m <sup>2</sup> )	125 000
Pitch area (m <sup>2</sup> )	1 200
Permeable landscaped area (m <sup>2</sup> )	3 060
Proportion of permeable surfaces to site area	3%

*The target is set at 50% of the site surface to be permeable. In this example, only 3% is permeable so SBAT for Stadia awards a score of only 0.1 – see page 37.*

Key performance area:

# environment

Category: EN1 Water

## EN1.4 Greywater

**Measurable: Proportion of greywater recycled**

Indicate the percentage of greywater produced and reused in the stadium.

### Example

Proportion of greywater recycled	0%
----------------------------------	----

*In this example, no greywater is recycled so SBAT for Stadia awards a score of zero – see page 37.*

## EN1.5 Planting

**Measurable: proportion of drought-resistant planting**

Indicate the percentage of planting in terms of the total landscaping that requires little irrigation.

### Example

Proportion of vegetation with low water requirements in the stadium	100%
---	------

*In this example, all the vegetation specified for landscaping purposes has low irrigation requirements so SBAT for Stadia awards a maximum score of 1.0 – see page 37.*

## Overall score for water

The individual scores of each of the five sub-categories under water are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for water is 2.6 – an average performance considering 5 is the highest achievable.

	<b>Criteria</b>	<b>Indicative performance measure</b>	<b>Target</b>	<b>Measured</b>	<b>Points</b>
<b>EN1</b>	<b>WATER</b>				<b>2.6</b>
EN1.1	Rainwater	Provision made to harvest rainwater.	100.0%	100%	1.0
EN1.2	Water Efficiency	Provision made to minimise water consumption through water-efficient devices.	100.0%	50%	0.5
EN1.3	Run-off	Proportion of permeable surfaces within the stadium site.	50.0%	3%	0.1
EN1.4	Greywater	Provision made to reuse greywater on site.	100.0%	0%	0.0
EN1.5	Planting	Proportion of planting on site that has low/ no water requirements.	100.0%	100%	1.0

# Key performance area: environment

## Category: EN2 Energy

In the case of energy, the targets set by *SBAT for Stadia* are:

EN2.1	Location	80.000%
EN2.2	Passive environmental control	100.000%
EN2.3	Energy efficiency	0.145
EN2.4	Control and building-management system	100.000%
EN2.5	Renewable energy	20.000%

### EN2.1 Location

**Measurable: Proximity of public-transport facilities**

Indicate by “yes” or “no” when asked about the availability of certain public-transport facilities within close proximity to the stadium.

#### Example

The following public-transport facilities (400 m from the stadium) will be used by spectators as follows:

Rail	Yes
Bus	Yes
Mini-bus taxi	Yes
Shuttle	No

In the case of this example, only 75% of the identified modes of public transport are available. As the target is 80%, *SBAT for Stadia* calculates a score of 0.9 – see page 41.

## EN2.2 Passive environmental

**Measurable: Mix of environmental-control strategies employed**

Indicate by “yes” or “no” when asked about certain environmental-control strategies implemented in the stadium.

### Example

The following heating/cooling strategies have been used:

Cross-ventilation	Yes
Shading devices to protect spectators from low angle or east/west sun angle	Yes
Cladding around façade	Yes

As all the stipulated strategies have been implemented, performance in this example is 100%. SBAT for Stadia, therefore, awards a score of 1.0 – see page 41.

## EN2.3 Energy efficiency

**Measurable: kVA of electrical equipment per spectator**

Indicate the total kVA value of installed electrical equipment in the stadium as well as the total seating capacity. SBAT for Stadia will calculate the kVA/spectator ratio automatically.

### Example

With 8 000 kVA of electrical equipment and 55 000 spectators, the kVA/spectator ratio in this example is 0.145

Total kVA installed electrical equipment	8 000
Seating capacity (post-2010)	55 000
Total kVA/spectator	0.145

With the target set at 0.145 achieved, SBAT for Stadia awards a score of 1.0 – see page 41.

Key performance area:

# environment

Category: EN2 Energy

## EN2.4 Control and building-management system

**Measurable:** mix of control systems used to monitor and reduce energy consumption

Answer “yes” or “no” when asked whether or not certain control systems are in place.

### Example

The following systems are in place:

Building management system	Yes
Central controls	Yes

In this example, the stipulated control systems are in place so SBAT for Stadia awards a score of 1.0 – see page 41.

## 2.5 Renewable energy

**Measurable:** portion of electricity consumption fed by renewable energy

Indicate the kWh of energy generated by renewable sources and the total kWh consumption of the stadium.

### Example

In this example, the actual kWh readings were not available. However it was known the energy consumption would not be fed by renewable energy and the ratio was indicated as such.

kWh of renewable energy provided	0
Total kWh conventional energy	1

With the target set at 20% renewable energy, SBAT for Stadia awards a score of zero in this case – see page 41.

## Overall score for energy

The individual scores of each of the five sub-categories under energy are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for energy is 3.9 – a very high score considering 5 is the highest achievable.

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EN2</b>	<b>ENERGY</b>				<b>3.9</b>
EN2.1	Location	Public-transport facilities available in close proximity to the stadium.	80.0%	75%	0.9
EN2.2	Passive environmental control	Environmental-control strategies used to cool/heat enclosed accommodation.	100.0%	100%	1.0
EN2.3	Energy efficiency	Total kVA of electrical equipment installed in the stadium per spectator.	0.145	0.145	1.0
EN2.4	Control and building-management consumption.	Control systems in place to minimise energy system	100.0%	100%	1.0
EN2.5	Renewable energy	Proportion of the annual kWh of electrical energy required for the stadium that can be met through renewable energy sources.	20.0%	0%	0.0

# Key performance area: environment

## Category: EN3 Waste

**In the case of waste, the targets set by  
SBAT for Stadia are:**

<b>EN3.1</b>	<b>Waste-management facilities</b>	<b>100%</b>
<b>EN3.2</b>	<b>Waste minimisation – front of house</b>	<b>100%</b>
<b>EN3.3</b>	<b>Waste minimisation – back of house</b>	<b>100%</b>
<b>EN3.4</b>	<b>Demolition</b>	<b>100%</b>
<b>EN3.5</b>	<b>Construction waste</b>	<b>90%</b>

### **EN3.1 Waste-management facilities**

***Measurable: separate containers for different waste streams***

Answer “yes” or “no” when asked answer whether or not certain types of waste containers have been provided as standard in the stadium’s waste-management/processing areas.

#### **Example**

The following separate containers have been provided:

<b>Food</b>	<b>No</b>
<b>Paper</b>	<b>No</b>
<b>Plastic</b>	<b>No</b>

*The target is set at 100% but none of the stipulated types of waste bins have been provided so, in this example, SBAT for Stadia awards a score of zero – see page 45.*

## EN3.2 Waste minimisation – front of house

**Measurable: separate containers for different waste streams**

Answer “yes” or “no” when asked whether or not certain types of waste containers have been provided as standard in the stadium.

### Example

The following separate containers have been provided:

Food	Yes
Paper	Yes
Plastic	Yes
Tins	Yes
Use of reusable containers	Yes

In this case, all types of containers required are included in the stadium. SBAT for Stadia, therefore, awards the maximum score of 1.0 – see page 45.

## EN3.3 Waste minimisation – back of house

**Measurable: adequate storage space for waste**

Simply indicate whether or not the stadium design caters for an adequate waste-management and storage area.

### Example

Area to manage waste has been provided	Yes
--	-----

As the target to include a waste-management area has been met, SBAT for Stadia awards a score of 1.0 – see page 45.

# Key performance area: environment

## Category: EN3 Waste

### EN3.4 Demolition

#### **Measurable: Proportion of existing stadium structure recycled**

Indicate the percentage of materials from the original stadium structure reused in the construction of the new stadium

#### Example

What proportion of the existing stadium structure has been recycled	95%
---	-----

*The target for recycling demolition waste has been set at 100% but, as 95% – very close to the actual target – has been achieved, SBAT for Stadia awards a score of 1.0 – see page 45.*

### EN3.5 Construction waste

#### **Measurable: Proportion of construction waste generated on site and recycled**

Indicate the weight (tons) of construction waste recycled and the total weight of all waste on site. SBAT for Stadia will automatically calculate the percentage of waste that is recycled.

#### Example

##### Construction waste is:

Weight (tons) of recycled construction material	1.00
Total weight (tons) of construction weight	2.00
What proportion of construction waste has been recycled	50%

*In this example, the actual tonnages were not available although accurate data would be preferable. In this case, the ratio was indicated as 50% but, with the target set at 90%, SBAT for Stadia calculates a score of 6.0.*

## Overall score for waste

The individual scores of each of the five sub-categories under waste are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for waste is 3.6 – a very high score considering 5 is the highest achievable.

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>EN3</b>	<b>WASTE</b>				<b>3.6</b>
EN3.1	Waste-management facilities	Provision of separate containers for different waste streams (food, plastic, paper) within the spectator seating area.	100.0%	0%	0.0
EN3.2	Waste minimisation – front of house	Provision of separate containers for different waste streams (food, plastic, paper) within the retail area.	100.0%	100%	1.0
EN3.3	Waste minimisation – back of house	Provision of adequate storage space for waste management in back-of-house facilities.	100.0%	100%	1.0
EN3.4	Demolition	Proportion of recycled/reused components from demolition of the stadium structure.	100.0%	95%	1.0
EN3.5	Construction waste	Proportion of construction waste recycled (with the rest going to landfill).	90.0%	50%	0.6

# Key performance area: environment

## Category: EN4 Site

In the case of the site, the targets set by *SBAT for Stadia* are:

EN4.1	Brownfield site	100%
EN4.2	Neighbouring buildings	100%
EN4.3	Vegetation	50%
EN4.4	Construction process	100%
EN4.5	Landscape inputs	75%

### EN4.1 Brownfield site

*Measurable: making use of an already-developed/disturbed site.*

Simply indicate whether or not this site has been developed or disturbed.

#### Example

Is this a brownfield site?	No
----------------------------	----

*As the goal of using a brownfield site was not met, SBAT for Stadia, in this case, awards a score of zero – see page 49.*

## EN4.2 Neighbouring buildings

**Measurable: mix of measures in place to mitigate impact on neighbouring buildings**

Answer “yes” or “no” with regard to mitigation measures in place.

### Example

The following measures have been put in place to reduce negative impacts:

Construction traffic is restricted to off-peak hours	No
Construction measures to reduce spread of dust/soil	Yes
Appointed "person" to ensure minimal negative impact of stadium construction on neighbouring buildings	Yes
Stadium does not cast a shadow on neighbouring buildings	Yes
Light pollution has been reduced through roof/lighting design	Yes
Noise pollution has been reduced through roof design	Yes

In this example, 83% of targeted mitigation measures is in place so SBAT for Stadia awards a score of 0.8 – see page 49.

## EN4.3 Vegetation

**Measurable: Proportion of site covered by vegetation**

Indicate the portion of the site that is permeable and covered by plants as well as the total site area.

### Example

Proportion of permeable surfaces to site area	4260
Other vegetated area	
	÷
Stadium site area (m <sup>2</sup> )	125 000

In this example, the portion of the site covered by vegetation is a mere 3% – way below the target of 50% so SBAT for Stadia awards a score of 0.1 – see page 49..

# Key performance area: environment

## Category: EN4 Site

### EN4.4 Construction process

**Measurable: Ways to minimise site disturbance**

Answer “yes” or “no” with regard to measures to minimise site disturbance.

#### Example

*The following measures were taken to minimise site disturbance:*

Construction limited to site area	Yes
Use of design to minimise cut and fill/accommodates site topography	Yes
Topsoil recovery	Yes
Use of fill from local construction sites	Yes

*As all the stipulated measures are in place, 100% of the target has met so SBAT for Stadia awards a score of 1.0 – see page 49.*

### EN4.5 Landscape inputs

**Measurable: proportion of landscape that does not require mechanical equipment or artificial input.**

Indicate the area of landscaping that requires these inputs as well as the total area of landscaping.

#### Example

Area of vegetation requiring mechanical equipment and artificial inputs	1
Area covered with vegetation	1

*In this example, the exact square metres of landscaping that would require mechanical input was not known but it was clear the entire landscape would need this kind of input.*

## Overall score for site

The individual scores of each of the five sub-categories under site are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for site is 2.7 – an average performance considering 5 is the highest achievable.

	<b>Criteria</b>	<b>Indicative performance measure</b>	<b>Target</b>	<b>Measured</b>	<b>Points</b>
<b>EN4</b>	<b>SITE</b>				<b>2.7</b>
EN4.1	Brownfield site	The site for the stadium was already disturbed or developed previously (brownfield).	100.0%	0%	0.0
EN4.2	Neighbouring buildings	Measures in place to mitigate negative impacts of the stadium (noise, lighting, traffic) on the surrounding areas.	100.0%	83%	0.8
EN4.3	Vegetation	Proportion of site with vegetation cover.	50.0%	3%	0.1
EN4.4	Construction process	Measures have been taken to minimise site disturbance (minimisation of area disturbed, cut-and-fill requirement).	100.0%	100%	1.0
EN4.5	Landscape inputs	Proportion of the landscaping that does not require mechanical equipment (lawn mowing) and/or artificial inputs such as weed killers, fertilisers and pesticides.	75.0%	100%	0.8

Key performance area:

# environment

Category: EN5 Materials and components

In the case of the materials and components, the targets set by *SBAT for Stadia* are as follows:

EN5.1	Roof	10%
EN5.2	Concrete	50%
EN5.3	Roof efficiency	139
EN5.4	Superstructure efficiency	4.3
EN5.5	Hazardous materials	100%

## EN5.1 Roof

### *Measurable: recycled content*

Indicate the percentage of the load-bearing roof structure built from recycled content.

### Example

Recycled content of the load-bearing roof structure	0%
---	----

*In the case of this example, recycled material has not been used in the construction of the roof, SBAT for Stadia, therefore, awards a score of 0 – see page 53.*

## EN5.2 Concrete

### **Measurable: recycled content**

Indicate the percentage of recycled material, such as fly-ash or crushed demolition waste used in the concrete mix.

#### **Example**

Recycled content of concrete	50%
------------------------------	-----

As the SBAT for Stadia target for recycled content in concrete is 50% and this target has been met, a score of 1.0 has been awarded – see page 53.

## EN5.3 Roof efficiency

### **Measurable: weight of roof relative to area covered**

Indicate the weight of the roof in terms of kg/m<sup>2</sup> covered.

#### **Example**

Weight of roof relative to area (with compression rings)	135
--	-----

The target is 139.5 and, as this target has, very nearly, been met, SBAT for Stadia awards a full score of 1.0 – see page 53.

Key performance area:

# environment

Category: EN5 Materials and components

## EN5.4 Superstructure efficiency

**Measurable: tonnage of concrete per spectator**

Indicate the total tonnage of concrete used in the stadium as well as the seating capacity. SBAT for Stadia will automatically calculate the weight/spectator ratio.

### Example

Weight of concrete (tons)	250 000
Seating capacity (post-2010)	55 000
Weight/spectator	4.55

In this example, 250 000 t of concrete is used for a 55 000-seater stadium. The ratio of weight per spectator is 4.55 – as the target is set at 4.3, SBAT for Stadia awards a score of 0.9 – see page 53.

## EN5.5 Hazardous materials

**Measurable: mix of screening procedures to help prevent the use of hazardous materials**

Answer “yes” or “no” when asked whether or not certain kinds of hazardous materials have been avoided.

### Example

The following hazardous materials have been used:

Materials that may off-gas	
VOCs/composite boards	No
Vinyl-based materials	No
PVC-based materials	No
Lead-based paints	No
HCFCs	No

In this example, proper procedures are in place to help avoid the use of stipulated hazardous materials so SBAT for Stadia awards a score of 1.0 – see page 53.

## Overall score for materials & components

The individual scores of each of the five sub-categories under materials and components are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for materials and components is 3.9 – a good performance considering 5 is the highest achievable.

Criteria performance measure		Indicative	Target	Measured	Points
<b>EN4</b>	<b>SITE</b>				<b>2.7</b>
<b>EN5.1</b>	Roof	Recycled content within the load-bearing roof structure.	10.0 %	0.0 %	0.0
<b>EN5.2</b>	Concrete	Average recycled content of concrete being used.	50.0 %	50.0 %	1.0
<b>EN5.3</b>	Roof efficiency	Weight of roof relative to area covered (kg/m <sup>2</sup> ).	139.5	135.0	1.0
<b>EN5.4</b>	Superstructure efficiency	Total tonnage of concrete per spectator that will be used in the stadium.	4.3	4.5	0.9
<b>EN5.5</b>	Hazardous materials	Screening procedures in place to avoid materials and finishes that may be harmful to human health and indoor air quality.	100.0 %	100.0 %	1.0

Key performance area:

# society

**Category: S01 Spectator comfort**

In the case of the materials and components, the targets set by *SBAT for Stadia* are as follows:

<b>SO1.1</b>	Shading	100%
<b>SO1.2</b>	Ventilation	100%
<b>SO1.3</b>	Large screens	2
<b>SO1.4</b>	Crowding	1.500
<b>SO1.5</b>	Proximity	100%

## S01.1 Shading

**Measurable: Percentage of spectator seating shaded at midday**

Indicate the percentage of the stadium shaded at midday.

### Example

“x%” of the stadium is shaded at midday	100%
---	------

As the target is 100% and this has been achieved, SBAT for Stadia awards a full score of 1.0 – see page 57.

## S01.2 Ventilation

**Measurable: measures to support air movement**

Answer “yes” or “no” when asked about measures in place to support air movement within the stadium.

### Example

Spectators are kept cool by:

Cross-ventilation	Yes
Shading devices to protect spectators from low angle east/west sun	Yes
Cladding around façade	Yes

*In this example, all the stipulated measures to support air movement within the stadium are in place so SBAT for Stadia awards a full score of 1.0 – see page 57.*

## S01.3 Large screens

**Measurable: number of large screens**

Indicate the number of large screens to be installed in the stadium.

### Example

Number of large screens	2
-------------------------	---

*SBAT for Stadia sets the target for any stadium to have two big screens. As this target has been met in this example, a score of 1.0 is awarded – see page 57.*

Key performance area:

# society

Category: S01 Spectator comfort

## S01.4 Crowding

**Measurable: length of counter space per spectator**

Indicate the running length of counter space at catering and drinks stations as well as the seating capacity of the stadium. SBAT for Stadia will automatically calculate the length/spectator ratio.

### Example

Running length of counter (m)	190 000
Seating capacity (post-2010)	55 000
Length/spectator	3.5

The targeted ration is 1.5 but, in this example, a much better ratio of 3.5 has been achieved. SBAT for Stadia, therefore, awards the maximum score of 1.0 – see page 57.

## S01.5 Proximity

**Measurable: proportion of spectators within optimal viewing positions**

Indicate the percentage of spectators seated within the optimal viewing distances and angles specified by FIFA.

### Example

Proportion of spectator areas within optimal and maximal viewing distances:	100%
---	------

As the target of 100% has been achieved, SBAT for Stadia awards a score of 1.0 – see page 57.

## Overall score for spectator comfort

The individual scores of each of the five sub-categories under spectator comfort are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

*Adding up the results of the examples mentioned above, the total score for materials and components is 5.0 – a perfect score!*

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>S01</b>	<b>SPECTATOR COMFORT</b>				<b>5.0</b>
<b>SO1.1</b>	Shading	Percentage of seating shaded at midday	100%	100%	1.0
<b>SO1.2</b>	Ventilation	Measures to support air movement within the stadium	100%	100%	1.0
<b>SO1.3</b>	Large screens	Number of large screens provided	2.0	2.0	1.0
<b>SO1.4</b>	Crowding	Running length of counter space per spectator	1.5	3.5	1.0
<b>SO1.5</b>	Proximity	Proportion of spectators within the optimal (90 m from centre line) and maximal viewing distances	100%	100%	1.0

Key performance area:

# society

## Category: SO2 Inclusive environments

In the case of inclusive environments, the targets set by *SBAT for Stadia* are as follows:

SO2.1 Transport	400
SO2.2 Way-finding	1
SO2.3 Space	100%
SO2.4 Toilets	100%
SO2.5 Distribution	100%

### SO2.1 Transport

**Measurable: distance (metres) between seating and transport facilities.**

Indicate the distance between seating for disabled people in the stadium and adjacent transport facilities.

#### Example

What is the average distance travelled by people with disabilities to the following facilities from the seating area?

Parking	60
Drop-off points	150

In this example, the average distance is 105 m – much better than the target of 400 m. SBAT for Stadia, therefore, awards a score of 1.0 – see page 61.

## S02.2 Way-finding

**Measurable: initiatives to improve access and way finding**

Indicate way-finding measures in place by answering “yes” or “no”.

### Example

The way-finding strategy will be enhanced with the following:

Use of pictograms/icons	No
Manned reception points and assistance	No
Tactile paving	No
Website with information on accessibility	No
Accessible lift (Braille/speaker)	No

*In this example, none of the stipulated way-finding strategies is in place and SBAT for Stadia, therefore, awards a score of zero – see page 61.*

## S02.3 Space

**Measurable: percentage of main levels that accommodate disabled people**

Indicate the number of levels that can accommodate disabled people as well as the total number of levels in the stadium.

### Example

Number of accessible main levels	7
Number of main levels	7

*The target is for all levels to be accessible to disabled people. In the case of this example, the target is met and SBAT for Stadia awards a score of 1.0 – see page 61.*

Key performance area:

# society

**Category: S02 Inclusive environments**

## S02.4 Toilets

**Measurable: distance (metres) between washing closets for disabled people and their seats**

Indicate whether or not the toilets meet SABS specifications and the distance of the toilets from the seats for disabled people.

### Example

Toilets are compliant with SABS Part P	Yes
These facilities for people with disabilities are “x” m from the seating:	
Toilets	25.0

*In this example, all toilets meet the SABS standard and are within reach of disabled people. A score of 1.0 is, therefore, awarded by SBAT for Stadia – see page 61.*

## S02.5 Distribution

**Measurable: distribution of facilities for disabled people**

Answer “yes” or “no” to indicate whether or not facilities for disabled people are distributed evenly throughout all levels in the stadium.

### Example

Facilities for people with disabilities are distributed evenly	Yes
--	-----

*As the target is met, SBAT for Stadia awards a score of 1.0 – see page 61.*

## Overall score for inclusive environments

The individual scores of each of the five sub-categories under inclusive environments are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for inclusive environment is 4.0 – an impressive performance considering that the highest possible score is 5!

	Criteria	Indicative performance measure	Target	Measured	Points
<b>SO2</b>	<b>INCLUSIVE ENVIRONMENTS</b>				<b>4.0</b>
<b>SO2.1</b>	Transport	Average distance from seating to transport facilities provided for people with disabilities	400	105	1.0
<b>SO2.2</b>	Way-finding	Access and way-finding to and around the stadium will be enhanced for people with limited literacy and people with disabilities	100%	0%	0.0
<b>SO2.3</b>	Space	Percentage of main levels within the stadium that can accommodate people with disabilities	100%	100%	1.0
<b>SO2.4</b>	Toilets	Distance of WCs for people with disabilities from seating	100%	100%	1.0
<b>SO2.5</b>	Distribution	Facilities (seating, WCs and parking) for people with disabilities are clustered or evenly distributed within the each level of the stadium	100%	100%	1.0

Key performance area:

# society

## Category: S03 Access to facilities

In the case of access to facilities, the targets set by *SBAT for Stadia* are as follows:

<b>S03.1</b>	Accommodation	1
<b>S03.2</b>	Banking	6
<b>S03.3</b>	Pedestrian/cycle routes	20%
<b>S03.4</b>	Food	100%
<b>S03.5</b>	Drink	100%

### S03.1 Accommodation

*Measurable: number of beds available within 4 km radius*

Indicate the number of hotel or bed-and-breakfast beds available within a 4 km radius of the stadium as well as the seating capacity of the stadium.

#### Example

Number of beds within 4 km of stadium	27 129
Seating capacity (post-2010)	55 000

*The target is that beds equivalent to 50% of the seating capacity must be available within a 4 km radius of the stadium. In this example, 49% is achieved and SBAT for Stadia, therefore, awards a score of 1.0 – see page 65.*

### S03.2 Banking

**Measurable: number of ATMs available within 400 m of the stadium.**

Indicate the number of ATMs available.

#### Example

Number of ATMs provided	1
-------------------------	---

The target is set for six ATMs to be available. However only one is provided and SBAT for Stadia awards a score of 0.2 – see page 65.

### S03.3 Pedestrian and cycle routes

**Measurable: number of pedestrians accommodated per hour**

Indicate the number of pedestrians the stadium precinct is designed to handle per hour.

#### Example

Number of pedestrians per hour planned for at peak	10 000
--	--------

The target is to accommodate pedestrian movement per hour equivalent to 20% of the stadium's seating capacity. In this example, 18% is achieved and SBAT for Stadia awards a score of 0.9 – see page 65.

Key performance area:

# society

Category: S03 Access to facilities

## S03.4 Food

**Measurable: proportion of spectators able to purchase food within one hour of an event**

Indicate the percentage of spectators able to purchase food within an hour before, during or after an event.

### Example

Proportion of spectators able to purchase food	100%
--	------

*In this example, the target of 100% has been met and SBAT for Stadia awards a full score of 1.0 – see page 65.*

## S03.5 Drinks

**Measurable: proportion of spectators able to purchase drinks within one hour of an event**

Indicate the percentage of spectators able to purchase drinks within an hour before, during or after an event.

### Example

Proportion of spectators able to purchase food	100%
--	------

*In this example, the target of 100% has been met and SBAT for Stadia awards a full score of 1.0 – see page 65.*

## Overall score for access to facilities

The individual scores of each of the five sub-categories under access to facilities are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for inclusive environment is 4.1 – an impressive performance considering that the highest possible score is 5!

	<i>Criteria</i>	<i>Indicative performance measure</i>	<i>Target</i>	<i>Measured</i>	<i>Points</i>
<b>SO3</b>	<b>ACCESS TO FACILITIES</b>				<b>4.1</b>
<b>SO3.1</b>	Accommodation	Number of hotel/B&B beds available within 4 km radius of the stadium	50%	49%	1.0
<b>SO3.2</b>	Banking	Number of ATMs within the stadium or within 400 m of the stadium	6	1	0.2
<b>SO3.3</b>	Pedestrian/cycle routes	Stadium effectively links into the local area through pedestrian and cycle routes with adequate capacity (number of people per hour)	20%	18%	0.9
<b>SO3.4</b>	Food	Proportion of spectators able to purchase food within one hour before, during and after an event	100%	100%	1.0
<b>SO3.5</b>	Drink	Proportion of spectators able to purchase drinks within one hour before, during and after an event	100%	100%	1.0

Key performance area:

# society

## Category: S04 Participation and control

In the case of participation and control, the targets set by *SBAT for Stadia* are as follows:

<b>SO4.1</b>	Environmental control	100%
<b>SO4.2</b>	Role players	100%
<b>SO4.3</b>	Social spaces	100%
<b>SO4.4</b>	Shared access	100%
<b>SO4.5</b>	Local community	100%

### S04.1 Environmental control

**Measurable: mix of local environmental control opportunities**

Answer “yes” or “no” when asked about local environmental control measures accommodated.

#### Example

The following local environmental controls are provided:

HVAC controls within each room	Yes
Light controls within each room	Yes
Opening windows/sliding doors	Yes

In this example, all the stipulated measures are accommodated so SBAT for Stadia awards a score of 1.0 – see page 69.

## S04.2 Role players

### *Measurable: mix of stakeholders involved*

Answer “yes” or “no” when asked about stakeholder forums in place as well as the frequency of their meetings.

#### Example

The stakeholders have the following forums:

Safety	Yes
Security	Yes
Environmental management	Yes
Community groups	Yes
NGO representatives	No
How many times a year do members meet?	12

*In this example 80% of the stipulated stakeholder forums are in place. SBAT for Stadia, therefore, awards a score of 0.8 – see page 69.*

## S04.3 Social spaces

### *Measurable: mix of community or social spaces provided*

Answer “yes” or “no” when asked about available social facilities.

#### Example

The following community/social facilities are accommodated:

Kitchen	No
Halls	No
Conference/meeting rooms	No
Offices	Yes
Other	Yes

*In this example, 56% of the stipulated mix of social spaces is accommodated. SBAT for Stadia, therefore, awards a score of 0.6 – see page 69.*

Key performance area:

# society

**Category: S04 Participation and control**

## S04.4 Shared access

**Measurable: sharing of facilities with the community**

Indicate core facilities shared with the community and how regularly this happens.

### Example

The following core stadium facilities are shared with the local community:

Pitch/track	Yes
Changing rooms	Yes
Stand	No
Gym	Yes
How many times a week does the community use the facilities?	5

In this example, 75% of the stipulated facilities are shared with the community. SBAT for Stadia, therefore, awards a score of 0.8 – see page 69.

## S04.5 Local community

**Measurable: existence of a local community forum**

Indicate whether or not a community forum exists and, if so, how regularly it meets.

### Example

Is there a community forum?	Yes
How many times a year do members meet?	12

As the target has been met, SBAT for Stadia awards a score of 1.0 – see page 69.

## Overall score for participation and control

The individual scores of each of the five sub-categories under participation and control are added up automatically by *SBAT for Stadia* to determine the overall score for this category. The score is represented graphically in the *SBAT for Stadia* report diagram.

### Example

Adding up the results of the examples mentioned above, the total score for participation and control is 4.2 – a high score considering the most points achievable are 5!

	Criteria	Indicative performance measure	Target	Measured	Points
<b>SO4</b>	<b>PARTICIPATION AND CONTROL</b>				<b>4.2</b>
SO4.1	Environmental control	Local environmental control (local switching, opening windows) for people in enclosed spaces (VIP suites, media suites etc)	100%	100%	1.0
SO4.2	Role players	A management structure/ forum of key stakeholders (municipality, local transport, waste, management, community groups and NGO representatives) affords appropriate partnership and greening initiatives at regular meetings	100%	80%	0.8
SO4.3	Social spaces	Community/social facilities (play grounds, sporting facilities) are provided as part of the development for the local community	100%	56%	0.6
SO4.4	Shared access	The core stadium facilities are shared with the local community on a regular basis.	100%	75%	0.8
SO4.5	Local community	A forum for local-community members to discuss stadium matters meets regularly	100%	100%	1.0

Key performance area:

# society

Category: **S05 Education, health and safety**

In the case of education, health and safety, the targets set by *SBAT for Stadia* are as follows:

<b>S05.1</b>	Education	100%
<b>S05.2</b>	Website	100%
<b>S05.3</b>	Health	100%
<b>S05.4</b>	Health and safety	100%
<b>S05.5</b>	Security	100%

## **S05.1 Education**

*Measurable: existence of a publicly-accessible visitors centre*

Indicate whether or not this type of facility exists.

### **Example**

Is there a visitors' facility?	Yes
--------------------------------	-----

As the target has been met, SBAT for Stadia awards a score of 1.0 – see page 73.

## S05.2 Website

**Measurable: publicly-accessible website**

Indicate whether or not a website exists and how many times per month it is updated.

### Example

Is there a publicly-available stadium website?	Yes
URL <a href="http://www.southafrica.info">http://www.southafrica.info</a>	
How many times a year is this updated?	once

*As the website is not updated continuously, SBAT for Stadia awards a score of only 0.1 – see page 73.*

## S05.3 Health

**Measurable: proportion of site workers trained in HIV/Aids awareness**

Indicate the percentage of site workers who have received this training.

### Example

Does the labourer training include HIV/Aids awareness training?	Yes
What proportion of site workers has had this training?	80%

*As the target is 100% but only 80% has been met, SBAT for Stadia awards a score of 0.8 – see page 73.*

Key performance area:

# society

**Category: S05 Education, health and safety**

## S05.4 Health and safety

**Measurable: percentage of site workers who have received health and safety training**

Indicate the percentage of site workers who have received this training.

### Example

Does labourer training include health and safety?	Yes
What proportion of site workers has received this training?	100%

As the target of 100% has been met, SBAT for Stadia awards a score of 1.0 – see page 73.

## S05.5 Security

**Measurable: coverage by CCTV**

Indicate whether or not CCTV monitoring is available in the stadium.

### Example

Will CCTV coverage be provided in and around the stadium?	Yes
---	-----

As the target has been met, SBAT for Stadia awards a score of 1.0 – see page 73.

## Overall score for education, health and safety

The individual scores of each of the five sub-categories under education, health and safety are added up automatically by *SBAT for Stadia* to determine the overall score in this category. The score is represented graphically in the *SBAT for Stadia* report diagram

### Example

Adding up the results of the examples mentioned above, the total score for education, health and safety is 3.9 – an above-average score considering 5 is the highest achievable.

	Criteria	Indicative performance measure	Target	Measured	Points
<b>S05 ACCESS TO FACILITIES</b>					<b>3.9</b>
<b>S05.1</b>	Education	Publicly-accessible visitor facility to describe the construction of the stadium to visitors	100%	100%	1.0
<b>S05.2</b>	Website	Publicly-accessible and regularly-updated stadium website	100%	8%	0.1
<b>S05.3</b>	Health	Proportion of site workers trained in HIV/Aids awareness	100%	80%	0.8
<b>S05.4</b>	Health and safety	Proportion of site workers trained in health and safety matters	100%	100%	1.0
<b>S05.5</b>	Security	Percentage of public areas (within and around the stadium) with CCTV coverage	100%	100%	1.0

### **SBAT for Stadia development by**

Jeremy Gibberd and Sizo Sebake, CSIR, as part of the review of  
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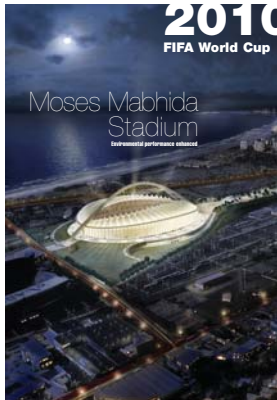
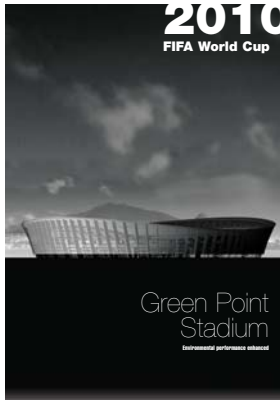
This electronic manual forms part of a series of publications covering the sustainability of South Africa's 2010 FIFA World Cup stadia. Apart from the *SBAT for Stadia* manual, the series comprises printed and electronic booklets on five participating 2010 FIFA World Cup stadia and training venues, as well as an executive summary.

A booklet on lessons learned relating to the greening of the stadia is also available.

For a copy of this booklet,  
visit the UEMP website: [www.uemp.co.za](http://www.uemp.co.za)

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**Booklets showcasing the sustainability performance of several of South Africa's 2010 FIFA World Cup match and training venues are available from the Urban Environmental Management Programme (UEMP).**



**Five stadia have been reviewed in accordance with the criteria set out by the Sustainable Building Assessment Tool. Royal Bafokeng Stadium in Rustenburg and Peter Mokaba Stadium in Polokwane were also reviewed.**

**Designers and managers of sports stadia across the world can benefit from South Africa's 2010 FIFA World Cup experience by adopting the Sustainable Building Assessment Tool (SBAT) for their projects.**

**This manual unpacks how to use SBAT's spreadsheet formulas to determine the sustainability performance of a stadium.**



**environmental affairs**  
Department  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA



Urban Environmental Management Programme



# SBAT for Stadia v0.14

August 2009

## 1. Introduction

This spreadsheet presents the *Sustainable Building Assessment Tool (SBAT) for Stadia* tool that was used to review four (4) 2010 FIFA World Cup stadia between 2007 and 2009. An SBAT appraisal aims to provide an overview of the sustainability performance of the stadium and is not intended to provide a highly detailed assessment.

The workbook consists of six (6) worksheets, namely:

### a) Questionnaire

The first tab (grey) presents the questionnaire, which was designed to provide a mechanism for effective information gathering. Fill in the coloured cells with the required data; grey (general), blue (economic); green (environmental) and orange (social). Related inputs are calculated and directed to the relevant "Performance Areas" tabs for the awarding of points.

### b) Targets

It should be noted that the SBAT draws on available benchmarks to set targets (second cyan tab), in many cases local information is not readily available and international benchmarks / targets have been used. The international benchmarks may be inappropriate and should be replaced with targets drawn from local best practice when these become available.

**note that targets should be reassessed for different contexts and updated to reflect technological advances.**

**It is important to**

Related targets are directed to the relevant "Performance Areas" tabs for the awarding of points.

### c) Performance areas (Economic, Environmental and Social)

The blue, green and orange tabs for the performance areas for the economic, environmental and social aspects, respectively, provide an outline of the criteria and indicators for each performance area. Figures related to each indicator from the "Questionnaire" and "Targets" tabs are divided one into the other in order to obtain a score out of 1. Where a score of more than 1 is obtained, a score of 1 is awarded.

### d) SBAT Report

The results of the points awarded in the performance result areas are presented through the SBAT report in the last tab (yellow). This is a radar diagram that provides the user with an overview of the sustainability performance of the stadium. The higher rating (i.e. 4, 5) indicate good performance and lower ratings (i.e. 0, 1) indicate poor performance.

Below the radar diagram a table provides the average ratings for the three sustainability performance areas.

## 2. SBAT for Stadia Manual

An SBAT for Stadia manual has been developed to support the use of this manual. This can be obtained electronically from [www.uemp.co.za](http://www.uemp.co.za).

## 3. Contact for additional information

For more details on the tool you can contact:

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		Target	Source	Link
<b>EC 1 Local economy</b>				
EC 1.1	Local labour force	80%	DPW	
EC 1.2	Local building materials	80%	JG	
EC 1.3	Local components and equipment	80%	JG	
EC 1.4	Local furniture and fittings	80%	JG	
EC 1.5	Maintenance	40%	LOC	
<b>EC 2 Efficiency</b>				
EC 2.1	Capacity	60%	??	
EC 2.2	Occupancy	60%	??	
EC 2.3	Space per spectator	1.05	Nagai Stadium	
EC 2.4	Shared parking	40%	??	
EC 2.5	Multiple use	100%	??	
<b>EC 3 Adaptability</b>				
EC 3.1	Alternative uses	67%	??	
EC 3.2	External space	80%	??	
EC 3.3	Services	80%	??	
EC 3.4	Media flexibility	100%	??	
EC 3.5	Suite flexibility	100%	??	
<b>EC 4 Ongoing costs</b>				
EC 4.1	Water consumption	4.0	per zone (pitch, toilets, VIP spaces, retail)	
EC 4.2	Energy consumption	4.0	per zone (lighting, HVAC, VIP spaces, retail)	
EC 4.3	Cost centres	80%	??	
EC 4.4	Maintenance & cleaning	100%	??	
EC 4.5	Facilities management	100%	?	
<b>EC 5 Capital Costs</b>				
EC 5.1	Training	1%	SETA training levy	
EC 5.2	Labour intensity	2.4	Green Point	
EC 5.3	SMME support	40%	LOC	
EC 5.4	Sustainable technology	3%	??	
EC 5.5	Private sector funding	2%	??	
<b>EN 1 Water</b>				
EN 1.1	Rainwater	100%	??	
EN 1.2	Water Efficiency	100%	??	
EN 1.3	Runoff	50%	??	
EN 1.4	Grey water	100%	??	
EN 1.5	Planting	100%	??	
<b>EN 2 Energy</b>				
EN 2.1	Location	80%	??	
EN 2.2	Passive environmental control	100%	??	
EN 2.3	Energy efficiency	0.145	Green Point	
EN 2.4	Control and BMS	100%	??	
EN 2.5	Renewable energy	20%	??	
<b>EN 3 Waste</b>				
EN 3.1	Waste management facilities	100%	??	
EN 3.2	Waste minimisation - front house	100%	??	
EN 3.3	Waste minimisation - back house	100%	??	
EN 3.4	Demolition	100%	??	
EN 3.5	Construction waste	90%	Sydney2000 Benchmark	
<b>EN 4 Site</b>				
EN 4.1	Brownfield site	100%	??	
EN 4.2	Neighbouring buildings	100%	??	
EN 4.3	Vegetation	50%	??	
EN 4.4	Construction process	100%	Green Point	
EN 4.5	Landscape inputs	75%	??	
<b>EN 5 Materials &amp; Components</b>				
EN 5.1	Roof	10%	??	
EN 5.2	Concrete	50%	??	
EN 5.3	Roof efficiency	139	Allianz	
EN 5.4	Superstructure efficiency	4.3	Allianz Stadium	
EN 5.5	Hazardous materials	100%	??	
<b>SO 1 Spectator Comfort</b>				
SO 1.1	Shading	100%	FIFA page 104	
SO 1.2	Ventilation	100%	??	
SO 1.3	Large screens	2	??	
SO 1.4	Crowding	1.500	FIFA	Running Length 1,0 - 1,5m per 1000
SO 1.5	Proximity	100%	FIFA	
<b>SO 2 Inclusive Environments</b>				
SO 2.1	Transport	400	??	
SO 2.2	Wayfinding	1	??	
SO 2.3	Space	100%	??	
SO 2.4	Toilets	100%	??	
SO 2.5	Distribution	100%	??	
<b>SO 3 Access to Facilities</b>				
SO 3.1	Accommodation	1	JG	
SO 3.2	Banking	0	??	
SO 3.3	Pedestrian / cycle routes	20%	??	
SO 3.4	Food	100%	??	
SO 3.5	Drink	100%	??	
<b>SO 4 Participation &amp; Control</b>				
SO 4.1	Environmental control	100%	??	
SO 4.2	Role players	100%	??	
SO 4.3	Social spaces	100%	??	
SO 4.4	Shared access	100%	??	
SO 4.5	Local community	100%	??	
<b>SO 5 Education, Health &amp; Safety</b>				
SO 5.1	Education	100%	??	
SO 5.2	Website	100%	??	
SO 5.3	Health	100%	??	
SO 5.4	Health & Safety	100%	Sidney Olympics	
SO 5.5	Security	100%	??	

# SBAT for Stadia Questionnaire

<b>Project Details</b>	
Name of Stadium	
Location	
Province	
Seating Capacity (post 2010)	
Total Construction Costs (R')	
Private Sector Funding (R')	
Stadium Site Area (m2)	
Stadium Gross Floor Area (m2)	
Area Stadium footprint (m2)	
<b>Duration of Construction</b>	
Start Date	
Completion Date	
Total days	0
Total years	0.0
Working days	230
Total working days	0.0
<b>Client Details</b>	
Client	
Contact Person	
Telephone No.	
E-mail address	
<b>Professional Team</b>	
Project Manager	
Architect	
Urban Designer	
Structural Engineer	
Civil Engineer	
Quantity Surveyor	
Wet Services Engineer	
Acoustic Engineer	
Mechanical Engineer	
Electrical Engineer	
Landscape Architect	
Transport Engineers	
Facilities Manager	
<b>Assessor Details</b>	
Company	
Contact name	
Telephone	
Fax no.	
E-mail address	
Assessor	
Date of assessment	

<b>EC 1</b>	<b>Local economy</b>	
EC 1.1	Local labour force	Proportion of local (from within 50km of the site) site workers.
		<u>Labourers from within 50km of the site</u> Total no. of labourers on site
EC 1.2	Local building materials	Proportion of building materials (concrete, cement, bricks, steel, etc) by value sourced from within the country.
		Concrete Steel Bricks Cement
		<u>Rand value of building materials sourced from within the country</u> Total Rand value of building material R -
EC 1.3	Local components and equipment	Proportion of components and equipment by value sourced from within the country.
		Components Equipment
		<u>Rand value of components &amp; equipment sourced from within the country</u> Total Rand value of components & equipmer R -
EC 1.4	Local furniture and fittings	Proportion of loose / built-in furniture and fittings by value sourced from within the country.
		Furniture Fittings
		<u>Rand value of furniture &amp; fittings sourced from within the country</u> Total Rand value of furniture & fitting R -
EC 1.5	Maintenance	Proportion of maintenance and repairs (by value) required by the finished stadium that can be undertaken by local SMMEs (turnover of <R5m).
		Maintenance and repairs to be undertaken by SMME Annual estimated maintenance and repairs cost

<b>EC 2</b>	<b>Efficiency</b>		
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EC 2.1	Capacity	Average capacity of stadium when in use (post 2010) in (% of full occupancy).
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No. of spectators expected to attend events post 2010   
 Total no. of spectators -

EC 2.2	Occupancy	No. of days per year that the stadium will be used when operational (post 2010).
--------	-----------	--

Total no. of planned days   
 No. weekend days

EC 2.3	Space per spectator	Total area of the stadium (excluding parking) per spectator.
--------	---------------------	--

Total stadium floor area -  
Total no. of spectators -

EC 2.4	Shared parking	Proportion of parking shared when stadium not in use.
--------	----------------	---

Parking will be shared regularly with local business community

No. of shared parking bays   
 Total no. of parking bays   
 (multiplied by)  
No. of days parking is used   
 Total no. of working days

EC 2.5	Multiple use	No. of additional (non stadium) facilities (retail, offices) incorporated in the stadium.
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The following additional (non-stadium) functions have been incorporated

Retail   
 Offices   
 Multi-purpose halls   
 Kitchens

<b>EC 3</b>	<b>Adaptability</b>		
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EC 3.1	Alternative uses	No. of different activities the stadium has been designed to accommodate (i.e. athletics, music performance etc).
--------	------------------	---

The following activities will be accommodated in the stadium

Soccer / Rugby   
 Athletics   
 Entertainment / Cultural events

EC 3.2	External space	Proportion of flat external space (as a proportion of stadium floor area) that has been designed to extend the functionality (support ancillary functions such as catering etc) of the stadium.
--------	----------------	---

Area of flat external space within site   
Stadium Gross Floor Area (m2) -

EC 3.3	Services	Services (i.e. electrical, water, sewage, communication points) for which provision has been made in and around the stadium to support temporary accommodation / events (i.e. catering during World Cup)
--------	----------	--

The following services have been provided

Electricity   
 Water   
 Sewerage   
 Stormwater management   
 Communication Points

EC 3.4	Media flexibility	Proportion of media spaces (by floor area) that can be adapted and expanded easily.
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Potential addition to media space   
Area of media spaces

EC 3.5	Suite flexibility	Proportion of VIP spaces (by floor area) that can be adapted and expanded easily.
--------	-------------------	---

Potential addition to VIP suite space   
Area of VIP suites

<b>EC 4</b>	<b>Ongoing costs</b>	
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EC 4.1	Water consumption	No. of meters / submeters to monitor water consumption.
--------	-------------------	---

No. of water meters

EC4.2	Energy consumption	No. of meters / submeters to monitor energy consumption.
-------	--------------------	--

No. of energy meters

EC 4.3	Cost centres	Privately used / tenanted areas (retail, VIP suites) will be charged for energy consumption.
--------	--------------	--

Will the tenants of these spaces be charged for energy consumption

EC4.4	Maintenance & cleaning	Methods for cleaning the stadium are easy without specialist equipment.
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How are the following building elements cleaned?

Roof   
 Façade   
 Seating

EC4.5	Facilities management	Measures taken to ensure that the operation of the stadium is efficient and sustainable.
-------	-----------------------	--

Has a facilities manager been appointed   
 Has a facilities manager been consulted in the design of the stadium   
 Has a facilities manager been consulted in the development of the tender for the stadium?

<b>EC 5</b>	<b>Capital Costs</b>
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EC 5.1	Training	Budget allowance for site worker training.
--------	----------	--

No. of labourers trained 0

Rand value of labourer training   
 Total Rand value of construction R -

EC5.2	Labour intensity	No. of person days of direct employment (on site - for construction) created through the construction of the stadium.
-------	------------------	---

**Person years**  
 Number of labourers on site 0  
 x  
 Total working days 0.0  
 Working days 230  
 =  
 equals to 0.0

**Million rands spent**  
 Cost of Construction R -  
 1 million rands R 1,000,000.00  
 =  
 equals to 0.0

Person years per million rand spent

EC 5.3	SMME support	Proportion of capital value of the project undertaken by SMME contractors.
--------	--------------	--

Rand value of SMMEs used for construction and procurement   
 Rand value of construction and procurement R -

EC5.4	Sustainable technology	Budget allowance for sustainable / innovative technologies.
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Rand value of sustainable technologies used R -  
 Total Rand value of construction R -

EC 5.5	Private sector funding	Private sector funding / support leveraged for the project.
--------	------------------------	---

Rand value of private sector funding R -  
 Total Rand value of construction R -

<b>EN 1</b>	<b>Water</b>		
EN 1.1	Rainwater	Provision made to harvest rainwater.	
			Rainwater harvesting system <input type="text"/>
EN 1.2	Water Efficiency	Provision made to minimise water consumption through water efficient devices.	
			The following water efficient devices have been provide
			Waterless urinals <input type="text"/>
			Dual flush toilets / Reduced flush toilet <input type="text"/>
			Self closing metering valves and demand tap <input type="text"/>
			Low flow showers <input type="text"/>
			Flow regulators and flow controller aerator <input type="text"/>
			Baths in place of Jacuzzis <input type="text"/>
EN 1.3	Runoff	Proportion of permeable surfaces within the stadium site.	
			Stadium Site Area (m2) <input type="text"/> 0
			Pitch Area (m2) <input type="text"/>
			Permeable landscaped Area (m2) <input type="text"/>
			Proportion of permeable surfaces to site area <input type="text"/>
EN 1.4	Grey water	Provision made to reuse grey water on site.	
			Proportion of grey water recycled <input type="text"/>
EN 1.5	Planting	Proportion of planting on site that has low / no water requirements.	
			Proportion of vegetation with low water requirements water used stadium <input type="text"/>
<b>EN 2</b>	<b>Energy</b>		
EN 2.1	Location	Public transport facilities available in close proximity to the stadium.	
			The following public transport facilities (400m of the stadium) will be used by spectators as follows:
			Rail <input type="text"/>
			Bus <input type="text"/>
			Mini-bus taxi <input type="text"/>
			Shuttle <input type="text"/>
EN 2.2	Passive environmental control	Environmental control strategies used to cool / heat enclosed accommodation.	
			The following heating / cooling strategies have been use
			Cross ventilation <input type="text"/>
			Shading devices to protect spectators from low angle east / west sun ang <input type="text"/>
			Cladding around façade <input type="text"/>
EN 2.3	Energy efficiency	Total kVA installed of electrical equipment in the stadium per spectator.	
			Total KVA installed electrical equipmen <input type="text"/>
			Seating Capacity (post 2010) <input type="text"/> 0
			Total KVA / spectator <input type="text"/>
EN 2.4	Control and BMS	Control systems in place to minimise energy consumption.	
			The following systems are in place
			Building Management System <input type="text"/>
			Central Controls <input type="text"/>
EN 2.5	Renewable energy	Proportion of the annual kWh of electrical energy required for the stadium that can be met through renewable energy sources.	
			kWh of renewable energy provided <input type="text"/>
			Total kWh conventional energy <input type="text"/>

<b>EN 3</b>	<b>Waste</b>		
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EN 3.1	Waste management facilities	Provision of separate containers for different waste streams (i.e. food, plastic, paper) within the spectator seating area.	
--------	-----------------------------	---	--

The following separate containers have been provide

Food	
Paper	
Plastic	

EN 3.2	Waste minimisation - front house	Provision of separate containers for different waste streams (i.e. food, plastic, paper) within the retailers area.	
--------	----------------------------------	---	--

The following separate containers have been provide

Food	
Paper	
Plastic	
Tins	
Use of reuseable container:	

EN 3.3	Waste minimisation - back house	Provision of adequate storage space for waste management in back of house facilities.	
--------	---------------------------------	---	--

Area to manage waste has been provide

Area of waste management facilit

Waste management area per spectato

EN 3.4	Demolition	Proportion of recycled / reused components from the demolition of the stadium structure.	
--------	------------	--	--

What proportion of the existing stadium structure has been recycle

EN 3.5	Construction waste	Proportion of construction waste recycled (with the rest going to landfill).	
--------	--------------------	--	--

Construction waste is:

Weight (tonnes) of recycled construction materia

Total weight (tonnes) of construction weigh

What proportion of construction waste has been recycle

<b>EN 4</b>	<b>Site</b>		
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EN 4.1	Brownfield site	The site for the stadium was already disturbed or previously developed (Brownfield).	
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Is this a Brownfield site?

EN 4.2	Neighbouring buildings	Measures in place to mitigate negative impacts of the stadium i.e. noise, lighting, traffic) on the surrounding areas.	
--------	------------------------	--	--

The following measures have been put in place to reduce negative impacts:

Construction traffic is restricted to off-peak hours

Construction measures to reduces spread of dust / so

Appointed "person" to ensure minimal negative impact of stadium construction o

neighbouring buildings

Stadium does not cast a shadow on neighbouring building

Light pollution has been reduced through roof / lighting desig

Noise pollution has been reduced through roof desig

EN 4.3	Vegetation	Proportion of site with vegetation cover.	
--------	------------	---	--

Proportion of permeable surfaces to site area -

Other vegetated area

Stadium Site Area (m2) -

EN 4.4	Construction process	Measures have been taken to minimise site disturbance (minimisation of area disturbed, cut and fill requirement).	
--------	----------------------	---	--

The following measures were taken to minimise site disturbanc

Construction limited to site area

Use of design to minimise cut and fill / accommodates site topograph

Topsoil recovery

Use of fill from local construction sites

EN 4.5	Landscape inputs	Proportion of the landscaping that does not require mechanical equipment (i.e. lawn cutting) and / or artificial inputs such as weed killers, fertilisers and pesticides.	
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Area of vegetation requiring mechanical equipment and artificial inputs

Area covered with vegetatio -

<b>EN 5</b>	<b>Materials &amp; Components</b>		
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EN 5.1	Roof	Recycled content within the load-bearing roof structure.	
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Recycled content of the load-bearing roof structure

EN 5.2	Concrete	Average recycled content of concrete being used.	
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Recycled content of concrete

EN 5.3	Roof efficiency	Weight of roof relative to area covered (kg/m2).	
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Weight of roof relative to area (with compression rings)

EN 5.4	Superstructure efficiency	Total tonnage of concrete per spectator that will be used in the stadium.	
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Weight of concrete (tonnes) /  
Seating Capacity (post 2010)

Weight / Spectator

EN 5.5	Hazardous materials	Screening procedures in place to avoid materials and finishes that maybe harmful to human health and indoor air quality.	
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The following hazardous materials have been used:  
 Materials that may off gas VOCs /composite board   
 Vinyl based materials   
 PVC based materials   
 Lead-based paints   
 HCFCs

<b>SO 1</b>	<b>Spectator Comfort</b>	
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SO 1.1	Shading	Percentage of seating shaded at midday.
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"x%" of the stadium is shaded at midday

SO 1.2	Ventilation	Measures to support air movement within the stadium.
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Spectators are kept cool by  
 Cross ventilation R -  
 Shading devices to protect spectators from low angle east / west sun angle R -  
 Cladding around façade R -

SO 1.3	Large screens	No. of large screens provided.
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No. of large screens

SO 1.4	Crowding	Running length of counter space per spectator.
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Running length of counter (m)   
 Seating Capacity (post 2010) 0  
 Length / spectator

SO 1.5	Proximity	Proportion of spectators are within the optimal (90m from centre line) and maximal viewing distances.
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Proportion of spectator areas that fall within the optimal and maximal viewing distances:

<b>SO 2</b>	<b>Inclusive Environments</b>	
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SO 2.1	Transport	Average distance from seating to transport facilities provided for people with disabilities.
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What is the average distance travelled by People with disabilities to the following facilities from the seating area?  
 Parking   
 Drop-off points

SO 2.2	Wayfinding	Access and wayfinding to and around the stadium will be enhanced for people with limited literacy and people with disabilities.
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The wayfinding strategy will be enhanced with the following:  
 Use of pictograms / icons   
 Manned reception points and assistance   
 Tactile paving   
 Website with information on accessibility   
 Accessible lift (braille / speaker)

SO 2.3	Space	Percentage of main levels within the stadium that can accommodate people with disabilities.
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No. of accessible main levels   
 No. of main levels

SO 2.4	Toilets	Distance of WCs for people with disabilities from seating.
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Toilets are compliant with SABS Part F   
 These facilities for people with disabilities are 'x'm from the seating area  
 Toilets

SO 2.5	Distribution	Facilities (i.e. seating, WCs, parking) for people with disabilities are clustered or evenly distributed within the each level of the stadium.
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Facilities for people with disabilities are evenly distributed

<b>SO 3</b>	<b>Access to Facilities</b>	
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SO 3.1	Accommodation	No. of hotel / B&B beds are available within 4km radius of the stadium.
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Number of beds within 4km of stadium   
Seating Capacity (post 2010) 0

SO 3.2	Banking	No. of ATMs within the stadium or within 400m of the stadium.
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Number of ATMs provided

SO 3.3	Pedestrian / cycle routes	Stadium effectively links into the local area through pedestrian and cycle routes with adequate capacity (number of people per hour).
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No. of pedestrians per hour planned for at peak

SO 3.4	Food	Proportion of spectators able to purchase food within 1 hour before, during and after an event.
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Proportion of spectators able to purchase food

SO 3.5	Drink	Proportion of spectators able to purchase drinks within 1 hour before, during and after an event.
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Proportion of spectators able to purchase drink

<b>SO 4</b>	<b>Participation &amp; Control</b>	
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SO 4.1	Environmental control	Local environmental control (local switching, openable windows) for people in enclosed spaces (VIP suites, media suites etc) exists.
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The following local environmental controls are provided:  
 HVAC controls within each room   
 Light controls within each room   
 Openable windows / sliding doors

SO 4.2	Role players	A management structure/forum of key stakeholders (municipality, local transport, waste, management, community groups and NGO representatives) enables appropriate partnership and greening initiatives to be pursued. Regular meetings occur.
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The stakeholders have the following forums:  
 Safety   
 Security   
 Environmental Management   
 Community groups   
 NGO representatives   
 How many times a year do members meet

SO 4.3	Social spaces	Community / social facilities (play grounds, sporting facilities) are provided as part of the development for the local community.
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The following community / social facilities are provided for:  
 Kitchen   
 Halls   
 Conference / meeting rooms   
 Offices   
 Other   
 List

How many times a week does the community use the facilities

SO 4.4	Shared access	The core stadium facilities are shared with the local community on a regular basis.
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The following core stadium facilities are shared with the local community:  
 Pitch / Track   
 Changing rooms   
 Stand   
 Gym

How many times a week does the community use the facilities

SO 4.5	Local community	A forum for local community members to discuss stadium matters meets regularly.
--------	-----------------	---

Is there a community forum? R -  
 How many times a year do members meet

SO 5	Education, Health & Safety	
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SO 5.1	Education	Publicly accessible visitor facility to explain the construction of the stadium to visitors.
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Is there a visitors' facility?

SO 5.2	Website	Publicly accessible and regularly updated stadium website.
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Is there a publicly available stadium website?   
 Uri:   
 How many times a year does this get updated?

SO 5.3	Health	Proportion of site workers have had HIV/Aids awareness training.
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Does the labourer training include HIV/Aids awareness training?

What proportion of site workers have had this training?

SO 5.4	Health & Safety	Proportion of site workers that have had health and safety training.
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Does the labourer training include health and safety?

What proportion of site workers have had this training?

SO 5.5	Security	Percentage of public areas (within and around the stadium) with CCTV coverage.
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Will CCTV coverage be provided in and around the stadium?

## Building Performance - Economic

Criteria		Indicative performance measure	Target	Measured	Points
<b>EC 1 Local economy</b>					
EC 1.1	Local labour force	Proportion of local (from within 50km of the site) site workers.	80%		
EC 1.2	Local building materials	Proportion of building materials (concrete, cement, bricks, steel, etc) by value sourced from within the country.	80%		
EC 1.3	Local components and equipment	Proportion of components and equipment by value sourced from within the country.	80%		
EC 1.4	Local furniture and fittings	Proportion of loose / built-in furniture and fittings by value sourced from within the country.	80%		
EC 1.5	Maintenance	Proportion of maintenance and repairs (by value) required by the finished stadium that can be undertaken by local SMMEs (turnover of <R5m).	40%		
<b>EC 2 Efficiency</b>					
EC 2.1	Capacity	Average capacity of stadium when in use (post 2010) in (% of full occupancy).	60%		
EC 2.2	Occupancy	No. of days per year that the stadium will be used when operational (post 2010).	60%		
EC 2.3	Space per spectator	Total area of the stadium (excluding parking) per spectator.	1.1		
EC 2.4	Shared parking	Proportion of parking shared when stadium not in use.	40%		
EC 2.5	Multiple use	No. of additional (non stadium) facilities (retail, offices) incorporated in the stadium.	100%		
<b>EC 3 Adaptability</b>					
EC 3.1	Alternative uses	No. of different activities the stadium has been designed to accommodate (i.e. athletics, music performance etc).	67%		
EC 3.2	External space	Proportion of flat external space (as a proportion of stadium floor area) that has been designed to extend the functionality (support ancillary functions such as catering etc) of the stadium.	80%		
EC 3.3	Services	Services (i.e. electrical, water, sewage, communication points) for which provision has been made in and around the stadium to support temporary accommodation / events (i.e. catering during World Cup)	80%		
EC 3.4	Media flexibility	Proportion of media spaces (by floor area) that can be adapted and expanded easily.	100%		
EC 3.5	Suite flexibility	Proportion of VIP spaces (by floor area) that can be adapted and expanded easily.	100%		
<b>EC 4 Ongoing costs</b>					
EC 4.1	Water consumption	No. of meters / submeters to monitor water consumption.	4		
EC4.2	Energy consumption	No. of meters / submeters to monitor energy consumption.	4		
EC 4.3	Cost centres	Privately used / tenanted areas (retail, VIP suites) will be charged for energy consumption.	80%		
EC4.4	Maintenance & cleaning	Methods for cleaning the stadium are easy without specialist equipment.	100%		
EC4.5	Facilities management	Measures taken to ensure that the operation of the stadium is efficient and sustainable.	100%		
<b>EC 5 Capital Costs</b>					
EC 5.1	Training	Budget allowance for site worker training.	1%		
EC5.2	Labour intensity	No. of person days of direct employment (on site - for construction) created through the construction of the stadium.	2.4		
EC 5.3	SMME support	Proportion of capital value of the project undertaken by SMME contractors.	40%		
EC5.4	Sustainable technology	Budget allowance for sustainable / innovative technologies.	3%		
EC 5.5	Private sector funding	Private sector funding / support leveraged for the project.	2%		

## Building Performance - Environmental

Criteria		Indicative performance measure	Target	Measured	Points
<b>EN 1 Water</b>					
EN 1.1	Rainwater	Provision made to harvest rainwater.	100%		
EN 1.2	Water Efficiency	Provision made to minimise water consumption through water efficient devices.	100%		
EN 1.3	Runoff	Proportion of permeable surfaces within the stadium site.	50%		
EN 1.4	Grey water	Provision made to reuse grey water on site.	100%		
EN 1.5	Planting	Proportion of planting on site that has low / no water requirements.	100%		
<b>EN 2 Energy</b>					
EN 2.1	Location	Public transport facilities available in close proximity to the stadium.	80%		
EN 2.2	Passive environmental control	Environmental control strategies used to cool / heat enclosed accommodation.	100%		
EN 2.3	Energy efficiency	Total kVA installed of electrical equipment in the stadium per spectator.	15%		
EN 2.4	Control and BMS	Control systems in place to minimise energy consumption.	100%		
EN 2.5	Renewable energy	Proportion of the annual kWh of electrical energy required for the stadium that can be met through renewable energy sources.	20%		
<b>EN 3 Waste</b>					
EN 3.1	Waste management facilities	Provision of separate containers for different waste streams (i.e. food, plastic, paper) within the spectator seating area.	100%		
EN 3.2	Waste minimisation - front house	Provision of separate containers for different waste streams (i.e. food, plastic, paper) within the retailers area.	100%		
EN 3.3	Waste minimisation - back house	Provision of adequate storage space for waste management in back of house facilities.	100%		
EN 3.4	Demolition	Proportion of recycled / reused components from the demolition of the stadium structure.	100%		
EN 3.5	Construction waste	Proportion of construction waste recycled (with the rest going to landfill).	90%		
<b>EN 4 Site</b>					
EN 4.1	Brownfield site	The site for the stadium was already disturbed or previously developed (Brownfield).	100%		
EN 4.2	Neighbouring buildings	Measures in place to mitigate negative impacts of the stadium i.e. noise, lighting, traffic) on the surrounding areas.	100%		
EN 4.3	Vegetation	Proportion of site with vegetation cover.	50%		
EN 4.4	Construction process	Measures have been taken to minimise site disturbance (minimisation of area disturbed, cut and fill requirement).	100%		
EN 4.5	Landscape inputs	Proportion of the landscaping that does not require mechanical equipment (i.e. lawn cutting) and / or artificial inputs such as weed killers, fertilisers and pesticides.	75%		
<b>EN 5 Materials &amp; Components</b>					
EN 5.1	Roof	Recycled content within the load-bearing roof structure.	10%		
EN 5.2	Concrete	Average recycled content of concrete being used.	50%		
EN 5.3	Roof efficiency	Weight of roof relative to area covered (kg/m2).	139.5		
EN 5.4	Superstructure efficiency	Total tonnage of concrete per spectator that will be used in the stadium.	4.3		
EN 5.5	Hazardous materials	Screening procedures in place to avoid materials and finishes that maybe harmful to human health and indoor air quality.	100%		

## Building Performance - Social

Criteria		Indicative performance measure	Target	Measured	Points
<b>SO 1 Spectator Comfort</b>					
SO 1.1	Shading	Percentage of seating shaded at midday.	100%		
SO 1.2	Ventilation	Measures to support air movement within the stadium.	100%		
SO 1.3	Large screens	No. of large screens provided.	2.0		
SO 1.4	Crowding	Running length of counter space per spectator.	1.5		
SO 1.5	Proximity	Proportion of spectators are within the optimal (90m from centre line) and maximal viewing distances.	100%		
<b>SO 2 Inclusive Environments</b>					
SO 2.1	Transport	Average distance from seating to transport facilities provided for people with disabilities.	400		
SO 2.2	Wayfinding	Access and wayfinding to and around the stadium will be enhanced for people with limited literacy and people with disabilities.	100%		
SO 2.3	Space	Percentage of main levels within the stadium that can accommodate people with disabilities.	100%		
SO 2.4	Toilets	Distance of WCs for people with disabilities from seating.	100%		
SO 2.5	Distribution	Facilities (i.e. seating, WCs, parking) for people with disabilities are clustered or evenly distributed within the each level of the stadium.	100%		
<b>SO 3 Access to Facilities</b>					
SO 3.1	Accommodation	No. of hotel / B&B beds are available within 4km radius of the stadium.	50%		
SO 3.2	Banking	No. of ATMs within the stadium or within 400m of the stadium.	0		
SO 3.3	Pedestrian / cycle routes	Stadium effectively links into the local area through pedestrian and cycle routes with adequate capacity (number of people per hour).	20%		
SO 3.4	Food	Proportion of spectators able to purchase food within 1 hour before, during and after an event.	100%		
SO 3.5	Drink	Proportion of spectators able to purchase drinks within 1 hour before, during and after an event.	100%		
<b>SO 4 Participation &amp; Control</b>					
SO 4.1	Environmental control	Local environmental control (local switching, openable windows) for people in enclosed spaces (VIP suites, media suites etc) exists.	100%		
SO 4.2	Role players	A management structure/forum of key stakeholders (municipality, local transport, waste, management, community groups and NGO representatives) enables appropriate partnership and greening initiatives to be pursued. Regular meeting occur.	100%		
SO 4.3	Social spaces	Community / social facilities (play grounds, sporting facilities) are provided as part of the development for the local community.	100%		
SO 4.4	Shared access	The core stadium facilities are shared with the local community on a regular basis.	100%		
SO 4.5	Local community	A forum for local community members to discuss stadium matters meets regularly.	100%		
<b>SO 5 Education, Health &amp; Safety</b>					
SO 5.1	Education	Publicly accessible visitor facility to explain the construction of the stadium to visitors.	100%		
SO 5.2	Website	Publicly accessible and regularly updated stadium website.	100%		
SO 5.3	Health	Proportion of site workers have had HIV/Aids awareness training.	100%		
SO 5.4	Health & Safety	Proportion of site workers that have had health and safety training.	100%		
SO 5.5	Security	Percentage of public areas (within and around the stadium) with CCTV coverage.	100%		