

DEVELOPING THE SUSTAINABLE BUILDING ASSESSMENT TOOL FOR STADIA

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Keywords: Sustainable Building Assessment Tool, SBAT, sustainability performance, FIFA 2010 World Cup, South Africa.

Summary

South Africa will, in 2010 host the continent's first FIFA World Cup, and in so doing attempt to continue the legacy of the Green Goal, developed for its predecessor, Germany, for the FIFA World Cup 2006. In preparation for the event, South Africa's Department of Environmental Affairs and Tourism (DEAT) aims to ensure that like the German stadia, South Africa stadia are environmentally sustainable, particularly in terms of water, energy and waste aspects.

A framework, specific to stadia, is required in order for the sustainability of each stadium to be rated. The Sustainable Building Assessment Tool (SBAT) has an existing structure; however its indicators are focused primarily on the assessment of commercial buildings.

The paper investigates a selection of indicators relevant for stadia and undertakes the development of an SBAT for Stadia for the environmental assessment of the 2010 World Cup stadia.

1 Introduction

South Africa will host the FIFA 2010 World Cup in three years' time and in keeping with the legacy left by the FIFA 2006 World Cup, the Department of Environmental Affairs and Tourism (DEAT) green status of the 2010 soccer stadiums is being reviewed.

1.1 Relevance

The review team proposed the use of the existing SBAT framework/methodology with adaptations to reflect the stadium building type. Table 1 outlines some differences between commercial buildings (for which the SBAT was originally intended) and stadium. This brief comparison shows that the two building types cannot be compared and therefore a tool targeting one building type (i.e. commercial building) cannot be used to measure the sustainability performance of the other (i.e. stadium) without being biased to the other (i.e. stadium).

Table 1 Comparison between a commercial building and a stadium

	BP Building, Cape Town	Green Point Stadium
Definition	A commercial building is a building type that is used for commercial use, including office buildings, warehouses, or retail (Wikipedia contributors, 2007).	A modern stadium is a predominantly outdoor place used for sports, concerts or other events. It consists of a field that is partly or completely surrounded by a structure designed to allow spectators to stand or sit and view the event (Wikipedia contributors, 2008).
Users	540 employees are accommodated in the building. At maximum capacity each employee has a space of 16,26m ² /occupant	50'000 spectators will seat on a structure that is open to most external element. Each spectator has a space of 1,97m ²
Occupancy	Approximately 260 days/year for a minimum of 12 hours/day	A minimum of 30 days/ year for a minimum of 4 hours/event
Area Analysis	More than 50% of the floor space is used for commercial purposes.	More than 50% of the floor space is used for spectator seating, VIP and media facilities.

Source: Sebake and Gibberd, 2008

1.2 Scope of Research

The research will present the development and use of the SBAT for Stadia assessment tool.

1.3 Research Aim and Questions

The aim of the research was to find an appropriate tool to assess the sustainability performance of the stadia for the 2010 FIFA World Cup.

The research question derived from this are:

- Can the SBAT be adapted to reflect the stadia building type?
- How will this new assessment tool be used?

1.4 Structure of the Paper

The paper is structured under the following headings; background, literature review, methodology, discussion and conclusions.

2 Background

2.1 South African Context

The Republic of South Africa is considered to be the most developed and modern country on the African continent. Since 1994, when the first democratic government was elected, South Africa has had positive economic growth (Knight, 2006). However, on the other side of these positive aspects, is a country which still has major social and economic problems, including poverty, inequality, unemployment, HIV/Aids and property and personal insecurity (Beall, et al, 2005).

It was in light of these socio-economic problems that South Africa's bid campaign for the 2010 Fédération Internationale de Football Association (FIFA) World Cup promised that it would ensure *"a lasting social legacy through the event and"* leverage *"the event to spread economic and social benefits beyond the borders of South Africa"* (DEAT, 2006). In May 2004, South Africa was awarded the rights to host the 2010 FIFA World Cup event. Ten stadiums will be constructed, upgraded or reconstructed for the event (FIFA, No date).

South Africa's hosting of the 2010 event presents an opportunity not only to run a successful event but also to achieve the political and social promises on which South Africa's bid campaign was based (Cornelissen, Swart 2006). In addition to fulfilling the promises made, South Africa will take on the challenge of upholding the standards set by Germany during the 2006 FIFA World Cup event, which was carried out in an environmentally accountable way.

South Africa's Department of Environmental Affairs and Tourism (DEAT) has addressed this challenge by setting up the Review of the Greening Status of the Stadia for the 2010 World Cup in South Africa project which is currently undertaken by Green by Design (GbD), Paul Carew Consulting (PjC) and the South African Council for Scientific and Industrial Research (CSIR). The project aims to review the sustainability initiatives that have been included in the host stadia, identify gaps and where appropriate provide recommendations.

2.2 SBAT framework

The SBAT framework includes criteria in all three sustainability aspects, namely, economic, environmental and social as outlined below (Gibberd, 2003):

- Economic: local economy; efficiency; adaptability and flexibility; ongoing costs; capital costs.
- Environmental: water; energy; waste; site; materials and components.
- Social: occupant comfort; inclusive environments; access to facilities; participation and control; education, health and safety.

Each of the 15 criteria has a set of five sub-criteria linked to indicators that are used to measure the sustainability performance of a proposed design or existing building (see Table 2).

Table 2 The Structure of the Sustainable Building Assessment Tool (SBAT)

Sustainability aspect	Criteria	Sub-Criteria	Indicator
EC ECONOMIC	EC1 Local Economy	EC1.1 Local Labour	Use of local (from within 50km of the site) labourers
		EC1.2 Local Materials	Building material sourced from within the country
		EC1.3 Local Materials and Components	Material and components sourced from within the country

		EC1.4 Local Furniture and Fittings	Furniture and fittings sourced from within the country
		EC1.5 Maintenance	Maintenance and repairs can be undertaken by local SMMEs (turnover of <R5m)
Total: 3 aspects	Total: 15 criteria	Total: 75 sub-criteria	Total: 75 indicators

Source: Sebake and Gibberd, 2008

3 Literature Review

3.1. Greening of sporting events

The concept of sustainable development has been defined by the World Commission on Environment and Development (WCED) in their Brundtland Report as meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). This was recognized as a balance between the environmental protection, economic growth and social development dimensions in 1992 at the Rio Declaration by the United Nations NGO Committee on Sustainable Development (UN, No date a).

Table 3 Chronology of global commitments to Sustainable Development and the Incorporation of Sustainability principles in the Olympics and FIFA

Sustainable Development	Year	Incorporation of Sustainability in the Olympics and FIFA
Brundtland Commission defines "sustainable development"	1987	
BREEAM – the first environmental assessment tool is developed	1990	
	1994	The Green Olympics are hosted (Lillehammer) IOC / UNEP Cooperative Agreement signed - aims to raise awareness and educate people on environmental issues in sport
	1995	
	1996	Environmental Protection is added to the Olympic Charter
Establishment of the Global Reporting Initiative (GRI)	1997	
Formation of the World Green Building Council Release of the first draft of GRI's Sustainability Reporting Guidelines	1999	Agenda 21: Sport for Sustainable Development is adopted by IOC
	2000	Sidney develops the "Olympic and Paralympic Games Environmental Benchmarks"
Release of the second version of GRI's Sustainability Reporting Guidelines	2002	
Development of the Sustainable Building Assessment Tool (SBAT)	2003	
	2006	Torino 2006 Olympics – first sustainable Olympics FIFA 2006 Germany – Green Goal Initiative
Formation of the South African Green Building Council	2007	FIFA Technical Requirements adds 'Green Goal' chapter

Source: Sebake and Gibberd, 2008

Of the largest global sporting organizations, the International Olympic Committee (IOC) was the first to respond to the global concern on environmental concern. This was done by the Local Organising Committee (LOC) who incorporated environmental practices in the implementation of the Lillehammer 1994 Winter Games. Subsequent LOCs followed this example including the Nagano 1998, Sydney 2000, Salt lake City 2002, Athens 2004 and Torino 2006 (IOC, 2007). The most recent Olympics Games stand out because the Torino Organizing Committee (TOROC) pioneered the move to sustainability reporting based on the Global Reporting Initiative (GRI) guidelines (TOROC, 2005). This ensured that planning, implementation and monitoring incorporated the three sustainability dimensions recognized at the 1992 Rio Declaration which went beyond focusing on environmental issues.

It is evident from the preparation of the following three Olympic Games events, namely Beijing 2008, Vancouver 2010 and London 2012, that the respective LOCs have been influenced by the sustainability practices undertaken in the Torino 2006 Winter Games and will be addressing sustainability as a major concern (IOC, No date).

The 2006 FIFA World Cup LOC were inspired by the successes of Australia for the 2000 Summer Olympics in Sydney and submitted a chapter called Environmental Concept for the stadia as part of their bid campaign even before FIFA required any commitment to Environmental Protection or Sustainable Development.

The Green Goal initiative was developed by the 2006 LOC who worked with the Öko-Institut and the World Wildlife Fund (WWF) to develop guidelines and objectives for the event. Implementation of the initiative was

difficult, mainly because construction of the stadia had already begun. The programme therefore only had a limited impact on the stadium planning (Öko-Institut, 2006).

Following Germany's successful hosting of the 2006 World Cup, FIFA (like the IOC following the Lillehammer Games in 1994) showed its support for environmental protection by adding a Green Goal chapter in its Football Stadiums: Technical Recommendations and Requirements (FIFA, 2007) manual and the incorporation of Environmental Protection in the host city agreement with the 2010 FIFA World Cup LOC and the host city (CoCT, 2006, pp 3). The host cities have been bound by this agreement to plan, implement and operate the 2010 stadia in an environmentally sustainable manner. South African legislation (which has been guided by global priorities encapsulated through documents like the Agenda 21, Millennium Development Goals and the Johannesburg Plan of Implementation (DEAT, 2006)) has provided additional guidance.

3.2 The use of Assessment tools for Sporting events

Table 4 Assessment tools used

	Tools used
Sydney 2000	Green Star
Torino 2006	SEA GRI guidelines
Vancouver 2010	LEED
London 2012	BREEAM Bespoke

4 Methodology

4.1 Background of the Review Project

The Review of the Greening of the Stadia for the FIFA 2010 World Cup project was initiated by the Department of Environmental Affairs and Tourism (DEAT) to review the sustainability initiatives that have been included in the host stadia, identify gaps and where appropriate provide recommendations. The project commenced in July 2007 and is undertaken by Green by Design (GbD), Paul Carew Consulting (PjC) and the South African Council for Scientific and Industrial Research (CSIR). To date two stadia (Moses Mabhid Stadium and Green Point Stadium) and one training venue (Athlone Stadium) have been reviewed.

The original terms of reference (ToR) for the proposal received from DEAT included environmental assessment of water, energy, waste and transport issues as outlined in the Green Goal Report (iSeluleko Consulting 2007). The review team's successful proposal to DEAT responded to these issues and included the suggestion that the SBAT be used to address some of the broader social and economic issues rather than solely focusing on environmental issues.

The review project widened the scope from a purely environmental focus and acknowledged South African local concerns, by assessing the social and economic issues. The use of the SBAT, which has been found to be the most suitable tool for a developing country context (Kaatz, et al, 2002) was therefore appropriate for use for the review project.

4.2 The Development of the SBAT for Stadia

The existing Sustainable Building Assessment Tool (SBAT) was adapted to create the SBAT for Stadia through the development of a set of indicators and targets/benchmarks that would support the assessment of the sustainability performance of the 2010 FIFA World Cup stadia.

The development process of the SBAT for Stadia is reflected in Diagram 1 (Sebake and Gibberd, 2008). The process is described below:

- The first stage (A) requires the review of relevant literature subsequent to the completion of the first SBAT version in 2003.
- From the review, an assessment framework is developed (B). This will be used to assess the appropriateness of new indicators to global trends.
- In the third stage (C), a review of the SBAT and the relevant building type is undertaken. Indicators not relevant to the building type are removed.
- Building specific indicators are added to the amended list of indicators (D). This stage is best undertaken in conjunction with the development of related targets / benchmarks where they exist (E).
- The indicators are then prioritized using the assessment framework developed in B above to ensure that each criterion has five indicators (one per sub-criteria) (F).
- This prioritization and elimination of indicators results in the first draft SBAT for Stadia (G).
- The SBAT for Stadia should ideally be piloted before being published on the website for public use (H). The field testing was with the first stadium.
- The piloting of the first draft SBAT for Stadia assessment tools will require input from relevant professional experts (I), and may lead to indicator – target / benchmarks set (J).

- Using this feedback and field testing, revise the SBAT for Stadia accordingly (K).
- Publish the revised version of the SBAT for Building Type on the www.sustainablebuilding.co.za website (L) and request user feedback over a three month period.
- Use the feedback and comments received from the users (M) to revise the tool before publishing a third and final version SBAT for Stadia online (N).

4.3 Assessment Process using the SBAT for Stadia

To date two stadiums and one training venue have been appraised. For the purposes of this paper, the focus will remain on the stadia for the event, not on the training venues. The two stadia will be referred to as stadium A and stadium B in order of commencement.

The review of the stadium was undertaken in three stages. The three stages are described in the following sections, which also highlight how the SBAT was used.

4.3.1 Stage 1: The Initial Workshop

The objective of the first stage was to review the existing sustainability initiatives and undertake an appraisal of the possibilities and opportunities that had not been explored.

During this stage, a full day workshop with the stadium authority and individual professional team members was held. This provided the review the sustainability initiatives currently being implemented in the stadium design. These included energy, water, waste, transportation, urban design and material selection.

Following the workshop, additional information was requested from the professional team, including technical documentation (i.e. a site plan, plans of all the levels, sections along both axes of the stadium) and any available and appropriate reports.

The information gathered from the workshop and from the professional team following the workshop is used to develop the first SBAT appraisal and the first draft of the stadium review report. The report consists of two parts; namely the general information and the stadium review.

The general information presents the host city's activities regarding and provided a contextual introduction of the stadium. The stadium review shows the results of the first SBAT appraisal and describes how the stadium design performs in terms of the sustainability review criteria defined in the TOR (i.e. water, energy, waste, transport). Possibilities and opportunities At the end of this stage, gaps in information were highlighted, particularly with regard to the SBAT, which could not be finalised without the missing data. The report, including the incomplete SBAT appraisal, was sent to the stadium authority, who shared this with the professional team.

4.3.2 Stage 2: The Interim Workshop

The objective of the second stage was to assess the feasibility of each of the possibilities and opportunities identified in the first draft report. Both of the stadiums reviewed have reached this stage, however the stadium A has had an additional visit, because processes have been improved.

During this stage, a half day workshop with the stadium authority and selected professional team members was held. This provided the review team with an opportunity to present the first draft report. The first stadium visited provided valuable feedback; however too much time was spend discussing the SBAT rating defeating the objective of the workshop. Following the feedback session, the shades of green decision-making matrix, developed by GbD, was drawn up to assist in allocating resources for the possibilities and opportunities identified.

Following the workshop a SBAT questionnaire was designed to capture missing information. This specifically sought information that was not easily accessible from drawings or reports. The SBAT questionnaire was sent to the stadium authority who forwarded it to the professional team. The SBAT questionnaire was then completed as far as was possible by one or more professional team members. Where information was readily available in a report or other documents not already submitted, this was requested in order to assist the review team and lessen the work load on the professional team.

At the end of this stage, gaps in information were highlighted, particularly with regard to the SBAT, which could not be finalised without the missing data. The report, including the incomplete SBAT appraisal, was sent to the stadium authority.

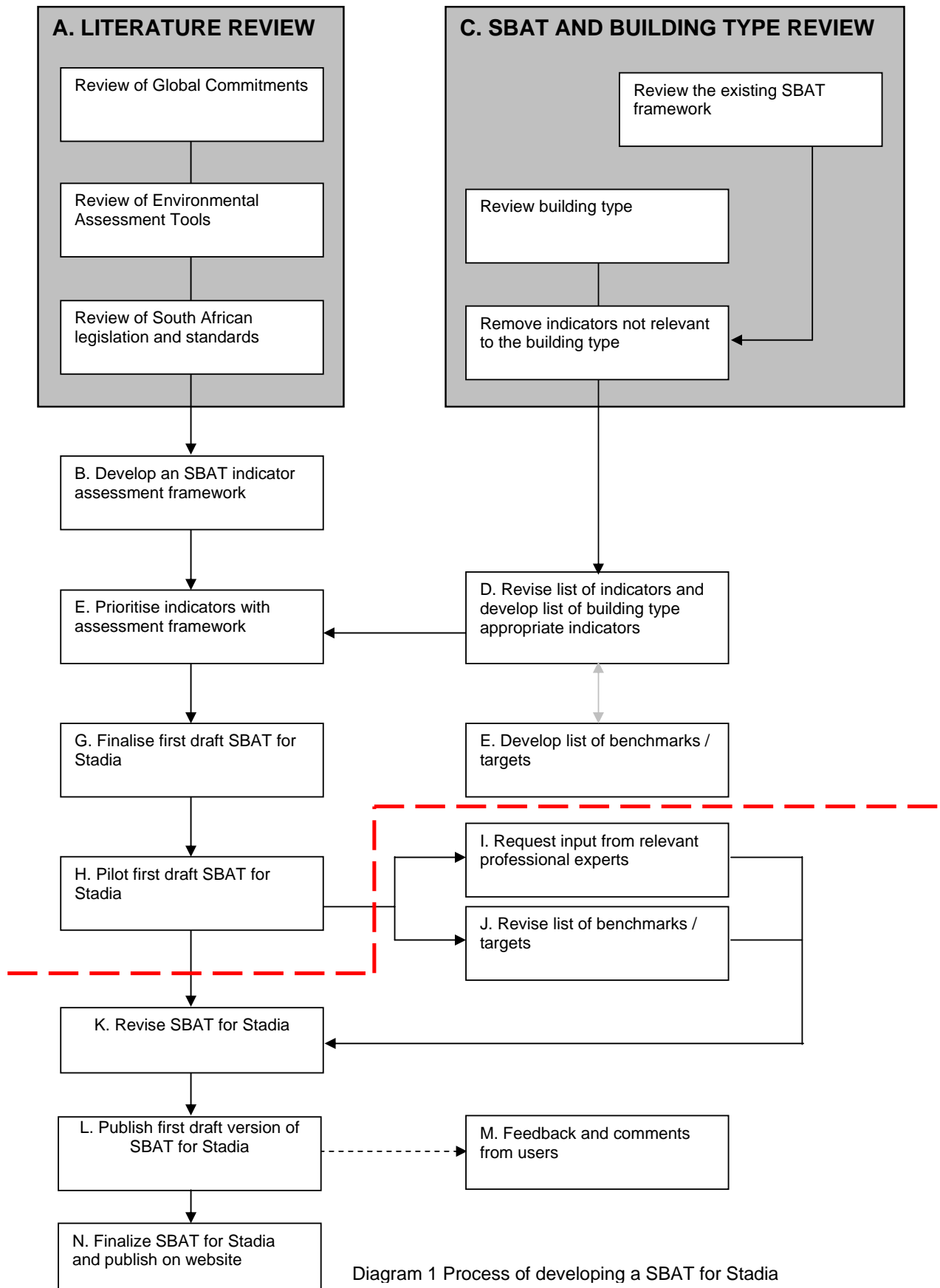


Diagram 1 Process of developing a SBAT for Stadia

4.3.3 Stage 3: The Final Workshop

The objective of the third and final stage is to finalize and present the final report to stadium authority and selected professional team members, and to submit the final report to DEAT. Only one of the two stadia currently under review has reached this stage, however the presentation still needs to take place.

During this stage, a half day workshop with the stadium authority and selected professional team members will be held. This provided the review team with an opportunity to present the final report with incorporating all the comments received from the stadium authority and professional team.

The final report consisted of a completed SBAT appraisal with information used from the SBAT questionnaire sent to the stadium authority. The SBAT diagram (see Figure 1) for the first and currently only stadium to reach this stage was incorporated in the report without the rating figures and final score.

4.4 An Overview of the SBAT Performance

The SBAT report above indicates that the overall sustainability performance of the stadium is good and fairly well balanced across the three different sustainability areas. Relatively poor performing areas include efficiency, water and site rated just under a score of 3 (Average). Areas that appear to perform well include the local economy, adaptability, materials & components, spectator comfort rated well over 3 (Very Good).

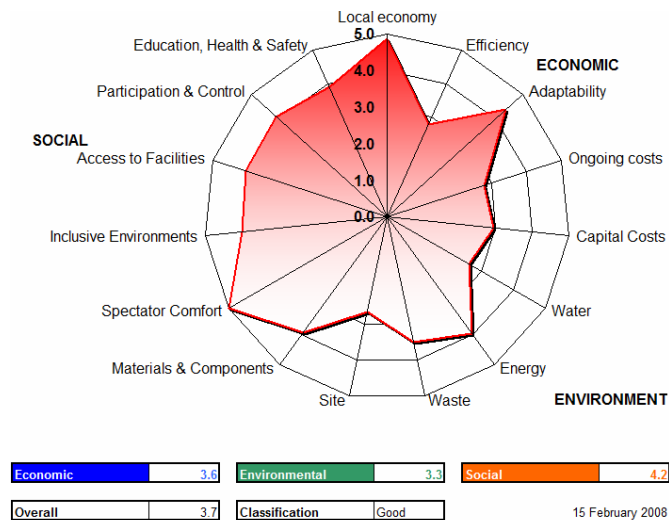


Figure 1 SBAT Radar Diagram Report

The overall rating is “Good” (score between 3.1 and 4) indicates that the approach taken is robust and may lead to a “Very Good” sustainability performance. The balanced performance (ratings vary from 3.6 to 4.2) within the three sustainability areas confirms that there has been an even and effective handling of the performance objectives and that one area (such as environmental issues) has not been allowed to eclipse the others. This balance is likely to have been achieved as a result of the experience of the professional team, the procurement policy and other policies being applied to the project.

5 Discussion

The 6th principle of the Rio Declaration on Environment and Development states that the “*special situation and needs of developing countries...shall be given special priority...*” (UN, No date). This suggests that as a developing country, South Africa needs to ensure that its social and economic issues are addressed before the environmental ones. Although this was aptly highlighted in the bid campaign the planning of the 2010 event has “*...unlike other World Cups ... been burdened with near-extreme expectations about what it can in fact achieve with regard to social and ... regional economic integration*” (Ndaba, 2007).

The review project widened the scope from a purely environmental focus and acknowledged South African local concerns, by assessing the social and economic issues. The use of the SBAT, which has been found to be the most suitable tool for a developing country context (Kaatz, et al, 2002) was therefore appropriate for use for the review project.

6 Conclusions

The development of the SBAT for Stadia has resulted in a set of indicators and targets which have not been previously available. The development of the tool will be useful for the construction of new and major refurbishment and possibly assist with the monitoring of existing stadia.

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