An Operational Environmental Management Guideline for the hospitality industry according to ISO 14000

by

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Submitted in partial fulfilment of the requirements for the degree of Master of Landscape Architecture in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria,
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ABSTRACT

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Increasing environmental awareness and an acceptance of accountability by the public and by businesses internationally and locally, could motivate organisations to adopt Environmental Management as part of their operations. The new direction the tourism and related industries are obliged to follow, in accordance with new government initiatives, will require responsibility in terms of the environment, management of the impacts these activities have on the environment and a commitment to the philosophy of sustainable development.

Even though international standards and benchmarks for Environmental Management exist for the hotel industry, standards and guidelines do not yet exist for the South African environment. Furthermore, guidelines for an Environmental Management System in accordance with ISO 14001 have not yet been drafted for this industry, either internationally or locally. The aim of this study is to compile a guideline document for the implementation of Operational Environmental Management in accordance with the requirements of an ISO 14001 Environmental Management System.

Three South African hotels, belonging to a local group of hotels but with international exposure, were researched as case studies to establish the impacts hotels may have on the environment. Literature on Environmental Management was studied to extract the requirements for Environmental Management, and combined with the requirements for the establishment of an Environmental Management System as prescribed by ISO 14001.

The research confirmed that hotel activities, facilities and services impact on the environment. Environmental Management procedures previously documented for hotels have not been incorporated into an ISO 14001 Environmental Management System. The study successfully combined Environmental Management procedures for the environmental impacts identified for hotel activities, facilities and services with the procedures of establishing an ISO 14001 Environmental Management System.

In summary, hotels have activities, facilities and services that impact significantly on the environment, but these significant impacts are site-specific. Detailed site-specific assessments should be undertaken when implementing this guideline for specific hotels, to establish the significance of each of the environmental impacts in relation to the site that is studied. Further studies should adapt this guideline document to the different accommodation types offered in the hospitality industry to ensure that an ISO 14000 Environmental Management System can be implemented at each of these accommodation types.

Key words:

Environmental impacts, Environmental Management, ISO 14001, Environmental Management System, hospitality industry, hotels, guideline document

UITTREKSEL

‘n Omgewingsbestuursriglyn vir die akkommodasie-industrie volgens ISO 14000.
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Toenemende omgewingsbewustheid en die aanvaarding van verantwoordelikheid deur die publiek en sakeondernemings wêreldwyd en plaaslik kan organisasies motiveer om omgewingsbestuur as ‘n integrale deel van hul ondernemings te implementeer. Die nuwe rigting wat toerisme en verwante industrieë onder leiding van nuwe regeringsinsiatiewe moet volg, verg verantwoordelikheid ten opsigte van die omgewing, die bestuur van die impakte wat aktiwiteite op die omgewing het, en ‘n verbintenis tot die filosofie van volhoubare ontwikkeling.

Alhoewel internasionale standaarde en doelwitte vir omgewingsbestuur vir die hotelindustrie bestaan, is geen dergelike standaarde en riglyne tans nog vir die Suid-Afrikaanse hotelindustrie geformuleer nie. Verder is daar nog nie plaaslike of internasionale riglyne vir ‘n omgewingsbestuursstelsel in ooreenstemming met ISO 14001 vir hierdie industrie geskryf nie. Die doel van hierdie studie is om ‘n riglyndokument vir die implementering van operasionele omgewingsbestuur in ooreenstemming met die vereistes van ‘n ISO 14001 omgewingsbestuurstelsel saam te stel.

Gevallestudies van drie Suid-Afrikaanse hotelle wat aan ‘n plaaslike groep hotelle behoort, maar internasionaal blootstelling geniet, is nagevors om die impakte wat hotelle op die omgewing mag hê, te bepaal. Bronne oor omgewingsbestuur is bestudeer om die vereistes van omgewingsbestuur te onttrek en dit te kombineer met die vereistes vir die samestelling van ‘n omgewingsbestuursstelsel soos deur ISO 14001 voorgeskryf word.

Die navorsing het bevestig dat hotelle aktiwiteite bedryf en fasiliteite en dienste lewer wat ‘n impak het op die omgewing. Omgewingsbestuursprosedures wat voorheen vir hotelle gedokumenteer is, is nie in ‘n ISO 14001 omgewingsbestuursstelsel vervat nie. Die studie het omgewingsbestuursprosedures vir die omgewingsimpakte wat vir hotelle se aktiwiteite, fasiliteite en dienste geïdentifiseer is, suksesvol gekombineer met die prosedures vir die vasstelling van ‘n ISO 14001 omgewingsbestuursstelsel.

Samevattend kan gesê word dat sommige aktiwiteite, fasiliteite en dienste van hotelle ‘n noemenswaardige impak op die omgewing uitoefen, maar hierdie noemenswaardige impakte is terrein-spesifiek. Gedetailleerde terreinspesifieke ondersoeke moet onderneem word wanneer hierdie riglyne vir individuele hotelle geïmplementeer word, ten einde die noemenswaardigheid van elke omgewingsimpak ten opsigte van die individuele terrein te bepaal. Verdere studies moet hierdie riglyndokument vir al die akkomodasietipes wat in die akkomodasie-industrie aangebied word aanpas om te verseker dat ‘n ISO 14000 omgewingsbestuurstelsel vir elk een van die akkomodasietipes geïmplementeer kan word.

Sleutelwoorde:

Omgewingsimpakte, omgewingsbestuur, omgewingsbestuurstelsel, ISO 14001, gasvryheidsbedryf, hotelle, riglyndokument

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

ANNEXURES

[1] International Hotels Environment Initiative. 1996.
[2] Department of Environmental Affairs and Tourism. 1992. (a.)

ABBREVIATIONS

ANSI	American National Standards Institute
CFCs	Chlorofluorocarbons
DEAT	Department of Environmental Affairs and Tourism
DME	Department of Minerals and Energy
DWAF	Department of Water Affairs and Forestry
EA	Environmental Assessments
EIA	Environmental Impact Assessment
EIIS	Environmental Impact Identification System
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
EMS	Environmental Management System
HCFCs	Halochlorofluorocarbons
HFCs	Halofluorocarbons
IAQ	Internal Air Quality
IEM	Integrated Environmental Management (procedure)
IHEI	International Hotels Environment Initiative
IH&RA	International Hotel and Restaurant Association
IMDG	International Maritime Dangerous Goods Code
ISO	International Organisation for Standardisation
ITTT	Interim Tourism Task Team
IUCN	International Union for Conservation of Nature and Natural Resources
NEMA	National Environmental Management Act
NEPA	United States' National Environmental Policy Act
ODP	Ozone-depletion potential
PCBs	Polychlorinated biphenyls
QMS	Quality Management System
[s.a.]	No date[3].
SABS	South African Bureau of Standards
SATOUR	South African Tourism
SSHI	Southern Sun Hotel Interests (Pty) Ltd
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency

[3] University of Pretoria. 2000.

1. CHAPTER 1: INTRODUCTION

1.1 Background

1.1.1 Increased environmental awareness

According to Fuggle and Rabie[4], it is universally accepted that in keeping with present trends, we must expect the world to become more crowded and polluted, less ecologically stable and more vulnerable to natural hazards in the years ahead, leading to a reduction in quality of life for all people.

In South Africa, as is the case internationally, environmental concern and responsibility for organisations' actions are becoming more and more important. This is illustrated in the literature available, ranging from textbooks on Environmental Management to government white papers, policies and legislation, and is highlighted by Fuggle and Rabie[5]:

> *…While isolated injunctions and attempts to control misuse of the environment can be traced from biblical times…until the late 19th century, environmental laws were directed at specific forms of pollution and at protecting occasional natural areas…*
>
> *…It was only by the mid-20th century…accepted that governments could and should regulate the use of the environment for conservation as well as for social purposes…and public authorities were committed to a problem-by-problem approach to environmental policy…*
>
> *A turning point in human-environment relationships was reached on 1 January 1970. On this day, the United States' National Environmental Policy Act (NEPA) was made law …This legislation recognized that human-environment relationships cannot be adequately addressed through piecemeal legislation which tackles problems on an ad hoc basis.*

In the White Paper on Environmental Management Policy for South Africa[6], in 1998, the South African Government highlighted the need for new methods to improve environmental quality:

> *Increasingly, governments appear to be looking to a mix of regulatory methods including both traditional command and control approaches and market-based*

[4] Fuggle and Rabie. 2000.
[5] Fuggle and Rabie. (2000:11-12)
[6] South Africa. White Paper on Environmental Management Policy for South Africa. (1998:58)

instruments to achieve improvement in environmental quality appropriate to specific situations. The development of environmental capacity in civil society and the private sector has led to alliances, agreements and joint initiatives to improve existing standards of control and best practice.

In the White Paper on Environmental Management Policy[7], it is stated that failure to integrate environmental concerns into economic planning and decision making at the time of writing the policy reflected a widespread view that environmental issues in South Africa enjoyed a low priority. It is further stated that government institutions are not required to implement Environmental Management Systems (EMSs), monitor impacts, or conduct environmental audits.

Current South African environmental legislation protects the environment against activities that may be harmful to the environment, as identified in Government Notice, Regulations R1182[8], in terms of the Environment Conservation Act, 1989[9]. Government Regulations R1183[10] apply to Environmental Assessments (EAs) to be undertaken for activities identified under Regulations R1182. In May 2002, these regulations were updated and amended by Regulations R670[11] and R672[12], to clarify and address interpretation difficulties experienced with R1182 and R1183.

Environmental Management for the operational phase is a requirement for mining activities and the Aide Memoire[13] serves as a guideline for the preparation of Environmental Management Programme Reports (EMPRs). According to Mr Herman Corneliussen[14], Assistant Director, Mining Environmental Management at the Department of Minerals and Energy (DME), the new Mineral and Petroleum Resources Bill will replace the existing Minerals Act[15] once it is promulgated. Until such time, the Environmental Management Programme Reports (EMPRs) are still the documents legally required by the Department of Minerals and Energy. Environmental Management Plans (EMPs) are now also required by provincial environmental authorities as a condition of approval of environmental assessments for activities identified in Government Regulations R1182.

To date, no formally published guidelines exist for Environmental Management for any activity. The Department of Water Affairs and Forestry (DWAF) published a Guideline for

[7] South Africa. White Paper on Environmental Management Policy. (1998:51)
[8] South Africa. 1997. GN R1182. 05/09/1997.
[9] South Africa. Environment Conservation Act, No. 73 of 1989.
[10] South Africa. 1997. GN R1183. 05/09/1997.
[11] South Africa. 2002. GN R670. 10/05/2002
[12] South Africa. 2002. GN R672. 10/05/2002
[13] Department of Minerals and Energy. 1992.
[14] Corneliussen. 2002.
[15] South Africa. Minerals Act, No. 50 1991.

Standardised Environmental Management Plans for Department of Water Affairs and Forestry projects in 2002[16]. However, the Department of Environmental Affairs and Tourism (DEAT) has not adopted these guidelines. The Integrated Environmental Management Information Series[17], published by Department of Environmental Affairs and Tourism (DEAT) in 2002, makes provision for a publication entitled "Environmental Management Plans", but has this not yet been published, since only the first six documents have been released.

At present, when investigating actions not included in the activities identified under Government Regulations R1182[18] or R670, no specific environmental control in terms of Environmental Management is enforced, unless an activity is in contravention of the National Environmental Management Act (NEMA)[19]. According to the White Paper on Environmental Policy[20], the EIA Regulations (Regulations R1182, R1183, R670 and R672) legislate only the scoping and Environmental Impact Assessment (EIA) portions of the Integrated Environmental Management (IEM) procedure. The white paper also claims that this fact is a major limitation of the current regulations and a proposal to legislate the entire IEM Procedure is being considered. By pre-empting potential contraventions of NEMA[21] and its legal implications, any activity that implements or enforces operational Environmental Management could be viewed as being pro-active and environmentally responsible.

According to SABS ISO 14001[22], organisations are increasingly concerned with achieving and demonstrating sound environmental performance by controlling the impact of their activities, products or services on the environment, taking into account their environmental policy and objectives. Companies do this in the context of increasing environmental legislation, the development of economic policies and other measures to foster environmental protection and an increased concern on the part of interested parties about environmental matters, including sustainable development.

The above claims by the International Organisation for Standardization (ISO) are internationally applicable, as can be seen in the examples discussed below. International trends indicate that companies establishing sound environmental practices would benefit in

[16] Department of Water Affairs and Forestry. 2002.
[17] Department of Environmental Affairs and Tourism. 2002. (b)
[18] South Africa. 1997. GN R 1182. 05/09/1997.
[19] South Africa. National Environmental Management Act, No. 107 1998.
[20] South Africa. White Paper on Environmental Policy of South Africa. (1998:51)
[21] South Africa. National Environmental Management Act, No. 107 1998.
[22] SABS ISO 14001. 1996.

the longer term, when international trade requirements and local legislation demand defined environmental standards.

Examples of organisations that have successfully implemented an Environmental Management System (EMS) and have registered or declared conformity with the ISO 14001 Environmental Management System (EMS) are listed on the website for Transformation Strategies[23] and include organisations such as the Copley Square Hotel in the United States of America; Wilton Armetale, a non-ferrous foundry in Lancaster County, Pennsylvania; Rockwell Automation in Twinsburg, Ohio; the Xerox Corporation, and IBM and 3M of the United States of America. These organisations list benefits such as reduced energy and water consumption, reduced costs of waste removal, recycling benefits and identification of hazardous waste as attributable to the implementation of their EMSs. Maris Hotels has published its environmental policy in accordance with the requirements of ISO 14001. The following declaration appears on the website of this group[24]:

> *Its implementation is regarded necessary given the role, which the company and all collaborating parties can play for the preservation of the environment in order to protect its clients and personnel, as well as to obtain healthy environmental conditions with long-term benefits to the tourist hotel product it offers.*

Environmental responsibility in hotels is also acknowledged by the International Hotel and Restaurant Association (IH&RA), which hosts annual Environmental Awards for which independent hotels may enter their environmental programmes. This programme is independent of ISO 14000. Entries are received from international hotel chains across the world, including hotels from Australia, Asia, Africa, Europe and North America. Action areas considered in the awards include environmental policy, design and construction, water, energy, waste, emissions, purchasing, staff training and guest communication.

Examples of organisations in South Africa that are certified by ISO 14001 are Eskom and the Arabella Golf Estate near Hermanus. An organisation in South Africa that has declared conformity to ISO 14001 is the Pecanwood Golf Estate at the Hartebeespoort Dam.

1.1.2 Environmental standards in the tourism industry of South Africa

The hospitality industry in its broad sense was targeted for this study, since tourism has been identified as one of the areas of potential economic growth in the Republic of South Africa in the White Paper on the Development and Promotion of Tourism in South Africa,

[23] Transformation Strategies. 2002. http://www.trst.com
[24] Maris Hotels. 2002. http://www.maris.gr/index.htm

published in 1996[25]. Hotels provide a service to guests and could influence visitors in setting examples in environmental awareness and responsibility. In the White Paper on the Development and Promotion of Tourism in South Africa[26] it is stated that:

> *Experience indicates that hotels that have taken a much broader view of their product tended to be more successful … In South Africa, signs of a more forward-looking private sector are emerging… These initiatives are, however, still the exception and hotels and other tourism establishments need to play a far more active role in influencing the quality of the total visitor experience. It is through taking a broader view of the product offered, and building partnerships with the government, local communities and other private sector interests, that the highest levels of customer satisfaction can be achieved… As such, the South African Tourism Board (SATOUR) has attempted to fill the gaps, in many instances carrying out the functions of both national government and statutory body - grading and classification of hotels, licenses, research and development, training, marketing, promotion and product development.*

In the light of the increased environmental awareness following the World Summit on Sustainable Development held in Johannesburg, South Africa, in August 2002, the Federated Hotels Association of South Africa[27] identified a need for guidelines in Environmental Management practices for the hospitality industry.

In the White Paper on the Development and Promotion of Tourism in South Africa[28], the concept of 'Responsible Tourism' emerged as the most appropriate concept for the development of tourism in this country. This was based on an assessment of the problems, constraints and opportunities facing the South African tourism industry, the imperatives of global change and the ideas and concerns raised during the countrywide workshops. This assessment was undertaken by the Interim Tourism Task Team (ITTT), appointed by the Minister of Environmental Affairs and Tourism in 1994, with the mandate of drafting a tourism discussion paper as a basis for a future national policy. Responsible Tourism, as quoted in the White Paper on the Development and Promotion of Tourism in South Africa[29], implies the responsibility of both employers and employees in the tourism industry to each other as well as to the customer. Responsible Tourism further implies a responsible government, as well as responsibility on the part of the tourists themselves to observe the norms and practices of South Africa, particularly with respect to the environment and culture of the country.

[25] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.
[26] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.
[27] Federated Hotels Association of South Africa. 2002. www.fedhasa.co.za
[28] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.
[29] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. (1996:17)

In the White Paper on the Development and Promotion of Tourism in South Africa[30] the areas where the tourism industry could focus on sustainable development and how a well-managed tourism industry could assist in reducing the environmental problems in the country, are highlighted as follows:

> *A well-managed tourism industry has the potential to ameliorate, rather than contribute to, South Africa's environmental problems. To achieve this, however, a number of actions are necessary. Specific principles and policy guidelines for environmental management as it relates to the tourism industry are as follows:*
>
> - *sustainable and responsible tourism development…*
> - *make mandatory the conduct of Integrated Environmental Management procedures for all new tourism projects*
> - *encourage ongoing social and environmental audits of tourism projects…*
> - *encourage tourism development in areas where tourism offers a competitive form of land-use…*
> - *…ensuring that neighbouring communities participate in and benefit from economic activities generated in and around conservation areas*
> - *…creation of successful pilot tourism programmes which demonstrate…the benefits that ecologically sensitive tourism schemes…*
> - *promote sustainable and responsible consumption of water and energy in tourism plants, using readily available technology and encouraging sustainable waste disposal, green packaging and recycling*
> - *support mandatory environmental management practices in ecologically sensitive areas…*
> - *ensure tourism plant does not deprive communities of access to coastal resources needed for their livelihoods*

In the White paper on the Development and Promotion of Tourism in South Africa[31], the establishment of a National Tourism Organisation is further proposed, with the main functions of such an organisation defined as:

- International marketing and promotion
- Research, market intelligence and information management
- Ensuring the setting and maintenance of appropriate standards to facilitate the positioning of the South African tourism industry in the international tourism arena

In applying the criteria listed above for reducing environmental problems, the hospitality industry could become ground-breakers in implementing Environmental Management

[30] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.
[31] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.

procedures, regular environmental audits of their activities, involving surrounding communities in hotel activities, facilitating the implementation of pilot projects of ecologically sensitive tourism schemes and demonstrating responsible consumption of natural resources such as water and energy. The hospitality industry could also play a role in marketing and promoting the country and its tourism attractions and participate in setting and maintaining standards for tourism and environmental responsibility.

1.2 Statement of the Problem

In response to growing environmental awareness and the role the tourism industry could play in managing impacts on the environment, this study aims to develop an Operational Environmental Management Guideline for the hospitality industry in accordance with ISO 14001.

The focus of this study was narrowed down to hotels as part of the hospitality industry in South Africa. Tourists visiting South Africa require accommodation as one of the basic amenities to be provided. A literature search found international accommodation categories where hotels are defined as properties with at least one licensed bar and restaurant on the premises, with on-site management, which serve breakfast and sometimes have conference or banqueting facilities[32], setting them apart from other accommodation categories such as self-catering accommodation, caravan and/or camp sites or guest houses. The Automobile Association of South Africa[33] classifies accommodation types into thirty-four categories, and hotels alone are spilt into eight categories. Given these facts, hotels can be viewed as the upmarket end of the accommodation industry, with more luxury features than other types of accommodation. Hotels as accommodation for tourists could generate potential environmental impacts on the environments in which they are located, although these environmental impacts would apply to other accommodation categories as well. This study aims to investigate the potential impacts hotels may have on the environment, and formulates a guideline document for mitigating these potential environmental impacts, taking into account the criteria for ISO 14001.

1.2.1 Sub-problems

The research will be conducted to address the problem via three sub-problems:

[32] Qualmark. 2002. www.qualmark.co.nz/docs
[33] Automobile Association. (2002:331).

a) Sub-problem 1 is the identification and description of the potential impacts of the hotel industry.

   Identify the potential environmental impacts hotels may have on the environment to establish an Environmental Management programme for these impacts according to ISO 14001.

b) Sub-problem 2 is the determination of Environmental Management requirements as expressed in ISO 14001.

   Investigate the guidelines and principles of Environmental Management and further define the guidelines and objectives in terms of ISO 14001 requirements.

c) Sub-problem 3 is the compilation of a guideline document, incorporating the principles and objectives of ISO 14001.

   Combine the principles and objectives of ISO 14001 and the requirements of Environmental Management into a useable guideline for hotels.

1.2.2 Hypothesis

a) The operational activities, facilities and services of hotels have significant impacts on the environment and these impacts can be identified and described.

b) These significant environmental impacts of operational activities, facilities and services of hotels can be managed according to ISO 14001 principles.

c) An informative guideline document can be compiled for use in the operational management of the hotel industry, by applying the principles and objectives of the ISO 14001 standards for Environmental Management.

1.2.3 Delimitations

a) This study will focus on hotels as part of the hospitality and tourism industry in South Africa. The study will focus on hotels in the Republic of South Africa only. A total of three hotels belonging to a South African group of hotels with international exposure were selected as case studies for this dissertation. Two hotels situated in or near sensitive environments and one in an urban environment, were studied. Research into the environmental activities, facilities and services of local hotels, and an international literature search, will be undertaken to identify the potential environmental impacts of the hotel industry. Only impacts on the environment that originate as a result of the operation of hotels will be addressed.

b) The principles and objectives of Environmental Management cover a broad field and will need to be narrowed down to be applicable to the operation of hotels in South Africa.

c) The guideline document to be compiled will be structured according to the guidelines of ISO 14001 and Environmental Management and the requirements identified for the hotel industry in terms of these issues. The guideline document will include national and/or international standards as benchmarks, where possible.

1.2.4 Definition of terms

a) All terms will be used as defined in the Oxford English Dictionary, except where use and meaning are discussed in the study. These terms will be defined under item 1.2.4 b).

b) Definition of terms where use and meaning are discussed in the study:

i. **Tourism Industry** is defined in the Tourism Act[34] as:

> *…the organised industry which is concerned with the promotion and handling of tours to and in the Republic [of South Africa], and the provision of services and facilities to and the provision for the needs of persons who undertake such tours, in the preparation for such tours, while they are under way and during their stay at their destinations.*

ii. **Hotel** is defined in accordance with the definition of the Tourism Grading Council of South Africa[35], and further defined by the Automobile Association of South Africa. **Hotels** provide accommodation to the travelling public, have a reception area and offer at least a "breakfast room" or communal eating area. In general a hotel makes food and beverage services available to guests. These may be outsourced or provided by the hotel. The Tourism Grading Council indicates that serviced accommodation includes hotels, lodges, guesthouses and bed and breakfast facilities. The Automobile Association of South Africa[36] divides accommodation types into thirty-four categories, and hotels alone are classified into eight categories:

- All-suite hotels. Managed like a hotel, but the accommodation offers a kitchen or kitchenette and is usually serviced.
- Commercial hotels. Hotels where the accommodation and facilities are geared to business travellers. The bar is usually an important element of

[34] South Africa. Tourism Act, No. 72 of 1993.
[35] Tourism Grading Council of South Africa. 2001.
[36] Automobile Association. (2002:331).

the hotel. Recreation facilities may include a pool and a gym. Families including children are welcome.

- Country commercial hotels. These are usually in the country and accommodation and facilities are geared towards the business traveller. The bar is usually an important element of the hotel. Recreation facilities may include a pool and a gym. Families including children are welcome.
- Full-service hotels. May be small or large, situated within a metropolitan area. Breakfast, lunch and dinner are available together with the expected hotel services and very comfortable, well-designed en-suite rooms and public areas including (cocktail) bar facilities. The hotels cater for leisure or business travellers and may offer conference and/or banqueting facilities.
- Leisure hotels. Hotel-style accommodation with extensive public areas and recreation facilities including restaurant(s) and bar(s). Aimed primarily at holidaymakers, but also accommodate conference visitors, business travellers and touring groups. May have à la carte facilities.
- Luxury hotels. May be small or large. Well-designed rooms and public areas. Top quality décor and the highest service standards. Extensive public areas available for guests and non-resident guests. À la carte dining, twenty-four-hour room service and reception, bars, concierge facilities. Likely to have conference/banqueting facilities. Gift/curio shop(s) on site.
- Selected service hotels. Hotels (privately owned or franchised) offering only selected services. Services like concierge, twenty-four-hour room service and dining facilities may not be available. Other services may be available but at an additional cost.
- Selected service hotels – budget. As for selected service, but rooms have the most basic facilities and rates are usually a lot lower.

iii. **Environment** shall have the definition stated in the National Environmental Management Act (NEMA)[37]:

Environment means the surroundings within which humans exist and is made up of:

- The land, water and atmosphere of the earth
- Micro-organisms, plant and animal life
- Any part or combination of the above two points and the interrelationships among and between them

[37] South Africa. National Environmental Management Act, No. 107 of 1998.

- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being

iv. **Sensitive environment** shall mean an environment that is characterised by aspects that are easily influenced or damaged by external factors such as pollution. The United Nations Environment Programme (UNEP)[38] further defines sensitive areas as:

> *Ecologically sensitive areas are those where natural resources are critically endangered by physical changes and which contain a great diversity and interdependence of living habitats. In such areas the following three basic principles of the Convention on Biodiversity apply:*
>
> - *Conservation of biological diversity*
> - *Sustainable use*
> - *Equitable sharing of benefits among local community and indigenous people*

v. **Integrated Environmental Management (IEM)** is defined by the White Paper on Environmental Management Policy[39] as:

> *…a code of practice ensuring that environmental considerations are fully integrated into the management of all activities in order to achieve a desirable balance between conservation and development.*

vi. **Environmental Management** will be used in the capitalised form, indicating the discipline of environmental management. According to Fuggle and Rabie[40], management is the execution of planned controls so as to achieve a desired outcome.

> *And when management skills and techniques are applied to care for the earth so as to achieve the goals inherent in the nine principles outlined in* [Caring for the Earth[41], a strategy for sustainable living, launched in partnership by the World Conservation Union, the United Nations Environment Initiative and the World Wide Fund for Nature]*, we are dealing with environmental management.*
>
> *General goals and specific objectives must be formulated and this must be undertaken with due regard to ethical, social and political norms. The goals and objectives must be given operational form; hence legislation and associated regulations come into being. Economic and technical*

[38] United Nations Environment Programme. 2002. (a)
[39] South Africa. White Paper on Environmental Management Policy. (1998:60)
[40] Fuggle and Rabie. (2000:3)
[41] International Union for Conservation of Nature and Natural Resources. 1991.

decisions must be made and alternative courses of potential action assessed.

The nine principles of 'Caring for the Earth', as listed by Fuggle and Rabie[42], are:

- Respect and care for the community life
- Improve the quality of human life
- Conserve the earth's vitality and diversity
- Minimise the depletion of non-renewable resources
- Keep within the earth's carrying capacity
- Change personal attitudes and practices
- Enable communities to care for their own environments
- Provide a national framework for integrating development and conservation
- Create a global alliance

vii. An **Environmental Management System** is defined by the American National Standards Institute[43] as a voluntary programme established by businesses and organisations that results in the integrated management of environmental practices and prevention of non-compliance with environmental regulations, and by the White Paper on Environmental Management Policy[44] as documented procedures drawn up as described in a South African Bureau of Standards (SABS) code of practice to implement the requirements of ISO 14001. Operating, emergency, data collection and documentation procedures are set out, along with procedures for training, the transfer of information and all the elements of a complete management and quality control system.

viii. An **Environmental Audit** is defined by the White Paper on Environmental Management Policy[45] as:

…a systematic, documented, regular and objective evaluation to see how well an organization or facility is operating in terms of its Environmental Management Systems (EMS), and is complying with statutory requirements and the organization's environmental policy.

ix. **Environmental Impact Assessment (EIA)** is defined by the White Paper on Environmental Management Policy[46] as:

…a detailed study of the environmental consequences of a proposed course of action. An environmental assessment or evaluation is a study of the environmental effects of a decision, project, undertaking or activity. It

[42] Fuggle and Rabie. (2000:2)
[43] American National Standards Institute. ISO 14000. [s.a.] (a)
[44] South Africa. White Paper on Environmental Management Policy. 1998:60)
[45] South Africa. White Paper on Environmental Management Policy. (1998:60)
[46] South Africa. White Paper on Environmental Management Policy. (1998:60)

is most often used within an Integrated Environmental Management (IEM) planning process as a decision support tool to compare different options.

x. The term **environmental aspect** referred to in ISO 14001[47] is defined as:

…element of an organisation's activities, products or services that can interact with the environment.

xi. An **environmental impact** is defined by the Guideline Document, EIA Regulations of 1998[48], as:

The degree of change in an environment resulting from the effect of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organisation's activities or may be indirectly caused by them.

In ISO 14001[49] an environmental impact is described as follows:

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

xii. The term **significant impact** is defined by the Guideline Document, EIA Regulations of 1998[50], as:

An impact that, by its magnitude, duration or intensity alters an important aspect of the environment.

Significance is differentiated into impact magnitude and impact significance in the Integrated Environmental Management Information Series[51]. Impact magnitude is described as:

…the measurable change (i.e. intensity, duration and likelihood).

Impact significance is described as:

…the value placed on the change by different affected parties (i.e. level of significance and acceptability).

xiii. **Responsible tourism** implies the responsibility of both employers and employees in the tourism industry to each other and to the customer. Responsible trade union practices and responsible employment practices will be the hallmarks of the new tourism in South Africa, according to the White Paper on the Development and Promotion of Tourism in South Africa[52]. Responsible tourism implies a responsible government as well as responsibility on the part of the tourists themselves to observe the norms and practices of

[47] SABS ISO 14001. 1996.
[48] Department of Environmental Affairs and Tourism. 1998.
[49] SABS ISO 14001. 1996.
[50] Department of Environmental Affairs and Tourism. 1998.
[51] Department of Environmental Affairs and Tourism. (2002:23) (b)
[52] South Africa. 1996. White Paper on the Development and Promotion of Tourism in South Africa.

South Africa, particularly with respect to the environment and culture of the country.

Key elements of responsible tourism as defined in the White Paper on the Development and Promotion of Tourism in South Africa[53] are:

- Avoid waste and over-consumption
- Use local resources sustainably
- Maintain and encourage natural, economic, social and cultural diversity
- Be sensitive to the host culture
- Involve the local community in planning and decision making
- Assess environmental, social and economic impacts as a prerequisite to developing tourism
- Ensure communities are involved in and benefit from tourism
- Market tourism that is responsible, respecting local, natural and cultural environments
- Monitor impacts of tourism and ensure open disclosure of information

xiv. **Noxious or offensive gas** is defined as follows in the Atmospheric Pollution Prevention Act[54]:

> *…means any of the following groups of compounds when in the form of gas, namely, hydrocarbons; alcohols; aldehydes; ketones; ethers; esters; phenols; organic acids and their derivatives; halogens, organic nitrogen, sulphur and halogen compounds; cyanides; cyanogens; ammonia and its compounds;*
>
> *inorganic acids; fumes containing antimony, arsenic, beryllium, chromium, cobalt, copper, lead, manganese, mercury, vanadium or zinc or their derivatives; cement works fumes and odours from purification plants, glue factories, cement works and meat, fish or whale processing factories; and any other gas, fumes or particulate matter which the Minister may by notice in the Gazette declare to be noxious or offensive gas for the purpose of this Act; and includes dust from asbestos treatment or mining in any controlled area which has not been declared a dust control area in terms of section twenty-seven…*

[53] South Africa. 1996. White Paper on the Development and Promotion of Tourism in South Africa.
[54] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.

xv. **Green-house gases** a defined by the White Paper on Environmental Management Policy[55] as:

> *… gases in the Earth's lower atmosphere that trap heat causing an increase in the Earth's temperature. These gases include carbon dioxide, methane, nitrous oxides and other synthetic chemicals.*

xvi. **General waste** is defined by the Department of Water Affairs and Forestry[56] as:

> *…any waste that does not fall within the definition of Hazardous Waste. It is a generic term applied to waste that does not pose a significant threat to public health or the environment if properly managed…Domestic waste is classified as "General Waste".*

xvii. **Hazardous waste** is defined by the Department of Water Affairs and Forestry[57] as:

> *…waste that has the potential, even in low concentrations, to have a significant adverse effect on public health and the environment because of its inherent toxicological, chemical and physical characteristics. Hazardous Waste requires stringent control and management, to prevent harm or damage and hence liabilities.*

xviii. A **bund** is defined as an artificial embankment, used in this instance to provide containment around containers where spillage of the contents of the containers may occur.

1.2.5 Assumptions

a) It is assumed that information regarding the environmental impact of hotel operations can be obtained to determine the significance of environmental impacts and that these environmental impacts can be mitigated.

b) The term environment is used in the context of its definition in the National Environmental Management Act (NEMA)[58], including biophysical, social and economic aspects.

c) It is assumed that ISO 14001 principles can be applied to the hotel industry.

d) It is assumed that the hotel industry will benefit from a guideline document that provides management guidelines for the industry's environmental practices during operations.

[55] South Africa. White Paper on Environmental Management Policy. (1998:60)
[56] Department of Water Affairs and Forestry (1998:2-3). (a)
[57] Department of Water Affairs and Forestry (1998:2-3). (a)
[58] South Africa. National Environmental Management Act, No. 107 of 1998.

e) It is assumed that the conclusions based on case studies of one hotel chain could be extrapolated to apply to the hotel industry in general.

1.3 Methodology

According to Blaikie[59] four ideal types of research strategies exist. These four research strategies are inductive research, deductive research, retroductive research and abductive research. Inductive research accumulates observations or data and is used to establish universal generalisations, used as an explanation of patterns. Blaikie[60] further states that:

> *…inductive strategy has been described as consisting of three principles: accumulation, induction and instance confirmation.*

Deductive research borrows or constructs a theory and expresses it as an argument to test theories in order to eliminate false theories and corroborate the correct ones. According to Blaikie[61], with deductive research:

> *…data are used to test the tentative answers. The aim is to see if the data match the hypothesis…what the researcher would like to develop is a theory that matches reality.*

Retroductive research documents and models a regularity to discover underlying mechanisms in order to explain observed regularities. Abductive research discovers everyday lay concepts, meanings and motives to describe and understand social life in terms of social motives and accounts.

In this dissertation, inductive research will be used by observing and analysing scientific data, in this case the hotels used as case studies. The case studies will be observed and analysed in terms of their potential impacts on the environment. Data has to be gathered by using objective methods. This will be done by listing all activities and facilities found at each of the identified sites and conducting a literature review to identify the requirements of ISO 14001. The identified environmental impacts will then be assessed to determine significant impacts, for which management guidelines will be provided to minimise the potential impacts.

Deductive research will be used to test theories in order to eliminate false theories and corroborate the correct ones. In the case of deductive research theories are proposed, tested and rejected if proven false. Blaikie[62] states that

[59] Blaikie (2000:100)
[60] Blaikie (2000:103)
[61] Blaikie (2000:105)
[62] Blaikie (2000:105)

Theories that survive this critical process are provisionally accepted, but never proven to be true.

This is the approach that will be followed in the hypothesis that hotels have significant impacts on the environment and that these impacts can be mitigated. The hypothesis further indicates that these mitigating measures could be written into a guideline document for operational Environmental Management for hotels.

This dissertation will be written in chapters addressing the sub-problems as identified under item 1.1. Chapter One will form the introduction to the dissertation. Chapter Two will investigate whether the hotel industry impacts on the environment, using inductive research. Chapter Three will research the requirements of ISO 14001 by inductive research and Chapter Four will indicate how the Environmental Management of the potential impacts of hotels can be formulated into a guideline document for the hotel industry by using deductive research. Each chapter will commence with an introduction and the methodology will be further detailed in that chapter.

1.4 Conclusion

It is evident from the literature and legal review that increasing environmental awareness and accountability by the public and businesses internationally and locally could motivate organisations to adopt Environmental Management as part of their operations. This will benefit the environment as well as the organisations themselves by reducing costs in terms of water and energy consumption, initiating waste management and recycling, and being generally proactive in adopting Environmental Management measures prior to legislative enforcement.

As can be seen in the examples listed under item 1.1.1, international organisations that have implemented an ISO 14001 Environmental Management System (EMS) have been able to declare cost savings, reduced use of energy and water, recycling initiatives and resultant reduced waste and waste removal costs, as well as the additional benefit of recognising hazardous waste and removing it from the general waste stream. Organisations that have implemented the ISO 14000 EMS include international hotel groups such as Maris Hotels. Local organisations such as Eskom and the Arabella Golf Estate near Hermanus have been certified for ISO 14000 compliance. According to Ms Margaret Rawicz[63], Principal Environmental Auditor at the SABS, companies in industries such as

[63] Rawicz. 2003.

mining, automobile and chemical industries and industrial processes have also been certified for ISO 14001 compliance.

It is clear that the new direction the tourism and related industries must follow will require responsibility in terms of the environment, the effective management of the impacts these activities have on the environment and adherence to the philosophy of sustainable development. Even though international standards and benchmarks exist for the hotel industry, standards and guidelines do not yet exist for the South African environment.

Furthermore, guidelines for an EMS in accordance with ISO 14001 have not yet been drafted for this industry either internationally or locally. According to Ms Rawicz[64], the SABS has written a guideline for the implementation of ISO 14001, but she was not aware of any industry-specific guidelines for the implementation of ISO 14001. In light of governmental trends, the tourism-related organisation; (for the purposes of this study, 'the hotel') that is proactive in adopting international standards will benefit in the longer term.

[64] Rawicz. 2003.

2. CHAPTER 2: THE IDENTIFICATION AND ASSESSMENT OF THE POTENTIAL ENVIRONMENTAL IMPACTS OF THE HOTEL INDUSTRY

2.1 Introduction

This chapter will investigate the impacts of hotel activities (related to the operating and management of the hotels) on the environment in which they are situated. The history and methodology relating to the determination of potential environmental impacts of hotels have to be determined to guide the assessment of hotels for potential environmental impacts. A decision made regarding the sources for data selection required to answer the questions posed under item 1.2, led to the use of case studies as the basis for data gathering and a comparison of the findings with international literature. Blaikie[65] discusses the use of case studies as a tool for the selection of data as being regarded in a number of ways:

- *as a particular kind of research design;*
- *as involving the use of particular kinds of research methods, usually qualitative; and*
- *as being a method of selecting the source of data*.

Blaikie[66] highlights the history of the use of case studies as a research tool and strategy. According to Blaikie[67], Goode and Hatt[68] regarded case studies as:

> *… a mode of organising data in terms of some chosen unit, … one may use all the techniques which any other mode of organisation uses: intensive interviews, questionnaires, self-histories, documents, case reports by others, letters, etc...*

Blaikie further elaborates that the main use of multiple-case studies as defined by Yin[69] is analogous to conducting a series of experiments:

> *Multiple cases, in this sense, should be considered like multiple experiments (or multiple surveys)...Analytical generalisation can be used whether your case study involves one or several cases.*

The number of cases to be included in the case studies will depend on the complexity of the phenomenon and the conditions in which it occurs. In this dissertation, three case studies were included as is detailed in item 1.2.3 and item 2.2.

[65] Blaikie (2000:213),
[66] Blaikie. 2000.
[67] Blaikie (2000:215)
[68] Goode and Hatt. 1952. In: Blaikie. 2000.
[69] Yin (1989:38) In: Blaikie. 2000.

2.2 Methodology

Before potential impacts on the environment can be assessed, a system or method for environmental impact identification has to be selected. A literature search for textbooks and publications was undertaken and four different methods of environmental impact identification were studied, namely:

1. The Integrated Environmental Management (IEM) Procedure[70], combined with the Integrated Environmental Management Information Series[71],
2. The Environmental Indicators as published by the Department of Environmental Affairs and Tourism[72] (DEAT),
3. The Environmental Impact Identification System (EIIS) as described by Julien, Fenves and Small[73], and
4. The checklist and matrix methods as described in Fuggle and Rabie[74].

A combination of criteria from all four systems was assimilated into one method, which was used for this dissertation, as discussed under items 2.4 and 2.5. Case studies were identified as the appropriate means of collecting data on hotels in South Africa, as discussed in item 2.1. In addition, a checklist was compiled which was completed initially by the author of this dissertation and checked with the Risk Manager of the hotel group that agreed to the use of some of their hotels as case studies. The checklist was then expanded and circulated to a group of environmental practitioners for peer review. Their comments were incorporated into the checklist and are described in more detail in item 2.7.

A hotel group in South Africa and hotels managed by this group were selected using the following criteria:

1. Hotels belonging to a South African group of hotels must be used as the basis for the case study.
2. International exposure has been identified as a selection criterion, since the ISO 14001 standards would not be applicable to hotels in South Africa without this scope of operation.
3. For a representative sample of case studies, two hotels should be situated in sensitive environments and one in an urban environment to provide a basis for comparison.

Southern Sun Hotel Interests (Pty) Ltd agreed to the use of three of their hotels as a basis for the case study. Two hotels in sensitive environments were selected, namely the

[70] Department of Environmental Affairs and Tourism. 1992. (a)
[71] Department of Environmental Affairs and Tourism. 2002.
[72] Department of Environmental Affairs and Tourism. 2002. http://www.environment.gov.za
[73] Julien, Fenves and Small. 1992.
[74] Fuggle and Rabie. (2000:768)

Malelane Sun Inter-Continental Resort located outside Malelane and adjacent to the Kruger National Park in Mpumalanga, and the Sabi River Sun located on the banks of the Sabie River in Hazyview in Mpumalanga. (FIG. 1 Locality Plan. Malelane Sun Inter-Continental Resort; FIG. 2 Locality Plan. Sabi River Sun). The third hotel, namely the Sandton Sun and Towers Inter-Continental in Sandton, Johannesburg, is located in an urban area where local authorities provide services. (FIG. 3 Locality Plan. Sandton Sun and Towers Inter-Continental.) This hotel was selected as a comparison to the two hotels located in sensitive areas.

As mentioned in item 1.3, the research methodology followed for the assimilation of data on the hotels was inductive research - the hotels were studied and activities and facilities offered by these hotels were identified and listed. All the activities and facilities at each of the hotels used for the case study had to be identified and listed in an objective manner. This is discussed under item 2.7. The activities and facilities are presented in tabular format for easier reference and to assist in checking the existence or occurrence of the particular activity or facility against the individual hotels used in the case studies. As detailed in item 1.3, deductive research was used to evaluate the activities and facilities identified at the hotels based on the criteria set for environmental impact identification. The evaluation was presented in tabular format where the source, activity or facility and potential area of impact on the environment are listed in a condensed manner for easier reference. The list of identified potential environmental impacts was circulated to three environmental consultants for peer review prior to the assessment of the environmental impacts. Conclusions were drawn and summarised under item 2.8.

2.3 Literature search

The literature search for this chapter was undertaken by utilising information sources as described in Botha and du Toit[75], an academic guideline published by the University of Pretoria:

- Human information sources:

  Personal communication and interviews with personnel of the hotel group studied in the case studies. Mr Colin Ackroyd, Risk Manager of Southern Sun, provided a comparative source to check the facilities, activities and services offered by the individual hotels that were used in the case studies. This formed the basis of the checklist used to identify potential environmental impacts for the hotels. The checklist

[75] Botha and du Toit. 1999.

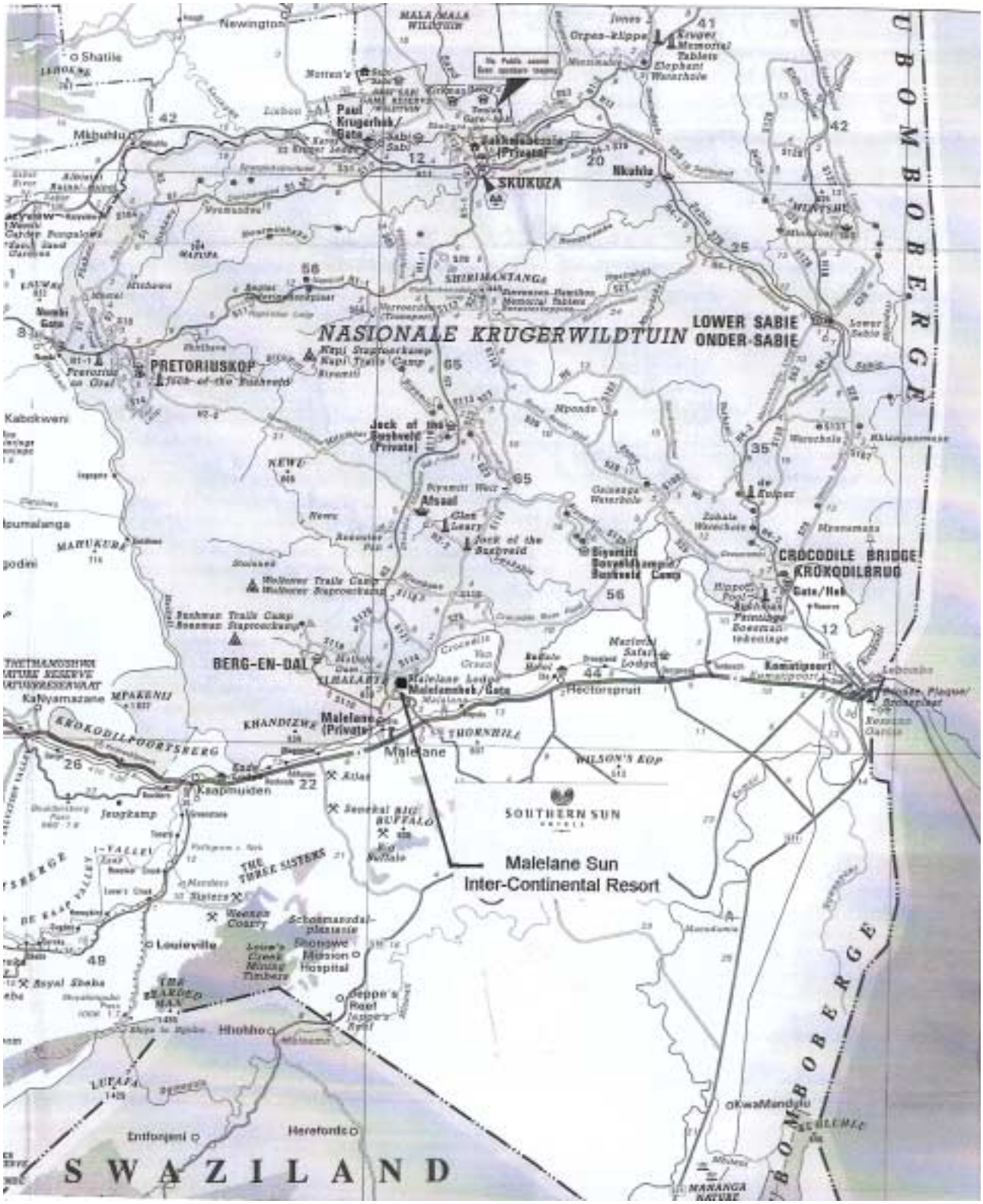

FIG. 1: Locality Plan. Malelane Sun Inter-Continental Resort[76].

[76] Map Source: Automobile Association. Tm-2. 956/6.

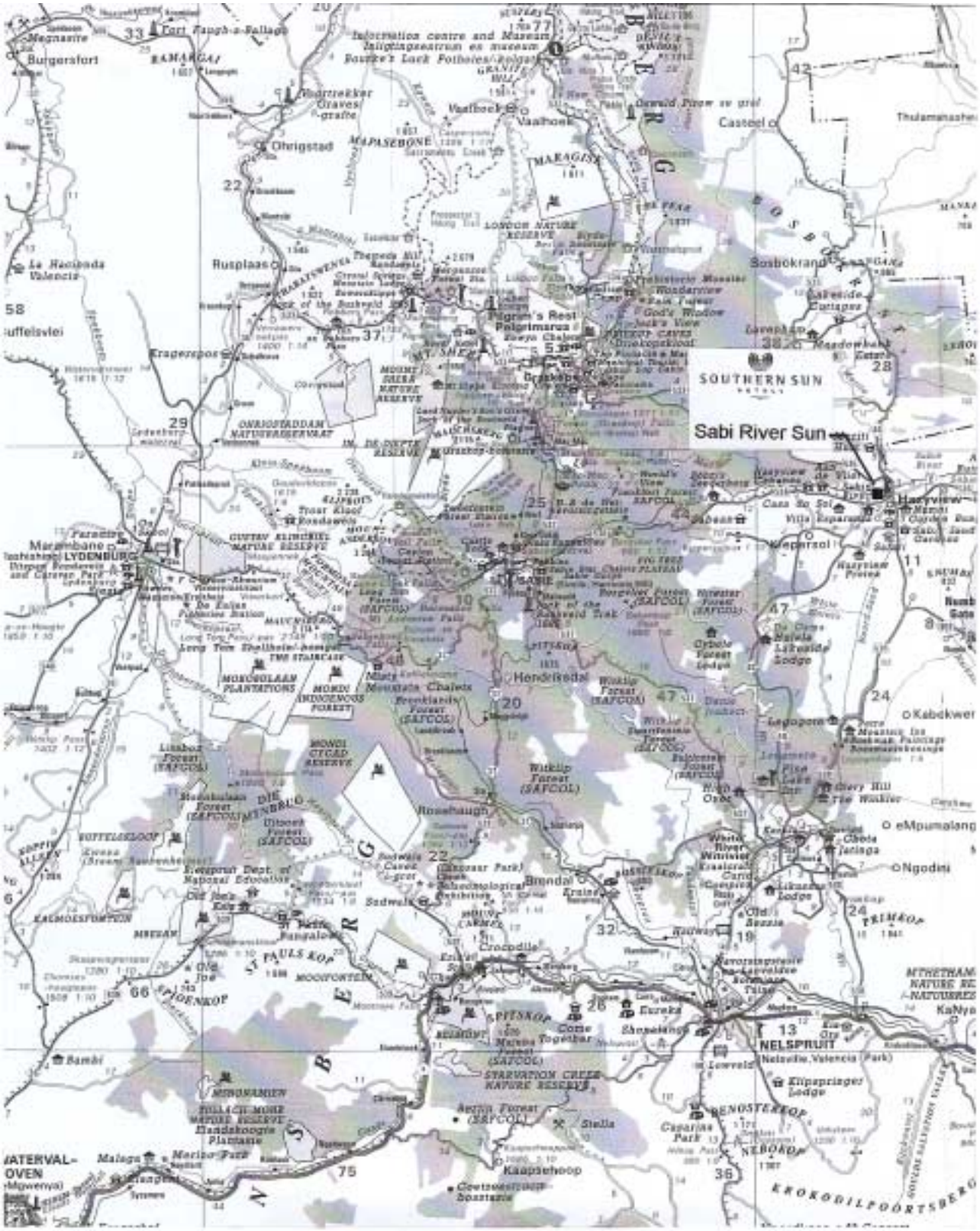

FIG. 2: Locality Plan. Sabi River Sun[77].

[77] Map Source: Automobile Association. Tm-2. 956/6.

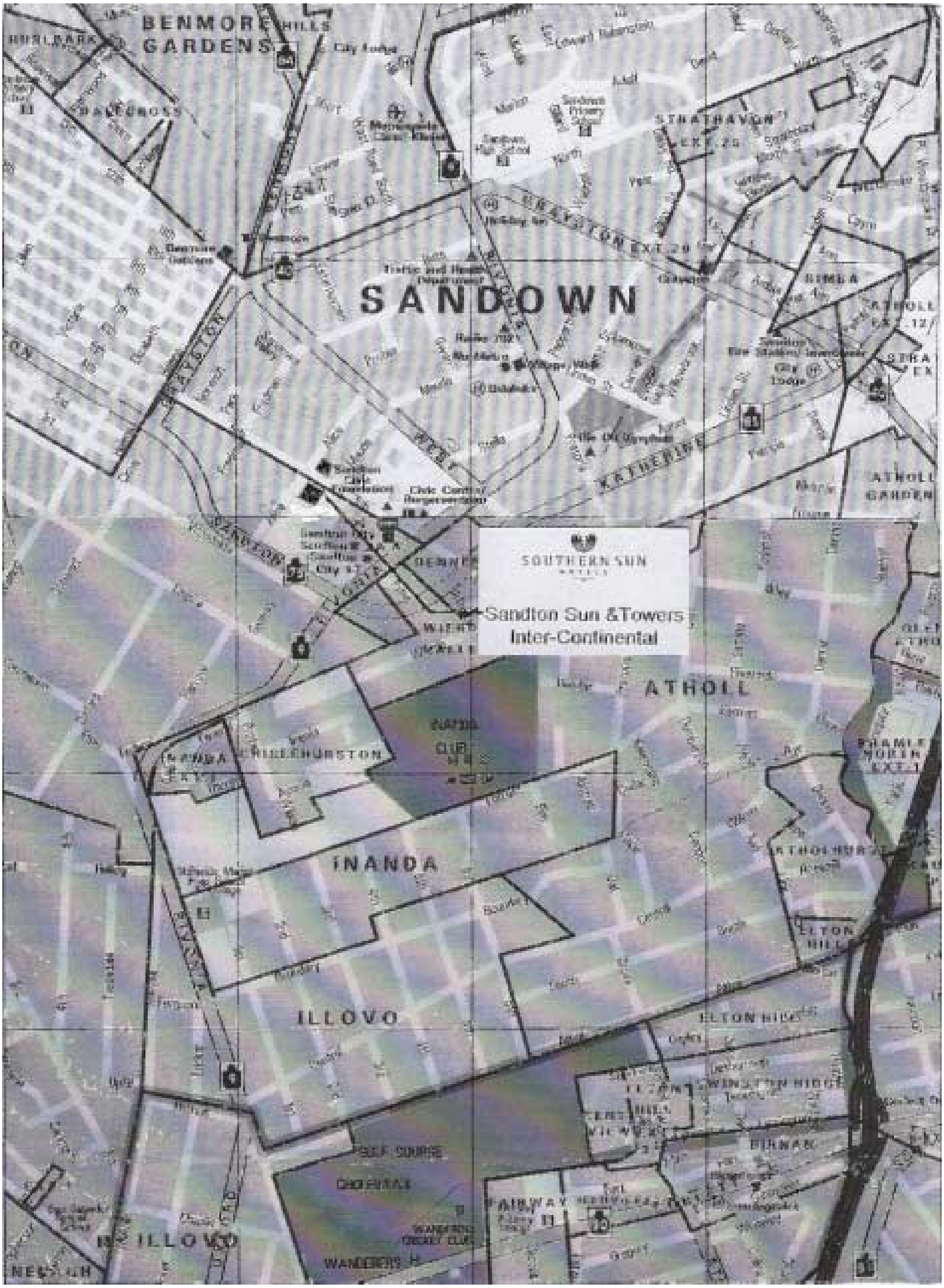

FIG. 3: Locality Plan. Sandton Sun and Towers Inter-Continental[78].

[78] Map Source: Map Studio. (1994/1995:34,56)

was then expanded and circulated to a group of three environmental practitioners for peer review. The three environmental consultants were Mr Rodney Brown[79], landscape architect and environmental consultant at Van Riet and Louw Landscape Architects, Mr Menno Klapwijk[80], partner, landscape architect and environmental consultant at Cave Klapwijk and Associates, and Mr Barend Smit[81], landscape architect and environmental consultant, associate at Ninham Shand Consulting Services. Comments received were incorporated into the checklist.

- Institutional information sources:

  Documents and legislation published by the National and Provincial government were sourced by Internet searches and by obtaining copies directly from the relevant government departments. Regulations R1182[82] and R1183[83] under the Environment Conservation Act[84] and the National Environmental Management Act (NEMA)[85] were sourced to determine the environmental requirements stipulated in South African legislation. The IEM[86] procedure and the newly published Integrated Environmental Management Information Series[87] were studied to provide guidance in impact identification and assessment. The pre-application checklist used by the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs[88] was used to expand the list of environmental characteristics for the checklist, particularly for construction activities in accordance with a suggestion made by Mr Brown[89].

- Journals:

  Articles published in international journals on Environmental Management were sourced and used in the research. These articles provided alternative methods for environmental impact identification.

- Monographs and textbooks:

  Textbooks on Environmental Management were available for research. Fuggle and Rabie[90] edited a textbook on Environmental Management in South Africa, providing principles and requirements of Environmental Management, as well as information and environmental impact identification and assessment methods. The International Hotels Environment Initiative (IHEI), operating from the United Kingdom, published an Industry Guide to Best Practice in 1996[91], which was used as a reference for

[79] Brown. 2003.
[80] Klapwijk. 2003.
[81] Smit. 2003.
[82] South Africa. 1997. Regulations No. R 1182. 05/09/1997.
[83] South Africa. 1997. Regulations No. R 1183. 05/09/1997.
[84] South Africa. 1989. Environment Conservation Act, No. 73 of 1989.
[85] South Africa. 1998. National Environmental Management Act, No. 107 of 1998.
[86] Department of Environmental Affairs and Tourism. 1992. (a)
[87] Department of Environmental Affairs and Tourism. 2002. (b)
[88] South Africa. [s.a].
[89] Brown. 2003.
[90] Fuggle and Rabie. 2000.
[91] International Hotels Environment Initiative. 1996.

benchmark data, to assist in identifying activities, facilities and services offered by hotels and to confirm best practice procedures for the Environmental Management of hotels. The Department of Landscape Architecture at the Louisiana State University[92] compiled a checklist for ecological survey and site analysis that was compared to the environmental characteristics listed in the IEM Procedure[93] and used to expand the checklist.

- Internet websites:
  The website for Southern Sun Hotel Interests[94] was used to determine activities, facilities and services offered by the three hotels that were used in the case studies.

2.3.1 Selecting an environmental impact identification system

In order for the study to be relevant to hotels operating in South Africa with local and international clientele, South African and international criteria for determining and assessing environmental impacts had to be sourced and studied. South African literature and legislation on environmental impact evaluation, such as the environmental indicators published by the Department of Environmental Affairs and Tourism (DEAT)[95], the IEM Procedure[96] and the Integrated Environmental Management Information Series[97], were sourced to assist with the impact identification process for hotels.

To broaden the application, articles published in international publications on environmental impact identification, were studied. Finally, a checklist including all the possible environmental impacts hotels may have on the environment was compiled and circulated to three environmental consultants for peer review. The four systems or processes of Environmental Impact Identification were selected and studied, and a combination of the aspects and criteria were used to determine an impact identification process for this dissertation. The four systems of environmental impact identification are briefly described in item 2.4 below, and summarised in Annexure A.

2.3.2 Assessment of potential environmental impacts of hotels

Once the potential impacts of hotels on the environment had been identified, these impacts had to be assessed for significance. This assessment was undertaken in accordance with principles as outlined in the Integrated Environmental Management Information Series,

[92] Louisiana State University. [s.a.]
[93] Department of Environmental Affairs and Tourism. 1992. (a.)
[94] Southern Sun Hotel Interests (Pty) Ltd. 2002. www.southernsun.com.
[95] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za
[96] Department of Environmental Affairs and Tourism. 1992. (a)
[97] Department of Environmental Affairs and Tourism. 2002. (b)

booklet 5, Impact Significance[98], and this was compared with the assessment processes described in Fuggle and Rabie[99].

2.3.3 Identification of activities and facilities at the hotels

The following sources were consulted as part of the identification of activities and facilities at the hotels, which were used as a basis for the case studies:

a) The website of Southern Sun Group[100] was used as the initial source to identify activities, services and facilities at each of the hotels selected for the case studies.

b) Discussions were held with Mr Colin Ackroyd, Risk Manager of Southern Sun Hotel Interests[101], to clarify and complete the list of activities, services and facilities at each of the sites where insufficient information was provided on the website.

c) The checklist of potential environmental impacts was compiled and circulated to three environmental consultants for review and comment.

d) An informal visit was paid to each of the hotels used in the case studies - the Sandton Sun and Towers in Sandton, the Malelane Sun Inter-Continental Resort and the Sabi River Sun in Hazyview, to experience and assess the facilities personally. The visits made it possible to expand on information provided by Mr Ackroyd and obtained from the website.

To ensure that the list of activities, facilities and services was comprehensive, literature published by the International Hotel Industry and South African references were also studied. The reference document published by the International Hotels Environment Initiative (IHEI) outlines potential impacts of the hotel industry on the environment and how these impacts could be mitigated, along with industry benchmarks. This guide is aimed mainly at European hotels but is applied worldwide. The guide was studied, bearing in mind the South African context.

In September 2001, Southern Sun Hotel Interests (Pty) Ltd (SSHI) compiled the results of a baseline environmental audit conducted in December 2000 into a report[102] and in February 2002 compiled an environmental training manual[103] as part of the implementation of their Environmental Management System. Both documents are unpublished. The training manual was co-authored by the author of this dissertation, and the Risk Manager of

[98] Department of Environmental Affairs and Tourism. 2002. (e)
[99] Fuggle and Rabie. (2000:772)
[100] Southern Sun. 2002. http://www.southernsun.com
[101] Ackroyd. 2002.
[102] Southern Sun Hotel Interests (Pty) Ltd. 2001.
[103] Southern Sun Hotel Interests (Pty) Ltd. 2002.

Southern Sun Hotel Interests. It was drafted for use by lay people (staff of Southern Sun Hotel Interests) and will be used as a South African reference in the process of identification of the potential environmental impacts of hotels.

2.4 Selecting an environmental impact identification system

No environmental impact identification system is stipulated in terms of the Environment Conservation Act[104], the Regulations R1182[105] and R1183[106] gazetted under the Environment Conservation Act, or the National Environmental Management Act (NEMA)[107]. The Council for the Environment proposed the concept of integrated environmental management to the then Minister of Environment Affairs in 1989, in a document entitled *Integrated Environmental Management in South Africa.* The South African Department of Environmental Affairs and Tourism tried to formalise the procedure set out in this document, in order for it to be accepted as policy by government.

The IEM procedure is the guideline series published by the Department of Environmental Affairs and Tourism (DEAT) in 1992[108] as a step towards a national environmental management policy. DEAT then stated that the Integrated Environmental Management procedure was designed to ensure that the environmental consequences of development proposals are understood and adequately considered in the planning process. DEAT also stated that the purpose of the IEM Procedure was to resolve or mitigate any negative impacts and to enhance positive aspects of development proposals. The Integrated Environmental Management series of six documents was used as the only basis for conducting Environmental Assessments in South Africa until the promulgation of the EIA Regulations R1182 and R1183[109] of September 1997. In 2002 DEAT published a new series of documents entitled the *Integrated Environmental Management Information Series*[110]. According to the authors the series is an overview of information reports on the concepts of and approaches to IEM. Stated in the 2002 document series, IEM is considered a key instrument of NEMA[111], where NEMA promotes the integrated environmental management of activities that have significant impacts on the environment. It is further stated in the document series[112] that:

[104] South Africa. 1989. Environment Conservation Act, No. 73 of 1989.
[105] South Africa. Regulations No. R 1182. 05/09/1997.
[106] South Africa. Regulations No. R 1183. 05/09/1997.
[107] South Africa. National Environmental Management Act, No. 107 of 1998.
[108] Department of Environmental Affairs and Tourism. 1992 (a)
[109] South Africa. Regulations No. R1182 and R 1183. 05/09/1997.
[110] Department of Environmental Affairs and Tourism. 2002.(b)
[111] South Africa. National Environmental Management Act, No. 107 of 1998.
[112] Department of Environmental Affairs and Tourism. (2002). (b:2)

IEM provides the overarching framework for the integration of environmental assessment and management tools that are appropriate for the various levels of decision making.

The IEM procedure[113] addresses integrated environmental management, which is not included in the Regulations R1182 and R1183 published under the Environment Conservation Act, No. 73 of 1989. The first two booklets of the newly published Integrated Environmental Management Information Series[114] address screening and scoping and will be referred to while assessing the identified potential environmental impacts of hotels. The series also allows for the publication of a booklet entitled 'Information Series 12 Environmental Management Plans', but to date only the first 6 of these information booklets have been published. The older IEM Procedure is therefore still relevant as a reference on environmental management plans as described in guideline document 3, Guidelines for Report Requirements[115]. In addition, the Regulations R1182 and R1183 have reduced the lists of activities and environments that may be affected by development, initially identified in the IEM procedure guideline document 1[116]. The complete lists of activities and environments are contained in Annexure B.

In the List of Activities[117], the planning and development of certain policy, planning and project proposals are identified as potentially harmful to the environment. The planning phases of hotels were investigated as part of the process of identification of the potential impacts of hotels on the environment. In the List of Environments[118], environments that may be affected by the planning and development of activities are listed. The following were identified as having bearing on the hotels in the case studies:

- In item No. 36 under the List of Activities, Project proposals:

  Buildings with a total floor space of 500 square metres or more

  are listed. All three hotels used in the case studies have floor spaces exceeding 500 square metres.
- In item No. 3 under the List of Environments, Designated areas or features:

  National, provincial or municipal nature reserves

  are listed. The Malelane Sun Inter-Continental Resort is situated adjacent to the Kruger National Park, and some activities could impact on this reserve.

[113] Department of Environmental Affairs and Tourism. 1992.
[114] Department of Environmental Affairs and Tourism. 2002. (b)
[115] Department of Environmental Affairs and Tourism. 1992. (c)
[116] Department of Environmental Affairs and Tourism. 1992. (a: 11-13)
[117] Department of Environmental Affairs and Tourism. 1992 (a:11)
[118] Department of Environmental Affairs and Tourism. 1992 (a:12)

- In item No. 21 under the List of Environments, Demarcated areas or features:

  Streams and river channels, and their banks.

  are identified. The Sabi River Sun is located on the banks of the Sabi River and the Malelane Sun Inter-Continental Resort is situated on the banks of the Crocodile River. Some activities at both hotels could impact on the rivers.

None of these three issues are clearly listed in the Regulations R1182[119] and the updated Regulations R670[120] as activities that could be harmful to the environment.

The elements of the affected environment, as described in guideline document 3, Guidelines for Report Requirements[121], were used as the structure in the process of determining potential environmental impacts. While using these elements for structural guidance, the Environmental Indicators published by DEAT[122] were used to provide a method to check which elements were identified as environmental indicators, and to ensure that these aspects were included in the process of identification of potential environmental impacts. The listed environmental indicators are:

- Inland water indicators
- Marine and coastal indicators
- Biodiversity and natural heritage indicators
- Land use indicators
- Human settlement indicators
- Atmospheric and climatic indicators
- Waste indicators
- Integrated indicators

The Environmental Indicators[123] as identified by DEAT are described in more detail in Annexure A.

Julien, Fenves and Small[124], indicate that previous approaches, such as map overlays, impact checklists, impact matrices and cause-effect networks have offered a way to present impacts on the environment, but have fallen short of assisting the evaluator in determining potentially significant impacts. Julien, Fenves and Small[125] developed an Environmental Impact Identification System (EIIS) to allow the evaluator to select impacts based on information regarding the type of project and the environment. Three elements form the basis of the EIIS, namely utilising previous environmental assessments, representation of

[119] South Africa. Regulations No. R1182. 05/09/1997.
[120] South Africa. Regulations No. R670. 10/05/2002.
[121] Department of Environmental Affairs and Tourism. 1992 (b:11)
[122] Department of Environmental Affairs and Tourism. 2002.(a) http://www.environment.gov.za
[123] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za
[124] Julien, Fenves and Small. 1992.
[125] Julien, Fenves and Small. 1992.

environmental evaluations and aggregation of past environmental evaluations. This method is described in detail in Annexure A.

Even though it is not a scientific environmental evaluation in the strictest sense, the International Hotels Environment Initiative (IHEI) was used as a comparative document as an example of previous environmental evaluations, the reason being that it listed potential areas where hotels may impact on the environment. The systems for impact identification, namely the IEM Procedure, the Integrated Environmental Management Information Series, the Environmental Indicators as published by DEAT, and the Environmental Impact Identification System (EIIS) as described by Julien, Fenves and Small, are described in further detail in Annexure A.

2.5 Identifying the facilities, activities and services at the hotels

To identify potential environmental impacts on the environment, each site (hotel) had to be studied to identify facilities present and activities undertaken or facilities and services offered at each hotel. To assist in this process, the document produced by the International Hotels Environment Initiative (IHEI)[126] was studied to ensure that all relevant activities were considered and that a comprehensive list of activities and facilities could be compiled.

A list was drawn up as part of the study which included activities, facilities and services for each of the hotels. The list also included activities, facilities and services that were not present at the hotels but were derived from the International Hotels Environment Initiative (IHEI)[127] to ensure that all possible actions that may impact on the environment would be identified and considered. The hotels were assessed against this list to further guide the process of identification of potential environmental impacts. The compilation of this list of facilities, activities and services was undertaken after the author of this dissertation had visited the sites. The checklist was then expanded after reviewing the website for Southern Sun[128] and studying the document published by the International Hotels Environment Initiative (IHEI)[129]. During a meeting with Mr Colin Acroyd of Southern Sun[130], a blank checklist was used to compare each hotel against the possible facilities, activities and services included in the checklist to provide a comprehensive list of activities, facilities and services for each of the three case studies.

[126] International Hotels Environment Initiative. 1996.
[127] International Hotels Environment Initiative. 1996.
[128] Southern Sun. 2002. http://ww/southernsun.com
[129] International Hotels Environment Initiative. 1996.
[130] Ackroyd. 2002.

2.5.1 Existing facilities

Table 1: Existing facilities

Facilities	Malelane Sun	Sabi River Sun	Sandton Sun and Towers
Number of rooms (all en-suite)	102 rooms	60 rooms 40 chalets	654 rooms
Restaurant	√	√	√
Kitchen	√	√	√
Kitchenettes in chalets	×	√	×
Gas cylinders for cooking	Bulk LP Gas vessel	√	√
Refrigeration units	√	√	√
CO_2 drinks dispensers	√	√	√
Air conditioning	√	√	√
Laundry	√	√	×
Borehole water	√	√	×
Municipal water	×	×	√
Abstraction from the river for potable water	√	√	×
Water purification plant	√	√	×
Municipal sewage removal	×	×	√
Water treatment plants (Sewage treatment plant)	√	√	×
Backup generator	√	√	√
Swimming pool	√	√	√
Sauna /steam baths	×	×	√
Outdoor entertainment area	√	√	×
Health club	×	×	√
Outdoor sports facilities	×	√	×
Beauty salon	Hair dresser on call	×	√
Gardens	√	√	×
Curio shop	√	√	×
Convenience store	×	√	×
Waste area	√	√	√
Storage yard	√	√	×
Fire extinguishers	√	√	√
Fuel storage tanks	√	√	√
Electrical water heaters	√	√	√
Water heaters using natural energy	×	×	×
Fireplaces	√	√	×
Elevators	×	×	√
Water features	√	√	√
Delivery vehicles	×	×	×
Courtesy vehicles	√	outsourced	outsourced

2.5.2 Services offered and activities undertaken

Table 2: Activities undertaken and services offered

Facilities	Malelane Sun	Sabi River Sun	Sandton Sun and Towers
Meals			
Breakfast only	√	√	√
Breakfast and dinner only (half board)	√	√	√
Three meals and full buffet (full board)	√	√	√
Twenty-four-hour room service	√	√	√
Other catering			
Functions	√	√	√
Conferences	√	√	√
Routine operational activities			
Cleaning services	√	√	√
Garden maintenance	√	√	√
General building maintenance	√	√	√
Vehicle washing	√	√	√
Servicing of vehicle fleet	×	×	×
Recreational activities			
Horse riding – horses kept on site	×	×	×
Game drives	√		×
Golf course – 18 holes	×	√	×
River rafting	×	×	×
Swimming pool	√	√	√
Volley ball courts	√	√	×
Squash courts	×	√	×
Walking/running trails	×	√	×
Bowling green	×	√	×
Children's play area	×	√	×
Gymnasium	×	×	√
Sauna	×	×	√

2.5.3 Summary

Tables 1 and 2 identified activities and facilities offered by the individual hotels. The hotels in sensitive areas had larger external areas and offered more outdoor recreational activities. The hotel in the urban centre offered more internal facilities in terms of health clubs and saunas/steam baths. For ease of identification of the environmental impacts, all the activities and facilities identified in the tables will be used below in discussing the identification of potential environmental impacts.

2.6 Identification of potential environmental impacts

The elements as identified in the IEM[131] procedure to determine where the identified activities, facilities and services of hotels impact on the environment are summarised in Annexure A and are in line with the definition of the environment as described in item 1.2.4 b) iii of this dissertation. These elements provided the context within which the potential environmental impacts of hotels were determined. The list of environmental characteristics as identified from the IEM Procedure was expanded by using examples of other flow charts prepared for environmental assessments, such as the checklist compiled by the Department of Landscape Architecture at the University of Louisiana[132].

As indicated by Fuggle and Rabie[133], the construction and operational phases of projects differ greatly in terms of activities and potential impacts on the environment. The checklist of potential environmental impacts for hotels for this dissertation was then compiled for four phases in the development of hotels, namely planning, construction, operation and decommissioning. To assist in the expansion of the issues under each of the environmental elements, the environmental indicators as identified by DEAT were used.

For this section, two of the three case studies were assessed in terms of their biophysical characteristics to assist in the assessment of the impacts later in this dissertation. The two hotels that were selected were the Sabi River Sun and the Sandton Sun and Towers Inter-Continental. The Sabi River Sun was selected as the example of the hotel located in a sensitive environment, due to the sewage treatment plant and water purification plant for potable water located on the site and managed by the hotel. The Sandton Sun and Towers Inter-Continental was visited as the comparative hotel located in an urban environment.

The biophysical assessments for the two hotels are discussed in detail in Annexure D, but applicable issues are highlighted in items 2.6.1 to 2.6.7. The tables used in this section were compiled by the author of this dissertation, based on the facilities, activities and services of hotels identified under item 2.5 and the environmental elements identified in item 2.4.2 on which these activities, facilities or services could impact. These tables were combined into an overall checklist of potential environmental impacts of hotels in all phases of their development, namely planning, construction, operation and decommissioning.

[131] Department of Environmental Affairs and Tourism. 1992. (a)
[132] University of Louisiana. [s.a.]
[133] Fuggle and Rabie. (2000:774)

2.6.1 Location and context

Location and context are defined in item 2.1. The location of a hotel will determine whether the property is affected by floodlines, and whether sites of cultural or archaeological significance will be affected by, or need to be incorporated into the development. A development that is significantly different from the surrounding land uses may cause a disturbance to the surrounding areas, or may trigger further development in a currently undeveloped area. The biophysical characteristics of the Sabi River Sun and Sandton Sun and Towers Inter-Continental are described in Annexure D.

Table 3: Activities, facilities or services identified which could impact on location and context

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Located near or adjacent to an environmentally sensitive area	Construction activities	Uncontrolled access into sensitive area causing damage	X	X		X
Located near or adjacent to an environmentally sensitive area	Unplanned access to guests	Uncontrolled access into sensitive area causing damage			X	
Site affected by floodlines	Construction activities	Flooding of development	X	X		
Site affected by floodlines	Construction activities	Damage to wetland areas	X	X		
Site affected by floodlines	Operational activities	Flooding of development and damage to structures		X	X	
Located near or adjacent to a site of cultural significance	Construction activities	Uncontrolled access causing damage	X	X		X
Located near or adjacent to a site of cultural significance	Unplanned access to guests	Uncontrolled access causing damage			X	
Zoning of the property prior to development, requiring an Environmental Impact Assessment process in terms of South African legislation	Change of land use for development	Potential damage to unique environments or ecological areas	X			
Development significantly different from surrounding land uses	Change of land use for development	Potential to initiate similar development in the area	X			

2.6.2 Boundaries

Developments end at boundaries shared with other developments or individuals. Activities in a development may have an effect on the adjacent properties, and an investigation of the boundaries and how the development will impact on the boundaries will enable sound management decisions. Boundaries of the Sabi River Sun and Sandton Sun and Towers Inter-Continental are described in Annexure D.

Table 4: Activities, facilities or services identified which could impact on site boundaries

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Development situated adjacent to a nature reserve/conservation area/coastal area	Construction activities	Uncontrolled access into sensitive area causing damage	X	X		X
Development situated adjacent to a nature reserve/conservation area/coastal area	Uncontrolled movement of guests	Uncontrolled access into sensitive area causing damage			X	
Situated adjacent to economically poor communities	Potential job opportunities	Economic upliftment		X	X	

2.6.3 Biophysical environment

The biophysical aspects of the two case studies differ greatly. It is recommended that a biophysical assessment be completed for each hotel where an Environmental Management System (EMS) will be implemented to identify any potential impacts the hotel might have on the environment.

a) Climate

During the construction phase of hotels, impacts on air quality include dust pollution from wind blowing over bare soil, smoke and particulates emitted to the atmosphere from cooking fires, diesel smoke from poorly maintained vehicles and evaporation from leaks or spills from fuel storage areas. The planning phase of the hotel could influence a decision to use passive ventilation as opposed to using air conditioning.

During the operational phase the quality of external and internal air is dependent on the levels of emissions produced during the operation of the hotel. The air quality affecting the hotel will also be dependent on emissions from facilities and activities situated around the hotel. Stratospheric ozone depletion and the emission of greenhouse gases are issues identified in the Environmental Indicators published by DEAT[134]. Emissions to the atmosphere are defined by the International Hotels Environment Initiative (IHEI)[135] as:

> *…emissions to the outdoor atmosphere of solid, liquid or gaseous substances that are potentially hazardous to human health or detrimental to the general environment*.

[134] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za
[135] International Hotels Environment Initiative. 1996.

These aspects impact on the environment during the operational phase of hotels.

Potential sources of impacts on air quality during the operation of hotels as identified by the IHEI[136] are emissions from fuel combustion in heating systems and vehicles, and emissions of organic and inorganic pollutants from kitchens and laundries during operation. According to the IHEI[137], losses to the atmosphere of volatile organic materials may lead to odours, toxicity and carcinogenic effects. In particular, studies have implicated chlorofluorocarbons (CFCs) in the depletion of the ozone layer and associated climatic changes. The potential of boiler exhausts to impact on air quality was identified by the IHEI[138], but does not apply to the hotels in these case studies. The item has been included in the list for the sake of completeness. The hotels used in the case studies use only standard water heaters such as industrial-sized geysers. As the geysers are electrically operated, no emissions occur from them. Although electricity generation causes particulate emissions to air at source, the hotels cannot directly influence these emissions.

Table 5: Activities, facilities or services identified which could impact on climate

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Buildings designed with passive ventilation systems	Less air conditioning needed	Less CFCs released to the atmosphere	X		X	
Bare soil surfaces	Windy conditions during construction	Dust particles blown into the air		X	X	X
Kitchen	Cooking	Odours and vapours released to air			X	
Laundry	Washing clothes	Steam and chemical vapours released to air			X	
Operation of backup generator	Emergency electricity generation	Particulates and gases released during combustion process		X	X	
Gas supply to hotel	Accidental gas leaks / rupturing of vessel.	Gases released to air – health hazard			X	
Air-conditioning systems	Refrigerants with ozone depleting potential could be released	Ozone in atmosphere could be depleted			X	
Air-conditioning systems	Viruses and bacteria can be transmitted	Contamination of internal air quality			X	
Air-conditioning systems	Cooling air	Waste heat released into atmosphere			X	
Fireplaces/cooking fires	Burning of fossil fuels	Particulates, CO, CO_2, NO_x and SO_x are released		X	X	
Refrigeration units	Refrigerants could be released with ozone depleting potential	Ozone in atmosphere could be depleted			X	

[136] International Hotels Environment Initiative. 1996.
[137] International Hotels Environment Initiative. 1996.
[138] International Hotels Environment Initiative. 1996.

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Aerosol cans	Spraying of air fresheners, insecticide, deodorants etc and releasing CFCs	Ozone in atmosphere could be depleted			X	
Fire extinguishers	Dowsing a fire	CO_2 is released during use			X	
Carbonated drinks dispensers	Making carbonated drinks at the bar	CO_2 is released			X	
Chemical storage area	Spillages from chemicals and cleaning agents	Vapours are released to air		X	X	
Vehicle fleet / courtesy vehicles	Emissions of noxious gases during operation	CO_2, NO_x and SO_x are released		X	X	
Boiler exhausts	Burning of fossil fuels	Particulates, CO_2 is released during use			X	
Fuel storage area	Leaks or spills	CO_2, NO_x and SO_x are released		X	X	
Garden maintenance	Application of pesticides and herbicides	Harmful chemicals are released to the atmosphere			X	
Sewage treatment plant	Natural processes of breaking down of sewage	Odours and gases released to the atmosphere			X	
Water purification plant and sewage treatment plant	Evaporation of chlorine during operation or leak of chlorine gas from bulk storage facility	Chlorine released to the atmosphere – health risk			X	
Swimming pools	Evaporation of chlorine	Chlorine released to the atmosphere – health risk			X	
Waste yard	Burning of domestic waste in rural areas	Particulates and gases could be released to the atmosphere		X	X	X

b) Topography

The topography of the sites where the Sabi River Sun and Sandton Sun and Towers Intercontinental are situated is described in Annexure D. Topography influences visibility of the site and buildings from surrounding areas, but also allows views from the development onto the surrounding landscape. Topography also determines the necessity of steps, level changes, ramps for disabled persons and the overall accessibility of the external areas to guests.

Table 6: Activities, facilities or services identified which could impact on topography

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Steep external areas	Unstabilised embankments	Potential soil erosion	X	X	X	X
Hotel and facilities	Views towards surrounding areas	Visual benefit to the development	X		X	
Hotel and facilities	Visible from surroundings	Visual / light pollution	X	X	X	

c) Geology

The geology of the sites where the Sabi River Sun and the Sandton Sun and Towers Intercontinental are located is described in Annexure D. The development may have a more tangible impact on the environment if nearby rock outcrops or formations are destroyed during construction. These features could become a prominent visual aspect of the development. However, shallow bedrock causes difficulties for the installation of services, foundations and general excavations on site during construction.

Table 7: Activities, facilities or services identified which could impact on geology

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Rocky outcrops, ridges and unique features on site	Uncontrolled construction activities	Damage to unique features	X	X		
Shallow bedrock	Installation of services, foundations and general excavation	Blasting required – noise pollution	X	X		

d) Soil

The soil types of the sites where the Sabi River Sun and the Sandton Sun and Towers are located, are described in Annexure D. The soil type has an influence on the severity of the impact of the activities, facilities and services on the soil. For example, sandy soils are porous and infiltration of any spill is quick, whereas clayey soils are less porous and infiltration would be slower. Accidental spills of chemicals, over-fertilisation of gardens and storage of harmful materials on exposed soil will cause contamination of soil and pollution may leach into groundwater. Waste areas and potential leaching of pollutants from these areas into soil, also impact on the soil quality. Irrigation precipitation applied incorrectly or regular walking on bare soil in rural areas could cause erosion and loss of topsoil. In addition, loss of soil is listed as an Environmental Indicator under land use. The potential contamination of soil by disposal of sludge from the sewage treatment plan is not discussed since the sewage treatment plant at the Sabi River Sun, as described in Annexure D, does not require the clearing of sludge from the system.

Table 8: Activities, facilities or services identified in hotels that could cause contamination of soil

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Sandy soils	Soil left bare after construction	Potential soil erosion	X	X	X	
Clay soils	Poor stormwater management	Potential water logging	X	X	X	
Hard surfaces in development	Increased stormwater runoff	Potential soil erosion	X	X	X	
Storage area	Accidental spill of chemicals such as pesticides, herbicides, chlorine or hydrochloric acid	Contamination of soil and groundwater		X	X	X
Storage area	Accidental spill of fuel or oil	Contamination of soil and groundwater		X	X	X
Waste area	Storage of hazardous waste	Contamination of soil and groundwater		X	X	
Waste area	Storage of waste foodstuffs	Contamination of soil by fluids leaching into soil			X	
Garden maintenance	Accidental spills of chemicals such as pesticides, herbicides or chlorine, hydrochloric acid or over-fertilisation of gardens.	Contamination of soil and groundwater			X	
Garden maintenance	Over-watering by irrigation system.	Erosion and loss of topsoil			X	
General maintenance	Accidental spill of hazardous substances such as oil based paints.	Contamination of soil and groundwater		X	X	X
Beauty salon	Incorrect disposal of redundant chemicals.	Contamination of soil and groundwater			X	
Housekeeping	Soapy water poured onto gardens after washing of external paved or tiled surfaces.	Contamination of soil and groundwater			X	
Gravel footpaths on the premises (rural areas)	Insufficient maintenance or lack of careful placement of paths	Erosion and loss of topsoil		X	X	
Informal parking on bare soil	Oils or fuel leaks from vehicles	Contamination of soil and groundwater		X	X	
Kitchen grease trap	Contents of grease trap disposed into domestic waste or buried on site	Contamination of soil and groundwater			X	
Parking area	Oil or fuel leaking onto bare soil	Contamination of soil and groundwater		X	X	

e) Hydrology

The hydrological aspects of the Sabi River Sun and Sandton Sun and Towers Intercontinental are described in Annexure D. In the Environmental Indicators relating to inland freshwater systems, as published by DEAT[139], issues such as limited freshwater resources, changing water quality, degradation and loss of freshwater ecosystem integrity, flood and drought management, inadequate distribution of

[139] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

freshwater services and conflicting interests over water sharing are addressed. The use of borehole and surface water impacts on limited freshwater resources. Activities allowing pollutants to be released into the stormwater and/or river system, contaminating freshwater above and below ground would all impact on inland freshwater systems.

The Sabi River Sun is located on the banks of the Sabie River, where periodic floods and droughts need to be considered for water supply and waste treatment. At this hotel, water as a physical environmental aspect plays an important role, but at the Sandton Sun and Towers Intercontinental, where potable water is supplied and sewage removed by waterborne systems provided by the local authority, water plays a role only where financial cost is involved.

The International Hotels Environment Initiative (IHEI)[140], identifies potential impacts on water quality as follows:

Stresses on water differ substantially in their form and ecological effects. They fall into the following four major categories:

- *Biological:*
  - *easily biodegradable compounds and nutritive substances,*
  - *non-biodegradable organic compounds,*
  - *microbiological substances,*
- *Chemical:*
  - *essential elements and salts,*
  - *non-essential elements and toxic substances.*
- *Waste heat.*
- *Radionuclides.*

Each one of these substances differentiates from the others, not only in its effect on human health and ecological systems, but most of all in its mechanism of decomposition or concentration within ecosystems.

[140] International Hotels Environment Initiative. (1996:99)

Table 9: Activities, facilities or services identified which could impact on hydrology

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Gardens	Re-use of grey water for irrigation	Potential water saving	X	X	X	
Water supply	Quality for use as drinking water (water purification required)	Health issues	X	X	X	
Water supply	Quality for use as irrigation water	Health issues			X	
Water supply	Excessive use during construction	Depletion of natural resource		X		X
Water supply	Excessive use of potable water for irrigation and operation of hotel	Depletion of natural resource			X	
Water supply	Abstraction of water from river	Permit required - depletion of natural resource	X	X	X	
Construction activities	Chemical or fuel spills	Contamination of surface and/or groundwater		X		
General maintenance	Chemical or fuel spills	Contamination of surface and/or groundwater			X	
Gardens and maintenance areas	Silt from bare soil areas washing into stormwater	Increased siltation of rivers		X	X	
Development adjacent to a wetland	Uncontrolled construction activities	Loss of sensitive habitat and biodiversity	X	X		
Development adjacent to a wetland	Uncontrolled access during maintenance or by guests	Loss of sensitive habitat and biodiversity			X	
Gardens	Retention of stormwater prior to exiting the site	Possible reuse of water		X	X	
Kitchen grease trap	Poor maintenance causing grease trap to overflow	Contamination of surface water			X	
Kitchen	Disposal of redundant food into sewage system	Overloading of sewage system, ultimate contamination of surface water.			X	
Kitchens, laundry and bathrooms	Chemicals washed into sewage system during cleaning	Contamination of surface water.			X	
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of waste heat			X	
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of toxins, nutrients and pesticides into river system			X	
Water treatment plants (Sewage plants)	Risk of discharge into the wetland	Contamination of sensitive habitat and loss of biodiversity	X	X	X	
Gardens and golf course	Fertiliser washed from golf course and gardens into stormwater system	Contamination of surface water			X	
Gardens	Use of pesticides and fertiliser during maintenance	Contamination of surface water			X	
Car park	Washing of guests' vehicles	Contamination of surface water		X	X	
Swimming pool	Backwash water released into storm water	Contamination of surface water			X	

f) Flora

The vegetation of the Sabi River Sun and Sandton Sun and Towers Intercontinental is described in Annexure D. In terms of biodiversity preservation, invasive exotic plant species and clearing of indigenous vegetation leading to habitat change or loss as described in the Environmental Indicators published by DEAT[141] are activities that would affect the environment. The Sabi River Sun is situated in an area where undisturbed indigenous vegetation still occurs.

Table 10: Activities, facilities or services that could impact on biodiversity of flora

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Site for development	Clearing of indigenous vegetation for construction	Loss of habitat and biodiversity	X	X		
Gardens	Exotic vegetation planted	Loss of biodiversity			X	
Gardens	Declared alien invasive exotic species allowed to proliferate	Loss of biodiversity			X	
Gardens	Using mono-culture plant species in landscaping	Loss of biodiversity	X	X	X	
Fireplaces	Use of indigenous wood as fuel for fires	Loss of biodiversity and natural resources		X	X	
Fireplaces	Use of invasive exotic wood as fuel for fires	Control of invasive exotic species			X	
Golf courses	Exotic plants and lawn allowed to replace indigenous vegetation	Loss of biodiversity	X	X	X	
Curio shop	Indigenous wood used to carve African art pieces	Loss of biodiversity			X	
Curio shop	Invasive exotic wood used to carve African art pieces	Control of invasive exotic species			X	

g) Fauna

The biophysical assessment of the Sabi River Sun and the Sandton Sun and Towers Intercontinental is described in Annexure D. Birdlife abounds on the property of the Sabi River Sun and contrasts with the urban environment of Sandton.

[141] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

Table 11: Activities, facilities or services identified which could impact on fauna

Site/area	Activity, facility or service that may impact on the environment	Potential biophysical environmental impact	Planning	Construction	Operation	Decommissioning
Site and surroundings	Change in ecological character of the area due to development	Loss of biodiversity and rare / threatened species	X	X	X	
Site and surroundings	Clearing of habitat during construction activities	Loss of biodiversity and rare / threatened species		X		X
Site and surroundings	Noise during construction	Disturbance to local fauna		X		X
Site and surroundings	Uncontrolled construction activities	Loss of biodiversity and rare / threatened species	X	X		X

2.6.4 Socio-economic environment

To the extent possible, demographics, standard of living, employment levels, housing and education standards of the surrounding communities for the Sabi River Sun and Sandton Sun and Towers Intercontinental are described in Annexure D. However, very little information could be obtained within the scope of this study. It is required, in terms of potential benefits the hotel may have for its surrounding community, that the status of the community in terms of these issues be determined. Hotels could have positive impacts on the economic environment of the community around them by providing employment opportunities to the staff, by allowing small businesses to develop for the provision of outsourced services such as transport services, gardening or housekeeping services, and by buying from the local suppliers. Improved employment levels would also have a secondary positive social impact on the general improvement of education levels and an improvement in the health of the local community. The potential environmental impacts hotels could have on the socio-economic environment of the community are listed in Table 12.

Table 12: Activities, facilities or services identified, which could impact on demographics, standard of living, employment levels or housing and education standards

Site/area	Activity, facility or service that may impact on the environment	Potential socio-economic environmental impact	Planning	Construction	Operation	Decommissioning
Large youth and young adult population	Employment opportunities	Economic upliftment		X	X	
Large youth and young adult population	Job losses after construction and at closure of hotel	Economic downturn		X		X
Employment of the community	Economic upliftment	Improved housing standards			X	
Employment of the community	Economic upliftment	Improved education levels			X	
Steep external areas	Contours, steps, levels required	Guest comfort	X			
Steep level changes	Access for disabled to be provided	Guest comfort	X	X	X	X
Development affected by floodlines	No development allowed below the 1:100 year floodline	Damage by floods – economic loss	X	X	X	

a) Services – waste removal

The waste management at the Sabi River Sun and Sandton Sun and Towers Inter-Continental hotels is described in more detail in Annexure D. Waste removal or on-site treatment is a service that affects the environment in which the hotels are situated. Even though this activity impacts on soil through the leaching of pollutants, this is a service-related issue which the author of this dissertation considered significant enough to address separately.

The Department of Environmental Affairs and Tourism (DEAT) identified pollution and waste management as key areas of concern in South Africa. In the White Paper on Integrated Pollution and Waste Management for South Africa[142], it is stated that the government will be introducing preventative strategies aimed at waste minimisation and pollution prevention. Waste is also identified as one of the Environmental Indicators by DEAT. In the White Paper on Integrated Pollution and Waste Management for South Africa[143] it is further stated that:

> *Pollution and waste management is not the exclusive preserve of government. The private sector and civil society have crucial roles to play. The fostering of partnerships between government and the private sector is a prerequisite for*

[142] South Africa. White Paper on Integrated Pollution and Waste Management in South Africa. 2000.
[143] South Africa. White Paper on Integrated Pollution and Waste Management in South Africa. (2000:1,6)

sustainable and effective pollution and waste management to take place…The government aims to:

- *encourage the prevention and minimisation of waste generation, and thus pollution at source*
- *encourage the management and minimisation of the impact of unavoidable waste from its generation to its final disposal*
- *ensure the integrity and sustained "fitness for use" of all environmental media, i.e. air, water and land*
- *ensure that any pollution of the environment is remediated by holding the responsible parties accountable*
- *ensure environmental justice by integrating environmental considerations with the social, political and development needs and rights of all sectors, communities and individuals, and*
- *prosecute non-compliance with authorisations and legislation*.

Issues identified by DEAT in relation to policy implementation are:

i. Waste avoidance, minimisation and prevention
ii. Recycling and re-use
iii. Treatment and handling
iv. Storage and final disposal.

These issues relate to the management of waste and will be referred to in Chapter Four of this dissertation. Environmental impacts identified and related to waste management at hotels are listed in Table 13.

Table 13: Activities, facilities or services through which hotels could have an effect on waste management

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Construction site	Littering during construction	Uncontrolled spreading of waste		X		X
Kitchen	Disposal of unsorted waste, including foodstuffs	Increased waste, contamination of soil			X	
Laundry	Disposal of unsorted waste such as chemical containers	Increased waste, contamination of soil			X	
Gardens	Disposal of organic waste	Increased waste			X	
Swimming pool	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material			X	
Beauty salon	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material			X	

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Storage area and waste yard	Disposal of hazardous waste into domestic waste stream	Contamination of soil and groundwater with hazardous material		X	X	
Waste yard	Storage of waste foodstuffs until collection of domestic waste	Attract vermin and pests – health risk		X	X	X
Waste yard	Incorrect disposal of chemicals, herbicides and pesticides	Contamination of soil and groundwater		X	X	X
Waste yard	Disposal of unsorted waste / unnecessary disposal of recyclable material	Increased waste and loss of potential recyclable material / resources.		X	X	X
Waste yard	Seepage from waste into bare soil	Contamination of soil and groundwater		X	X	X
Convenience store	Disposal of unsorted waste	Increased waste			X	
General maintenance	Disposal of hazardous waste and building materials as domestic waste	Increased waste and contamination of soil with hazardous material		X	X	X
General maintenance	Disposal of fluorescent tubing	Hazardous waste potentially retained in domestic waste stream.			X	X
General maintenance	Cleaning of fireplaces	Ash disposed in gardens – contamination of soil		X	X	X
Maintenance of vehicle fleet	Waste oil and lubricants disposed as domestic waste.	Contamination of soil. Hazardous waste retained in domestic waste stream.		X	X	X

b) Infrastructure, energy and water supply

The sewer treatment plant, fuel storage, energy and water supply for both the Sabi River Sun and the Sandton Sun and Towers Inter-Continental are discussed in Annexure D. In the White Paper on the Development and Promotion of Tourism in South Africa[144], it is stated that the sustainable use of local resources is one of the key elements of responsible tourism. Hotels utilise natural resources in the form of energy and water. Energy in South Africa is mostly supplied as electricity, generated from coal, which is a non-renewable natural resource. Water is supplied in most cases by the local authorities or provincial water board, but in some instances water may be extracted from boreholes on site.

Since electricity at the hotels selected for the case studies is supplied by the local authorities, the hotels would only have an influence on the type of energy source utilised to provide their electricity, if the management team decided to investigate alternative energy sources such as solar power. The management team of a hotel

[144] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.

would have an influence on the amount of electricity used at the hotel. Water supply is included in the services since the Sandton Sun and Towers Intercontinental receives water from local authorities. The use of these natural resources, and in particular the excessive use thereof, will impact on the reduction of natural resources as identified in the Environmental Indicators published by DEAT[145]. Hotels could investigate optimum use of current electricity and water supplied to protect energy and water sources, and could investigate alternative energy sources such as solar, water or wind energy. However, the application of such technology is not currently economically viable for use by hotels in South Africa.

Table 14: Activities, facilities or services identified where hotels could impact on infrastructure, energy and water supply

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Construction activities	Using excessive water for construction activities	Utilising water		X		X
Service yard	Potential leaks or spills from fuel storage tanks	Contamination of soil and groundwater		X	X	X
Electricity supply to hotel	Electricity generated using fossil fuels	Utilising non-renewable natural resource	X	X	X	X
Electricity supply to hotel	Electricity generated using fossil fuels	Noxious gases and particulates released to air	X	X	X	X
Electricity supply to hotel	Alternative energy sources utilised	Reduction in the use of non-renewable natural resource	X	X	X	X
Service yard	Use of back-up generator	Noxious gases and particulates released to air		X	X	X
Service yard	Use of diesel when operating back-up generator	Use of a non-renewable resource	X	X	X	X
Kitchen	Catering, including the preparation of meals and drinks	Utilising energy			X	
Kitchen	Washing dishes	Utilising water and energy			X	
Kitchen (refrigerators/chillers)	Cooling/storage of foodstuffs, making ice	Utilising energy			X	
Guest rooms	Lights left burning when guests are not in	Utilising energy			X	
Guest rooms	Taps left running, using too much water when bathing/showering	Utilising water			X	
Laundry	Washing of linen and towels	Utilising energy and water			X	
Water heater	Heating water for guests and washing of dishes	Utilising energy			X	
Air conditioning	Heating or cooling rooms and public areas	Utilising energy			X	
Gardens	Maintenance applying excessive irrigation	Utilising water		X	X	
Swimming pool	Leaking pool filled up regularly	Utilising water			X	

[145] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Sauna and steam baths	Heating water	Utilising water and energy during operation			X	
Elevators	Movement between floors	Utilising energy			X	
Potable water supply	Quality of water	Health issues			X	
Water treatment plants	Pumping water during treatment process	Utilising energy and water			X	
Water abstraction	Pumping water from the river	Utilising water and energy		X	X	X
Water features and swimming pool	Pumps circulating water	Utilising energy			X	

c) Social infrastructure/community involvement

The participation of the Sandton Sun and Towers Inter-Continental and the Sabi River Sun in local community upliftment programmes is briefly described in Annexure D. Hotels that are situated within communities, whether urban or rural, will impact on these communities in positive and negative ways. Employment can be offered, assisting in improving the local economy, hotels can benefit communities by making donations to local charity organisations, the use of local suppliers will again benefit the local economy and initially a new hotel may trigger the influx of hopeful job seekers until employment reaches a stable point.

Table 15: Activities, facilities or services identified where hotels could impact on social infrastructure/community involvement

Site/area	Activity, facility or service that may impact on the environment	Potential socio-economic environmental impact	Planning	Construction	Operation	Decommissioning
Community liaison	Providing charity or education drives,	Social upliftment			X	
Staff/Management influence	Support or drive environmental awareness programmes	Increased environmental awareness			X	
Employment	Employment of local community or outsourcing services for cleaning, laundry services, garden maintenance, eradication of invasive exotics, game drives and management of curio shops and convenience stores	Increased employment			X	

d) Land use

In the Environmental Indicators published by DEAT[146] potential impacts of land use are indicated as being that of land degradation, land use management and soil loss. Loss of soil and pollution of soil are addressed under item 2.6.3 d) of this dissertation. In the interpretation of land use as the actual use of the land, development of a hotel and the location of a hotel should take place within the local authority development structure for the area (adhering to the Land Development Objectives and Integrated Development Plans for the area it is situated in).

Table 16: Activities, facilities or services identified which could impact on land use

Site/area	Activity, facility or service that may impact on the environment	Potential social and biophysical environmental impacts	Planning	Construction	Operation	Decommissioning
Location of development	Development significantly different from surrounding land uses	Potential opposition to the development	X	X		
Location of development	Development significantly different from surrounding land uses	Potential to initiate similar development in the area	X		X	
Location of development	Development located in a high crime risk area	Safety issues		X	X	X
Location of development	Development located near other properties with floodlights or adjacent to busy roads, railway lines or airports	Noise and light pollution			X	
Location of development	Functions or sports events in quiet surroundings	Noise and light pollution			X	

e) Access and circulation

Access to and from the hotel is important during construction and operation, and is briefly discussed for the Sabi River Sun and the Sandton Sun and Towers Inter-Continental in Annexure D.

[146] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

Table 17: Activities, facilities or services identified which could impact on access and circulation

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Location of development	Construction vehicles using local road network	Traffic increase and disruption		X		X
Location of development	Large functions or events drawing crowds	Traffic increase and congestion			X	

f) Local government and administration

Local by-laws and legislation pertaining to the area or country where the hotel is located need to be adhered to. Contraventions of any environmental legislation or local by-laws could lead to citing, fines against the hotel or closure of the hotel.

2.6.5 Cultural and historic environment

a) Areas of cultural/archaeological interest

During the planning phase of the hotel, care must be taken to identify any sites of particular cultural or archaeological interest. These areas must be protected and access during construction restricted. Careful control of access to guests could be allowed after construction.

b) Areas of architectural interest

Any existing buildings with architectural value on the premises must be identified during the planning phase and protected against damage during construction. The architectural features could become an item of tourist interest in the area.

c) Visual impact

Visual impacts of hotels can be considered, as well as walking trails to sites of cultural or historic significance. The way culturally or historically sensitive sites are protected during the planning and development phases and managed during the operational phase could impact on these sites. The visual intrusion of the architecture should be considered during the planning and construction phases. Lighting of external features and access points could be classified as a visual impact.

d) Other aspects of particular significance or value

Noise is highlighted by the International Hotels Environment Initiative (IHEI)[147] as disturbing to the guests' environment:

> *Noise, or unwanted sound, and its detrimental effects, are increasing. Numerous sources of noise, either incidental to an industrial process or mode of transport, or as an end in themselves in information and entertainment are synonymous with modern life. Urban lifestyles now mean exposure to noise at home, in transit, in the workplace and during leisure activities.*
>
> *The effects on the environment of sound at various intensities include:*
>
> - *Effects on human health (physical).*
> - *Effects on people (psychological, physiological and physical).*
> - *Reduction in quality of life.*
> - *Financial consequences.*

Table 18: Activities, facilities or service that could impact on the cultural and historic environment

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Areas of cultural/archaeological interest	Uncontrolled construction activities	Potential damage to sensitive artefacts/areas	X	X		X
Areas of cultural/archaeological interest	Uncontrolled movement of guests	Potential damage to sensitive artefacts/areas			X	
Areas of architectural interest	Uncontrolled construction activities	Potential damage to structures	X	X		X
Areas of architectural interest	Uncontrolled movement of guests	Potential damage to structures			X	
External areas and access points	Spotlights illuminating the buildings, entrances and outdoor sports facilities	Visual intrusion/light pollution		X	X	X
Views onto the development	New buildings visible in the natural surrounding landscape	Visual intrusion		X	X	X
Views onto the development	Architectural style or colours not blending into the surroundings	Visual pollution	X	X	X	
Outdoor entertainment area	Music at functions, public address system	Noise pollution			X	
Outdoor sports facilities and swimming pool	Noisy activities/games/players	Noise pollution			X	
Internal functions	Music at functions, public address system	Noise pollution			X	
Construction site	Loud construction activities such as blasting or drilling	Noise pollution		X		X

[147] International Hotels Environment Initiative. (1996:138)

Site/area	Activity, facility or service that may impact on the environment	Potential environmental impact	Planning	Construction	Operation	Decommissioning
Maintenance yard/gardens	Loud maintenance activities such as edge trimming, lawn mowing or drilling	Noise pollution			X	

2.6.7 Specialist reports prepared

The document produced by the International Hotels Environment Initiative (IHEI)[148], the baseline environmental audit[149] and the draft training manual for environmental awareness[150] produced by Southern Sun Hotel Interests can be considered as specialist reports on environmental impacts hotels may have on the environment.

2.6.8 Summary

The tables as listed under items 2.6.1 to 2.6.7 are summarised in Table 19 on page 54 - 59. From this table it can be noted that most of the activities, facilities or services associated with the development and operation of hotels would have an impact on the environment during the operational phase. For the purpose of this study, only the environmental impacts associated with the operational impacts of hotels will be assessed further and possible mitigation or management measures will be discussed later in this dissertation. It should also be noted that most of the activities, facilities or services have environmental impacts during the operational phase of the development. In Table 20 on page 60, the operational environmental impacts of hotels alone have been extracted for this study.

[148] International Hotels Environment Initiative. 1996.
[149] Southern Sun Hotel Interests (Pty) Ltd. 2001.
[150] Southern Sun Hotel Interests (Pty) Ltd. 2002

Table 19: Summary table of possible impacts hotels may have on the environment

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
1 Location and context						
	In vicinity of environmentally sensitive area	Potential damage to sensitive vegetation or fauna or ecological zone	X	X		
	Site affected by floodlines	Potential flooding of the property	X	X	X	
	Area of cultural significance	Potential damage to cultural or historic artefacts	X	X		
	Current zoning requiring a change of land use and resulting in requirement of Environmental Impact Assessment in terms of legislation	Change of land use	X			
	Development significantly different from surrounding land uses	Potential opposition to the development, potential to initiate similar development in the area	X			
2 Boundaries						
	Situated adjacent to a nature reserve/conservation area/coastal area	Potential damage to sensitive environments	X	X		
	Situated near economically poor communities	Potential job creation opportunities	X	X		
3 Biophysical environment						
3.1 Climate	Air conditioning – refrigerants with ozone-depleting potential released to the atmosphere	Potential atmospheric ozone depletion			X	
	Air conditioning – waste heat released externally	Microclimatic temperature increase				
	Air conditioning – bacteria and viruses released/circulated	Health risk internally			X	
	Operation of back-up generators	Emission of greenhouse gases and particulate pollution		X	X	
	Dust from bare soil surfaces blown into the air during construction / maintenance	Dust pollution of atmosphere		X	X	X
	Chemical, pesticide or herbicide spills during maintenance activities	Air pollution due to chemical, pesticide/herbicide evaporation			X	
	Swimming pool chemicals (such as chlorine) evaporation	Air pollution			X	
	Buildings designed with passive ventilation - less air conditioning required	Reduced atmospheric ozone depletion	X		X	
	Operation of vehicle fleet or courtesy vehicles	Air pollution from emissions of NO_x, SO_x		X	X	
	Safety requirements for gas vessels	Accidental leaks and contamination of air. Health risk		X	X	
	Cooking activities in kitchens	Odours and vapours released to air			X	
	Laundry operation	Steam and chemical vapours released to air			X	
	Burning of fossil fuels in fireplaces	Noxious gases and particulates released to air		X	X	

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
	Refrigeration used for cooling of food – potential leaks of refrigerants with ozone depleting potential	Atmospheric ozone depletion			X	
	Aerosol cans used in maintenance/cleaning – CFCs released	Atmospheric ozone depletion			X	
	Operating of fire extinguishers or leaks from fire extinguishers	CO_2 released to air			X	
	Natural breakdown process of sewage in treatment plant	Odours and gases released to air			X	
	Leaks or spills from fuel storage area	Releases of SO_x, NO_x, CO_2 to air		X	X	
	Operation of boilers using fossil fuels	CO_2 released to air			X	
	Leaks from carbonated drinks dispensers and draft machines	CO_2 released to air			X	
	Accidental spillage of chemicals or cleaning agents	Contamination of air with noxious or corrosive gases			X	
	Evaporation of chlorine from swimming pool, water purification plant and sewage treatment plant or leaks from chlorine gas storage facility	Chlorine released to the atmosphere – health risk			X	
3.2 Topography	Views to surroundings	Visual benefit to development	X	X	X	
3.3 Geology	Rock outcrops, ridges and unique features	Potential damage to unique features	X	X		
3.4 Soil	Sandy soil	Higher risk of soil erosion	X	X	X	X
	Clay soil	Potential problems with drainage	X	X	X	
	Soil left bare after development, or trenching during construction	Possibility of soil erosion		X		
	Increased stormwater runoff due to development	Possibility of soil erosion		X	X	
	Increased pedestrian movement on unpaved surfaces	Possibility of soil erosion		X	X	
	Over-watering from irrigation system	Possibility of soil erosion			X	
	Fuel or chemical spills during construction or maintenance	Contamination of soil		X	X	X
	Spills from fertiliser, pesticides/herbicides during maintenance	Contamination of soil			X	
	Incorrect disposal of chemicals from beauty salon	Contamination of soil			x	
	Seepage from waste yard not managed correctly	Contamination of soil		X	X	
	Hazardous waste stored incorrectly	Contamination of soil		X	X	
	Spills from hazardous material stored incorrectly	Contamination of soil		X	X	
	Grease/kitchen waste from grease trap disposed incorrectly	Contamination of soil			X	
	Soapy water from housekeeping poured onto soil	Contamination of soil			X	
	Oil/fuel dripping onto bare soil in parking area	Contamination of soil		X	X	
3.5 Hydrology	Re-use of grey water from any area	Potential water saving			X	
3.6 Streams and rivers	Situated near floodlines	No development allowed below 1:100 year flood line without permit	X	X	X	X
	Quality for use as potable water	Health issues			X	
	Quality for use as irrigation water	Health issues				
	Excessive use for potable water and irrigation	Depletion of natural resource		X	X	
	Chemical/fuel spills	Contamination of surface and/or ground water		X	X	
	Pesticides/herbicides/fertiliser washed into stream	Contamination of surface and/or groundwater			X	
	Discharge of sewage treatment plant not operating correctly	Contamination of surface and/or groundwater		X	X	
	Waste heat discharged into water from sewage treatment plant	Temperature increase in river – biological impact			X	

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
	Pollutants, toxins, nutrients and pesticides from sewage treatment plant released into river	Contamination of surface and/or groundwater			X	
	Increased siltation due to runoff over bare soil	Contamination of surface and/or groundwater		X	X	
3.7 Groundwater	Quality for use as potable water	Health issues				
	Quality for use as irrigation water	Health issues		X	X	
	Abstraction for use – permit required	Legal issues	X	X		
	Abstraction for use	Over utilisation and depletion of natural resources			X	
	Chemical/fuel spills	Contamination of surface and/or groundwater		X	X	
	Pesticides/herbicides/fertiliser leached into soil	Contamination of surface and/or groundwater			X	
3.8 Wetlands	Development located adjacent to wetland or affecting a wetland	Loss of sensitive ecological areas	X	X		
	Chemical/fuel spills	Contamination of sensitive environment		X	X	
	Pesticides/herbicides/fertiliser washed into wetland	Contamination of sensitive environment			X	
	Releases from sewage treatment washed into wetland	Contamination of sensitive environment			X	
3.9 Storm water	Increased runoff over bare soil	Potential soil erosion	X	X	X	X
	Increased runoff over bare soil	Siltation of streams		X	X	X
	Chemical/fuel spills	Contamination of surface water		X	X	
	Contamination by pesticides/herbicides/fertiliser	Contamination of surface water			X	
	Runoff with swimming pool backwash water mixing into stormwater runoff	Contamination of surface water			X	
	Grease/kitchen waste from grease trap overflowing into stormwater runoff	Contamination of surface water			X	
	Potential to retain water for slower release to stream	Replenishment of natural resources		X	X	
	Runoff from car wash or parking area entering stream/river	Contamination of surface water		X	X	
3.10 Flora	Removal of existing vegetation for development	Loss of rare/threatened vegetation	X	X		
	Clearing of the site for construction	Loss of natural vegetation and biodiversity		X		X
	Landscaping with monoculture plant species or exotic plant species	Loss of natural vegetation and biodiversity		X	X	
	Lack of management of gardens	Threat to natural vegetation by influx of invasive exotic species		X	X	X
	Indigenous trees cut down for firewood for fireplaces	Loss of indigenous plants		X	X	
	Indigenous trees and plants cut down for crafts/curios	Loss of indigenous plants			X	
	Cutting down invasive exotic species for firewood for fireplaces	Control of invasive exotic species		X	X	
3.11 Fauna	Change in ecological character of the area due to development	Loss of rare/threatened species	X	X	X	
	Noisy construction activities on site	Disturbance to local fauna during construction		X		X
	Uncontrolled development and construction activities on site	Loss of biodiversity		X	X	
4 Socio-economic environment						
4.1 Demographics	Large youth and young adult population	Job opportunities		X	X	

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
	Large youth and young adult population	Job losses after construction and during closure		X		X
4.2 Standard of living	Job opportunities	Increased living standard		X	X	
	Contours, levels, steps required/planning for disabled guests	Guest comfort	X			
	Visible to surrounding areas	Visual pollution	X	X		X
4.3 Employment levels	Construction and operation	Increased job opportunities		X	X	
4.4 Housing standards	Secondary impact of employment	Improvement of housing				
4.5 Education standards	Secondary impact of employment	Increased education				
4.6 Employment standards	Increased job opportunities during construction and operation	Increased economic status of community		X	X	
4.7 Services – waste removal	Littering during construction	Uncontrolled waste management		X		X
	Poorly managed waste yards	Health risk		X	X	
	No separation/recycling of waste	Excessive waste to landfill			X	
	Ash from fireplaces disposed in gardens	Contamination of soil		X	X	
	Hazardous waste not separated from general waste stream	Contamination of soil and groundwater		X	X	
	Stormwater from badly managed waste yard	Contamination of surface and groundwater			X	
	Seepage from waste yard	Contamination of soil and groundwater		X	X	
	Chemicals from maintenance, swimming pool or beauty salon disposed incorrectly	Contamination of soil and groundwater			X	
	Grease from kitchen grease traps disposed incorrectly	Contamination of soil and groundwater			X	
4.8 Infrastructure – fuel storage on site	Potential leaks/spills from fuel storage	Contamination of soil and groundwater		X	X	X
4.9 Infrastructure – energy supply	Electricity generated by fossil fuels	Noxious gases and particulates released to air		X	X	
	Utilising energy for service provision – cooking, laundry, cleaning, cooling of beverages, air conditioning, saunas, elevators, pumping of water for drinking/sewage treatment	Depletion of natural resource			X	
	Operation of back-up generators	Noxious gases and particulates released to air and noise pollution		X	X	
	Alternative energy sources utilised	Reduction in use of natural resources	X		X	
	Illumination using energy	Depletion of natural resource		X	X	
	Washing of clothes in laundry	Utilising energy and water			X	
	Heating water for guests and washing of dishes	Utilising energy			X	
	Heating or cooling rooms and public areas	Utilising energy			X	
	Heating water for sauna and steam baths	Utilising energy during operation			X	
	Elevators moving between floors	Utilising energy			X	
	Pumping water from the river	Utilising energy		X	X	
	Pumps for water features and swimming pool circulating water	Utilising energy			X	
4.10 Infrastructure – potable water supply	Quality of Local Authority potable water	Health issue	X	X	X	

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
	Additional water required	Depletion of natural resource		X	X	
	Excessive use of water for service provision - swimming pool top-up, laundry, washing dishes, cleaning, taps dripping, water treatment plants	Depletion of natural resource			X	
	Washing of clothes in laundry	Utilising energy and water			X	
	Maintenance applying excessive irrigation to gardens	Utilising water		X	X	
	Leaking swimming pool filled up regularly	Utilising water			X	
	Sauna and steam baths	Utilising water during operation			X	
	Pumping water during sewer treatment process	Utilising energy and water			X	
	Pumping water from the river	Utilising water		X	X	
4.11 Infrastructure – sewer network	On-site sewer treatment plant	Health issue	X	X	X	X
	Potential leaks/spills	Contamination of surface water		X	X	
	Overloading/blocking of sewer network due to incorrect disposal of kitchen food waste or grease	Contamination of surface water			X	
	Contamination due to disposal of chemicals into sewer	Contamination of surface water		X	X	
4.12 Social infrastructure	Community liaison	Social upliftment	X	X	X	X
	Environmental awareness creation	Social upliftment		X	X	
	Outsourcing services such as housekeeping, laundry, courtesy vehicles, game drives, management of sports facilities and beauty salons	Employment		X	X	X
4.13 Land use	Development significantly different from surrounding land uses	Potential opposition to the development, potential to initiate similar development in the area	X	X		
	Development located in high crime-risk area	Safety issues		X	X	
	Development located near other properties with floodlights or adjacent to busy roads, railway lines or airports	Noise and light pollution		X	X	X
	Functions or sports events in quiet surroundings	Noise and light pollution			X	
4.14 Access and circulation	Construction vehicles using local road network	Traffic increase and disruption		X		X
	Large functions/events drawing crowds	Traffic increase and congestion			X	
4.16 Local government and administration	Adherence to by-laws and legislation	Legal issues	X	X	X	X
5 Cultural and historic environment						

Criteria for assessment	Activity, facility or service that may impact on the environment	Environmental impact	Planning	Construction	Operation	Decommis-sioning / Closure
5.1 Areas of cultural/archaeological interest	Uncontrolled construction activities	Potential damage to sensitive artefacts/areas	X	X		
	Increased visitors to sensitive artefacts/areas walking on bare soil or undesignated areas	Potential erosion			X	
	Increased visitors to sensitive artefacts/areas	Damage to artefacts or areas			X	
5.2 Areas of architectural interest	Uncontrolled construction activities	Potential damage to sensitive aspects	X	X		
5.3 Visual impact	Spotlights shining onto buildings or roads	Light pollution		X	X	X
	Locality leading to high visibility	Light pollution	X	X		
	Architectural style	Visual pollution	X	X		
	Building and feature colours	Visual pollution		X	X	
5.4 Other aspects of particular value/significance	Loud construction activities such as blasting, drilling, etc.	Noise pollution		X		X
	Loud maintenance activities such as lawn mowing or edging or drilling	Noise pollution			X	
	Events held at outdoor sports facilities	Noise pollution			X	
	Functions held in quiet surroundings	Noise pollution			X	

Table 20: Operational activities, facilities or services of hotels that could impact on the environment

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact
1 Location and context		
Located near or adjacent to an environmentally sensitive area	Unplanned access to guests	Uncontrolled access into sensitive area causing damage
Site affected by floodlines	Operational activities	Flooding of development and damage to structures
Located near or adjacent to a site of cultural significance	Unplanned access to guests	Uncontrolled access causing damage
2 Boundaries		
Development situated adjacent to a nature reserve/conservation area/coastal area	Uncontrolled movement of guests	Uncontrolled access into sensitive area causing damage
Situated adjacent to economically poor communities	Potential job opportunities	Economic upliftment
3 Biophysical environment		
3.1 Climate		
Bare soil surfaces	Windy conditions during construction	Dust particles blown into the air
Kitchen	Cooking	Odours and vapours released to air
Laundry	Washing clothes	Steam and chemical vapours released to air
Operation of back-up generator	Emergency electricity generating	Gases and particulates released during combustion process
Gas supply to hotel	Accidental gas leaks/rupturing of vessel	Gases released to air – health hazard
Air-conditioning systems	Potential release of refrigerant with ozone depleting potential	Depletion of atmospheric ozone
Air-conditioning systems	Viruses and bacteria can be transmitted	Contamination of internal air quality
Air-conditioning systems	Cooling air	Waste heat released into atmosphere
Fireplaces/cooking fires	Burning of fossil fuels	Particulates, CO, CO_2, NO_x and SO_x are released
Refrigeration units	Cooling foodstuffs	CFCs could be released
Aerosol cans	Spraying of air fresheners, insecticide, deodorants, etc.	CFCs could be released during use
Fire extinguishers	Dowsing a fire	CO_2 is released during use
Carbonated drinks dispensers	Making carbonated drinks at the bar	CO_2 is released
Chemical storage area	Spillages from chemicals and cleaning agents	Vapours are released to air
Vehicle fleet/courtesy vehicles	Emissions of noxious gases during operation	Carbon dioxide, NO_x and SO_x are released
Boiler exhausts	Burning of fossil fuels	Particulates, CO and CO_2 are released during use
Fuel storage area	Leaks or spills	CO_2, CO, NO_x and SO_x are released
Garden maintenance	Application of pesticides and herbicides	Harmful chemicals are released to the atmosphere
Sewage treatment plant	Natural processes of breaking down of sewage	Odours and gases released to the atmosphere
Swimming pools	Evaporation of chlorine	Chlorine released to the atmosphere
Waste yard	Burning of domestic waste in rural areas	Particulates and noxious gases released to the atmosphere
3.2 Topography		
Hotel and facilities	Views towards surrounding areas	Visual benefit to the development
Hotel and facilities	Visible from surroundings	Visual/light pollution
3.3 Soil		
Sandy soils	Soil left bare after construction	Potential soil erosion

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact
Clay soils	Poor stormwater management	Potential water logging
Hard surfaces in development	Increased stormwater runoff	Potential soil erosion
Storage area	Accidental spill of chemicals such as pesticides, herbicides, chlorine or hydrochloric acid	Contamination of soil and groundwater
Storage area	Accidental spill of fuel or oil	Contamination of soil and groundwater
Storage area	Accidental spill of hazardous substance	Contamination of soil and groundwater
Waste area	Storage of hazardous waste	Contamination of soil and groundwater
Waste area	Storage of waste foodstuffs	Contamination of soil by fluids leaching into soil
Garden maintenance	Accidental spills of chemicals such as pesticides, herbicides or chlorine, hydrochloric acid or over-fertilising of gardens	Contamination of soil and groundwater
Garden maintenance	Over-watering by irrigation system	Erosion and loss of topsoil
General maintenance	Accidental spill of hazardous substances such as oil based paints	Contamination of soil and groundwater
Beauty salon	Incorrect disposal of redundant chemicals	Contamination of soil and groundwater
Housekeeping	Soapy water poured onto gardens after washing of external paved or tiled surfaces	Contamination of soil and groundwater
Gravel footpaths on the premises (rural areas)	Insufficient maintenance or lack of careful placement of paths	Erosion and loss of topsoil
Informal parking on bare soil	Oils or fuel leaks from vehicles	Contamination of soil and groundwater
Kitchen grease trap	Contents of grease trap disposed into domestic waste or buried on site	Contamination of soil and groundwater
Parking area	Oil or fuel leaking onto bare soil	Contamination of soil and groundwater
3.4 Hydrology		
Gardens	Re-use of grey water for irrigation	Potential water saving
Development affected by floodlines	No development allowed below the 1:100 year floodline	Damage by floods – economic loss
Water supply	Quality for use as drinking water (water purification required)	Health issues
Water supply	Quality for use as irrigation water	Health issues
Water supply	Excessive use of potable water for irrigation and operation of hotel	Depletion of natural resource
Water supply	Abstraction of water from river	Permit required - depletion of natural resource
General maintenance	Chemical or fuel spills	Contamination of surface and/or groundwater
Gardens and maintenance areas	Silt from bare soil areas washing into stormwater	Increased siltation of rivers
Development adjacent to a wetland	Uncontrolled access during maintenance or by guests	Loss of sensitive habitat and biodiversity
Gardens	Retention of stormwater prior to exiting the site	Possible reuse of water
Kitchen grease trap	Poor maintenance causing grease trap to overflow	Contamination of surface water
Kitchen	Disposal of redundant food into sewage system	Overloading of sewage system, ultimate contamination of freshwater
Kitchens, laundry and bathrooms	Chemicals washed into sewage system during cleaning	Contamination of surface water
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of waste heat
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of toxins, nutrients and pesticides into river system
Water treatment plants (Sewage plants)	Risk of discharge into the wetland	Contamination of sensitive habitat and loss of biodiversity
Gardens and golf course	Fertiliser washed from golf course and gardens into stormwater system	Contamination of surface water

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact
Gardens	Use of pesticides and fertiliser during maintenance	Contamination of surface water
Car park	Washing of guests' vehicles	Contamination of surface water
Swimming pool	Backwash water released into stormwater	Contamination of surface water
3.5 Flora		
Gardens	Exotic vegetation planted	Loss of biodiversity
Gardens	Declared alien invasive exotic species allowed to proliferate	Loss of biodiversity
Gardens	Using monoculture plant species in landscaping	Loss of biodiversity
Fireplaces	Use of indigenous wood as fuel for fires	Loss of biodiversity and natural resources
Fireplaces	Use of invasive exotic wood as fuel for fires	Control of invasive exotic species
Golf courses	Exotic plants and lawn allowed to replace indigenous vegetation	Loss of biodiversity
Curio shop	Indigenous wood used to carve African art pieces	Loss of biodiversity
Curio shop	Invasive exotic wood used to carve African art pieces	Control of invasive exotic species
3.6 Fauna		
Site and surroundings	Change in ecological character of the area due to development	Loss of biodiversity and rare/threatened species
4 Socio-economic environment		
4.1 Economic environment		
Large youth and young adult population	Employment opportunities	Economic upliftment
Employment of the community	Economic upliftment	Improved housing standards
Employment of the community	Economic upliftment	Improved education levels
4.2 Waste management		
Kitchen	Disposal of unsorted waste, including foodstuffs	Increased waste, contamination of soil
Laundry	Disposal of unsorted waste such as chemical containers	Increased waste, contamination of soil
Gardens	Disposal of organic waste	Increased waste
Swimming pool	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material
Beauty salon	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material
Storage area and waste yard	Disposal of hazardous waste into domestic waste stream	Contamination of soil and groundwater with hazardous material
Waste yard	Storage of waste foodstuffs until collection of domestic waste	Attract vermin and pests – health risk
Waste yard	Incorrect disposal of chemicals, herbicides and pesticides	Contamination of soil and groundwater
Waste yard	Disposal of unsorted waste/unnecessary disposal of recyclable materials	Increased waste and loss of potential recyclable material/resources.
Waste yard	Seepage from waste into bare soil	Contamination of soil and groundwater
Convenience store	Disposal of unsorted waste	Increased waste
General maintenance	Disposal of hazardous waste and building materials as domestic waste	Increased waste and contamination of soil with hazardous material
General maintenance	Disposal of fluorescent tubing	Hazardous waste potentially retained in domestic waste stream.
General maintenance	Cleaning of fireplaces	Ash disposed in gardens – contamination of soil
Maintenance of vehicle fleet	Waste oil and lubricants disposed as domestic waste	Contamination of soil. Hazardous waste retained in domestic waste stream
4.3 Infrastructure, energy and water supply		
Service yard	Potential leaks or spills from fuel storage tanks	Contamination of soil and groundwater
Electricity supply to hotel	Electricity generated using fossil fuels	Utilising non-renewable natural resource

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact
Electricity supply to hotel	Electricity generated using fossil fuels	Noxious gases and particulates released to air
Electricity supply to hotel	Alternative energy sources utilised	Reduction in the use of natural resource
Service yard	Use of back-up generator	Noxious gases and particulates released to air
Kitchen	Catering, including the preparation of meals and drinks	Utilising energy
Kitchen	Washing dishes	Utilising water
Kitchen (refrigerators/chillers)	Cooling/storage of foodstuffs, making ice	Utilising energy
Laundry	Washing of linen and towels	Utilising energy and water
Guest rooms	Lights left burning when guests are not in	Utilising energy
Guest rooms	Taps left running, using too much water when bathing/showering	Utilising water
Water heater	Heating water for guests and washing of dishes	Utilising energy
Air-conditioning	Heating or cooling rooms and public areas	Utilising energy
Gardens	Maintenance applying excessive irrigation	Utilising water
Swimming pool	Leaking pool filled up regularly	Utilising water
Sauna and steam baths	Heating water	Utilising water and energy during operation
Elevators	Movement between floors	Utilising energy
Potable water supply	Quality of water	Health issues
Water treatment plants	Pumping water during treatment process	Utilising energy and water
Water abstraction	Pumping water from the river	Utilising water and energy
Water features and swimming pool	Pumps circulating water	Utilising energy
4.4 Social infrastructure/community involvement		
Community liaison	Providing charity or education drives	Social upliftment
Staff/Management influence	Support or drive environmental awareness programmes	Increased environmental awareness
Employment	Employment of local community or outsourcing services for cleaning, laundry services, garden maintenance, eradication of invasive exotics, game drives and management of curio shops and convenience stores	Increased employment
4.5 Land use		
Location of development	Development significantly different from surrounding land uses	Potential to initiate similar development in the area
Location of development	Development located in a high crime-risk area	Safety issues
Location of development	Development located near other properties with floodlights or adjacent to busy roads, railway lines or airports	Noise and light pollution
Location of development	Functions or sports events in quiet surroundings	Noise and light pollution
4.6 Access and circulation		
Location of development	Large functions or events drawing crowds	Traffic increase and congestion
5 Cultural and historic environment		
Areas of cultural/archaeological interest	Uncontrolled movement of guests	Potential damage to sensitive artefacts/areas
Areas of architectural interest	Uncontrolled movement of guests	Potential damage to structures
External areas and access points	Spotlights illuminating the buildings, entrances and outdoor sports facilities	Visual intrusion/light pollution
Views onto the development	New buildings visible in the natural surrounding landscape	Visual intrusion

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact
Views onto the development	Architectural style or colours not blending into the surroundings	Visual pollution
Outdoor entertainment area	Music at functions, public address system	Noise pollution
Outdoor sports facilities and swimming pool	Noisy activities/games/players	Noise pollution
Internal functions	Music at functions, public address system	Noise pollution
Maintenance yard/gardens	Loud maintenance activities such as edge trimming, lawnmowing or drilling	Noise pollution

2.7 Assessment of significance of the identified environmental impacts

The potential environmental impacts identified in item 2.6 of this dissertation were assessed against the criteria described in the booklet on Impact Significance, Integrated Environmental Management Information Series 5[151]. It is stated in the document that significance as a concept lies at the core of impact identification, evaluation and decision making in Environmental Impact Assessment (EIA). The process described in the document includes impact identification, impact prediction and impact evaluation. In the document on Impact Significance as part of the Integrated Environmental Management Series[152] it is stated that:

> *…the concept* [of defining environmental impact significance] *remains largely undefined and there is no international consensus on a single definition…following common elements of the various interpretations:*
>
> - *Environmental significance is a value judgement*
> - *The degree of environmental significance depends on the nature of the impact*
> - *The importance is rated in terms of both biophysical and socio-economic values*
> - *Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.*

In the same document, three methods of identifying, predicting and evaluating impact significance are described, namely scaling, weighting and aggregation. Finally, generic approaches and criteria are discussed which can be adapted to specific contents and projects, according to the document on Impact Significance[153]. Under this heading, a method of determining impact significance using systematic generic and judgemental criteria is discussed. It is stated that impact magnitude should, as far as possible, be

[151] Department of Environmental Affairs and Tourism. 2002 (f)
[152] Department of Environmental Affairs and Tourism. 2002 (f:5)
[153] Department of Environmental Affairs and Tourism. 2002 (f:15)

determined by reference to legal requirements, accepted scientific standards or social acceptability. It is further stated that generic criteria, drawn from published South African practice, were used to describe the magnitude and significance of impacts in a systematic manner. The criteria listed are[154]:

- *extent or spatial scale of the impact;*
- *intensity or severity of the impact;*
- *duration of the impact;*
- *mitigatory potential;*
- *acceptability;*
- *degree of certainty;*
- *status of the impact; and*
- *legal requirements*

Describing the impacts in terms of the above criteria provides a consistent and systematic basis for the comparison and application of judgements. Ratings should be assigned to each criterion.

Categories for the rating of impact magnitude and significance are listed and can be summarised as follows[155]:

High	*…In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination…*
Medium	*…impact is not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible.*
Low	*Impact is of a low order … likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required…*
No impact	*Zero impact.*

For each of the eight criteria listed above, criteria for rating the significance are provided and are contained in Annexure E. The potential environmental impacts listed in Table 20 were assessed according the criteria and ratings described above and contained in Annexure F, by referring to the Sabi River Sun and the Sandton Sun and Towers Intercontinental as case studies. A summary of the significance of the environmental impacts is contained Table 21.

[154] Department of Environmental Affairs and Tourism. 2002 (f:25)
[155] Department of Environmental Affairs and Tourism. 2002 (f:25)

Table 21: Summary of significance of operational activities, facilities or services of hotels that could impact on the environment

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
1 Location and context				
Located near or adjacent to an environmentally sensitive area	Unplanned access to guests	Uncontrolled access into sensitive area causing damage	Medium	No impact
Site affected by floodlines	Operational activities	Flooding of development and damage to structures	High	No impact
Located near or adjacent to a site of cultural significance	Unplanned access to guests	Uncontrolled access causing damage	High	No impact
2 Boundaries				
Development situated adjacent to a nature reserve/conservation area/coastal area	Uncontrolled movement of guests	Uncontrolled access into sensitive area causing damage	Medium	No impact
Situated adjacent to economically poor communities	Potential job opportunities	Economic upliftment	Medium Positive	Medium Positive
3 Biophysical environment				
3.1 Climate				
Bare soil surfaces	Windy conditions during construction	Dust particles blown into the air	Medium	No impact
Kitchen	Cooking	Odours and vapours released to air	Low	Low
Laundry	Washing clothes	Steam and chemical vapours released to air	Medium	Medium
Operation of back-up generator	Emergency electricity generating	Gases and particulates released during combustion process	Medium	Medium
Gas supply to hotel	Accidental gas leaks/rupturing of vessel.	Gases released to air – health hazard	Medium	Medium
Air-conditioning systems	Cooling internal air	CFCs could be released	Low	Low
Air-conditioning systems	Cooling internal air	Viruses and bacteria can be transmitted – contamination of internal air quality	Medium	Medium
Air-conditioning systems	Cooling air	Waste heat released into atmosphere	Low	Low
Fireplaces/cooking fires	Burning of fossil fuels	Particulates, CO_2, NO_x and SO_x are released	Medium	No impact
Refrigeration units	Cooling foodstuffs	CFCs could be released	Low	Low
Aerosol cans	Spraying of air fresheners, insecticide, deodorants, etc.	CFCs could be released during use	Low	Low
Fire extinguishers	Dowsing a fire	CFCs may be released and CO_2 is released during use	Medium	Medium
Carbonated drinks dispensers	Making carbonated drinks at the bar	CO_2 is released	Medium	Medium
Chemical storage area	Spillages from chemicals and cleaning agents	Vapours are released to air	Medium	Medium
Vehicle fleet/courtesy vehicles	Emissions of noxious gases during operation	CO_2, NO_x and SO_x are released	Medium	Medium
Boiler exhausts	Burning of fossil fuels	Particulates and Carbon dioxide is released during use	Secondary impact	Secondary impact
Fuel storage area	Leaks or spills	CO_2, NO_x and SO_x are released	Medium	Medium
Garden maintenance	Application of pesticides and herbicides	Harmful chemicals are released to the atmosphere	Medium	Low
Sewage treatment plant	Natural processes of breaking down of sewage	Odours and gases released to the atmosphere	Medium	No impact

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
Water purification plant and sewage treatment plant	Evaporation of chlorine during operation or accidental leaking of chlorine gas from bulk storage vessel	Chlorine released to the atmosphere – health risk	Medium	No impact
Swimming pools	Evaporation of chlorine	Chlorine released to the atmosphere – health risk	Low	Low
Waste yard	Burning of domestic waste in rural areas	Particulates and noxious gases released to the atmosphere	Medium	No impact
3.2 Topography				
Hotel and facilities	Views towards surrounding areas	Visual benefit to the development	Low Positive	High Positive
Hotel and facilities	Visible from surroundings	Visual/light pollution	Low	Medium
3.3 Soil				
Sandy soils	Soil left bare after construction	Potential soil erosion	Medium	No impact
Clay soils	Poor stormwater management	Potential water logging	Medium	No impact
Hard surfaces in development	Increased stormwater runoff	Potential soil erosion	Medium	No impact
Storage area	Accidental spill of chemicals such as pesticides, herbicides, chlorine or hydrochloric acid	Contamination of soil and groundwater	Medium	Medium
Storage area	Accidental spill of fuel or oil	Contamination of soil and groundwater	Medium	Medium
Storage area	Accidental spill of hazardous substance	Contamination of soil and groundwater	Medium	Medium
Waste area	Storage of hazardous waste	Contamination of soil and groundwater	Medium	Medium
Waste area	Storage of waste foodstuffs	Contamination of soil by fluids leaching into soil	Medium	Medium
Garden maintenance	Accidental spills of chemicals such as pesticides, herbicides or chlorine, hydrochloric acid or over-fertilisation of gardens.	Contamination of soil and groundwater	Medium	Medium
Garden maintenance	Over-watering by irrigation system.	Erosion and loss of topsoil	Medium	Low
General maintenance	Accidental spill of hazardous substances such as oil based paints.	Contamination of soil and groundwater	Medium	Low
Beauty salon	Incorrect disposal of redundant chemicals.	Contamination of soil and groundwater	Medium	Low
Housekeeping	Soapy water poured onto gardens after washing of external paved or tiled surfaces.	Contamination of soil and groundwater	Medium	Low
Gravel footpaths on the premises (rural areas)	Insufficient maintenance or lack of careful placement of paths	Erosion and loss of topsoil	Medium	No impact
Informal parking on bare soil	Oil or fuel leaks from vehicles	Contamination of soil and groundwater	Medium	No impact
Kitchen grease trap	Contents of grease trap disposed into domestic waste or buried on site	Contamination of soil and groundwater	Medium	Medium
3.4 Hydrology				
Gardens	Re-use of grey water for irrigation	Potential water saving	Medium Positive	Medium Positive
Development affected by floodlines	No development allowed below the 1:100 year flood line	Damage by floods – economic loss	Medium	No impact

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
Water supply	Quality for use as drinking water (water purification required)	Health issues	Medium	Low
Water supply	Quality for use as irrigation water	Health issues	Medium	Medium
Water supply	Excessive use of potable water for irrigation and operation of hotel	Depletion of natural resource	Medium	Medium
Water supply	Abstraction of water from river	Permit required - depletion of natural resource	Medium	No impact
General maintenance	Chemical or fuel spills	Contamination of surface and/or ground water	Medium	Medium
Gardens and maintenance areas	Silt from bare soil areas washing into stormwater	Increased siltation of rivers	Medium	Low
Development adjacent to a wetland	Uncontrolled access during maintenance or by guests	Loss of sensitive habitat and biodiversity	High	No impact
Gardens	Retention of stormwater prior to exiting the site	Possible re-use of water	Medium Positive	No impact
Kitchen grease trap	Poor maintenance causing grease trap to overflow	Contamination of surface water	Medium	Medium
Kitchen	Disposal of redundant food into sewage system	Overloading of sewage system, ultimate contamination of freshwater.	Medium	Medium
Kitchens, laundry and bathrooms	Chemicals washed into sewage system during cleaning	Contamination of surface water.	Medium	Low
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of waste heat	Low	No impact
Water treatment plants (Sewage plants)	Treating effluent prior to release into river systems	Release of toxins, nutrients and pesticides into river system	High	No impact
Water treatment plants (Sewage plants)	Risk of discharge into the wetland	Contamination of sensitive habitat and loss of biodiversity	High	No impact
Gardens and golf course	Fertiliser washed from golf course and gardens into stormwater system	Contamination of surface water	Medium	Low
Gardens	Use of pesticides and fertiliser during maintenance	Contamination of surface water	Medium	Low
Guest car park	Washing of guests' vehicles	Contamination of surface water	Medium	Low
Swimming pool	Backwash water released into stormwater	Contamination of surface water	Medium	Low
3.5 Flora				
Gardens	Exotic vegetation planted	Loss of biodiversity	High	Low
Gardens	Declared alien invasive exotic species allowed to proliferate	Loss of biodiversity	Medium	Low
Gardens	Using monoculture plant species in landscaping	Loss of biodiversity	High	Low
Fireplaces	Use of indigenous wood as fuel for fires	Loss of biodiversity and natural resources	Medium	Low
Fireplaces	Use of invasive exotic wood as fuel for fires	Control of invasive exotic species	Medium Positive	Low Positive
Golf courses	Exotic plants and lawn allowed to replace indigenous vegetation	Loss of biodiversity	High	Low
Curio shop	Indigenous wood used to carve African art pieces	Loss of biodiversity	Medium	Low
Curio shop	Invasive exotic wood used to carve African art pieces	Control of invasive exotic species	Medium Positive	Low Positive
3.6 Fauna				
Site and surroundings	Change in ecological character of the area due to development	Loss of biodiversity and rare / threatened species	Medium	No impact

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
4 Socio-economic environment				
4.1 Economic environment				
Large youth and young adult population	Employment opportunities	Economic upliftment	Medium Positive	Medium Positive
Employment of the community	Economic upliftment	Improved housing standards	Medium Positive	Medium Positive
Employment of the community	Economic upliftment	Improved education levels	Medium Positive	Medium Positive
4.2 Waste management				
Kitchen	Disposal of unsorted waste, including foodstuffs	Increased waste, contamination of soil	Medium	Medium
Laundry	Disposal of unsorted waste such as chemical containers	Increased waste, contamination of soil	Medium	Medium
Gardens	Disposal of organic waste	Increased waste	Medium	Medium
Swimming pool	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material	High	High
Beauty salon	Disposal of hazardous chemicals in domestic waste stream	Contamination of soil and groundwater with hazardous material	High	High
Storage area and waste yard	Disposal of hazardous waste into domestic waste stream	Contamination of soil and groundwater with hazardous material	High	High
Waste yard	Storage of waste foodstuffs until collection of domestic waste	Attract vermin and pests – health risk	Medium	Medium
Waste yard	Incorrect disposal of chemicals, herbicides and pesticides	Contamination of soil and groundwater	High	High
Waste yard	Disposal of unsorted waste/unnecessary disposal of recyclable material	Increased waste and loss of potential recyclable material/resources.	Medium	Medium
Waste yard	Seepage from waste into bare soil	Contamination of soil and groundwater	Medium	Low
Convenience store	Disposal of unsorted waste	Increased waste	High	High
General maintenance	Disposal of hazardous waste and building materials as domestic waste	Increased waste and contamination of soil with hazardous material	High	High
General maintenance	Disposal of fluorescent tubing	Hazardous waste potentially retained in domestic waste stream.	High	High
General maintenance	Cleaning of fireplaces	Ash disposed in gardens – contamination of soil	Low	No impact
Maintenance of vehicle fleet	Waste oil and lubricants disposed as domestic waste	Contamination of soil. Hazardous waste retained in domestic waste stream.	Medium	Medium
4.3 Infrastructure, energy and water supply				
Service yard	Potential leaks or spills from fuel storage tanks	Contamination of soil and groundwater	Medium	Low
Electricity supply to hotel	Electricity generated using fossil fuels	Utilising non-renewable natural resource	Secondary impact	Secondary impact
Electricity supply to hotel	Electricity generated using fossil fuels	Noxious gases and particulates released to air	Secondary impact	Secondary impact
Electricity supply to hotel	Alternative energy sources utilised	Reduction in the use of natural resource	Medium Positive	Medium Positive
Service yard	Use of back-up generator	Noxious gases and particulates released to air	Medium	Medium
Kitchen	Catering, including the preparation of meals and drinks	Utilising energy	Medium	Medium
Kitchen	Washing dishes	Utilising water	Medium	Medium
Kitchen (refrigerators / chillers)	Cooling/storage of foodstuffs, making ice	Utilising energy	Medium	Medium

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
Laundry	Washing of linen and towels	Utilising energy and water	Medium	Medium
Guest rooms	Lights left burning when guests are not in	Utilising energy	Medium	Medium
Guest rooms	Taps left running, using too much water when bathing/showering	Utilising water	Medium	Medium
Water heater	Heating water for guests and washing of dishes	Utilising energy	Medium	Medium
Air conditioning	Heating or cooling rooms and public areas	Utilising energy	Medium	Medium
Gardens	Maintenance applying excessive irrigation	Utilising water	Medium	Medium
Swimming pool	Leaking pool filled up regularly	Utilising water	Low	Low
Sauna and steam baths	Heating water	Utilising water and energy during operation	Medium	Medium
Elevators	Movement between floors	Utilising energy	Medium	Medium
Water treatment plants	Pumping water during treatment process	Utilising energy and water	Medium	No impact
Water abstraction	Pumping water from the river	Utilising water and energy	Medium	No impact
Water features and swimming pool	Pumps circulating water	Utilising energy	Medium	Medium
Guest rooms	Dripping taps not closed	Wasting water	Medium	Medium
4.4 Social infrastructure/community involvement				
Community liaison	Providing charity or education drives	Social upliftment	Medium Positive	Medium Positive
Staff/Management influence	Support or drive environmental awareness programmes	Increased environmental awareness	Medium Positive	Medium Positive
Employment	Employment of local community or outsourcing services for cleaning, laundry services, garden maintenance, eradication of invasive exotics, game drives and management of curio shops and convenience stores	Increased employment	High Positive	Medium Positive
4.5 Land use				
Location of development	Development significantly different from surrounding land uses	Potential to initiate similar development in the area	High Positive	Medium Positive
Location of development	Development located in a high crime-risk area	Safety issues	High	High
Location of development	Development located near other properties with floodlights or adjacent to busy roads, railway lines or airports	Noise and light pollution	Medium	Medium
Location of development	Functions or sports events in quiet surroundings	Noise and light pollution	Medium	Medium
4.6 Access and circulation				
Location of development	Large functions or events drawing crowds	Traffic increase and congestion	Low	Medium
5 Cultural and historic environment				
Areas of cultural/archaeological interest	Uncontrolled movement of guests	Potential damage to sensitive artefacts/areas	High	No impact
Areas of architectural interest	Uncontrolled movement of guests	Potential damage to structures	High	No impact
External areas and access points	Spotlights illuminating the buildings, entrances and outdoor sports facilities	Visual intrusion/light pollution	Medium	Low
Views onto the development	New buildings visible in the natural surrounding landscape	Visual intrusion	High	Medium

Criteria for assessment	Activity, facility or service that may impact on the environment	Potential environmental impact	Significance	
			Sabi River Sun	Sandton Sun and Towers
Views onto the development	Architectural style or colours not blending into the surroundings	Visual pollution	High	Medium
Outdoor entertainment area	Music at functions, public address system	Noise pollution	Medium	Low
Outdoor sports facilities and swimming pool	Noisy activities/games/players	Noise pollution	Medium	Low
Internal functions	Music at functions, public address system	Noise pollution	Medium	Low
Maintenance yard/gardens	Loud maintenance activities such as edge trimming, lawnmowing or drilling	Noise pollution	Medium	Low

Table 21 above indicates that the significance of environmental impacts could vary between hotels, depending on their location and the sensitivity of the environment in which the hotels are located.

2.8 Conclusion

The four environmental impact identification systems used as a reference in this chapter provided a checklist of environmental aspects, which could arise during planning, development or operation of hotels. The literature search further produced the document published by the International Hotels Environment Initiative (IHEI)[156] in which Environmental Management for hotels is discussed. This publication identifies areas in which hotels may impact on the environment and describes potential management methods to reduce these impacts. The case studies were compared to the list of environmental aspects and a list of potential environmental impacts for planning, construction, operation and decommissioning was compiled.

From this list, potential environmental impacts for the operational phase of hotels were extracted. The environmental impacts for the operational phase of hotels were assessed in terms of significance in accordance with the document on Impact Significance[157], which forms part of the Integrated Environmental Management information Series, and rated as high, medium, low or no impact. The summary Table 21 indicates that the location of a hotel influences the significance of certain environmental impacts, as illustrated by the difference in significance of, for example, the environmental impact of potential damage to environmentally or culturally sensitive sites, where the potential environmental impact for

[156] International Hotels Environment Initiative. 1996.
[157] Department of Environmental Affairs and Tourism. 2002. (f.)

the Sabi River Sun is high and no potential impact exists for the Sandton Sun and Towers Inter-Continental.

The first hypothesis, 'The hotel industry impacts on the environment and these impacts can be identified and described' is supported by the research findings in that hotels offer activities, facilities and services which may have significant negative effects on the environment, depending on the location of the hotel.

3. CHAPTER 3: THE DETERMINATION OF ENVIRONMENTAL MANAGEMENT REQUIREMENTS AS EXPRESSED IN ISO 14001

3.1 Introduction

This chapter will investigate the underlying principles of Environmental Management, followed by refinement of Environmental Management as defined in the ISO 14000 Environmental Management series. Voluntary Environmental Management Systems (EMSs), where a group of organisations have drafted a standard Environmental Management System (EMS) for implementation by those organisations, and internationally accredited Environmental Management Systems (EMSs) exist. The United States Environmental Protection Agency (USEPA) embarked on a voluntary programme of pilot projects to collect and analyse comparable high-quality data on Environmental Management Systems (EMSs) in order to establish a national Environmental Management System (EMS) database. In June 2000, baseline data for the first 50 facilities were released. Voluntary EMSs available for the tourism industry internationally include the International Hotels Environment Initiative (IHEI), the Green Globe 21 Programme and the United Nations Environment Programme (UNEP) documentation. The United Nations Environment Programme (UNEP) documentation includes publications such as:

- Case studies on environmental good practice in hotels
- The Environmental action pack for hotels[158]
- Sensitive areas and protected area management
- Information on sustainable tourism[159]

Locally, a newly established programme, the *Heritage Environmental Rating Programme*[160], has been developed to provide operators of different types of tourism products and services with an Environmental Management Programme (EMP). According to the information pamphlet on *Heritage,* the programme is designed to reduce and limit the impact of operations on the environment in which their tourism activities operate. The *Heritage* programme provides a three-tiered approach and rating of environmental management performance, namely *Heritage Silver* for entry-level performance, *Heritage Gold* for mid-level performance, and *Heritage Platinum* as the ultimate achievement in the rating procedure. According to the information pamphlet, the *Heritage* programme is an evaluation of the way in which tourism organisations conduct their business. The programme audits a

[158] UNEP. 2002. (b) http://www.uneptie.org/pc/tourism/library/actionpack.htm
[159] UNEP. 2002. (d) http://www.uneptie.org/pc/tourism/sust-tourism/home.htm
[160] Qualitour (Pty) Ltd. 2002.

tourism establishment in terms of management systems, communications and marketing, resource management and community involvement. Membership of the *Heritage* programme allows for three audits per annum, an implementation manual, advisory and consulting services by the *Heritage* programme, subsidised training, marketing and promotion and subscription to selected publications.

In addition to the four voluntary EMSs listed above, ISO 14001 provides a formal, internationally accredited EMS applicable to all types of systems, processes, industries and services. This chapter will not investigate the positive and negative aspects of different EMSs, but will focus on the requirements and principles of ISO 14001 as an internationally accepted standard. The internationally recognised ISO 14001 EMS is not applicable to only one industry or activity, but is flexible enough to allow each organisation to define, implement and monitor its own EMS. Even though the documentation obtained from the ISO stipulates the broad description of 'an organisation', it will imply an individual hotel or group of hotels within the framework of this study.

3.2 Methodology

In addition to investigating the principles of Environmental Management as a broad activity, this chapter will further define this activity in terms of the principles set out by ISO 14001. The origin of the ISO standards and their adoption by the South African Bureau of Standards (SABS) are briefly discussed. Principles for an ISO 14001 EMS are detailed and listed in order to set the standards for the guideline document for hotels, which will be compiled in Chapter Four, by combining the environmental impacts of hotels identified in Chapter Two with the principles of ISO 14001. Inductive research is applied and no interpretation is undertaken in this chapter as it merely states existing facts.

3.3 Literature search

The literature search for this chapter was undertaken by utilising information sources as described by Botha and du Toit[161]:

- Institutional information sources:
  Documents and legislation published by the National and Provincial government were sourced by Internet searches and by obtaining copies directly from the Government Printers. The South African government publications and White Papers that motivated

[161] Botha and du Toit. 1999

the adoption of an EMS included the White Paper on Environmental Management Policy for South Africa[162] and the National Environmental Management Act (NEMA)[163]. ISO 14001 documentation as well as criteria for Environmental Impact Assessment (EIA) as listed in Chapter Two, highlight the requirement of adherence to environmental legislation.

- Research and development reports:
  Documentation on assessment standards and ISO 14001 standards was obtained from the South African Bureau of Standards (SABS) and was used to establish the criteria for the establishment of an ISO 14001 EMS. The criteria had to be established in order to formulate the guideline document for an EMS in accordance with the requirements of ISO 14001.
- Journals:
  International publications that discuss Environmental Management and examples of the application of ISO 14001 were sourced on the Internet. These articles provided a wider background to the application of ISO 14001 EMSs.
- Monographs and textbooks:
  The textbook by Fuggle and Rabie[164] on Environmental Management in South Africa was used to provide background on the development of Environmental Management and environmental law. Barnard[165] was used in this study as the background for addressing legal requirements of Environmental Management. Legal compliance is one of the key factors of a successful EMS according to ISO 14001, and in accordance with environmental impact determination criteria as listed in Chapter Two.

3.4 Principles of Environmental Management

Fuggle and Rabie[166] state that Environmental Management encompasses a broad spectrum of activities, and that the implementation of Environmental Management encompasses the formulation of general goals and specific objectives. The goals and objectives must be given operational form, with due regard to legislation and associated regulations. In Fuggle and Rabie[167] it is further stated that:

[162] South Africa. White Paper on Environmental Management Policy for South Africa. 1997.
[163] South Africa. National Environmental Management Act, No. 107 of 1998.
[164] Fuggle and Rabie. 2000.
[165] Barnard. 1999.
[166] Fuggle and Rabie. 2000.
[167] Fuggle and Rabie. (2000:3)

> *Economic and technical decisions must be made and alternative courses of potential action assessed.*

The statements made by Fuggle and Rabie[168] imply the implementation of a procedure that guides activities in terms of environmental controls.

The Integrated Environmental Management (IEM) procedure[169] lists three stages in the process namely Stage 1, planning and assessment of the proposal, Stage 2, decision, and Stage 3, implementation. During implementation, it is recommended in the IEM procedure that a monitoring programme be required by the authorities, regardless of whether an Environmental Management Plan (EMP) has been completed. The monitoring programme should include guidelines regarding activities, actions to be undertaken and parties responsible for these actions. It is indicated in the IEM procedure that monitoring should include verification of impact predictions, appraisal of mitigatory measures, adherence to approved plans and compliance with conditions of approval. It is also recommended in the IEM procedure that periodic assessments or audits of the positive and negative impacts of the proposal be undertaken. The recently published Integrated Environmental Management Information Series[170] indicates in the list of definitions that Integrated Environmental Management includes the application of Environmental Management tools such as monitoring, auditing and reporting. This in turn indicates a procedure or documented list of actions to be followed during the management of a development project.

In the National Environmental Management Act (NEMA)[171], some of the principles of Environmental Management are directly applicable to hotels and their potential impacts on the environment, such as the minimisation of pollution and degradation of the environment, waste, use and exploitation of non-renewable resources and loss of biodiversity. Furthermore, Environmental Management in hotels can be integrated into the operation of the hotel as highlighted in item 4b):

> *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.*

and item 4e):

[168] Fuggle and Rabie. 2000.
[169] Department of Environmental Affairs and Tourism. 1992. (a)
[170] Department of Environmental Affairs and Tourism. 2002. (e:36)
[171] South Africa. National Environmental Management Act, No. 107 of 1998.

Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.

3.4.1 Environmental Management and legal requirements of Environmental Management for the life cycle of a project

Projects are typically characterised by four phases in their life cycles, namely:

a) The planning phase
b) The implementation or construction phase
c) The operational phase
d) The decommissioning phase

These phases are linked to the so-called 'cradle to grave'[172] approach in Environmental Management. Even though this study focuses on the operational phase of hotels, the environmental impact identification process in Chapter Two addressed all the aspects related to the life cycle of hotels before selecting only environmental impacts relating to the operational phase of hotels.

Because the location of a hotel is critical to its long-term impacts on the environment in which it is situated, planning and development stages need to be considered carefully. However, in South Africa legislative aspects pertaining to the planning and development phase of hotels govern the implementation of these projects and will be briefly addressed here. Prior to the promulgation of Regulations R1182 and R1183[173] under the Environment Conservation Act[174], the IEM Procedure[175] provided a process to be followed in the determination of the environmental impacts (if any) of a proposed development. Before September 1997, the IEM Procedure was also used to establish whether or not an Environmental Impact Assessment (EIA) was required. According to the IEM procedure, a significant impact would result in an impact assessment being required, whereas insignificant or no impacts required only an initial assessment. After the completion of the assessments, the process continued with a reviewing of the assessment and the issuing of a 'record of decision' upon the approval of the proposal. Conditions of approval could be stipulated and opportunities for appeal existed. The final stage of the IEM Procedure was the implementation stage, during which monitoring and audits of the activities were required.

[172] Department of Water Affairs and Forestry. 2002.
[173] South Africa. 1997. Regulations No. R 1182 and R1183. 05/09/1997.
[174] South Africa. 1989. Environment Conservation Act, No. 73 of 1989.
[175] Department of Environmental Affairs and Tourism. 1992. (a)

Since September 1997 a list of identified activities, listed in the Regulations R1182[176] and updated in R672[177] in May 2002, has been applied to determine whether an environmental assessment will be required for a proposed development. Resort developments and change of land use from undetermined or agricultural land to any other land use are two activities that require environmental assessments for new developments and may have bearing on the development of a new hotel. Applications for authorisation to proceed with a development under the Regulations R1182 and R1183[178] and updated Regulations R607 and R672[179] follow a similar route of screening, scoping and environmental assessment, as described in the recently published Integrated Environmental Management Information Series[180]. At present Environmental Management Plans (EMPs) and their implementation are not governed by legislation, but are included in the conditions of approval of an application to the relevant environmental authorities. According to the guideline document for standardised EMPs published by the Department of Water Affairs and Forestry[181], EMPs are not requirements enforced by the Department of Environmental Affairs and Tourism, but may be requested by the authorities as a condition of the 'record of decision', in support of the EIA, particularly for the project construction phase. The Environmental Management Plan (EMP) may sometimes continue into the operational phase, depending on the nature of the project. When investigating activities which fall outside of the activities identified under Government Notice, Regulations R1182[182], no specific environmental control in terms of Environmental Management is enforced, unless an activity is in contravention of NEMA[183].

NEMA[184] broadens the scope of environmental control of activities that may impact negatively on the environment. Critical to NEMA are the requirements of avoidance, minimisation or remediation of environmental damage. To be able to implement Environmental Management on this basis, mitigation/management measures for the environmental impacts need to be identified. Authorities should be able to ensure that the mitigation/management measures are being implemented and their effectiveness should be monitored. Effective implementation of mitigation or rehabilitation measures and the management of activities are guided by an EMP. The purpose of an EMP is to describe how negative environmental impacts will be managed, rehabilitated or monitored, and how positive impacts will be maximised. Mitigation measures should be organised and

[176] South Africa. 1997. Regulations No. R 1182. 05/09/1997.
[177] South Africa. 1997. Regulations No. R 670. 10/05/2002.
[178] South Africa. 1997. Regulations No. R 1182 and R1183. 05/09/1997.
[179] South Africa. 1997. Regulations No. R607 and R672. 10/05/2002.
[180] Department of Environmental Affairs and Tourism. 2002. (b)
[181] Department of Water Affairs and Forestry. (2002:2)
[182] South Africa. Regulations No. R 1182. 05/09/1997.
[183] South Africa. National Environmental Management Act, No. 107 Of 1998.
[184] South Africa. National Environmental Management Act, No. 107 Of 1998.

coordinated into a structured and well-informed plan which guides the construction, operation and decommissioning of a development. In the guideline document, the Department of Environmental Affairs and Tourism[185] states that:

> *An effective Management Plan will be a practical document which precisely sets out both the goals and actions required in mitigation or optimisation. It should include at least the following information:*
>
> - *Specific goals of the Management Plan*
> - *Details of management actions*
> - *Party responsible for carrying out the management recommendations*
> - *Timing and duration of management actions*
> - *Personnel, training and financial implications*

In the guideline document for standardised Environmental Management Plans[186], the Department of Water Affairs and Forestry states that EMPs are usually drafted for the development/implementation phase of projects, but EMPs may sometimes continue into the operational phase of a project, depending on the nature of the project. The implementation of these management plans is still not a legal requirement. The Department of Minerals and Energy requires Environmental Management of mining operations to extend throughout the life cycle of a mine's activities. This aspect of Environmental Management is stipulated in the Aide Memoire[187] published by the Department of Minerals and Energy. No further legislation exists in South Africa to govern Environmental Management for the operational phase of projects.

According to SABS ISO 14001[188], organisations are increasingly concerned with achieving and demonstrating sound environmental performance by controlling the impact of their activities, products or services on the environment. When implementing ISO 14001 principles, control of the impacts of an organisation's activities is managed by taking into account its environmental policy and objectives. Companies strive to control the environmental impact of their activities in the context of increasing environmental legislation, the development of economic policies and other measures to foster environmental protection, and increased concern on the part of interested parties about environmental matters, including sustainable development. The procedures of Environmental Management, as proposed by ISO 14001 are applicable to the operational phase of projects and, in this case, of hotels.

[185] Department of Environmental Affairs and Tourism. (1992:18) (b)
[186] Department of Water Affairs and Forestry. (2002:2)
[187] Department of Minerals and Energy. 1992.
[188] SABS 14001. 1996.

3.5 An Environmental Management System

An Environmental Management System (EMS) allows for the allocation of resources, the assignment of responsibilities and an ongoing evaluation of activities relating to the management of the organisation's environmental impacts. According to the American National Standards Institute (ANSI)[189], the EMS should be integrated into all management decisions and the existing structure of an organisation. Environmental Management Systems (EMSs) are defined by the White Paper on Environmental Management Policy for South Africa[190] as:

> *…documented procedures drawn up as described in a South African Bureau of Standards (SABS) code of practice to implement the requirements of ISO 14000. Operating, emergency, data collection and documentation procedures are set out, along with procedures for training, the transfer of information and all the elements of a complete management and quality control system.*

An EMS is defined in ISO 14001 as[191]:

> *…the part of the overall management system that includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.*

3.6 International Standardisation

3.6.1 The need for and origin of standardisation

Export-minded industries have long sensed the need to agree on world standards to help rationalise the international trading process. According to the International Organisation for Standardization (ISO)[192], this was the origin of the establishment of the ISO. International standardisation is well established for technologies in diverse fields, such as information processing and communications, textiles, packaging, distribution of goods, energy production and utilisation, ship building, banking, financial services and others. The ISO[193] lists the main reasons for the continual growth in standardisation as:

[189] American National Standards Institute. ISO 14000. 2002. (a)
[190] South Africa. White Paper on Environmental Management Policy for South Africa. 28/08/1997.
[191] SABS ISO 14001. (1996:2)
[192] International Organisation for Standardization. 2002. (a) http://www.iso.ch/iso/en/ISOOnline.frontpage
[193] International Organisation for Standardization 2002. (b) http://www.iso.ch/iso/en/ISOOnline.frontpage

- *Worldwide progress in trade liberalisation*

  …economies increasingly encourage diverse sources of supply and provide opportunities for expanding markets. On the technology side, fair competition … be based on identifiable, clearly defined common references that are recognized from one country to the next, and from one region to the other. An industry-wide standard, internationally recognized, developed by consensus among trading partners, serves as the language of trade.
- *Interpenetration of sectors*

  No industry… completely independent of components, products, rules of application, etc., that have been developed in other sectors.
- *Worldwide communications systems*

  Full compatibility among open systems fosters healthy competition among producers, and offers real options to users since it is a powerful catalyst for innovation, improved productivity and cost cutting.
- *Global standards for emerging technologies*

  Standardization programmes in completely new fields are being developed…. include advanced materials, the environment, life sciences, urbanisation and construction. In this instance the need for standardisation is in defining terminology and accumulating databases of quantitative information.
- *Developing countries*

  … a standardisation infrastructure is a basic condition for the success of economic policies aimed at achieving sustainable development. Creating such an infrastructure in developing countries is essential for improving productivity, market competitiveness, and export capability.

In particular the last item listed by the International Organisation for Standardization (ISO)[194] is applicable to organisations, and specifically for the purpose of this study, to hotels in South Africa.

In order to support the June 1992 United Nations Conference on Environmental Development held in Brazil, the International Organisation for Standardization (ISO) made a commitment to determine ways in which it might support the concept of 'sustainable business development'. The organisation was requested to consider the preparation of standards to harmonise environmental labels developed by different consumer protection organisations and to help eliminate technical barriers to trade caused by label proliferation. In 1993, the ISO Technical Committee 207 (TC207) was formed to develop such standards. The ISO 14000 series was developed in the areas of EMSs, environmental auditing,

[194] International Organisation for Standardization 2002. (b) http://www.iso.ch/iso/en/ISOOnline.frontpage

environmental labels and declarations, environmental performance evaluation, life-cycle assessment and terms and definitions for Environmental Management.

In September 1996, the international committee finalised the ISO 14001 standards for EMSs. Similar to the Quality Management System (QMS) implemented for ISO 9001, ISO 14001 requires the implementation of a management system in accordance with defined internationally recognised standards (such as the standards set in the ISO 14001 specification). As a continuation of the standardisation process, the ISO 14000 series of international standards have been developed to incorporate Environmental Management into operations and product standards.

The ISO 14000 series is a based on the ISO 9000 Product Quality Standards, but does not replace ISO 9000. An organisation with an ISO 9000 registration has a good foundation for the implementation of an ISO 14000 EMS and both are part of an organisation's overall management system. ISO 14001 also does not replace any regulations, legislation and codes of practice that an organisation has to comply with. Rather, it provides a system for monitoring, controlling and improving performance regarding those requirements. Fredericks and McCallum [195] state that:

> *ISO 14000 is the package that ties the mandatory requirements into a management system which is made up of objectives and targets focusing on meeting and exceeding the mandatory requirements with a focus on prevention and continuous improvements.*

The ISO 14001 standard does not establish absolute requirements for environmental performance beyond a statement of commitment to compliance with applicable legislation and regulations, prevention of pollution and continual improvement in the environmental policy.

The President of the South African Bureau of Standards (SABS) approved the standards produced by the ISO on 14 October 1996, without technical deviation or language editing, as a South African Standard[196]. Once the SABS has adopted an international standard, this standard is published as an SABS standard. Therefore, once the ISO 14001 international standard was adopted by the SABS, it was published as SABS ISO 14001.

[195] Fredericks and Mccallum. 1995.
[196] SABS ISO 14001. (1996:i)

3.6.2 Reasons for certification by ISO 14001

As stated in ISO 14001[197], many organisations have undertaken reviews or audits to assess their environmental performance. In isolation, these audits may not provide an organisation implementing an EMS with the assurance that its performance meets its legal and policy requirements. In contrast, a certified ISO 14001 EMS ensures that an organisation will continue to meet its legal and policy requirements. To be effective, audits need to be conducted within a structured management system and integrated into the overall management activity.

International standards covering Environmental Management are aimed at providing organisations with an effective EMS. These standards can be integrated with other management systems to assist organisations in achieving environmental and economic goals. Benefits of certification by ISO 14001 according to the International Organisation for Standardization[198], can be summarised as follows:

a) ISO 14001 is an internationally recognised standard for EMSs.
   Conformity to ISO 14001 may assist an organisation to remain competitive in the marketplace.
b) Identification of areas for reduction in energy and other resource consumption.
   A reduction in consumption will lead to a reduction in operating costs.
c) Reducing environmental liability and risk.
   Fewer potential liabilities will need to be faced if an organisation understands the environmental legislation and regulations applicable to it, and can verify operation in accordance with such legislation.
d) Consistent compliance with legislative and regulatory requirements.
e) Preventing pollution and reducing waste.
f) Responding to pressure from customers and shareholders.
   In terms of the tourism and hospitality industry, hotel chains may require compliance with ISO 14001 as a requirement for membership of a particular chain of hotels. In addition, the increasing public awareness of environmental issues may require hotels to register with the ISO 14000 programme to ensure the continued support of the particular hotel group by guests.
g) Improving community goodwill
   When an EMS is implemented, the organisation displays a responsibility towards the environment.

[197] SABS ISO 14001. 1996.
[198] International Organisation for Standardisation. 2002. http://www.iso14000.com/implementation/iso14_cee_overview.htm

h) Responding to pressure from insurers

In the ISO 14001[199] document it is also stated that:

The International Standard is applicable to any organisation that wishes to

a) implement, maintain and improve an environmental management system;

b) assure itself of its conformance with its stated environmental policy;

c) demonstrate such conformance to others;

d) seek certification/registration of its environmental management system by an external organisation;

e) make a self-determination and self-declaration of conformance with this International Standard.

3.7 The SABS ISO 14000 Series

In a supporting document published by the South African Bureau of Standards (SABS) on how to implement ISO 14001, the establishment of the ISO 14000 series is motivated as follows:

During the Earth Summit in Rio de Janeiro in 1992, the Business Council for Sustainable Development emphasised that "business and industry need tools to help measure environmental performance, and develop powerful environmental management techniques.

The Global Environmental Management Initiative[200] relates ISO 14001 to an Environmental Management System as follows:

The [ISO 14001] *standard specifies the core elements of an EMS, but contains only those elements that may be objectively audited for certification or self-declaration purposes.*

The standard was written in a way that makes it applicable to organisations of all types and sizes within any cultural or socio-economic setting. Haklik[201] states that:

ISO 14001 is the only standard intended for registration by third parties. All the others are for guidance. ISO 14001 is a management standard, it is not a performance or product standard. The underlying purpose of ISO 14001 is that companies will improve their environmental performance by implementing ISO 14001, but there are no standards for performance or the level of improvement. It is a process for managing company activities that impact the environment.

This SABS ISO 140001 standard should enable an organisation to manage its environmental impacts while adhering to the requirements of the standard itself, as well as

[199] SABS ISO 14001. 1996.
[200] Global Environmental Management Initiative. 1996.
[201] Haklik. [s.a.]

to international norms, legislation and regulations. The approach of the SABS ISO 14001 standard is holistic in that it addresses the impact of an organisation on the environment in terms of the total context in which the organisation operates. The standard defines the core elements of an EMS, which should be audited by a third party for certification/registration purposes. It requires compliance with applicable legislation, continual improvement of environmental performance and prevention of pollution.

The intention is that an organisation should identify those activities that may impact on the environment. In compliance with the policies of the organisation, certain goals and targets are set to address these activities. The organisation must then develop action plans that will achieve these goals and targets while minimising the identified environmental impacts, taking into consideration the elements of continual improvement within the constraints imposed by finance and technology. The SABS ISO 14001 standard further require that organisations periodically review and evaluate their management systems in order to improve environmental performance with regard to the identified environmental aspects and activities.

3.7.1 Sections of the SABS ISO 14000 Series

SABS ISO 14000 is a group of standards covering the following areas:

a) Environmental Management Systems (ISO 14001, 14002, 14004)
b) Environmental Auditing (ISO 14010, 14011, 14012)
c) Environmental Performance (ISO 14031)
d) Environmental Labelling (ISO 14020, 14021, 14022, 14023, 14024, 14025)
e) Life-cycle assessment (ISO 14040, 14041, 14042, 14043)

3.7.2 Core elements of SABS ISO 14001

In SABS ISO 14001[202] the emphasis is placed on the prevention of impacts on the environment and continuous improvement of performance, while aiming to balance environmental protection and prevention of pollution with socio-economic needs. One requirement of a successful SABS ISO 14001 EMS is the documentation of procedures that are implemented and maintained in such a way that the successful achievement of environmental goals will demonstrate ongoing compliance with regulations. The EMS should also allow organisations to manage the environmental impact of their activities,

[202] SABS ISO 14001. 1996.

products and services in accordance with their self-declared environmental policy and objectives.

Consistent with the principles of SABS ISO 14001, the environmental policy and environmental aspects/impacts analysis, including legal and other requirements, shape the programme by influencing the selection of specific measurable environmental goals, objectives and targets. The following five core elements of an EMS are listed in SABS ISO 14001[203] (FIG 4 Environmental Management System Model for the ISO 14001 International Standard) and can be described as follows:

a) Establishment of an appropriate environmental policy

The SABS ISO 14001 standard includes the need for organisations to document an environmental policy and to make this available to the public. The environmental policy is a statement by the top management of an organisation.

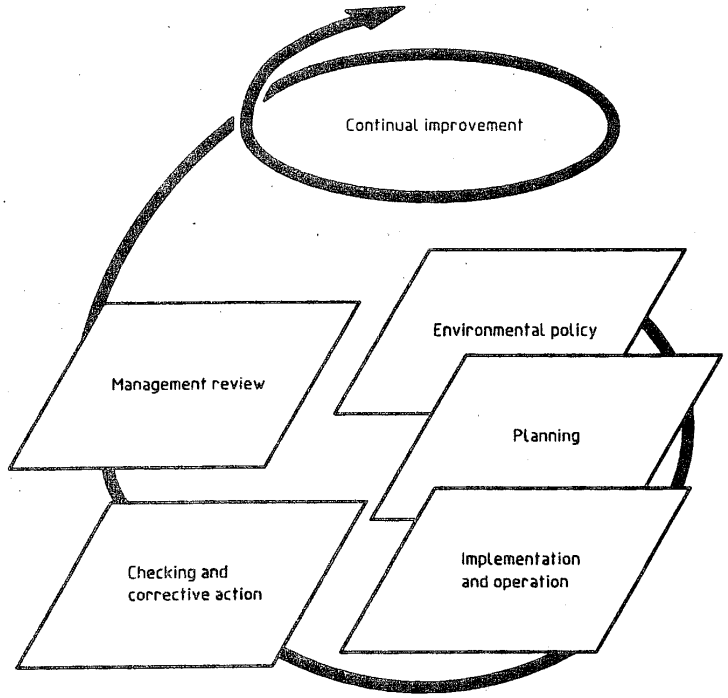

FIG. 4: Environmental Management System Model for the ISO 14001 International Standard[204].

The policy constitutes the objectives of the organisation in relation to environmental performance. It has to be documented, communicated to all employees and made available to the public. The environmental policy must indicate a commitment to continual improvement, pollution prevention and regulatory compliance, and should

[203] SABS ISO 14001. 1996.
[204] SABS ISO 14001. (1996:vi)

provide a framework for the setting of objectives. The environmental policy is the driving force for implementing and improving the EMS of the organisation, and ultimately its environmental performance. The policy should be clear so that it can be easily understood by internal and external interested parties, and should be reviewed periodically and revised to reflect any changing conditions and information.

b) The planning phase

Planning includes the identification of environmental aspects relating to an organisation or hotel's activities, products or services which the organisation can expect to influence in order to determine those which may have significant impacts on the environment. The aspects relating to these significant impacts must be considered when environmental objectives are set for the organisation. Procedures must be established for the ongoing review of the environmental aspects and impacts of products, activities and services. Based on these environmental aspects and impacts, environmental goals and objectives must be established that are consistent with the environmental policy. Programmes must then be set in place to implement these objectives.

Environmental aspects, including those that organisations can control and those that they can expect to influence, should be identified. These environmental aspects include:

i. Emissions to air
ii. Releases to water
iii. Waste management
iv. Contamination of land
v. Use of raw materials and natural resources
vi. Other local environmental and community issues

Planning also requires the establishment of a procedure to identify and allow access to legal and other requirements that influence and are applicable to the activities, products and services of the organisation and the development, documentation and maintenance of environmental objectives and targets consistent with the environmental policy of the organisation. An Environmental Management programme should also be established during this phase to achieve the following:

i. The objectives of the organisation
ii. The designation of responsibilities at each organisational level
iii. The documentation and communication of these responsibilities
iv. The details of the actions
v. The time within which the objectives have to be achieved

c) Implementation and operation of the Environmental Management System (EMS)

Once an EMS has been compiled, detailed procedures relating to operational control, emergency situations, data collection and documentation procedures are drafted. Specific programmes and/or projects must then be developed to achieve environmental goals, objectives and targets. These specific programmes and/or projects apply to the management of the impacts of the organisation on the environment and are thus only broadly defined. Implementation involves the following actions[205]:

i. The provision of technology and the financial and human resources necessary for the EMS
ii. The appointment of specific management representatives, including the definition, documentation and communication of roles
iii. The written management system documentation, training and awareness-raising procedures for employees
iv. Internal and external communication procedures
v. Documentation control procedures
vi. Operational control
vii. Documented and communicated emergency response procedures

d) Checking and corrective action procedures

The checking and corrective action elements of the system help to ensure continuous improvement by addressing root causes of non-conformity. The ongoing management review of the EMS and its elements helps to ensure the continuing suitability, adequacy and effectiveness of the system. This involves the monitoring and evaluation of operational processes and the establishment of an EMS audit programme to determine conformity with objectives and other EMS requirements as set by the organisation itself. Monitoring and evaluation should also provide information for the management review; preventative and corrective action in the case of non-conformity and documentation of those actions. Monitoring and evaluation

[205] SABS ISO 14001. 1996.

should finally include the maintenance of environmental records, including training records and audit and review results.

e) Periodic management review of the overall Environmental Management System

A requirement of SABS ISO 14001 is that Environmental Management Systems (EMSs) must include appropriate measures for monitoring and review to ensure effective functioning of the EMS and to identify and implement corrective measures timeously. A second requirement of SABS ISO 14001 is that internal audits of the EMS be conducted routinely to ensure that non-conformity to the system is identified and addressed. In addition, the management review process must ensure top management involvement in the assessment of the EMS, and that the need for change be addressed, in order to ensure its continuing efficiency based on the audit results, changing circumstances and the commitment to improvement. Changes have to be documented.

f) Management review

As stated in SABS ISO 14001[206], the management structure of the organisation or hotel should review and evaluate the EMS at fixed intervals. The purpose of this review is to maintain continual improvement, suitability and effectiveness of the EMS and to maintain the system's performance. The document further requires that the review of the environmental policy, objectives and procedures should be carried out by the level of management that defined them. Any changes to the procedure should be documented.

3.8 Conclusion

The second hypothesis stated in Chapter One, 'Guidelines for Environmental Management exist and are further expressed in the guidelines and principles of the ISO 14000 series' is supported by the inductive research findings. The National Government of the Republic of South Africa has defined principles for Environmental Management in the National Environmental Management Act (NEMA)[207]. The core elements of Environmental Management have been described and relate to the implementation of a management system or procedures, similar to the ISO 14001 EMS. The guidelines for Environmental

[206] SABS ISO 14001. (1996:9)
[207] South Africa. National Environmental Management Act, No. 107 of 1998.

Management as defined by SABS ISO 14001[208] are clear and can be interpreted to produce a guideline document for Environmental Management in the hotel industry.

The ISO 14000 series of documents have been drafted to be broad standards, which can be modified for application to any type of organisation. The requirements of SABS ISO 14001[209] can be read to substitute 'hotels' for 'organisation' in each instance, making the standard applicable to the hotel industry.

The implementation of SABS ISO 14001 implies the management of the significant environmental impacts of the organisation, but does not clearly stipulate how these environmental impacts are to be determined or controlled. An ISO 14001 EMS should be regarded as an overall system or procedure within which the management of the significant environmental impacts are to take place. Environmental Management focuses on the practical management of environmental impacts and issues. Therefore there are methods used in Environmental Management that could be incorporated and utilised in the compilation of an ISO 14001 EMS.

[208] SABS ISO 14001. 1996.
[209] SABS ISO 14001. 1996.

4. CHAPTER 4: THE COMPILATION OF A GUIDELINE DOCUMENT FOR ENVIRONMENTAL MANAGEMENT IN THE HOTEL INDUSTRY, BASED ON ISO 14000 PRINCIPLES

4.1 Introduction

The research data collected in Chapter Two, which addresses the identification and assessment of the potential environmental impacts of the operational phase of hotels, will form the core of the guideline document compiled in this chapter. A guideline document for managing the potential environmental impacts identified in Chapter Two will be compiled by adhering to the core elements of SABS ISO 14001 as discussed in item 3.8.1. The aim of the guideline document is to set principles and assist in the establishment of an Environmental Management System (EMS) for the Hotel Industry.

The guideline document will outline the methodology applicable to the compilation of an Environmental Management System (EMS) and highlight baseline standards in the mitigation/management of the potential environmental impacts identified in Chapter Two of this study.

4.2 Methodology

The approach in compiling the guideline document is to set out the core elements of an EMS as required by SABS ISO 14001[210], and to incorporate the principle of mitigating and managing environmental impacts as is detailed in the Integrated Environmental Management (IEM) Procedure. The environmental impacts identified in Chapter Two will be addressed in terms of the management of these impacts. A broad framework of management principles for the identified environmental impacts will assist hotels in adapting the guideline document for their own use. The identified environmental impacts should be mitigated or managed to meet, or aim to meet benchmarks set by the hotel itself, or South African and international standards. The management of the environmental impacts identified for hotels will be compiled into a table for each of the core elements defined by SABS ISO 14001[211].

[210] SABS ISO 14001. 1996.
[211] SABS ISO 14001. 1996.

4.3 Literature review

The SABS ISO 14000 series documents, particularly SABS ISO 14001[212] and SABS ISO 14004[213], were used as the main structure to produce the final guideline document. The environmental awareness training manual produced by Southern Sun Hotel Interests (Pty) Limited[214] was used as a reference in this study, to provide South African information and standards. An Internet search produced an unpublished dissertation on the implementation of an ISO 14001 EMS by Yarnell[215], which does not specify the University the postgraduate student is affiliated to. This abstract provided a summary of the methods used to implement an ISO 14001 EMS as an example from a source other than ISO.

Benchmarks and standards to manage the identified environmental impacts were obtained from the International Hotels Environment Initiative (IHEI)[216], Fuggle and Rabie[217] and the Environmental Indicators published by the Department of Environmental Affairs and Tourism (DEAT)[218]. The textbook published by Barnard[219], *Environmental Law for All,* was also used as a reference to confirm current South African legislation.

An Internet search was conducted to locate further applicable research. The United Nations Environment Programme (UNEP) has published two documents on environmental awareness and management for hotels, namely an Environmental Action Pack for Hotels[220] which provides practical information, checklists and examples of issues such as how to undertake environmental self-audits, define priorities and determine the best areas for action, how to integrate Environmental Management into daily operations, how to develop concrete actions in main areas such as energy, solid waste, water, effluent and emissions generation, contractors and suppliers, and how to monitor progress. The second publication by the United Nations Environment Programme is a document on case studies, *Environmental Good Practice in Hotels*[221], which highlights a range of environmental initiatives from recycling to water conservation, new building techniques and examples of environmental initiatives undertaken by other hotel groups. These two publications assisted in setting standards and benchmarks for the management of the identified environmental impacts.

[212] SABS ISO 14001. 1996.
[213] SABS ISO 14004. 1996.
[214] Southern Sun Hotel Interests (Pty) Ltd. 2002.
[215] Yarnell. [s.a.]
[216] International Hotels Environment Initiative. 1996.
[217] Fuggle and Rabie. 2000.
[218] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za
[219] Barnard. 1999.
[220] United Nations Environment Programme. 2002. (b)
[221] United Nations Environment Programme. 2002. (c)

4.4 Core elements of SABS ISO 14001

To assimilate an Environmental Management System (EMS) for hotels, the core elements of SABS ISO 14001, as listed in item 3.8.1, were used as the structure for this section. Examples of how hotels could implement this will be given where applicable.

4.4.1 Establishment of an appropriate environmental policy

This study will not draft an environmental policy, but will set guidelines regarding the content of such a policy based on the requirements of SABS ISO 14001. It is recommended that each group of hotels or individual hotel aiming to establish an SABS ISO 14001 EMS could use these guidelines to draft its own environmental policy. Since the environmental policy is the driving force of the implementation of the SABS ISO 14001 EMS, the top management of the hotel or hotel group should draft the policy. In a group of hotels this implies the top management of the group, such as the chief executive officer and the board of directors. In a single hotel, this implies the general manager and his/her management team. The formulation of the environmental policy and support of the policy by the management team ensures commitment from top management to the EMS, its implementation and continual improvement. The contents and guidelines for the drafting of an environmental policy have been detailed in SABS ISO 14004[222]. When drafting the environmental policy, hotels should consider:

- *the organisation's mission, vision, core values and beliefs;*
- *requirements for and communication with interested parties;*
- *continual improvement;*
- *guiding principles;*
- *coordination with other organisational policies (e.g. quality, occupational health and safety);*
- *specific local or regional conditions; and*
- *compliance with relevant environmental regulations, laws and other criteria to which the organisation subscribes[223].*

The environmental policy of the hotel must be communicated to the employees of the hotel and made available to the public. The environmental policy should be appropriate to the nature, scale and environmental impacts of the activities, products or services of the hotel.

[222] SABS ISO 14004. (1996:6-7)
[223] SABS ISO 14004. (1996:6)

4.4.2 Planning of the Environmental Management System (EMS)

Prior to the planning of an Environmental Management System (EMS), an initial review of current environmental practices in the hotel or group of hotels could be undertaken to assist in the understanding of how current activities, services and facilities may impact on the environment. The review could also be used to determine how these impacts on the environment are currently being managed. The initial audit could be structured in the format of a questionnaire with elements following the same order as the environmental aspects listed in SABS ISO 14001[224]. The results of this initial audit will provide guidance on how much corrective action and training would be required

The planning of an SABS ISO 14001 EMS includes the following steps:

1. Identifying and addressing environmental aspects that impact significantly on the environment
2. Establishing a procedure to ensure compliance with legal and other requirements
3. The development, documentation and maintenance of environmental objectives and targets
4. The establishment of an Environmental Management programme (EMP)

Aspects that will impact on the environment must be identified with respect to the activities, products and services of the hotel, by using a process to identify significant environmental impacts that should be addressed as a priority by the EMS. The process followed in Chapter Two could be used as an example of the methodology to identify operational aspects of hotels and their impacts on the environment.

a) Environmental aspects

Environmental aspects as defined by SABS ISO 14001[225], are

i. Emissions to air
ii. Releases to water
iii. Waste management
iv. Contamination of land
v. Use of raw materials and natural resources
vi. Other local environmental and community issues

The potential environmental impacts that were identified in Chapter Two of this study were arranged in terms of the environmental aspects as defined by SABS ISO 14001[226]. Environmental aspects are described in SABS ISO 14004[227] as

[224] SABS ISO 14001. 1996.
[225] SABS ISO 14001. 1996.
[226] SABS ISO 14001. 1996.

… an element of an organisations' activity, product or service which can have a beneficial or adverse impact on the environment.

An environmental impact refers to

… the change which takes place in the environment as a result of the aspect.

The environmental aspects related to activities were listed and environmental impacts detailed in accordance with the examples and table format outlined in SABS ISO 14004[228].

As stated in item 4.2, all the operational environmental impacts identified in this dissertation will be included in the guideline document, even though significant environmental impacts for the hotels used as case studies were determined. This is due to the fact that the significance of an environmental impact may vary from one hotel to the next, depending on location, proximity to sensitive environments or types of facilities offered.

i. Emissions to air

Climatic environmental impacts that hotels may have on the environment as identified under biophysical environment in item 2.7.3 a), can be regarded as emissions to air as listed under the environmental aspects of SABS ISO 14001[229].

Table 22: Potential environmental impacts of hotels related to the aspects of emissions to air

Activity, facility, product or service	Aspect	Impact
Facility – bare soil surfaces	Windy conditions blowing dust into the air	Contamination of air with particulates
Activity – cooking	Potential for odours and vapours released	Emission to and contamination of external air quality
Activity – washing of laundry	Steam and chemical vapours released	Emission to and contamination of external air quality
Activity – operating generator for back-up electricity in emergency situations	Gases released during combustion process	Contamination of air with greenhouse gases and particulates
Facility – Gas supply for cooking.	Accidental leaks or rupturing of vessel	Contamination of air with noxious gases
Facility – operating air-conditioners	Possible release of CFCs	Ozone depletion by CFCs
Facility – operating air-conditioners	Transmission of viruses and bacteria	Contamination of internal air quality
Facility – operating air-conditioners	Warm air returned to external air	Waste heat that affects microclimate
Activity – operating fireplaces in winter	Release of CO_2 through burning of fossil fuels	Contamination of external air quality with particulates, CO, CO_2, NO_x, SO_x
Facility – operating refrigeration units and ice	Possible release of ozone depleting refrigerants	Ozone depletion by CFCs

[227] SABS ISO 14004. 1996.
[228] SABS ISO 14004. 1996.
[229] SABS ISO 14001. 1996.

Activity, facility, product or service	Aspect	Impact
machines		
Service – housekeeping and maintenance using aerosol cans	Possible release ozone depleting refrigerants	Ozone depletion by CFCs
Emergency activity – dowsing a fire with CO_2 fire extinguishers	Possible release of CO_2 during use	Contamination of external air quality with greenhouse gases
Service – providing carbonated drinks at the bar	Release CO_2 during operation	Release of CO_2
Accidental activity – spilling chemicals or cleaning agents	Harmful vapours released to air	Contamination of air with possible noxious or corrosive gases
Service – courtesy vehicle	Noxious gases emitted during operation	Contamination of air with greenhouse gases
Service – operating boilers	Burning of fossil fuels (secondary impact) for energy	Contamination of air with particulates and CO_2
Facility – fuel storage area	Accidental spill of fuel during filling of tank or vehicles	Contamination of air with CO_2, NO_x, SO_x
Service – garden maintenance	Application of pesticides and herbicides	Contamination of air with harmful chemicals
Facility – sewage treatment plant	Odours released during natural break-down processes	Contamination of air with odours and gases
Facility – swimming pool	Evaporation of chlorine	Contamination of air with chlorine
Facility – waste yard	Burning of domestic waste in rural areas	Contamination of air with particulates and noxious gases

ii. Releases to water

Possible hydrological environmental impacts of hotels on the environment where water quality is affected, as identified under biophysical environment in item 2.7.3 c), can be regarded as releases to water as listed under the environmental aspects of SABS ISO 14001[230].

Table 23: Potential environmental impacts of hotels related to the aspect of releases to water

Activity, facility, product or service	Aspect	Impact
Activity – cleaning of kitchen	Incorrect disposal of kitchen wet-waste into sewage system	Contamination of surface water
Activity – cleaning of kitchen grease trap	Poor maintenance causing grease trap to overflow	Contamination of surface water
Activity – cleaning during housekeeping activities	Chemicals washed into sewage system	Contamination of surface water
Activity – operating sewage treatment plant	Release of toxins, nutrients and pesticides into river if not operating correctly	Contamination of surface water
Activity – operating sewage treatment plant	Heat released during chemical processes	Waste heat returned to river system and affecting microbiology
Service - maintenance of gardens and golf course	Fertiliser from gardens and golf course washed into stormwater	Contamination of surface water
Service – maintenance of gardens	Use of pesticides and fertiliser during maintenance	Contamination of surface water
Service – general maintenance	Accidental chemical or fuel spill	Contamination of surface water
Activity – washing of guests' vehicles	Washing water contaminated with grease, oil, fuel and detergents into the stormwater system	Contamination of surface water
Service – maintenance of swimming pool	Back wash water released into stormwater system	Contamination of surface water
Facility – bare soil in gardens and maintenance areas	Stormwater runoff washing silt into streams	Contamination of surface water

[230] SABS ISO 14001. 1996.

iii. Waste management

The potential environmental impacts identified for services under the socio-economic environment in item 2.7.4 a) will be listed here.

Table 24: Potential environmental impacts of hotels related to the aspect of waste management

Activity, facility, product or service	Aspect	Impact
Activity – cleaning of kitchen	Disposal of unsorted waste and foodstuffs	Increased waste to landfill, contamination of soil and groundwater
Activity – disposal of empty containers	Disposal of hazardous chemical containers	Contamination of soil and groundwater with hazardous waste
Activity – garden maintenance	Removal of garden refuse to waste site	Increased waste to land fill
Activity – disposal of pool chemical containers	Disposal of hazardous chemical containers in domestic waste	Contamination of soil and groundwater with hazardous waste
Service – operating beauty salon	Disposal of hazardous chemicals in domestic waste	Contamination of soil and groundwater with hazardous waste
Activity – managing waste yard/skip	Disposal of hazardous waste in domestic waste	Contamination of soil and groundwater with hazardous waste
Activity – managing waste yard/skip.	Foodstuff/wet-waste from kitchens in skip attracting vermin and pests	Health risk in spreading disease and vermin
Activity – managing waste yard/skip	Disposal of unsorted waste	Increased waste to landfill
Service – operating convenience store	Disposal of unsorted waste	Increased waste to landfill
Activity - general maintenance	Disposal of hazardous waste and building material in domestic waste	Increased waste to landfill and contamination of soil and groundwater with hazardous waste
Activity - general maintenance	Disposal of fluorescent light tubing in domestic waste	Contamination of soil and groundwater with hazardous waste
Activity– cleaning of fireplaces	Disposal of ash in gardens	Contamination of soil
Activity - maintenance of vehicle fleet	Waste oil and lubricants disposed as domestic waste	Contamination of soil and groundwater with hazardous waste

iv. Contamination of land

Possible environmental impacts of hotels on soils as identified under biophysical environment in item 2.7.3 b), can be regarded as contamination of land as listed under the environmental aspects of SABS ISO 14001[231].

Table 25: Potential environmental impacts of hotels related to the aspect of contamination of land

Activity, facility, product or service	Aspect	Impact
Facility – soil left bare after construction	Stormwater runoff flowing over bare soil areas	Soil erosion
Facility – poor stormwater management	Poor infiltration in clay areas	Water logging

[231] SABS ISO 14001. 1996.

Activity, facility, product or service	Aspect	Impact
Facility – hard surfaces in development	Increased stormwater runoff	Potential soil erosion
Activity – managing chemical storage area	Accidental spillage of chemicals such as pesticides, herbicides, bleaches, chlorine and acids	Contamination of land
Activity – managing fuel storage area	Accidental spillage of fuel or oil	Contamination of land
Activity – managing waste area	Storage of hazardous waste	Contamination of land
Activity – managing waste area	Storage of foodstuffs and wet-waste from kitchens	Contamination of land
Activity – garden maintenance	Accidental spillage of chemicals used in maintenance	Contamination of land
Activity – general maintenance	Accidental spills of hazardous substances such as paints/oils	Contamination of land
Service – operating beauty salon	Incorrect disposal of chemicals	Contamination of land
Activity – housekeeping	Disposing of soapy water onto gardens after washing paved or tiled surfaces	Contamination of land
Facility – gravel footpaths in rural areas	Stormwater runoff flowing over bare soil areas	Soil erosion
Facility- informal parking area on bare soil	Oil or fuel leaks from vehicles	Contamination of land
Facility – kitchen grease trap	Contents of grease trap disposed of into domestic waste or buried on site	Contamination of land

v. Use of raw materials and natural resources

Potential environmental impacts on flora and fauna, as identified under biophysical environment in item 2.7.3 d), and environmental impacts on infrastructure, energy and water supply as identified under socio-economic environment in item 2.7.4 b) can be regarded as impacts on biodiversity and raw materials, and therefore natural resources as listed under the environmental aspects of SABS ISO 14001[232].

Table 26: Potential environmental impacts of hotels related to the aspect of use of raw materials and natural resources

Activity, facility, product or service	Aspect	Impact
Activity – uncontrolled access into an ecologically sensitive area	Potential damage to sensitive habitats	Loss of habitat and biodiversity
Activity – establishment or extensions of gardens	Clearing of indigenous vegetation	Loss of habitat and biodiversity
Activity – establishment or extensions of gardens	Planting exotic vegetation	Loss of habitat and biodiversity
Activity – incorrect garden maintenance procedures.	Declared invasive exotic species allowed to proliferate	Loss of biodiversity
Service – provision of wood-burning fireplaces	Use of indigenous wood for fireplaces	Loss of biodiversity and natural resources
Service – provision of golf courses	Planting exotic lawns and plants where indigenous vegetation has been cleared	Loss of biodiversity
Facility – curio shop	Use of indigenous wood for producing African art encouraged	Loss of biodiversity
Activity – establishment of gardens	Change in ecological character of the area	Loss of biodiversity

[232] SABS ISO 14001. 1996.

Activity, facility, product or service	Aspect	Impact
Activity – operating sewage treatment plant	Risk of discharge into wetland systems	Contamination of sensitive habitat and loss of biodiversity
Facility – development located in floodplain	Damage to development during floods	Economic loss
Facility – potable water quality	Quality of water for use as potable water supply – purification required or not	Health issues
Facility – irrigation water quality	Quality of water used for irrigation – suitable for potable water or not	Health issues
Facility – irrigation application	Excessive use of water	Use of natural resource
Facility – abstraction of water from river	Permit to control waster use	Use of natural resource
Service – provide catering, meals and drinks	Utilising energy (electricity)	Use of natural resource
Activity – washing dishes in kitchen	Utilising water	Use of natural resource
Service – supplying fresh produce, cold drinks, etc.	Utilising energy (electricity)	Use of natural resource
Activity – lights left on when guests are not in rooms	Utilising energy (electricity)	Use of natural resource
Activity – taps left dripping and guests using too much water	Utilising water	Use of natural resource
Service – laundering of clothes, towels and linen	Utilising energy and water	Use of natural resources
Service – providing hot water for guests and kitchen	Utilising energy (electricity)	Use of natural resource
Service – providing air conditioning	Utilising energy (electricity)	Use of natural resource
Activity – irrigating gardens	Utilising water	Use of natural resource
Activity – topping up swimming pool	Utilising water	Use of natural resource
Service – provision of sauna and steam baths	Utilising water and energy (electricity)	Use of natural resources
Activity – operating elevators	Utilising energy (electricity)	Use of natural resources
Activity – pumping of water for sewage treatment plant	Utilising water and energy (electricity)	Use of natural resources
Activity – abstracting water from the river	Utilising water and energy (electricity)	Use of natural resources
Activity - operating water features and swimming pool	Utilising energy (electricity)	Use of natural resources

vi. Other local environmental and community issues

Potential environmental impacts as identified for community involvement under socio-economic environment in item 2.7.4 d), cultural and historic environment item 2.7.5, and noise as identified under other aspects of particular importance under item 2.7.6, can be regarded as local environmental and community issues under the environmental aspects of SABS ISO 14001[233].

Table 27: Potential environmental impacts of hotels related to the aspect of other local environmental and community issues

Activity, facility, product or service	Aspect	Impact
Activity – employment of local community	Increase income in local community	Economic upliftment
Activity – employment of local community	Economic upliftment	Improved housing and education levels
Activity – management support of environmental awareness programmes	Improved environmental awareness	Positive environmental impact

[233] SABS ISO 14001. 1996.

Activity, facility, product or service	Aspect	Impact
Activity – sourcing local communities for employment	Employing local people, outsourcing services to local organisations, local purchasing	Local community benefit
Activity – community liaison	Hotel providing charity or education drives	Local community benefit
Facility – hotel different from surrounding land uses	Potential to initiate similar development	Local community benefit
Facility – hotel located in a high crime-risk area	Potential safety risk to guests	Safety issues
Facility – hotel located near other developments with flood lights	Floodlights shining into guest rooms	Light pollution
Facility – hotel located near busy roads, railway lines or airports	Noise disturbing guests	Noise pollution
Service – provide illumination on external areas for safety and marketing	Visual intrusion of / excess illumination	Light pollution
Facility – outdoor entertainment facilities	Excessive noise from outdoor entertainment	Noise pollution
Facility – outdoor sports facility	Excessive noise from outdoor sports activities	Noise pollution
Activity - indoor functions	Excessive noise from music or PA system	Noise pollution
Activity – loud maintenance activities	Excessive noise from activities such as edge trimming, lawnmowing or drilling	Noise pollution
Activity – event or function held at hotel	Increased traffic and congestion on local road network	Traffic impact
Activity – uncontrolled access to culturally or archaeologically sensitive site	Uncontrolled movement causing potential damage	Potential damage to artefacts
Activity – uncontrolled access to sites of architectural interest	Uncontrolled movement causing potential damage	Potential damage to structures
Facility – hotel visible from surroundings	New buildings visible in natural surroundings landscape	Visual intrusion
Facility – architectural style of the hotel	Architectural style not blending into the surroundings	Visual pollution

This section of the EMS also requires the control and management of the environmental impacts. Benchmarks for each of the environmental impacts identified will be listed under item 4.6.

b) Establishing a procedure to ensure compliance with legal and other requirements

According to SABS ISO 14004[234], procedures should be established to provide and allow access to legal and other requirements which influence and are applicable to the activities, products and services of the hotel. Hotels should also refer to the final King Report on Corporate Governance 2002[235] (referred to as the King II Report) for principles on corporate governance. As from 1 March 2002, the use of a 'Code of Corporate Practices and Conduct' as included in the King II Report, was introduced to enhance the general principles of company law, and most of the recommendations in the King II Report are proposed amendments to the Companies Act[236]. According to Hofmeyr, Herbstein and Gihwala Incorporated Attorneys[237], reports on 'Non-financial

[234] SABS ISO 14004. 1996.
[235] Institute of Directors. 2002.
[236] South Africa. 1973. Companies Act, No. 61 of 1973.
[237] Hofmeyr, Herbstein and Gihwala Inc. 2003. www.hofmeyr.co.za

Matters' are now referred to as 'Integrated Sustainable Reporting'. In the King II Report it is proposed that a company should report at least annually on the nature and extent of its social, transformation, ethical, safety, health and environmental management policies and practices. According to Hofmeyr, Herbstein and Gihwala Incorporated Attorneys, this is called the 'triple bottom line' of a company.

Organisations usually use the services of consultants during their construction and/or establishment. During the planning and construction period, the top management of the hotel or group of hotels may employ a consulting team to ensure that all legislative issues and local government by-laws are adhered to, but top management, the general manager of an individual hotel, or the chief executive officer of a group of hotels, ultimately remains responsible for compliance with all applicable legislation. For the establishment of a procedure to ensure compliance with legal and other requirements during the operational period of activities of the hotel, the areas that should be focussed on, as listed in SABS ISO 14001[238], are:

i. Industry codes of practice
ii. Agreements with public authorities,
iii. Non-regulatory guidelines

These should be established and confirmed by the management structure of the hotel.

In SABS ISO 14004[239], it is indicated that organisations should establish procedures to identify, access and understand all the legal and any other requirements to which the organisation subscribes, and are directly responsible for the environmental aspects of its activities, products or services. Once these procedures have been established, they should be maintained. In SABS ISO 14004[240], sources of environmental regulations are listed as:

i. All levels of government
ii. Industrial associations or groups
iii. Commercial databases
iv. Professional services

The increasingly extensive environmental legislation of South Africa should be consulted and adhered to. With the continuous updating of South African legislation, it is advisable to ensure that the company establishes an environmental legislative database or library, which should be updated on a regular basis. This can be done

[238] SABS ISO 14001. 1996.
[239] SABS ISO 14004. 1996.
[240] SABS ISO 14004. 1996.

internally by sourcing websites listing the latest governmental legislation, either www.polity.org.za or www.gov.za, for acts and www.gov.za/regulations/index.html for regulations, regularly contacting the Government Printer's office in Pretoria, or appointing a consultant on environmental law to assist in updating the database or library. An Internet search identified a company in South Africa that will provide such a service electronically.

c) The development, documentation and maintenance of environmental objectives and targets

This section relates directly to the environmental policy, which has to be developed along the guidelines as highlighted under item 4.4.1. Internal targets, priorities and criteria should be developed where external standards do not meet the needs of the organisation. In SABS ISO 14004[241], it is stated that internal criteria and external standards should assist the organisation in the development of its objectives and targets as follows:

i. Objectives should be specific and targets should be measurable wherever possible

Once the environmental policy has been drafted and approved by the top management of the hotel or group of hotels, objectives and targets should be set for the organisation. The objectives and targets should be drafted by top management in consultation with the remainder of the management team.

The objectives and targets should include:

- a statement of compliance with environmental regulations, and may also include
- commitments by the hotel or group of hotels to:
  - *minimise any adverse negative environmental impacts…,*
  - *development of environmental performance evaluation procedures…,*
  - *prevent pollution, reduce waste and the consumption of* [natural] *resources..., and commit to …recycling* [initiatives],
  - *education and training,*
  - *sharing environmental experience,*
  - *involvement of and communication with interested parties,*
  - *work towards sustainable development,*
  - *encourage the use of EMS by suppliers and contractors*[242].

[241] SABS ISO 14004. 1996.
[242] SABS ISO 14004. (1996:7)

ii. Where possible, preventative measures should be taken into account

iii. The objectives should be reviewed regularly and updated in accordance with the performance of the hotel

These objectives and targets should be reviewed and adapted in accordance with the improvements made during the implementation of the EMS, or as environmental objectives change. The objectives and targets must be used as goals to be achieved in the implementation of an EMS. The performance achieved by the EMS must be constantly measured against the objectives and targets set by the hotel. This is described in more detail in item 4.7.

d) The establishment of an environmental management programme (EMP)

The programme should include the following:

i. It should describe how the objectives and targets of the hotel would be achieved, including time scales and persons responsible for implementing the organisation's environmental policy.

ii. The programme may be subdivided to address specific elements of the operations and should include an environmental review for new activities.

iii. The management programme should address schedules, resources and responsibilities for achieving the organisation's objectives and targets.

iv. The Integrated Environmental Management (IEM) procedure has to be incorporated to assist in the management of the identified impacts on the environment. This is discussed in detail in item 4.6.

4.5 Defining criteria for impact assessment

In the planning phase of SABS ISO 14001, an organisation (a hotel) should consider its significant environmental impacts when establishing and reviewing the objectives set for the hotel or organisation. The assessment of environmental impacts for the operational phase of hotels as identified in Chapter Two was undertaken in Annexure F to determine the significance of each environmental impact and was summarised in Table 21 of this dissertation. Owing to the fact that the significance of environmental impacts varies according to the location and sensitivity of the environment in which the hotel is situated, the management of all the negative environmental impacts identified in Annexure F will be discussed in this chapter.

4.6 Management of environmental impacts

This section is included as a guideline for the minimisation and management of environmental impacts. It is implied as part of the continual improvement that is at the core of ISO 14001, but there are no clear indications as to how this should be executed or implemented. The management recommendations made in this section are aimed at assisting hotels in a practical application of the SABS ISO 14001 principles.

4.6.1 Management of environmental impacts by listing benchmarks and standards for environmental aspects

This section will set mitigation measures to reduce or manage the possible environmental impacts of hotels on the environment. The management of the impacts will be described by elaborating on the tables produced for the environmental aspects and impacts under item 4.4.2 a).

a) Emissions to air

Air quality in South Africa is governed by the Atmospheric Pollution Prevention Act[243], but is based, according to Barnard[244], on the guidelines of the civil wrong of nuisance. Barnard[245] further states that it is difficult to set standards for the control of air quality. Air quality standards and regulations against air pollution by smoke have been gazetted under the Atmospheric Pollution Prevention Act[246] for a number of cities and towns in the country, but these Local Authority by-laws are implemented and controlled by the Local Authority only. The Directorate of Air Quality Control of the Department of Environmental Affairs and Tourism (DEAT) has identified general guidelines to serve as the environmental standard for deciding permissible emissions of noxious and greenhouse gases. The environmental standard for maximum levels of smoke is based on two guidelines, according to Barnard[247]. A concentration level based on micrograms per cubic metre and colour densities is used to determine the extent of pollution by smoke.

[243] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[244] Barnard. 1999.
[245] Barnard. 1999.
[246] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[247] Barnard. 1999.

According to the International Hotels Environment Initiative (IHEI)[248], chlorofluorocarbons (CFCs) and halochlorofluorocarbons (HCFCs) are man-made gases of low toxicity, non-flammability and high stability, and were widely used as refrigerants in the past. The longevity of these gases is characterised by a slow breakdown once they are released to the atmosphere. The Montreal Protocol governs the cessation of the use of CFCs with high ozone-depletion potential (ODP). Halochlorofluorocarbons (HCFCs) contain less ozone-depleting chlorine than CFCs and its phasing out will take longer. Halofluorocarbons (HFCs) are new long-term alternative refrigerants, containing no chlorine and they pose no risk to the ozone layer. Table 28 lists substitutes for CFCs.

Table 28: Substitutes for Chlorofluorocarbons (CFCs) according to the International Hotels Environment Initiative[249]

Refrigerant name	Components	Ozone depletion potential
Freon 22	HCFC	0.05
HFC-23	HFC	0.0
Blends MP-39, MP-52, MP-66	HFC / HCFC	0.03
HCFC-123	HCFC	0.02
HCFC-124	HCFC	0.02
HCFC-125	HCFC	0.0
HFC-134a	HFC	0.0
Blend HP-81	HFC / HCFC	0.02-0.03
Blend HP-80		
Blend HP-62	HFC	0.0

Even though the emissions to air from hotels are small when compared to industrial emissions, the emissions can still be managed to reduce their potential impacts. Areas where hotels may impact on air quality include:

i. Dust pollution from wind blowing over bare soil surfaces
ii. Vapours and odours from cooking released into the atmosphere
iii. Steam and chemical vapours released during washing of laundry
iv. The release of particulates and noxious gases during the operation of back-up diesel generators

[248] International Hotels Environment Initiative (1996:131)
[249] International Hotels Environment Initiative (1996:133)

v. Accidental leaks from bulk LP gas vessels or gas bottles, possible leaking of CFCs from air conditioning and refrigeration units
vi. CO_2 and particulates released into the atmosphere during burning of fires in fireplaces
vii. Possible contamination of internal air quality with viruses and bacteria through air-conditioning system
viii. Accidental spillage of chemicals and release of vapours to the atmosphere,
ix. Vapours released into the atmosphere during the application of pesticides and herbicides
x. The secondary impact of using electricity where fossil fuels are burnt to generate electricity and particulates and noxious gases are released into the atmosphere

The management of the environmental impacts identified for operations in the hotel industry will be addressed in Table 29 on page 107.

Table 29: Management of emissions to air

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – bare soil surfaces	Windy conditions blowing dust into the air	Contamination of air with particulates	1. Planting of vegetation to cover bare surfaces. 2. Management and maintenance of soil paths to prevent erosion and dust.	Department of Agriculture	
Activity – cooking	Potential for odours and vapours released	Emission to and contamination of external air quality	1. The International Hotels Environment Initiative [250] recommends filtration in kitchen exhaust systems. 2. Activated carbon filters will remove odour. 3. Filters must be cleaned and replaced regularly and exhaust systems serviced regularly.	Department of Environmental Affairs and Tourism (DEAT), Directorate Air Quality Control	Atmospheric Pollution Prevention Act[251]
Activity – washing of laundry	Steam and chemical vapours released	Emission to and contamination of external air quality	1. Filters must be fitted to exhaust systems. 2. Dust filters in driers must be cleaned daily or as necessary[253].	DEAT, Directorate Air Quality Control	Atmospheric Pollution Prevention Act[252]
Activity – operating generator for back-up electricity in emergency situations	Gases and particulates released during combustion process	Contamination of air with particulates and greenhouse gases	1. The International Hotels Environment Initiative[254] states that combustion engines operating efficiently emit colourless smoke as opposed to black smoke. 2. Regular services will ensure efficient operation of generators. 3. Search for alternative energy sources or fuel sources.	Local authority	Local bylaws gazetted under the Atmospheric Pollution Prevention Act[255]
Facility – Gas supply to hotel	Accidental leaks or rupturing of vessel	Contamination of air with noxious gases	1. Gas vessels should be serviced and checked on a regular basis and should be located in a well-ventilated area. 2. Vents must be located on ground level to allow heavier gas to escape in case of leaks. 3. Adhere to applicable codes from South African Bureau of Standards. SABS 690[257], SABS 1774[258], SABS 1650[259], SABS 087 part III[260].	Department of Labour and Local Authorities	Occupational Health and Safety Act[256] Local by-laws

[250] International Hotels Environment Initiative (1996:108)
[251] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[252] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[253] Southern Sun Hotel Interests (Pty) Ltd. 2002.
[254] International Hotels Environment Initiative (1996:108)
[255] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[256] South Africa. Occupational Health and Safety Act, No. 85 of 1993.
[257] SABS 690. 1975.
[258] SABS 1774. 1998.
[259] SABS 1650. 1995.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – operating air-conditioners	Possible release of ozone-depleting refrigerant	Ozone depletion by CFCs	1. South Africa signed the Montreal protocol in 1990 and is required to reduce CFC emissions. 2. The International Hotels Environment Initiative[262] indicates that air conditioning units should be leak-tested frequently. 3. Refrigerant should be recovered when loss occurs during maintenance operations. 4. Refrigerants with lower ozone-depletion potential (ODP) should be used if possible. 5. More efficient equipment should be purchased when replacing old units.	DEAT, Directorate Air Quality Control	Atmospheric Pollution Prevention Act[261] Montreal Protocol
Facility – operating air-conditioners	Transmission of viruses and bacteria	Contamination of internal air quality	1. According to International Hotels Environment Initiative (IHEI)[263] internal air quality should be screened for dust particles, *Legionella pneumophilia*, nicotine, organics and formaldehyde. Precautions against *Legionella pneumophilia* (Annexure G) have been listed by the IHEI[264]. 2. Cooling towers should be provided with water treatment to prevent bacterial infection. 3. Cooling tower exhaust must be relocated if close to an inlet vent or a closed system should be implemented.	Department of Health	Occupational Health and Safety Act[265]
Facility – operating air-conditioners	Warm air returned to external air	Waste heat that affects microclimate	1. Newer air-conditioning models operate more efficiently and emit less waste heat to the atmosphere. 2. Planting could be adapted where warm air is expelled to benefit from this warmer air.	None at present	
Activity – operating fireplaces in winter	Release of particulates, CO and CO_2 through burning of fossil fuels	Contamination of external air quality with greenhouse gases	1. The IHEI[266] recommends that fossil fuels should be replaced by gas where possible. 2. Switching to gas-operated fireplaces could reduce fossil fuel emissions.	DEAT, Directorate Air Quality Control	Atmospheric Pollution Prevention Act, No 45 of 1965

[260] SABS 087. 1975.
[261] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[262] International Hotels Environment Initiative (1996:117)
[263] International Hotels Environment Initiative (1996:121)
[264] International Hotels Environment Initiative (1996:121)
[265] South Africa. Occupational Health and Safety Act, No. 85 of 1993.
[266] International Hotels Environment Initiative (1996:130)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			3. Certified fireplaces are allowed to be operated in smoke-free zones declared under the Atmospheric Pollution Prevention Act[267].		
			4. Investigate convection heating as opposed to fireplaces.		
Facility – operating refrigeration units and ice machines	Possible release of ozone depleting refrigerants	Ozone depletion by CFCs	1. The IHEI[268] indicates that refrigeration units should be leak-tested frequently.	DEAT, Directorate Air Quality Control	Atmospheric Pollution Prevention Act, No 45 of 1965
			2. Refrigerant should be recovered when loss occurs during maintenance operations.		
			3. Refrigerants with lower Ozone Depletion Potential (ODP) should be used where possible.		
			4. More efficient equipment should be purchased when replacing old units.		
Service – housekeeping and maintenance using aerosol cans	Possible release of CFCs	Ozone depletion by CFCs	1. CFC propelled aerosol cans should not be purchased – most products on the market in South Africa are CFC free.	Montreal protocol - DEAT, Directorate Air Quality Control	
Emergency activity – dowsing a fire with CO_2 extinguishers	Possible release of CO_2 during use	Contamination of external air quality with greenhouse gases	1. CO_2 fire extinguishers are required where electrical machinery is housed. Storage and operation in accordance with SABS 1151[269].	Local fire department	Occupational Health and Safety Act[270]
			2. Use powder-based extinguishers elsewhere. Storage and operation in accordance with SABS 810[271].		
			3. Check extinguishers monthly and test CO_2 extinguishers hydrostatically every five years.		
Service – providing carbonated drinks at the bar	Release CO_2 during operation	Release of greenhouse gases	1. Purchase carbonated drinks in cans where possible – reduces the risk of leaks from gas bottles.		
			2. Test dispensers monthly for leaks and service regularly.		
Accidental activity – spilling chemicals or cleaning agents	Harmful vapours released to air	Contamination of air with possible noxious or corrosive gases	1. Chemicals stored in well-ventilated areas.	Occupational Health and Safety Act[272]	
			2. Safety clothing to be provided when working with corrosive or dangerous chemicals		

[267] South Africa. Atmospheric Pollution Prevention Act, No. 45 of 1965.
[268] International Hotels Environment Initiative (1996:107)
[269] SABS 1151. 1992.
[270] South Africa. Occupational Health and Safety Act, No. 85 of 1993.
[271] SABS 810. 1992.
[272] South Africa. Occupational Health and Safety Act, No. 85 of 1993.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			3. Emergency procedures displayed visibly		
Service – courtesy vehicle	Noxious gases emitted during operation	Contamination of air with greenhouse gases	1. Barnard[273] recommends the encouragement of the development of energy efficient engines. 2. Use of catalytic converters should be made compulsory. 3. The development of alternative energy sources for fuel should be supported. 4. The International Hotels Environment Initiative[274] recommends a change to lighter, smaller cars that consume less fuel.	Local Authority and DEAT, Directorate Air Quality Control	
Service – operating boilers	Burning of fossil fuels (secondary impact) for energy	Contamination of air with particulates and CO_2	1. Search for alternative energy supply from renewable resources.		
Facility – fuel storage area	Accidental spill of fuel during filling of tank or vehicles	Contamination of air with CO_2, NO_x, SO_x	1. Ensure safe operation of filler hoses and training of staff operating with the equipment. 2. Where possible, issue personal protective clothing or equipment. 3. Draft and implement a spillage containment procedure.	Department of Health Department of Labour	Occupational Health and Safety Act[275]
Service – garden maintenance	Application of pesticides and herbicides	Contamination of air with harmful chemicals	1. Issue personal protective clothing to personnel 2. Ensure staff has undergone adequate training in the use of chemicals. 3. Do not apply in windy conditions.	Department of Health Department of Labour Department of Agriculture	Occupational Health and Safety Act[276] Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act[277]
Facility – sewage treatment plant	Odours released during natural break-down processes	Contamination of air with odours and gases	1. Ensure sewage treatment plant is located away and downwind from hotel. 2. Ensure regular checks on the system and replace outdated equipment	Department of Health	
Facilities – sewage treatment plant and water purification plant	Evaporation of chlorine during operation or leaking of chlorine gas from bulk storage vessel	Contamination of air with chlorine	1. Ensure sewage treatment and water purification plants are located away and down wind from hotel. 2. Utilise minimum chemicals as necessary to maintain optimum chemical balance.	Department of Health Department of Labour	Occupational Health and Safety Act[278]

[273] Barnard. 1999.
[274] International Hotels Environment Initiative (1996:130)
[275] South Africa. Occupational Health and Safety Act, No 85 of 1993.
[276] South Africa. Occupational Health and Safety Act, No 85 of 1993.
[277] South Africa. Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, No. 36 Of 1947.
[278] South Africa. Occupational Health and Safety Act, No 85 of 1993.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			3. Ensure necessary safety procedures and measures are operational for chlorine gas storage vessel 4. Regularly check and service bulk gas storage vessel		
Facility – swimming pool	Evaporation of chlorine	Contamination of air with chlorine	1. Investigate option to switch to salt chlorinator. 2. Utilise minimum chemicals as necessary to maintain optimum chemical balance.	None at present	
Facility – waste yard	Burning of domestic waste in rural areas	Contamination of air with particulates and noxious gases	1. Prevent burning of domestic waste where possible. 2. Where no domestic waste removal service is provided, manage own landfill site in accordance with Department of Water Affairs and Forestry[280] guidelines and recycle as far as possible.	DEAT Local Authorities Department of Water Affairs and Forestry	Atmospheric Pollution Prevention Act, No 45 of 1965 Local by-laws Minimum requirements for waste disposal by landfill[279]

[279] Department of Water Affairs and Forestry. 1998. (a)
[280] Department of Water Affairs and Forestry. 1998. (b)

b) Releases to water

The International Hotels Environment Initiative (IHEI)[281] indicates that the aim of hotels endeavouring to improve water quality should be to ensure that no environmental contamination takes place, or that environmental contamination is limited. A further aim is to minimise harmful effects such as corrosion, scaling and deposits to extend the life expectancy of the hotel's equipment and pipe systems. Chemicals are among the harmful substances that affect water quality. The IHEI[282] lists chemicals that are prohibited in countries around the world, but the document does not indicate which countries participate in the prohibition.

i. Prohibited chemicals for water treatment

Prohibited chemicals for water treatment listed by the IHEI[283] are chromates (used in cooling towers), hydrazines (used in boilers/water heaters) and amines (used in boilers) that are harmful when steam comes into contact with food.

ii. Prohibited pesticides

Prohibited pesticides listed by the IHEI[284] are DDT, endrin, arsenic, mercury, phosphorus, thallium sulphate, sodium fluoro acetate, chlordane, lindane, aldrin, dinosep, cyanit, methylbromide, carbacyl, anticoagulant concentrate, zinc phosphate concentrate and captafol (except Canker).

According to Barnard[285], the Water Quality Management Policies and Strategies in the RSA published by the Department of Water Affairs and Forestry (DWAF) in April 1991, aimed to address the decline in water quality in the country. The Water Quality Management Policies and Strategies state that the standard of effluent discharged into a water body should not reduce its usefulness to other users. Barnard[286] views this approach as addressing both point and non-point sources of pollution. The IHEI[287] states that sewage treatment plants primarily remove suspended and organic matter. The quality of the water released from sewage plants is governed by the requirements for the purification of wastewater or effluent as published by DWAF[288].

[281] International Hotels Environment Initiative (1996:91)
[282] International Hotels Environment Initiative (1996:92)
[283] International Hotels Environment Initiative. 1996.
[284] International Hotels Environment Initiative. 1996.
[285] Barnard. 1999.
[286] Barnard (1999:273).
[287] International Hotels Environment Initiative (1996:103).
[288] South Africa. 1984. Regulations R991. Requirements for the purification of wastewater or effluent. GG 9925.

Potential areas where hotels may impact on water quality are:

i. Through incorrect disposal of kitchen waste into sewer systems
ii. Overflowing grease traps
iii. Cleaning aids and chemicals washed into the sewer systems
iv. Contamination from releases from sewage treatment plants
v. Fertiliser washed into storm-water systems or streams
vi. Pesticides or herbicides washed into storm-water systems or streams
vii. At vehicle wash bays where oil and fuel may be washed into sewers or storm-water systems
viii. If backwash water from swimming pools is discharged into steams or storm-water systems

The management of the environmental impacts identified for operations in the hotel industry will be addressed in Table 30 on page 114.

Table 30: Management of releases to water

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – cleaning of kitchen	Incorrect disposal of kitchen wet-waste into sewage system	Contamination of surface water	1. The International Hotels Environment Initiative (IHEI)[289] warns against high volumes of organic waste disposed into the sewage system. Grease traps between disposal and sewage system will divide food waste and fat from liquid waste. 2. Clean grease traps regularly to avoid blockages and smells. 3. Dispose of contents of grease trap as separately bagged and not directly into compactor or waste bins. 4. Find source to utilise wet-waste from kitchens such as farmers for pig food to reduce waste.	Department of Health and Local Authority's Water and Waste Water Services	National Water Act[290]
Activity – cleaning of kitchen grease trap	Poor maintenance causing grease trap to overflow	Contamination of surface water	1. Clean grease traps regularly to avoid blockages and smells. 2. Dispose of contents of grease trap as separately bagged and not directly into compactor or waste bins. 3. Find source to utilise wet-waste from kitchens (such as farmers for pig food) to reduce waste.	Department of Health and Local Authority's Water and Waste Water Services	National Water Act[291]
Activity – cleaning during housekeeping activities	Chemicals washed into sewage system	Contamination of surface water	1. Chemicals purchased and used should be biodegradable. 2. Quantities of chemicals used should be sufficient for housekeeping purposes but not used in excess.	Department of Water Affairs and Forestry (DWAF)	National Water Act[292]
Activity – operating sewage treatment plant	Release of toxins, nutrients and pesticides into river if not operating correctly	Contamination of surface water	1. Sewage treatment plants should be maintained and serviced regularly to ensure optimum performance. 2. Discharge from sewage treatment plant should be tested monthly by independent laboratories and results monitored by relevant authorities.	DWAF Department of Health	Regulations R991[293]

[289] International Hotels Environment Initiative (1996:99)
[290] South Africa. National Water Act, No. 36 of 1998.
[291] South Africa. National Water Act, No. 36 of 1998.
[292] South Africa. National Water Act, No. 36 of 1998.
[293] South Africa. 1984. Regulations R991. Requirements for the purification of wastewater or effluent. GG 9925.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – operating sewage treatment plant	Heat released during chemical processes	Waste heat returned to river system and affecting microbiology	1. Sewage treatment plants should be maintained and serviced regularly to ensure optimum performance.	DWAF	Regulations R991[294]
Activity – maintenance of gardens	Extraction of borehole water for irrigation purposes	Reduction of groundwater as natural resource by excessive use	1. Existing boreholes must be registered with the Department of Water Affairs and Forestry(DWAF) in terms of the National Water Act[295]. 2. A license application for new boreholes must be submitted DWAF prior to the establishment of such a borehole.	(DWAF	National Water Act[296]
Activity – washing of guests' vehicles	Washing water contaminated with grease, oil, fuel and detergents into the stormwater system	Contamination of surface water	1. Wash bay or area should be fitted with a grease trap between the surface inlet and sewage system to separate oils and grease from water. 2. Soaps used to wash vehicles must be biodegradable.	None at present	
Service – maintenance of swimming pool	Backwash water released into stormwater system	Contamination of surface water	1. Adequate filtration of swimming pool water through planting prior to its release into streams or stormwater systems.	Local authority	
Facility – bare soil in gardens and maintenance areas	Stormwater runoff washing silt into streams	Contamination of surface water	1. Planting of bare soil areas in gardens and providing an impervious surface to maintenance areas where appropriate.	None at present	
Service – general maintenance	Accidental spillage of fuel or oil	Contamination of surface water	1. Ensure safety precautions are taken when transporting fuel or oil and all containers are closed. 2. Ensure safety precautions are taken at storage area, and spillage containment measures and bunded walls around fuel storage area are provided. 3. Any spill must be cleaned up immediately, affected water contained if possible, and treated with a chemical to break down oil or fuel.	DWAF	

[294] South Africa. 1984. Regulations R991. Requirements for the purification of wastewater or effluent. GG 9925.
[295] South Africa. National Water Act, No. 36 of 1998.
[296] South Africa. National Water Act, No. 36 of 1998.

c) Waste management

In the White Paper on Integrated Pollution and Waste Management for South Africa[297] it is stated that one of the aims of the government is to encourage the prevention and minimisation of waste. One of the objectives listed for the White Paper on Environmental Management Policy for South Africa[298] in terms of integrated pollution and waste management is:

> *To set targets to minimise waste generation and pollution at source and promote a hierarchy of waste management practices, namely reduction of waste at source, reuse and recycling with safe disposal as the last resort.*

Section 20 of the Environment Conservation Act[299] governs waste handling and disposal. The International Hotels Environment Initiative (IHEI)[300] recommends a waste management programme for hotels by conducting a waste review to determine the type and volume of waste produced, and to assess possibilities for reducing, re-using or recycling waste generated by hotels. In South Africa, recycling initiatives are becoming more accessible commercially and many recycling initiatives benefit previously disadvantaged individuals by providing a necessary income generated from the sale of recycled materials. Hotels should aim at reducing waste at source by separating re-usable and recyclable items from the waste stream prior to depositing waste in the waste yard or compactor.

In addition to managing and minimising domestic waste, hotels should identify and separate hazardous substances from the domestic waste stream. Even though hotels would not produce large quantities of hazardous waste, it is important to note the existence of such waste products and remove these substances from the domestic waste stream for separate, correct disposal. The Department of Water Affairs and Forestry (DWAF) published a series of documents entitled the Waste Management Series[301] in 1998. One of the documents addresses Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste[302]. In this document published by DWAF[303], four steps in the classification of hazardous waste are listed:

i. Identification of the waste or waste stream as potentially hazardous
ii. Testing and analysis to determine the hazardous properties, characteristics and components of a waste

[297] South Africa. White Paper on Integrated Pollution and Waste Management for South Africa. 2000.
[298] South Africa. White paper on Environmental Management Policy for South Africa. 28/08/1997.
[299] South Africa. Environment Conservation Act, No. 73 of 1989.
[300] International Hotels Environment Initiative (1996:18)
[301] Department of Water Affairs and Forestry. 1998. (a)
[302] Department of Water Affairs and Forestry. 1998 (a)
[303] Department of Water Affairs and Forestry 1998. (a:2-5)

iii. Classification and treatment in accordance with SABS 0228, 'The identification and Classification of Dangerous Substances and Goods'

iv. Analysis and Hazard Rating of the waste or its residue in order to determine the Hazard Rating and the Minimum Requirements for disposal

In SABS code 0228[304], the South African Bureau of Standards (SABS) classified hazardous wastes into 9 classes as outlined in Table 31.

Table 31: SABS Code 0228[305]. 'The Identification and Classification of Dangerous Goods and Substances'

Class	Description
CLASS 1	Explosives
CLASS 2	Gases (compressed under pressure)
CLASS 3	Flammable liquids
CLASS 4	Flammable solids or substances
CLASS 5	Oxidising substances and organic peroxides
CLASS 6	Toxic and infectious substances
CLASS 7	Radioactive substances
CLASS 8	Corrosives
CLASS 9	Other miscellaneous substances

In the Waste Management Series published by DWAF[306], it is stated that:

> *In many cases it will be a Minimum Requirement that waste be treated to reduce its hazardousness.*

Careful handling, collection, packaging, temporary storage and transportation of hazardous waste are essential for the maintenance of public health and environmental protection. Hazardous substances are also governed by the Hazardous Substances Act[307], which provides for the control of hazardous substances. The disposal of hazardous substances is controlled in terms of Section 20 of the Environment Conservation Act[308]. Both DWAF and the Department of Environmental Affairs and Tourism (DEAT) regulate waste management issues, but DWAF is more concerned with landfill management issues and potential groundwater contamination through such activities.

[304] SABS 0228. 1990.
[305] SABS 0228. 1990.
[306] Department of Water Affairs and Forestry. 1998 (a:2-6).
[307] South Africa. Hazardous Substances Act, No. 15 of 1973.
[308] South Africa. Environment Conservation Act, No. 73 of 1989.

Chemical disposal should also be undertaken with care and empty containers should not be disposed of into the domestic waste stream without neutralising the chemical. The International Hotels Environment Initiative (IHEI)[309] recommends a management practice for the handling of chemicals to achieve the following:

i. To ensure the storage, use and disposal of these chemicals safeguard health and the environment
ii. To assess other means of control
iii. To set a practice guideline relating to storage, preparation, application and disposal of chemicals

The management of the environmental impacts identified for operations in the hotel industry will be addressed in Table 32 on page 119.

[309] International Hotels Environment Initiative. (1996:165)

Table 32: Waste management

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – cleaning of kitchen	Disposal of unsorted waste and foodstuffs	Increased waste to landfill, contamination of land	1. The White Paper on Integrated Pollution and Waste Management[310] proposes to reduce waste, reuse items and recycle as much as possible. 2. Recycle items such as glass, paper, cardboard and aluminium cans. 3. Redistribute leftover foods to pig farmers or compost making organisations.	Department of Water Affairs and Forestry (DWAF) Department of Environmental Affairs and Tourism (DEAT)	The White Paper on Integrated Pollution and Waste Management
Activity – disposal of empty containers	Disposal of hazardous chemical containers	Contamination of land with hazardous waste	1. Empty chemical containers that contained corrosive substances (chemicals for dishwashers or toilet cleaners) must be separated from the domestic waste stream. 2. Where possible, an exchange programme with the chemical supplier to change empty containers for full containers should be initiated to reduce container waste. 3. Empty containers should be washed out prior to disposal and, if possible, punctured to prevent use as drinking water containers.	DWAF DEAT	Section 20 of the Environment Conservation Act[311]
Activity – garden maintenance	Removal of garden refuse to waste site	Increased waste to landfill	1. Garden refuse should be used for compost on either the property of the hotel or the property of the garden maintenance organisation. 2. Empty containers of pesticides and herbicides can now be recycled at garden centres supporting the National 'Save the wagtail' campaign[312].	DWAF DEAT	

[310] South Africa. 2000. The White Paper on Integrated Pollution and Waste Management for South Africa. GG 20978.
[311] South Africa. Environment Conservation Act, No. 73 of 1989.
[312] South African Landscapers Institute. 2002.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			3. Empty chemical containers should be washed out prior to disposal and, if possible, punctured to prevent use as drinking water containers.		
Activity – disposal of pool chemical containers	Disposal of hazardous chemical containers in domestic waste	Contamination of land with hazardous waste	1. Empty chemical containers that contained oxidising substances (bleaches and chlorine) must be separated from the domestic waste stream.	DWAF DEAT	Section 20 of the Environment Conservation Act[313]
Service – operating beauty salon	Disposal of hazardous chemicals in domestic waste	Contamination of land with hazardous waste	1. Empty chemical containers that contained corrosive substances (nail varnish remover, hair treatment products) must be separated from the domestic waste stream. 2. Where possible, an exchange programme with the chemical supplier to exchange empty containers for full containers should be initiated to reduce container waste. 3. Empty chemical containers should be washed out prior to disposal and, if possible, punctured to prevent use as drinking water containers.	DWAF DEAT	Section 20 of the Environment Conservation Act
Activity – managing waste yard/skip	Disposal of hazardous waste in domestic waste	Contamination of land with hazardous waste	1. Hazardous wastes must be identified and removed from the domestic waste stream and stored separately. 2. Hazardous wastes must be disposed of at DWAF approved disposal sites.	DWAF DEAT	Section 20 of the Environment Conservation Act
Activity – managing waste yard/skip	Foodstuff/wet-waste from kitchens in skip attracting vermin and pests	Health risk in spreading disease and vermin	1. Redistribute left-over foods to pig farmers or compost-making organisations. 2. Waste should not be allowed to remain in the waste yard for long periods as it attracts vermin and pests.	DWAF Department of Health DEAT	

[313] South Africa. Environment Conservation Act, No. 73 of 1989.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – managing waste yard/skip	Disposal of unsorted waste	Increased waste to landfill	1. In the White Paper on Integrated Pollution and Waste Management[314] the reduction of waste and maximal reuse and recycling of items are proposed. 2. Recycle glass, paper, cardboard and aluminium cans, etc.	DWAF DEAT	
Service – operating convenience store	Disposal of unsorted waste	Increased waste to landfill	1. In the White Paper on Integrated Pollution and Waste Management[315] the reduction of waste and maximal reuse and recycling of items are proposed. 2. Recycle glass, paper, cardboard and aluminium cans, etc.	DWAF DEAT	
Activity - general maintenance	Disposal of hazardous waste and building materials in domestic waste	Increased waste to landfill and contamination of land with hazardous waste	1. Hazardous wastes must be identified and removed from the domestic waste stream and stored separately. 2. Hazardous wastes must be disposed of at DWAF approved disposal sites.	DWAF DEAT	Section 20 of the Environment Conservation Act
Activity – general maintenance	Disposal of fluorescent light tubing in domestic waste	Contamination of soil and groundwater with hazardous waste	1. Separate fluorescent light tubing from domestic waste. 2. Take care not to shatter tubes in an unprotected area or near people. 3. Dispose of fluorescent tubes in custom made fluorescent tube dispensers.	DWAF DEAT	
Activity – cleaning of fireplaces	Disposal of ash in gardens	Contamination of soil	1. Dispose of ash in skip or waste bins and not onto soil.	None at present	
Activity – maintenance of vehicle fleet	Waste oil and lubricants disposed as domestic waste	Contamination of soil and groundwater with hazardous waste	1. Where possible, send vehicles to service yard for maintenance. 2. If vehicles are serviced on own property, drain oils and lubricants into containers for recycling.	DWAF DEAT	Section 20 of the Environment Conservation Act

[314] South Africa. 2000. White Paper on Integrated Pollution and Waste Management for South Africa. GG 20978.
[315] South Africa. 2000. White Paper on Integrated Pollution and Waste Management for South Africa. GG 20978.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			3. Do not dispose of used oil or lubricants into domestic waste, but store separately for recycling.		

d) Contamination of land

The use, storage and accidental spillage of chemicals, pesticides, herbicides and fuels have an impact on the soils the products are applied to. The International Hotels Environment Initiative (IHEI)[316] lists the storage of fuel and gas as a practice with risks to the environment. The use and storage of fuel in the hotel should be governed by a documented fuel storage practice, detailing the following:

i. Ensuring that there is no environmental contamination resulting from current practice
ii. Ensuring that future operations do not cause contamination
iii. Ensuring that, where necessary, all storage facilities are licensed and conform to local regulations
iv. Minimising the risk of fire
v. Preventing economic losses from product leakage or loss, or from the high cost of contamination clean-up

The South African Bureau of Standards (SABS) has published standard codes for the storage of liquid fuel in SABS 0131-1, 'The Storage and handling of liquid fuel Part 1: Small consumer installations', which would apply to the small volumes of diesel stored at hotels.

The use of pesticides and herbicides could contaminate the soil they are applied to and have secondary harmful effects on animals, birds or insects coming into contact with these chemicals. According to Fuggle and Rabie[317], insecticides, herbicides, fungicides, acaricides, nematicides and rodenticides are grouped under chemicals used to kill organisms threatening human well-being. Of these chemicals, pesticides and herbicides are used in the largest quantities and have the most severe impact on the environment. The IHEI[318] recommends a management practice for the use and storage of pesticides and herbicides that includes the following steps:

i. Identify the products used
ii. Establish whether these chemicals comply with local regulations
iii. Assess other means of control
iv. Set a practice guideline relating to storage, preparation and application of chemicals

In South Africa the 'Save the wagtail campaign'[319] has launched facilities for the disposal of used pesticides and herbicides and their containers at participating garden

[316] International Hotels Environment Initiative. (1996:150)
[317] Fuggle and Rabie. (2000:523)
[318] International Hotels Environment Initiative. (1996:165)
[319] South African Landscapers Institute. 2002.

centres in the country. This campaign is able to cope with small volumes only, but in most instances hotels would not store large volumes of pesticides or herbicides. The management of the environmental impacts identified for contamination of land by the hotel industry will be addressed in Table 33 on page 125.

Table 33: Management of contamination of land

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – soil left bare after construction	Stormwater runoff flowing over bare soil areas	Soil erosion	1. Plant vegetation to cover soil in garden areas. 2. Maintenance areas to be provided with impervious surfaces where appropriate.	Department of Agriculture	
Facility – poor stormwater management	Poor infiltration in clay areas	Water logging	1. Install subsurface drainage where required. 2. If volumes permit, incorporate harvesting of subsurface water for irrigation.	None at present	
Facility – hard surfaces in development	Increased stormwater runoff	Potential soil erosion	1. Ensure adequate planning of stormwater system to allow for energy dissipation at outlet of all stormwater before allowing surface flow. 2. Incorporate wetland or filtration planting at stormwater outlet to assist infiltration and energy dissipation.	None at present	
Activity – managing chemical storage area	Accidental spillage of chemicals such as pesticides, herbicides, bleaches, chlorine and acids	Contamination of land	Management practices recommended by the International Hotels Environment Initiative (IHEI)[320] for the control of chemicals. 1. Stores should be built to prevent foreseeable accidents, spills, leakage, fires and weather. 2. Stores should display warning signs without attracting unwanted attention. 3. Floors of stores should be impervious to liquid, anti-slip, chemically resistant, washable and with a means to divert spills. 4. Effective first-aid provision should be available.	Department of Agriculture	Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act[321]
Activity – managing fuel storage area	Accidental spillage of fuel or oil	Contamination of land	The IHEI[322] recommends spill prevention methods. 1. Secondary containment for underground tanks. 2. Overspill protection and recovery and disposal procedures for fuel spilled during filling. 3. Bunding for above ground tanks and recovery and disposal procedures for fuel collected in bunding.	SABS 0131-1 'The Storage and handling of liquid fuel Part 1: Small consumer installations' Local authority Department of Water Affairs and Forestry (DWAF)	

[320] International Hotels Environment Initiative (1996:166)
[321] South Africa. Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, No. 36 Of 1947.
[322] International Hotels Environment Initiative (1996:153)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – managing waste area	Storage of hazardous waste	Contamination of land	Storage methods proposed by the IHEI[323]: 1. Store in a cool place away from direct sunlight. 2. Store in a secure area on strong shelving and stacked to avoid toppling over. 3. Facilitate stock rotation in storage area. 4. Do not block accesses or corridors. 5. Emergency equipment should be available. 6. Chemicals should be isolated from each other. 7. Volatile chemicals and gas cylinders should be stored externally and secured correctly. 8. Material should be stored in properly labelled containers.	DWAF	
Activity – managing waste area	Storage of foodstuffs and wet-waste from kitchens	Contamination of land	1. Reduce food waste by redistribution to pig farmers or compost making organisations. 2. Waste area should be cleaned and waste removed regularly.	Department of Health	
Activity – garden maintenance	Accidental spillage of chemicals used in maintenance	Contamination of land	Recommendations by the International Hotels Environment Initiative (IHEI)[324] 1. Safe area for mixing and preparation of pesticides and other chemicals. 2. Operatives to be provided with equipment and protective clothing, and should be adequately trained in the use of the chemical. 3. Area of application should be clearly marked prior to commencement of application. 4. Only appropriate quantity of chemical removed from store. 5. Soil affected by accidental spill to be removed from the area and disposed of as part of hazardous waste. 6. Additional remedial treatment as recommended by the Material Safety Data Sheets should be applied.	Department of Agriculture	Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act[325]

[323] International Hotels Environment Initiative (1996:184)
[324] International Hotels Environment Initiative. (1996:170)
[325] South Africa. Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, No. 36 of 1947.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – general maintenance	Accidental spills of hazardous substances such as paints/oils	Contamination of land	Measures recommended by the IHEI[326] 1. Compile a hazardous materials manual addressing use, handling, storage and disposal. 2. Disposal and treatment of spills should occur as recommended by the manufacturer and displayed on the Material Safety Data Sheet. 3. Affected soil should be removed and disposed of as part of hazardous waste and the remaining soil treated as recommended by the manufacturer.	DWAF	
Service – operating beauty salon	Incorrect disposal of chemicals	Contamination of land	1. Corrosive or oxidising chemicals are classified as hazardous waste and such chemicals and their containers should be disposed of in accordance with hazardous waste practices.	DWAF	
Activity – housekeeping	Disposing of soapy water onto gardens after washing paved or tiled surfaces	Contamination of land	1. Housekeeping chemicals should not be disposed of onto soil or plants, but into a sewer if these are not corrosive or oxidising chemicals. 2. Chemicals should be well-diluted prior to disposal to reduce the concentration and potential reaction in the sewer system. 3. Hazardous chemicals should be disposed of as hazardous waste or as per manufacturer's instructions.	DWAF	
Facility – gravel footpaths in rural areas	Stormwater runoff flowing over bare soil areas	Soil erosion	1. Ensure footpaths are maintained and erosion corrected as soon as it occurs. 2. Provide a stabilising additive to the soil to prevent erosion (such as soilcrete).	None at present	
Facility – informal parking area on bare soil	Oil or fuel leaks from vehicles	Contamination of land	1. Provide parking on impervious surfaces where possible. 2. Provide adequate fuel separators at storm-water grids on parking area. 3. If no other alternative is possible, clear all affected soil as soon as possible after spillage of oil or fuel and treat with an applicable chemical to neutralise or disperse the fuel or oil. 4. Dispose of affected soil as hazardous waste.	DWAF	

[326] International Hotels Environment Initiative (1996:184)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – kitchen grease trap	Contents of grease trap disposed into domestic waste or buried on site	Contamination of land	1. Clean grease trap regularly once a week. 2. Dispose of contents of grease trap in double sealed bags separate from domestic waste. 3. Investigate biological additives to the grease trap to assist in breaking down grease.	DWAF	

e) Use of raw materials and natural resources

The extraction of borehole water is governed by the National Water Act[327], requiring registration of existing boreholes and application for permits with the Department of Water Affairs and Forestry when new boreholes are planned. In the National Environmental Management Act (NEMA)[328] it is prescribed:

> *…that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.*

Where hotels are located in areas of sensitive habitats or pristine vegetation, the principle of sustainable development as given above shall be applied as far as possible. According to Fuggle and Rabie[329], South Africa is one of the countries with the highest biodiversity in terms of plant life. They maintain that this places a responsibility on South African citizens to conserve this resource. Conservation also relies on the protection of the natural vegetation against invasion by noxious plants. In the amended Regulations 15[330] categories 1 to 3 of declared weeds and invader plants and requirements for eradication and control of these weeds and invaders are listed under the Conservation of Agricultural Resources Act [331].

The International Hotels Environment Initiative (IHEI)[332] lists recommendations for energy and water conservation, but according to the IHEI, the objective of hotels should still be to provide a comfortable environment for guests. New buildings can be designed to incorporate equipment that is energy and water efficient, but older buildings have to be operated efficiently to ensure a reduction in the wastage of energy and water. Older buildings can be adapted during refurbishment programmes to include energy efficient equipment, energy efficient lighting, flow restrictors on taps and water-efficient equipment. The management of the environmental impacts identified for management and use of raw materials and natural resources in the hotel industry will be addressed in Table 34 on page 130.

[327] South Africa. National Water Act, No. 36 of 1998.
[328] South Africa. National Environmental Management Act, No. 107 of 1998.
[329] Fuggle and Rabie. (2000:212)
[330] South Africa. Regulations R15. Declared Weeds and Invader Plants. 08/03/2001.
[331] South Africa. Conservation of Agricultural Resources Act, No. 43 of 1983.
[332] International Hotels Environment Initiative (1996:47)

Table 34: Management of the use of raw materials and natural resources

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – uncontrolled access into an ecologically sensitive area	Potential damage to sensitive habitats	Loss of habitat and biodiversity	1. Provide controlled access into sensitive habitats such as walkways with information boards for use by guests. 2. Ensure no access is allowed off the pathways into natural areas.	National Department of Environmental Affairs and Tourism (DEAT), Biodiversity and Heritage branch	National Environmental Management Act (NEMA)[333]
Activity – establishment or extensions of gardens	Clearing of indigenous vegetation	Loss of habitat and biodiversity	1. Biodiversity preservation is one of the principles of sustainable development[334] and as little as possible of the natural vegetation should be disturbed during establishment or extension of gardens. 2. If disturbance cannot be avoided, remediation of the impact by rehabilitation of the affected area should be undertaken. 3. Rehabilitation should involve the replanting of endemic or indigenous vegetation as far as possible.	DEAT, Biodiversity and Heritage branch	
Activity – establishment or extensions of gardens	Planting exotic vegetation	Loss of habitat and biodiversity	1. Exotic vegetation may have an adverse effect on the natural vegetation of the area and may even include declared weeds or invader plants[335]. 2. Rehabilitation should involve the replanting of endemic or indigenous vegetation as far as possible.	DEAT, Biodiversity and Heritage branch	
Activity – incorrect garden maintenance procedures	Declared invasive exotic species allowed to proliferate	Loss of biodiversity	1. Declared weeds or invader plants under the Regulation 15[336] of the Conservation of Agricultural Resources Act must be eradicated or treated in accordance with the legislation.	Department of Agriculture	Regulation 15[337] of the Conservation of Agricultural Resources Act[338]
Service – provision of wood-burning fireplaces	Reduction of natural resource through use of indigenous wood for fireplaces	Loss of biodiversity and natural resources	1. Where possible, the International Hotels Environment Initiative (IHEI)[339] recommends a switch from fossil fuels to renewable energy resources. 2. The current activities in support of eradication of invasive exotic trees in South Africa provides firewood from exotic trees as a replacement for indigenous wood.	DEAT, Biodiversity and Heritage branch	

[333] South Africa. National Environmental Management Act, No. 107 of 1998.
[334] South Africa. National Environmental Management Act, No. 107 of 1998.
[335] South Africa. Declared Weeds and Invader Plants. Regulations R15. 08/03/2001.
[336] South Africa. Declared Weeds and Invader Plants. Regulations R15. 08/03/2001.
[337] South Africa. Declared Weeds and Invader Plants. Regulations R15. 08/03/2001.
[338] South Africa. Conservation of Agricultural Resources Act, No. 43 of 1983.
[339] International Hotels Environment Initiative (1996:130)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – provision of golf courses	Planting exotic lawns and plants where indigenous vegetation has been cleared	Loss of biodiversity	1. Biodiversity preservation is one of the principles of sustainable development[340] and as little as possible of the natural vegetation should be disturbed during establishment or extension of gardens. 2. If disturbance cannot be avoided, remediation of the impact by rehabilitation of the affected area should be undertaken. 3. Rehabilitation should involve the replanting of endemic or indigenous vegetation as far as possible.	Provincial Environmental Authority	
Facility – curio shop	Reduction of natural resource through use of indigenous wood for the production of African art items	Loss of biodiversity	1. Cultural education in the value of indigenous vegetation must be implemented to reduce the use of indigenous wood. 2. The current activities in support of eradication of invasive exotic trees in South Africa provide wood from exotic trees as a replacement for indigenous wood.	DEAT, Biodiversity and Heritage branch	
Service – provide catering, meals and drinks	Utilising energy (electricity)	Use of natural resource	Recommendations by the IHEI[341] to reduce energy use 1. Use the cheapest energy source for cooking and dishwashing. 2. Centralise kitchen operations. 3. Shut equipment off when not in use. 4. Match equipment operation to needs/demands. 5. Operate all equipment with maximum efficiency and do not leave operating equipment open, thus reducing heat loss. 6. Locate heating equipment together, away from cooling equipment.	None at present	
Activity – washing dishes in kitchen	Utilising water	Use of natural resource	Recommendations by the IHEI[342] to reduce water use 1. Shut off booster of dishwashers automatically by a solenoid valve when equipment is not in use. 2. Operate equipment at full capacity – use dishwashers only when full.	None at present	
Service – supplying fresh produce, cold drinks, etc	Utilising energy (electricity)	Use of natural resource	Recommendations by the IHEI[343] to reduce energy use	None at present	

[340] South Africa. National Environmental Management Act, No. 107 of 1998.
[341] International Hotels Environment Initiative (1996:47)
[342] International Hotels Environment Initiative (1996:65)
[343] International Hotels Environment Initiative (1996:66)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
			1. Turn off lights in cold storage rooms when not in use. 2. Ensure all doors close/seal properly. 3. Keep coils free from ice build-up and service regularly to ensure optimum efficiency. 4. Set defrost cycles not to coincide with peak demand. 5. Do not place warm food in cold storage rooms and place cold or frozen foods in storage immediately. 6. Ensure optimum air circulation in cold storage rooms.		
Activity – lights left on when guests are not in rooms	Utilising energy (electricity)	Use of natural resource	The IHEI[344] recommends the interface of air-conditioning in guest rooms and power supply through a Building Automation System. 1. If this cannot be implemented, simply switching off lights and air-conditioning when rooms are not in use will assist in savings. 2. Guest awareness could be raised in the conservation of natural resources. 3. Change lighting to energy efficient equipment and install dimmers where possible.	None at present	
Activity – taps left dripping and guests using too much water	Utilising water	Use of natural resource	1. Housekeeping monitoring and closing dripping taps will assist in reducing water use. 2. Guest awareness could be raised in the conservation of natural resources. 3. Thorough maintenance of all taps in hotel	None at present	
Service – laundering of clothes, towels and linen	Utilising energy and water	Use of natural resources	The IHEI[345] makes recommendations for the saving of water and energy in laundries. 1. Adapt laundry operating hours to actual operational needs. 2. Keep sufficient stock of linen to avoid excessive washing. 3. Modify laundry operation to actual loads. Operate equipment at fully loaded capacity. 4. Repair leaks of water or steam immediately. Service equipment regularly to ensure optimum operation.	None at present	
Service – providing hot water for guests and	Utilising energy (electricity)	Use of natural resource	The IHEI[346] makes recommendations for efficient operation of water heaters.	None at present	

[344] International Hotels Environment Initiative (1996:58)
[345] International Hotels Environment Initiative (1996:66)
[346] International Hotels Environment Initiative (1996:60)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
water for guests and kitchen			1. Maintain water heaters at optimum condition and ensure that heating is at the most cost effective temperature while ensuring guest comfort. 2. Convert to a closed water circulation system if possible. 3. Operate heating outside peak demand periods to reduce cost. 4. Operate water heaters at optimum temperature considering temperature loss throughout hotel. Avoid excessive heating of water. 5. Investigate alternative energy sources such as solar power		
Service – providing air-conditioning	Utilising energy (electricity)	Use of natural resource	The IHEI[347] makes recommendations for efficient operation of air conditioning systems. 1. Adjust air-conditioning temperatures at night to reduce demand. 2. Isolate areas not in use by switching off air-conditioning in these areas. 3. Ensure chillers or cooling towers operate at maximum efficiency and are serviced regularly. 4. Ensure that there is as little as possible infiltration of external air when operating air-conditioning.	None at present	
Activity – irrigating gardens	Utilising water	Use of natural resource	1. Set irrigation system to operate at times of least evaporation. 2. Adjust irrigation system to summer and winter cycles to ensure optimum but not excessive irrigation. 3. Install rain metres to switch off irrigation system when it rains or manually override the system	None at present	
Activity – topping up swimming pool	Utilising water	Use of natural resource	1. Ensure no leaks occur from the swimming pool. 2. Discourage guests splashing water excessively, increasing water loss from the swimming pool.	None at present	
Service – provision of sauna and steam baths	Utilising water and energy (electricity)	Use of natural resources	1. Ensure equipment operates efficiently and is serviced regularly. 2. Switch equipment off when not in use.	None at present	
Activity – irrigating gardens	Re-use grey water for irrigation	Possible saving of water	1. Investigate areas for grey water harvesting such as problematic groundwater in basement, or other areas or stormwater runoff, or backwash water from swimming pool.	None at present	

[347] International Hotels Environment Initiative (1996:57)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Facility – development affected by floodlines	Potential damage to structures and danger to guests	Economic loss and safety risk	1. Ensure no new development takes place below the 1:100 year floodline. Older developments must be above the 1:50 year floodline.	Department of Water Affairs and Forestry (DWAF)	National Water Act[348]
Facility – potable water quality	Quality of water for use as drinking water (purification required)	Health issues	1. Regular tests of potable water by independent laboratories. 2. Initiate water purification where required in accordance with World Health Standards for potable water.	Department of Health. DWAF	
Facility – irrigation water quality	Quality for use as irrigation water	Health issues	1. If water used for irrigation is non-potable, ensure there is no means for contamination of potable water source with irrigation water. 2. Ensure all irrigation water points are marked non-potable water.	Department of Health. DWAF	
Facility – water supply	Excessive use of potable water for irrigation and operation of hotel	Depletion of natural resource	1. Ensure water saving initiatives are implemented where possible. 2. Reduce wastage by regular maintenance of all facilities. 3. Ensure irrigation system is set for optimum precipitation and prevent over-watering. 4. Ensure the irrigation system has an override switch or rain sensor to stop irrigation during rain.	None at present	
Facility – sewage treatment plants	Pumping of water during treatment process	Utilising energy (electricity) and water	1. Ensure the treatment plant operates at maximum efficiency and service regularly to ensure no excessive electricity or water is used.	None at present	
Facility – sewage treatment plant	Risk of discharge into wetland systems	Contamination of sensitive habitat and loss of biodiversity	1. Ensure placement of outlet of effluent into river is located away from sensitive wetland systems. 2. Allow for adequate filtration of sewage effluent prior to discharge into wetland or river. 3. Ensure optimum operation of system and regular testing by independent laboratories.	DWAF DEAT, Biodiversity and Heritage branch.	
Facility – water abstraction from stream	Pumping water from the steam	Utilising energy and water	1. Ensure a water saving programme is in place to minimise use of water throughout the facility 2. Ensure water is only pumped for demand and no excessive volumes are abstracted 3. Ensure a permit is obtained to allow abstraction of water.	DWAF	National Water Act[349]
Facility – water features and swimming pool	Pumps circulating water in features	Utilising energy	1. Ensure an energy efficient pump is installed. 2. Service pumps regularly to ensure no wasting of electricity. 3. Operate during low-demand periods where possible to reduce cost of electricity.	None at present	

[348] South Africa. National Water Act, No. 36 of 1998.
[349] South Africa. National Water Act, No. 36 of 1998.

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – establishment of gardens	Change in ecological character of the area	Loss of biodiversity	1. Select vegetation carefully to retain biodiversity. 2. Plan gardens carefully to limit disturbance of pristine areas.	DEAT, Biodiversity and Heritage branch	
Activity - operating elevators	Utilising energy (electricity)	Use of natural resources	1. Ensure elevators are serviced regularly to ensure optimum performance. 2. Ensure latest technology is used where possible to lower energy demand.	None at present	

f) Other local environmental and community issues

In the White Paper on the Development and Promotion of Tourism in South Africa[350] it is stated that local communities have not been involved in the tourism industry in the past, and unique opportunities for the previously neglected local communities to become involved in the tourism industry are listed. Other environmental issues falling under this heading are light and noise pollution. Fuggle and Rabie[351] define noise as undesirable sound and classify effects of noise as physical effects, physiological effects and effects on communication and productivity. Sound is measured in decibels (dB) and 0dB is defined as the start of the decibel scale for sound.

Table 35: Noise levels to be expected in certain typical environments[352]

Noise Level dBA	Typical environment	Subjective description
140	30m from jet aircraft during take-off	Unbearable
120	Large diesel power generator	
100	Printing press room	Very noisy
90	7m from heavy truck, 5m from pneumatic drill	
70	Blaring portable radio	Noisy
60	Supermarket	
50	Day conditions in average home	Quiet
40	Night conditions in average home (urban)	
20	Background in professional recording studio	Very quiet
0	Threshold of normal hearing	

The Occupational Health and Safety Act[353] defines noise pollution as 65dB at a distance of 1m from source. The use of personal protective equipment in the event of noise generated by equipment exceeding this level is required. Fuggle and Rabie[354] point out that the Environment Conservation Act[355] makes specific provision for the issuing of regulations with regard to noise. These regulations pertain mostly to industrial noise. The International Hotels Environment Initiative (IHEI)[356] recommends that noise from equipment and facilities in the hotels be reduced. The management of the environmental impacts identified for local environmental and community issues will be addressed in Table 36 on page 137.

[350] South Africa. White Paper on the Development and Promotion of Tourism in South Africa. 1996.
[351] Fuggle and Rabie. (2000:571)
[352] Fuggle and Rabie. (2000:573)
[353] South Africa. Occupational Health and Safety Act, No. 85 of 1993.
[354] Fuggle and Rabie. (2000:579)
[355] South Africa. Environment Conservation Act, No. 73 of 1989.
[356] International Hotels Environment Initiative. (1996:147)

Table 36: Management of other local environmental and community issues

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – employment of local community	Increased income in local community	Economic upliftment	1. Hotels could outsource services such as housekeeping, courtesy vehicles, laundry services, game drives or the management of recreation activities to local community members or organisations.	None at present	
Activity – employment of local community	Economic upliftment	Improved housing and education levels	1. Increased income channelled to the local community will assist in providing better income and a general improvement in education and housing standards.	None at present	
Activity – management support of environmental awareness programmes	Improved environmental awareness	Positive environmental impact	1. Hotels should assist and support environmental awareness programmes initiated by staff or the local communities surrounding the hotel.	None at present	
Activity – community liaison	Hotel providing charity or education drives	Local community benefit	1. Local community members could attend environmental or other training programmes for upliftment. 2. Hotels should select local charity organisations to support with blankets, condemned linen, food distribution or financial assistance.	None at present	
Facility – hotel is different from surrounding land uses	Potential to initiate similar development	Local community benefit	1. The local community will benefit from added employment opportunities and local purchasing initiatives of additional tourism and hotel facilities in the area.	Local Development Objectives and Local Authorities	
Facility – hotel is located in a high crime risk area	Potential safety risk to guests	Safety issues	1. Ensure security is on duty at all entry points at all times, provided with panic buttons linked to armed response units and in radio communication. 2. Ensure surveillance of premises with cameras. 3. Ensure guests are aware of safety hazards and take precautions against snatch and grab incidents. 4. Form a community watch to prevent criminals from running riot in the area.	Local police	
Activity – sourcing local communities for employment	Employing local people, outsourcing services to local organisations, local purchasing	Local community benefit	The White Paper on the Development and Promotion of Tourism in South Africa[357] lists categories where the local community could be involved or employed namely: 1. Operators of tourism infrastructure 2. Services to the industry 3. Suppliers to the industry	None at present	
Service – provide illumination on external areas for safety and	Visual intrusion of/excess illumination	Light pollution	1. Ensure lights do not disturb oncoming traffic on adjacent roads.	None at present	Local by-laws

[357] South Africa. White Paper on the Development and Promotion of Tourism in South Africa (1996:8)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
external areas for safety and marketing			2. Ensure lights do not disturb neighbours. 3. Ensure lights do not disturb guests in rooms.		
Facility – hotel located near other developments with floodlights	Floodlights shining into guest rooms	Light pollution	1. Ensure neighbour liaison is of such a nature that requests to modify floodlights in adjoining properties can be made. 2. Provide dark curtain linings in guest rooms.	Local Authority	Local by-laws
Facility – hotel located near busy roads, railway lines or airports	Noise disturbing guests	Noise pollution	1. During refurbishment, investigate double glazing and thicker carpeting to absorb sounds.	Local authority	Local by-laws
Facility – outdoor entertainment facilities	Excessive noise from outdoor entertainment	Noise pollution	The International Hotels Environment Initiative (IHEI)[358] makes recommendations to reduce noise disturbance. 1. Evaluate effects of noisy functions on guest-room sound levels. 2. Consider relocating or eliminating disturbing night clubs. 3. Set schedules for maximum sound levels for music entertainment in public areas.	Local authority	Local by-laws
Facility – outdoor sports facility	Excessive noise from outdoor sports activities	Noise pollution	1. Set times/schedules when outdoor facilities may be used. 2. Ensure location is away from guest rooms to minimise noise.	Local authority	Local by-laws
Activity indoor functions	Excessive noise from music or PA system	Noise pollution	The IHEI[359] makes recommendations to reduce noise disturbance. 1. Determine maximum sound levels allowed internally on guest floors. 2. Determine necessity of public paging and set restrictions for time of day and location. 3. Guests can be contacted by telephone in rooms and staff can be contacted by radios or cellular phones instead of using public paging systems.	Local authority	Local by-laws
Activity – loud maintenance activities	Excessive noise from activities such as edge trimming, lawn mowing or drilling	Noise pollution	1. Plan timing of maintenance activities to occur in times where guests are busy with recreation activities or between check-in and check-out times.	Local authority	Local by-laws
Activity – event or function held at hotel	Increased traffic and congestion in local road network	Traffic impact	1. Arrange traffic management by local traffic police in advance of the event. 2. Plan the time of the event so as not to cause additional traffic congestion during peak traffic periods. 3. If possible, provide alternative routes for visitors or patrons to reduce congestion on main routes.	Local traffic department	

[358] International Hotels Environment Initiative. (1996:143)
[359] International Hotels Environment Initiative. (1996:143)

Activity, facility, product, service or condition	Aspect	Impact	Management	Responsible authority	Applicable legislation
Activity – uncontrolled access to culturally or archaeologically sensitive site	Uncontrolled movement causing potential damage	Potential damage to artefacts	1. Provide controlled access and walkway areas to and in the area and prevent people from leaving demarcated walking areas. 2. Provide adequate guides to the facility. 3. Provide surveillance by people and cameras.	South African Heritage and Resource Agency	National Heritage Resources Act[360]
Activity – uncontrolled access to sites of architectural interest	Uncontrolled movement causing potential damage	Potential damage to structures	1. Provide controlled access and walkway areas to and in the area, and prevent people from leaving demarcated walking areas. 2. Provide adequate guides to the facility. 3. Provide surveillance by people and cameras.	South African Heritage and Resource Agency	National Heritage Resources Act[361]
Facility – hotel visible from surroundings	New buildings visible in natural surrounding landscape	Visual intrusion	1. Ensure building colours blend in with surrounding landscape. 2. Ensure height restrictions are not exceeded and facility does not protrude beyond the natural horizon. 3. Ensure lights and architectural style blends with surrounding area.	Local Development Objectives, Local Authority	
Facility – architectural style of hotel	Architectural style not blending in with the surroundings	Visual pollution	1. New additions should match existing building style. 2. Colours should blend in with the surroundings. 3. Architectural style should not be intrusive or should match existing character of the area. 4. Ensure height restrictions are not exceeded and facility does not protrude beyond the natural horizon.	Local Development Objectives, Local Authority	

[360] South Africa. National Heritage Resources Act, No. 25 of 1999
[361] South Africa. National Heritage Resources Act, No. 25 of 1999

4.7 Implementation and operation of the Environmental Management System

In SABS ISO 14001[362], it is stated that the organisation should develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets, to ensure that the implementation of the Environmental Management System (EMS) is effective. Therefore, the top management of the hotel or group of hotels should assess its staff capacity and skills to ensure that the EMS is implemented effectively. In SABS ISO 14004[363] it is further indicated that the implementation of Environmental Management could be approached in stages, based on the level of awareness of environmental requirements and available resources in the organisation. The aspects discussed in this section of the SABS ISO 14004[364] are:

1. Ensuring capability
2. Support action

4.7.1 Ensuring capability

Issues for ensuring capability are listed in SABS ISO 14004[365] as

a) Human, physical and financial resources
b) EMS alignment and integration
c) Accountability and responsibility
d) Environmental awareness
e) Motivation and knowledge, skills and training

Each of these issues will be briefly addressed here.

a) Human, physical and financial resources

In SABS ISO 14004[366], it is indicated that appropriate resources in terms of human resources, physical resources such as facilities and equipment, and financial resources should be defined and made available to ensure the implementation and achievement of the environmental policies, targets and objectives set by the organisation. Physical and financial resources could limit the implementation of the EMS and may have to be phased in over a number of financial years. Once the necessary mitigatory actions required to minimise and manage the identified environmental impacts have been determined, the financial implications can also be

[362] SABS ISO 14001. 1996.
[363] SABS ISO 14004. 1996.
[364] SABS ISO 14004. 1996.
[365] SABS ISO 14004. 1996.
[366] SABS ISO 14004. 1996.

determined. Human resources should be allocated towards the implementation of the EMS, such as an environmental committee consisting of a combination of management, maintenance and housekeeping staff. This committee could be tasked with monthly targets during the phasing in of the EMS and once the system has been fully implemented, the committee could be responsible for the regular monitoring of the system.

b) Environmental Management System (EMS) alignment and integration

In SABS ISO 14004[367], it is recommended that the elements of the EMS should be so designed that they align and integrate effectively with existing management system elements. International trends indicate that safety, health and the environment are managed as one aspect of the management and operational structures of organisations. In South Africa, organisations are required to adhere to the Occupational Health and Safety Act (OHSA)[368], and should have reporting and monitoring structures in place to accommodate the implementation and management of these requirements. It should be relatively simple to incorporate an additional portfolio for environmental compliance into an existing committee at a hotel.

c) Accountability and responsibility

In SABS ISO 14004[369], it is recommended that the overall responsibility for the EMS should be assigned to a senior person, or persons, or functions in the organisation with sufficient authority, competence and resources to ensure that the system is implemented and managed effectively. If a post already exists for a risk manager or safety and health manager, this could be incorporated into his or her portfolio. If this portfolio is not assigned to a member of the hotel staff, the general manager must accept responsibility for the EMS. In SABS ISO 14004[370] it is further stipulated that employees at all levels should be individually accountable, within the scope of their responsibilities, for environmental performance in the support of the EMS. In hotels, this would be tiered down from the general manager so that the maintenance manager, chief housekeeper and head chef would each be responsible for individual components of the EMS and staff members could be allocated to assist in tasks to ensure compliance at all levels of the environmental management plan (EMP).

[367] SABS ISO 14004. 1996.
[368] South Africa. Occupational Health and Safety Act, No. 85 of 1993.
[369] SABS ISO 14004. 1996.
[370] SABS ISO 14004. 1996.

d) Environmental awareness and motivation

The responsibility for the building of environmental awareness and motivation of employees in implementing and managing the EMS rests with the top management of an organisation. The general manager of the individual hotel or the chief executive officer of a group of hotels is responsible for communicating the environmental policy to the employees and should display commitment to the environmental policy. This demonstration of commitment should cascade down to the management team and section heads, and finally to the employees in general. Displaying the environmental policy in prominent staff areas would assist in raising awareness along with training in aspects of the EMP.

In SABS ISO 14004[371] it is stated that:

> *It is the commitment of the individual people, in the context of shared environmental values that transforms an environmental management system from paperwork into an effective process. All members of the organisation should understand and be encouraged to accept the importance of achieving the environmental objectives and targets for which they are responsible and/or accountable.*

The recognition of achievements by employees and encouragement of suggestions in terms of the environmental objectives and targets of a hotel will motivate the employees of the hotel to support the EMS. Incentives such as 'Environmental champion of the month' or team competitions could assist in staff motivation to improve compliance with requirements and help bring about the principle of continual improvement as required by the EMP.

e) Knowledge and training

The employees of the hotel should be afforded the necessary training to achieve the environmental policies, objectives and targets established by the organisation. In SABS ISO 14004[372], it is recommended that employees receive training in the methods and skills to perform their required tasks efficiently and competently. Employees should also be informed of the impact their activities may have on the environment if their tasks are not performed correctly. Relevant training for general staff could range from waste recycling and management, to water and electricity conservation to handling of chemicals. Management personnel could be trained in

[371] SABS ISO 14004 (1996:16)
[372] SABS ISO 14004. 1996.

monitoring the management of the impacts of the hotel on the environment, implementation and regular monitoring of the EMS, and reporting procedures.

The knowledge required to achieve the environmental objectives and targets of the hotel should also be incorporated into the employment requirements of the hotel, particularly pertaining to personnel selection and the recruitment, training and development of skills and continuing education of employees. In SABS ISO 14004[373], it is also indicated that organisations using outsourced contractors to perform duties on their properties, should ensure that these contractors are informed of the environmental policy, targets and objectives, and have sufficient knowledge and training to perform their duties in an environmentally responsible manner. In hotels in particular, this would apply to outsourced housekeeping and maintenance companies.

4.7.2 Support action

Issues relating to the establishment of support action are listed in SABS ISO 14004[374] as:

a) Communication and reporting
b) EMS documentation
c) Operational control
d) Emergency preparedness and response

Each of these issues will be briefly addressed here.

a) Communication and reporting

Communication and reporting involves establishing processes of internal reporting and, if required, external reporting on the environmental activities of the hotel. This is done to:

i. Demonstrate the commitment to the environment by the management structure of the organisation
ii. Address concerns and questions regarding the environmental aspects of the organisation's activities, products or services
iii. Raise awareness of the environmental policy, objectives and targets of the organisation or hotel
iv. Inform internal and external parties about the EMS and performance of the organisation or hotel

[373] SABS ISO 14004. 1996.
[374] SABS ISO 14004. 1996.

In SABS ISO 14004[375] items that could be included in regular reports are listed, including the procedure for receiving and responding to employee concerns, the procedure for receiving and considering the concerns of other interested parties, and the procedure for communicating the environmental policy and performance of the organisation and the results from EMS audits and reviews communicated to all the appropriate people.

b) Environmental Management System (EMS) documentation

In SABS ISO 14004[376], it is stated that all operational processes and procedures should be defined, appropriately documented and updated as necessary.

The nature of the documentation can vary depending on the size and complexity of the organisation. Where elements of the EMS are integrated with an organisation's overall management system, the environmental documentation should be integrated into existing documentation. For ease of use, the organisation can consider organising and maintaining a summary of the documentation to:

- *collate the environmental policy, objectives and targets,*
- *describe the means of achieving environmental objectives and targets*
- *document key roles, responsibilities and procedures,*
- *provide direction to related documentation and describe other elements which are appropriate for the organisation's management system, where appropriate*
- *demonstrate that the environmental management system elements which are appropriate for the organisation are implemented*

The documentation of the EMS forms the basis for the effective monitoring and auditing of its implementation. Once all the targets and management procedures have been set, the documentation will become the most important aspect of the EMS.

c) Operational control

Operational control has to be established and maintained to ensure that the environmental policy, objectives and targets are achieved. The operations and activities relating to significant environmental impacts should be considered at this stage, and also when operational controls are developed or modified. Operational control in the case of hotels relates to the environmental impacts determined in item 4.4.1 a), but the significance of each of these impacts needs to be determined on a

[375] SABS ISO 14004.
[376] SABS ISO 14004 (1996:19)

site-specific basis by the hotel concerned. Operational control is implemented through the mitigation/management of the identified impacts, addressed in item 4.6.1.

d) Emergency preparedness

In SABS ISO 14004[377], it is indicated that emergency plans and procedures should be established to ensure appropriate responses to unexpected or accidental incidents. Procedures for dealing with environmental incidents and potential emergency situations should be defined and maintained. These procedures should be communicated to all employees of the organisation and should be easily accessible in case of emergency. The procedures should also be communicated to guests.

In SABS ISO 14004[378], it is stated that operating procedures and controls should include, where appropriate, the following:

i. Accidental emissions to the atmosphere
ii. Accidental discharges to water and land
iii. Specific environmental and ecosystem effects from accidental releases

When related to the hotel environment, accidental issues to be considered include accidental spills of chemicals, including pesticides, herbicide, cleaning agents and maintenance chemicals, accidental spills of fuel, fires and floods. The issues are summarised in Table 37.

Table 37:Environmental incidents and potential emergency situations to be considered for hotels

Environmental Incidents and emergency situations	Activity, facility or service where incident may occur	Environmental impact
Accidental spills of chemicals	1. Swimming pool	Emission to atmosphere and contamination of land, surface and groundwater
	2. Housekeeping	
	3. General maintenance	
	4. Application of pesticides and herbicides	
Accidental spills of fuel (diesel and oil)	1. General maintenance	Contamination of land, surface and groundwater
	2. Operation of back-up generator	
Fires	1. Kitchen – cooking activities	Danger to safety of guests and staff
	2. Maintenance yard	
	3. Guest rooms	
	4. Electrical equipment	
Floods	Structures near river/in floodlines	Danger to safety of guests and staff Damage to structures

[377] SABS ISO 14004. 1996.
[378] SABS ISO 14004. 1996.

4.8 Measurement and evaluation

In SABS ISO 14001[379], it is stipulated that an organisation should measure, monitor and evaluate its environmental performance. These are key activities that should ensure that the organisation is performing in accordance with its EMP and that it is implementing the SABS ISO 14001 principle of continual improvement. The activities for this section, as listed under SABS ISO 14004[380], are:

1. Measuring and monitoring of ongoing performance
2. Corrective and preventative action
3. EMS records and information management
4. Audits of the EMS

The activities are detailed in SABS ISO 14004.

The activities and environmental aspects as identified for hotels that must be mitigated/managed in the EMS, must be monitored regularly, reports should be submitted and remedial action (corrective and preventative action) should be undertaken prior to the next scheduled monitoring inspection. Monitoring should include measurement of the current performance of the hotel against the targets set in the environmental policy and detailed in the EMP under mitigatory measures for the identified environmental impacts. To facilitate this, baseline targets should be set against which the hotel could be measured or checked. Any deviations and shortcomings should be identified and corrective action taken. Monitoring also includes reporting of instances of non-performance such as spills or excessive use of natural resources.

In SABS ISO 14004[381], it is stated that, to implement measurement and evaluation, the following actions must be undertaken:

1. Reports should indicate performance during the previous monitoring event and list findings of the current monitoring
2. Monitoring should include ensuring that records are maintained and are accessible, legal aspects are kept current and adhered to, and communication channels are functioning
3. Auditing should occur less frequently. If regular monitoring takes place on a quarterly basis, auditing could be undertaken annually or bi-annually

[379] SABS ISO 14001. 1996.
[380] SABS ISO 14004. 1996.
[381] SABS ISO 14004. 1996.

The audit as required by SABS ISO 14004[382] may be completed by either internal or external auditors and should determine whether the EMS conforms to the planned arrangements, and has been properly implemented and maintained.

4.9 Review and improvement

In SABS ISO 14001[383] it is stated that:

> *An organisation should review and continually improve its environmental management system, with the objective of improving its overall environmental performance.*

In SABS ISO 14004[384], it is further indicated that periodic review should be undertaken by the management team of the hotel or group of hotels to ensure the continued suitability and effectiveness of the EMS. Depending on the management structure in the hotel or group of hotels, each manager should report on the appropriateness of the EMS in terms of his field of expertise, but group decisions should be taken where any changes are proposed. SABS ISO 14004[385] contains a list of items that should be included in the review of the EMS, including a review of the environmental objectives, targets and environmental performance, findings of the EMS audits and the evaluation of the suitability of the environmental policy. Where the findings of the environmental system audits highlight a particular area in the hotel where the implementation of the system has revealed shortcomings, the management review process could initiate additional training for staff members working in this area, or could initiate an incentive scheme to improve performance. According to SABS ISO 14004[386], continued improvement is achieved by continually measuring the environmental performance of the EMS against the environmental policy, objectives and targets of the hotel to identify opportunities for improvement.

4.10 Conclusion

It is the view of the author of this dissertation that an organisation that wishes to implement an ISO 14001 EMS should first undertake an environmental impact assessment to identify significant environmental impacts. Once this has been done, an EMP should be drafted that outlines the management and mitigation of these significant impacts. Subsequently, the mitigatory measures and implementation of these measures must be incorporated into the

[382] SABS ISO 14004. 1996.
[383] SABS ISO 14001. 1996.
[384] SABS ISO 14004. 1996.
[385] SABS ISO 14004. (1996:23)
[386] SABS ISO 14004. 1996.

SABS ISO 14001 process prior to setting targets against which performance can be measured.

Prior to the compilation of an EMS for a hotel, an initial review of the hotel or group of hotels should also be undertaken to assess the current level of environmental awareness and compliance with environmental standards in the hotel or group of hotels. The initial review could be undertaken along the categories identified under 'Environmental aspects' in SABS ISO 14001. Once the baseline has been established, it will assist the management team in planning for the necessary training and remedial action required to achieve the objectives and targets set as part of the implementation of the EMS.

The environmental impacts identified in Chapter Two can be managed by implementing changes to the operation of hotels. The management of these impacts can be included in the structure of an EMS as required by SABS ISO 14001. The third hypothesis, 'An informative guideline document can be compiled for use in the operational management of the hotel industry, by applying the principles and objectives of SABS ISO 14001 for Environmental Management', has been achieved successfully by the incorporation of the principle of mitigation of environmental impacts into the guidelines for the establishment of an EMS as required by SABS ISO 14001.

5 SUMMARY AND RECOMMENDATIONS

5.1 Conclusions of the study

In Chapter One the aims and objectives for the study were set, namely to investigate the potential impacts of hotels on the environment and to formulate a guideline document for mitigating these environmental impacts along the criteria set by SABS ISO 14001. The first hypothesis, 'The hotel industry impacts on the environment and these impacts can be identified and described', was proved correct in Chapter Two, which set out to identify all the activities, facilities and services offered by hotels that may impact on the environment, as well as all potential environmental impacts during the planning, construction, operational and decommissioning phases of a hotel. Environmental impacts of hotels for all four phases were identified in Chapter Two, according to the listed aspects as described in the *Guidelines for Report Requirements*[387], published as part of the Integrated Environmental Management (IEM) Procedure:

a) Location and context
b) Boundaries
c) The biophysical environment, which includes:
   climate, topography, geology, soil, hydrology, flora and fauna
d) The socio-economic environment, that includes:
   demographics, standard of living, employment levels, housing and education standards, services such as waste removal, infrastructure, energy and water supply, social infrastructure or community involvement, land use, access and circulation, local government and administration
e) The cultural and historic environment, which includes:
   areas of cultural or archaeological interest, areas of architectural interest, visual impact
f) Other aspects of particular significance or value, such as noise pollution
g) Specialist reports where the document produced by the International Hotels Environment Initiative (IHEI)[388] was located and incorporated into the study

These identified potential environmental impacts were narrowed down to operational environmental impacts only and assessed in terms of their significance for two of the three hotels selected for the case studies. The assessment of the significance of these environmental impacts indicated that potential environmental impacts for the operational

[387] Department of Environmental Affairs and Tourism. 1992. (b)
[388] International Hotels Environment Initiative. 1996.

phase of hotels exist with varying levels of significance, depending on the location and type of facilities offered at a specific hotel. From the environmental impacts identified in Chapter Two, it can be concluded that hotels have activities, facilities and services in their operational phase that may have significant impacts on the environment.

The second hypothesis, 'Guidelines for Environmental Management exist and are further expressed in the guidelines and principles of the ISO 14000 series', was proved correct in Chapter Three, which set out to identify the principles of Environmental Management and to further define these requirements in terms of the requirements of an ISO 14001 Environmental Management System (EMS). SABS ISO 14001 includes sufficient information to guide the structuring of a guideline document for the establishment of an ISO 14001 EMS for the operation of hotels. The requirements for an ISO 14001 EMS include:

a) The publication of an environmental policy
b) The setting of goals and objectives
c) The implementation of the EMS
d) Checking and corrective action through monitoring and measurement
e) The compilation of a management review process

The findings of the research in Chapter Three concluded that sufficient information on the ISO 14001 EMS existed to compile a guideline document for the implementation of an ISO 14001 EMS for the hotel industry.

The third hypothesis, 'An informative guideline document can be compiled for use in the operational management of the hotel industry by applying the principles and objectives of ISO 14001 for Environmental Management', was proved to be feasible. The potential environmental impacts of the operational phase of hotels on the environment that were identified in Chapter Two could be classified into the required environmental aspects required for an ISO 14001 EMS. These environmental aspects, as described by SABS ISO 14001[389], are:

i. Emissions to air
ii. Releases to water
iii. Waste management
iv. Contamination of land
v. Use of raw materials and natural resources
vi. Other local environmental and community issues

[389] SABS ISO 14001. 1996.

Under each of these aspects, environmental impacts for the operational phase of hotels identified in Chapter Two could be classified and are tabulated in Tables 13 to 18 in Chapter Four.

Chapter Four sets out to compile a guideline document for the Environmental Management of possible environmental impacts of the operational phase of hotels, in accordance with the criteria set in SABS ISO 14001. These criteria were described in Chapter Four and the management of the environmental impacts of hotels were addressed in Tables 20 to 29 in Chapter Four. However, a step-by-step process as required for a guideline document is not very clearly defined in Chapter Four. Item 5.2.2 lists the steps to be followed in the establishment of an ISO 14001 EMS for a hotel and refers back to the relevant items in Chapter Four.

5.2 Recommendations of the study

5.2.1 Undertake detailed site-specific environmental assessments

When hotels implement this EMS, it is necessary that detailed site-specific assessments for each individual site be undertaken in accordance with the example in Annexure D, to establish the significance of each of the environmental impacts. This detailed site-specific assessment will determine the significance of the environmental impacts identified in Chapter Two for each individual hotel that is assessed.

5.2.2 Steps to be followed to implement an SABS ISO 14001 Environmental Management System (EMS)

The steps listed in SABS ISO 14004[390] for the implementation of an EMS can be followed by any hotel wishing to implement such an EMS. Environmental Management principles, as defined by ISO 14001[391], may be used to formulate a guideline document for the Environmental Management of hotels. The following steps, as described in Chapter Four, should be applied:

a) Establishment of an appropriate environmental policy as detailed in item 4.4.1

[390] SABS ISO 14004. 1996
[391] SABS ISO 14O01. 1996.

b) Planning of the Environmental Management System (EMS) as detailed in item 4.4.2, and implementation of the system by means of the following steps:
   i. Determination of environmental aspects and impacts as detailed in item 4.4.2 a)
   ii. Establishment of a procedure for the provision and allowance of access to legal and other requirements which influence and are applicable to the activities, products and services of the hotel as detailed in item 4.4.2 b)
   iii. The development, documentation and maintenance of environmental objectives and targets as detailed in item 4.4.2 c)
   iv. The establishment of an Environmental Management programme as detailed in item 4.4.2 d) and the management of the identified environmental impacts for the operational phase of hotels as described in item 4.6.1

c) Implementation and operation of the EMS:
   i. Ensuring capability as described in item 4.7.1
   ii. Ensuring support action as described in item 4.7.2

d) Implementing measurement and control of the EMS as detailed in item 4.8

e) Establishing review and improvement procedures as detailed in item 4.9

5.3 Recommendations for future studies

5.3.1 Adapt the guideline document to suit the different accommodation types offered by the hospitality industry

As indicated in Chapter One item 1.1.2, hotels provide a service to guests and could influence visitors by setting an example with regard to environmental awareness and responsibility. The item further indicates that hotels could be viewed as the upmarket end of the accommodation industry, offering more luxury features than other types of accommodation. Hotels as accommodation facilities for tourists would provide examples of potential impacts on the environment in which they are located, but these impacts would apply to other accommodation facilities as well. This study focused on the hotel industry, but further studies should adapt this guideline document to suit the different accommodation types offered in the hospitality industry to facilitate the implementation of an ISO 14001 EMS in each of these accommodation sectors.

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ANNEXURE A
SYSTEMS OF ENVIRONMENTAL IMPACT IDENTIFICATION

SYSTEMS OF ENVIRONMENTAL IMPACT IDENTIFICATION

1 Integrated Environmental Management Procedure[1] combined with the Integrated Environmental Management Information Series[2]:

In the Integrated Environmental Management Procedure, as described by the Department of Environmental Affairs, three stages in the process of integrated environmental management are indicated:

a) Stage 1: Plan and assess the proposal

The central notion of the Integrated Environmental Management (IEM) procedure is that its underlying principles should direct planning of proposals instead of it being a consideration to be addressed once the proposal has been planned or decided upon.

The following steps are recommended during the development of the proposal:

i. Notification of neighbours and other interested and affected parties
ii. Establishment of policy requirements
iii. Establishment of legal requirements
iv. Establishment of administrative requirements
v. Establishment of the purpose of the proposal
vi. Consideration of integrated environmental management requirements
vii. Consultation with authorities
viii. Consultation with interested and affected parties
ix. Identification and consideration of alternatives
x. Identification and consideration of issues, opportunities and constraints for alternatives
xi. Consideration of mitigatory options
xii. Consideration of management plan options

According to the Integrated Environmental Management (IEM) Procedure[3], the proposal will be better planned and the decision-making process will be streamlined if the recommended steps are incorporated when the proposal is developed. During the first stage of the procedure, the proposal is classified and assessed before Stage 2 is reached.

Central to the assessment during the Integrated Environmental Management (IEM) Procedure are the published List of Activities, the List of Environments and the

[1] Department of Environmental Affairs and Tourism. 1992. (a)
[2] Department of Environmental Affairs and Tourism. 2002. (b)
[3] Department of Environmental Affairs and Tourism. 1992. (a)

Summary List of Environmental Characteristics (Annexure B), which would assist in the determination of potential impacts of a new development on the environment. These listed activities, environments and environmental characteristics in terms of the IEM Procedure do not require environmental assessments in terms of South African legislation. However, they formed the basis for the identified activities, which now require environmental assessments as governed by South African legislation.

In the List of Activities[4] the planning and development of certain policy, planning and project proposals are identified as potentially harmful to the environment. The planning phases of hotels were not included in this research, since the environmental management guideline was drafted for the operational phase of hotels. Careful planning and location of hotels could reduce the potential environmental impacts of their construction.

In the List of Environments, those environments that may be affected by the planning and development of activities are included. The following were identified as having bearing on the hotels in the case studies:

- Item No. 36: List of Activities, Project proposals,

  Buildings with a total floor space of 500 square metres or more

  are listed. The floor areas of all three hotels used in the case studies exceed 500 square metres.
- Item No. 3: List of Environments, Designated areas or features:

  National, provincial or municipal nature reserves.

  are listed. The Malelane Sun Inter-Continental Resort is situated adjacent to the Kruger National Park, and some activities could impact on this reserve.
- Item No. 21: List of Environments, Demarcated areas or features:

  Streams and river channels, and their banks.

  are also identified. The Sabi River Sun is located on the banks of the Sabi River and the Malelane Sun Inter-Continental Resort is situated on the banks of the Crocodile River. Some activities at both hotels could impact on the rivers.

b) Stage 2: Decision

At this stage of the process, proposals are reviewed by the authorities and may be returned for assessments to be undertaken or additional information to be provided.

[4] Department of Environmental Affairs and Tourism. 1992 (a)

Whether or not a proposal is approved, a 'record of decision' must be issued and an opportunity for appeal against this 'record of decision' must be allowed.

3) Stage 3: Implementation

A proposal may be implemented upon approval being granted by the authorities. In accordance with the IEM Procedure an environmental management plan may be required. A monitoring programme should be implemented, following clear guidelines, and periodic assessments or audits should be undertaken to provide feedback on the adequacy of the planning.

1.1 Aspects to be addressed in describing the affected environment

In guideline document No. 3, *Guidelines for Report Requirements*[5], as described in the Integrated Environmental Management Procedure, a methodology for the identification of potential impacts on the environment is described. Elements in the biophysical environment are identified to provide a context within which the activities, facilities and services could be assessed to determine their impacts on the environment. The listed elements to be addressed are:

a) Location and context
b) Boundaries
c) The biophysical environment to include:
   climate, soil, geology, hydrology, topography, flora and fauna
d) The socio-economic environment to include:
   demographics, standard of living, employment levels, housing, education, services, social infrastructure, local infrastructure, local government and administration, water and power supply
e) Cultural and historical environment to include:
   sites of architectural and cultural interest, visual impact
f) Other aspects of particular significance or value
g) Reference to specialist reports that may have been prepared

This list will be used to structure the process of identification of environmental impacts.

2 Integrated Environmental Management Information Series[6]

It is stated in the preface to the booklet on *Screening*[7], that the aim of the document series is to provide general information on techniques, tools and processes for environmental

[5] Department of Environmental Affairs and Tourism, 1992. (b)
[6] Department of Environmental Affairs and Tourism. 2002. (b)

assessment and management. The document series was designed for use in South Africa by a panel of South African environmental practitioners and government authorities. At this stage, the document series consists of the following six booklets:

- Screening
- Scoping
- Stakeholder engagement
- Specialist studies
- Impact significance
- Ecological risk assessment

Additional publications in this series are planned.

2.1 Screening

The first document in this series, *Screening*[8] provided an overview of the screening process in IEM and clarified some of the confusion between the screening and scoping stages of environmental assessment. The purpose of screening, as stated in this document, is:

> *Screening determines whether or not a development proposal requires environmental assessment, and if so, what level of assessment is appropriate. Screening is therefore a decision making process that is initiated during the early stages of the development of a proposal [9].*

The document differentiates between two types of screening, namely mandatory screening and pre-application screening. Mandatory screening is defined as:

> *…that process which is typically administered by an environmental authority or some institution with vested powers to instruct and become party to a screening process.*

An example of such a screening process is the checklists to be completed when applying to the various provincial Departments of Environment for activities identified in Regulations R1182 and R1183[10]. Pre-application screening is described as:

> *…undertaken outside the formal process, typically at the discretion of a development proponent. Pre-application screening is the process whereby key environmental issues associated with a proposed development are anticipated at the earliest opportunity, and are considered as an integral part of pre-feasibility investigation.*

It is stated in the document that pre-application screening often involves some form of fatal flaw analysis.

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[7] Department of Environmental Affairs and Tourism. 2002. (b)
[8] Department of Environmental Affairs and Tourism. 2002. (b)
[9] Department of Environmental Affairs and Tourism. 2002. (b:3)
[10] South Africa. 1997. Regulations R1182 and R1183. 05/09/1997.

2.2 Scoping

In *Scoping*[11], the second booklet in the series, the scope of an environmental assessment is defined as:

> *…the range of issues and alternatives it considers, and the approach towards the assessment that will follow it…Scoping is a critical stage in the integrated environmental management (IEM) procedure, since it is an important tool for involving the public in the environmental assessment process, and for structuring assessment studies*[12]*.*

It is explained in the document that the priorities of the environmental assessment are set through scoping and that it may continue throughout planning and assessment, depending on whether or not issues or alternatives are added or excluded from the study as additional information is added. The scoping process is divided into three phases:

- *Planning the scoping procedure*
- *A process of stakeholder engagement to identify the key issues,*
- *Reporting on the terms of reference for the next phase of the assessment*[13]

2.3 Stakeholder engagement

The third booklet in the series, *Stakeholder engagement*[14], focuses on overcoming problems in the process of stakeholder involvement or public participation resulting from different definitions and interpretations of the process. It is stated in the document that different levels of stakeholder engagement range from

> *…stakeholder protest to informing, consulting, involving, collaborating with and empowering stakeholders in the decision-making process*[15]*.*

Objectives for each of the levels of stakeholder engagement, as well as the responsibilities of stakeholders, environmental consultants and stakeholder engagement practitioners, are provided in the document. Approaches to stakeholder engagement and techniques for facilitating the process are also provided.

[11] Department of Environmental Affairs and Tourism. 2002. (c)
[12] Department of Environmental Affairs and Tourism. 2002. (c:2)
[13] Department of Environmental Affairs and Tourism. 2002. (c:2)
[14] Department of Environmental Affairs and Tourism. 2002. (d)
[15] Department of Environmental Affairs and Tourism. 2002. (d:3)

2.4 Specialist studies

It is stated in the booklet entitled *Specialist Studies*[16], that international studies such as those conducted by Eberhardt (1976) and Beanlands and Dinker (1984), have highlighted concerns over the technical quality of Environmental Impact Assessments (EIAs) in general and the inaccuracy of impact predictions. In the document the focus rests on the specialist study of the EIA process. An overview of the debate on the weaknesses and problems experienced in specialist studies is provided. A list of identified areas of weakness in EIA specialist studies provided in the document includes:

- *Baseline studies*
- *Impact prediction and assessment*
- *Impact mitigation*
- *Post-EIA impact monitoring*
- *Specialist study reporting*

In the document, guidelines are provided to the environmental practitioner for drafting and clarifying the terms of reference, outlining the specialist study approach, choosing appropriate specialists and independent peer review. Guidance for the specialist is also provided *inter alia* and includes the definition of the scope of work, establishing baseline environmental conditions and prescribing mitigation measures.

2.5 Impact significance

In the fifth booklet, *Impact Significance*[17], significance is described as being the core of impact identification, prediction, evaluation and decision making in the EIA process. However, it is also acknowledged that the concept of determining significance has remained largely undefined, and that no international consensus exists among environmental practitioners regarding the best approach to assessing the significance of impacts.

The process of determining impact significance includes the following tasks as detailed in the document:

- Impact identification
- Impact prediction
- Impact evaluation

[16] Department of Environmental Affairs and Tourism. 2002. (e)
[17] Department of Environmental Affairs and Tourism. 2002. (f)

It is further stated in the document that the evaluation of significance of environmental impacts is linked to all the phases of the EIA process and that the concept of significance has different meanings at different stages of the EIA process. An overview of formal methods for determining environmental impact significance is provided in the document, as well as varying definitions of the concept of significance. The document provides an overview of key criteria to be considered in the determination of environmental impact significance, instead of prescribing or recommending a specific method to be applied.

2.6 Ecological Risk Assessment

In the sixth document, *Ecological Risk Assessment*[18] the concepts and approaches for ecological risk assessment are described. In this document, conservative approaches to risk assessment and hazard identification followed by the United Kingdom, Sweden, Australia/New Zealand and East Asia are described as a guide to best practice within the framework of the legislation of each country. It is recommended that the risk assessor, risk manager and interested and affected parties identify the best practices and tools for performing specific risk assessments and that involvement by stakeholders, interested and affected parties, regulatory agencies and the public be incorporated into the process.

3 Environmental indicators as published by the Department of Environmental Affairs and Tourism

A draft core set of environmental indicators was published by the Department of Environmental Affairs and Tourism of South Africa in September 2001[19] as a series of eight documents. The National Environmental Indicators project was developed to link biophysical indicators to a broader socio-economic and political environment to increase the relevance of environmental indicator development. The indicators listed also list criteria against which an environmental impact can be measured and are intended to track environmental changes in relation to their ultimate causes. The indicators and criteria will assist in the determination of potential environmental impacts of hotels on the environment, and ultimately in the management of these identified impacts. The environmental indicators are grouped under the following headings:

[18] Department of Environmental Affairs and Tourism. 2002. (g)
[19] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

3.1 Inland water indicators

According to the draft report on Inland Water Indicators by Godfrey, Claassen, Todd, Batchelor, du Preez and Smakhtin[20], inland water systems are affected by natural (such as catastrophic events, rainfall or evaporation) and anthropogenic (such as population growth, waste generation or land use change) drivers. Impacts affect either the quality or the quantity of inland water systems.

Issues identified in the report pertaining to inland water systems are:

a) Limited freshwater resources
b) Changing freshwater quality
c) Degradation and loss of freshwater ecosystems integrity
d) Flood and drought management of inland water resources
e) Inadequate and inequitable distribution of land freshwater services
f) Conflicting interests over water sharing

The impacts of hotels on inland water, particularly freshwater resources and freshwater quality will be investigated in this study.

3.2 Marine and coastal indicators

According to the draft report on Marine and Coastal Indicators by Harrison, Taljaard and van Niekerk[21], the exploitation of coastal and marine resources may not be allowed to continue. The report claims that for coastal development to be ecologically sustainable, the protection of coastal ecosystems and the wise use of marine and coastal resources would be required. If coastal development is to be socially sustainable, public awareness and shared responsibility are required and disadvantaged communities should be empowered. If coastal development is to be economically sustainable, opportunities should be diversified to provide work opportunities and access to resources. Finally, the report states that for coastal development to be institutionally sustainable, creative partnerships between government, the private sector and civil society should be encouraged. These partnerships should be aimed at maintaining the diversity, health and productivity of the country's coast.

The key issues relating to marine and coastal indicators are:

a) Degraded habitats and biodiversity loss
b) Unsustainable harvesting of resources
c) Increased pollution into the coastal and marine environment

[20] Godfrey, Claassen, Todd, Batchelor, du Preez and Smakhtin. 2001.
[21] Harrison, Taljaard and van Niekerk. 2001.

d) Sea level rise/flooding

e) Ongoing maintenance and sustainable use of coastal and marine ecosystem services.

None of the hotels that were considered in the case study are located near coastal environments. These indicators should be considered for hotels located in coastal environments. Key issues that might be affected by hotels could include degraded habitats and biodiversity loss and increased pollution of the coastal and marine environment.

3.3 Biodiversity and natural heritage indicators

According to the draft report on Biodiversity and Natural Heritage Indicators by Le Maitre and Reyers[22], three levels of biodiversity are generally recognised, namely:

- Genetic biodiversity
- Species biodiversity
- Ecosystems or community level biodiversity

Scientific and public understanding of the importance of biodiversity is developing rapidly. The instrumental value of biodiversity is the use value to humans and includes the goods, services, information and psycho-spiritual value of biodiversity. In their draft report on Biodiversity and Natural Heritage, Le Maitre and Reyers rate South Africa as one of the top-25 biodiverse countries in the world. According to the Biodiversity and Natural Heritage Indicators Report, natural heritage includes all South Africa's geological formations, landscapes, plants and animals, the rich variety of peoples and their cultural and historical heritage.

Issues listed in the report on Biodiversity and Natural Heritage Indicators, pertaining to biodiversity and heritage indicators, are:

a) Species and genetic diversity loss

b) Habitat change or loss and loss of landscape function

c) Alien invasive organisms

d) Over-harvesting

e) Genetically modified organisms

f) Bio-prospecting (commercial exploitation of biological resources)

g) Loss of cultural and natural resources

The impacts of hotels on loss of natural resources will be investigated in this study.

[22] Le Maitre and Reyers. 2001.

3.4 Land use

According to the draft report on Land Use Indicators by Arendse and Wilkinson.[23], the most important land uses in South Africa are agriculture, commercial forestry and mining. The report indicates that approximately six million South Africans are dependent on agriculture for their livelihood and primary agriculture offers the largest employment opportunities in the country. The report summarises that South Africa requires its land resources in order to sustain its population and to contribute to the country's economic growth, but states that the terrestrial systems are fragile and must be managed carefully. Issues listed in the Report on Land Use Indicators are:

a) Land degradation
b) Land use management
c) Soil loss

The impacts of hotels on these issues will be investigated in this study.

3.5 Human settlement indicators

According to the draft report on Human Settlement Indicators by Wilkinson[24], human settlements encompass all places where people live, including remote communities, rural centres and cities. The activities carried out in these settlements should provide residents with goods, services and quality of life.

The draft report further states that both positive and negative aspects of people living in a concentration of human settlement could be identified. Positive aspects listed are that dense settlements can be managed effectively in terms of management and service provision, limit the extent of environmental damage and make mitigation programmes cost effective. A negative aspect listed is that such dense human settlements could have a damaging effect on the environment if critical thresholds of pollution are exceeded. Three issues listed in the draft report on Human Settlement Indicators are:

a) Urban decay
b) Urban sprawl
c) Densification of human settlements

The possible impact of hotels on the issues listed above will be investigated in this study.

[23] Arendse and Wilkinson. 2001.
[24] Wilkinson. 2001.

3.6 Atmospheric and climatic indicators

South Africa signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1997 and is therefore required to reduce atmospheric concentrations of greenhouse gases such as carbon dioxide, nitrous oxide and methane in order to fulfil its obligations under this Convention. According to the draft report on Atmospheric and Climatic Indicators by Van der Merwe and Muller[25], South Africa has been identified as a climatically sensitive country.

Stratospheric ozone depletion has been identified as an international issue and South Africa was a signatory to the Montreal Protocol in 1990. This Protocol controls the use of ozone-depleting substances. The report on Atmospheric and Climatic Indicators states that predictions show that the period of greatest ozone depletion is expected to occur in the next two decades. According to the report, air quality impacts are governed by the distribution of air pollutants where impacts are experienced at a distance from source. According to the report on Atmospheric and Climatic Indicators, long-lived air pollutants such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbons (CFCs) are internationally significant in terms of distribution and impacts, whereas short-lived air pollutants such as nitric oxide, sulphur dioxide and particulate matter are regionally and locally significant in terms of distribution and impacts.

Items specifically listed are climate change and variability (in particular emissions of greenhouse gases, such as carbon dioxide, methane and nitrous oxide and renewable and non-renewable energy use), stratospheric ozone depletion (in particular the emission of ozone-depleting substances), air quality and integrated issues. The impacts of hotels on the environment in terms of carbon dioxide emission, non-renewable energy use and ozone depleting substance use will be investigated in this study.

3.7 Waste indicators

Waste is described in the draft report on waste indicators by Arendse[26] as a consequence of development, which must be systematically managed to conserve resources and protect the environment. The waste indicators report states that a transformation to a development that is economically, socially and environmentally sustainable will require *inter alia* a redefinition of the way in which pollution and waste is managed. Issues identified in the report on waste indicators are:

[25] Van der Merwe and Muller. 2001.
[26] Arendse. 2001.

a) Increased amounts of waste produced
b) Lack of appropriate legislation and enforcement of legislation

The impacts of hotels on the environment in terms of waste generation will be investigated in this study.

3.8 Integrated indicators

The draft report on integrated indicators by De Wit, Ramsar, King and Schwabe[27] focuses on the integration of environmental concerns with the social, economic and political context that drive these changes. The indicators identified in this report are intended to track environmental changes in relation to their ultimate causes. The indicators finally selected and listed in this report are:

a) Air quality and climate integrated indicators
b) Land use integrated indicators
c) Biodiversity and natural heritage integrated indicators
d) Marine and coastal integrated indicators
e) Cross-cutting and emerging issues and general Environmental Management integrated indicators

This final list of indicators and the summary table (Annexure C), as provided in the draft report on integrated indicators[28], will be used to determine the potential environmental impacts of hotels.

4 Utilising precedents to assist in the determination of environmental impacts

The determination of the environmental features that may be affected by a project is described as follows by Julien, Fenves and Small[29]:

> *The identification of environmental impacts establishes the possible consequences of a given set of activities on environmental elements. The activities and environmental elements refer to the actions comprising the project and the physical, biological or human components of the ecosystem affected, respectively… essential to begin with an effective identification of the impacts.*

Julien, Fenves and Small[30] maintain that previous approaches, such as map overlays, impact checklists, impact matrices and cause-effect networks, offered a way to represent impacts on the environment, but fell short of assisting the evaluator in determining potentially significant impacts. An Environmental Impact Identification System (EIIS) was

[27] De Wit, Ramsar, King and Schwabe. 2001.
[28] De Wit, Ramsar, King and Schwabe. 2001.
[29] Julien, Fenves and Small. (1992:168)
[30] Julien, Fenves and Small. 1992.

developed to allow the evaluator to select impacts based on information regarding the type of project and the environment. Three elements form the basis of the EIIS:

4.1 Utilising previous environmental assessments

Reliance on previous evaluations lies at the core of the Environmental Impact Identification System. These evaluations assist in determining what sources of information could be used to assist in the identification of environmental impacts. The principle is to extract environmental impacts considered in past environmental evaluations that were similar to the current evaluation. To apply this element from the Environmental Impact Identification System to the identification of environmental impacts caused by the hotel industry, the International Hotels Environment Initiative (IHEI)[31] was studied. This document will be used as a guide in the determination of potential environmental impacts of hotels, to act as a baseline in this dissertation. The document produced by the International Hotels Environment Initiative (IHEI)[32] groups potential areas or aspects where hotels may have impacts on the environment under the following headings in individual chapters:

a) Introducing and developing an environmental culture in [the] hotel

   This chapter addresses the communication of the environmental programme to staff, guests, business partners and the local community in which the hotel is situated.

b) Waste management

   This chapter addresses the reduction of waste from the hotel through recycling initiatives and the separation of hazardous and non-hazardous waste.

c) Energy and water conservation

   This chapter addresses conservation of water and energy in terms of cost savings, maintaining the profitability of the hotel, but still meeting the needs of guests.

d) Water quality

   This chapter addresses the sources of water and ways to improve water quality by introducing standards and remedial actions to reduce, among others, suspended solids, high salt content, acidity, corrosivity and bacteriological contamination.

e) Product purchase

   This chapter addresses the environmental impacts of products and considers how purchasing decisions may make a contribution towards the protection of the environment. Guidelines for product purchasing are also provided.

f) Indoor air quality

   This chapter addresses potential contaminants of internal air in hotels and methods of improving the internal air quality. The standards for Internal Air Quality (IAQ) published by the World Health Organization are given in this chapter.

[31] International Hotels Environment Initiative. 1996.
[32] International Hotels Environment Initiative. 1996.

g) External air emissions

This chapter lists sources of air pollution and areas where hotels may participate in air pollution and addresses activities in respect of which hotels could reduce their emissions to the atmosphere.

h) Noise

This chapter defines noise and its potential sources in hotels and assists in setting objectives for noise levels in hotels.

i) Stored fuel

This chapter assists hotels in undertaking a fuel storage inventory and corrective action and lists storage and handling regulations.

j) Polychlorinated biphenyls (PCBs)

According to the International Hotels Environment Initiative[33], Polychlorinated biphenyls (PCBs) are man-made oils and waxes with very good thermal and electrical insulation properties and were used as coolants until the 1970s. Because of the stability of the products, the natural process of breaking them down is extended, and substances may build up in natural tissue with adverse effects for humans. This chapter addresses regulations for the use, marking, storage and disposal of PCBs.

k) Pesticides and herbicides

This chapter lists good practices in the handling, storage, preparation, application and disposal of chemicals. It also addresses alternative methods of pest control to minimise the use of pesticides or herbicides.

l) Hazardous materials

This chapter defines hazardous materials and lists areas where hazardous materials may occur in the hotel. It also addresses methods of handling, storage, labelling and disposing of hazardous materials.

m) Asbestos

This chapter addresses the hazards of asbestos dust and methods of managing asbestos in the hotel.

4.2 Representation of environmental evaluations

According to Julien, Fenves and Small[34], all environmental impact assessments have the same three principal components, namely a project, an environment and a set of impacts caused by the project on the environment. The element of representation of environmental evaluations requires a structure for each of the three components that is sufficiently general to allow the description of most types of environmental impact. The system assigns a tree

[33] International Hotels Environment Initiative. 1996.
[34] Julien, Fenves and Small. 1992.

structure to the project and environment hierarchies. Hierarchies are defined as follows by Julien, Fenves and Small[35]:

> *…to serve as a scheme for the classification and assessment of the potential impacts.*

Both the project and the environment are represented as trees of actions and environmental elements, so that identification of potential impacts is completed by linking the two hierarchies with each other. Each impact is defined by specifying the source and the receptor of the impact. The impacts do not relate to general activities and general environmental elements, but impact links are established only between the most specific project or policy activities and environmental elements.

4.3 Aggregation of past environmental evaluations

Once the process to structure and store previous environmental evaluations has been completed, a system to access and retrieve these evaluations is required. Julien, Fenves and Small[36] indicate their preference for allowing evaluators to define new impact networks by gathering impact networks of similar evaluations. This aggregation will permit the evaluator to determine which activities, environmental elements and impacts were considered in the past and whether or not these activities, environmental elements or impacts should be eliminated from, included in or expanded upon in the new environmental evaluation. Two conditions must be adhered to for such an approach to work successfully, as stated by Julien, Fenves and Small[37]:

> *the environmental evaluations must share a common organisation; and*
>
> *an adequate indexing scheme for retrieving and storing similar environmental evaluations must be defined.*

In the Environmental Impact Identification System (EIIS) a relational database is compiled which contains the impact networks and their contextual information. Each relation in the database must describe one of the following components: the evaluation, the evaluator, the project, the environment, the activities or environmental elements, the hierarchical tree relations and the environmental impacts. These relations are defined by a set of attributes uniquely identifying the information stored under each relation and sets it apart from the other relations. This dissertation relied on the use of the International Hotels Environment Initiative (IHEI) document[38] to identify activities, facilities and services provided by the hotel industry, which could cause potential environmental impacts.

[35] Julien, Fenves and Small. (1992:172)
[36] Julien, Fenves and Small. (1992:174)
[37] Julien, Fenves and Small. (1992:174)
[38] International Hotels Environment Initiative. 1996.

5 Checklist and matrix methods as described in Fuggle and Rabie[39]

5.1 Checklists

Fuggle and Rabie[40] define checklists as comprehensive lists of structured questions related to environmental parameters and specific human actions. Checklists are used to assist in organising thinking, help with data collection and presentation and warn against the omission of potential environmental impacts. Fuggle and Rabie[41] describe checklists as being severely limited as a method of communication; checklists lead investigators through the analysis process in a predetermined manner, and by providing predetermined lists, checklists omit the preliminary step of the description of the environment. According to Fuggle and Rabie[42], the most useful feature of checklists is that they are

> *…aides memoires and bases for constructing cause-effect matrices.*

5.2 The Leopold matrix

In Fuggle and Rabie[43] the Leopold matrix is described as having been developed from the checklist approach, but it divides the checklist into two data sets where one set is related to environmental elements and the other to human actions. The two data sets are arranged at right angles to form a cross-tabulation or matrix. The matrix is applied where each action in the project is checked against each environmental characteristic of the area. All cells where a potential impact on the environment may occur are divided diagonally and scored individually in terms of the technical perspective of the scale or magnitude of the impact, and in terms of the social importance of the impact. Fuggle and Rabie[44] criticise the matrix method for its complexity, its unfamiliar format and the numerical scoring system used in the assessment process. The scoring system requires subjective estimates of magnitude and significance without the aid of specific guidelines or standardised weightings.

5.3 Cross-tabulation or matrix approach

In Fuggle and Rabie[45] the cross-tabulation of specific environmental characteristics and specific human actions is described as:

> *providing an easy way of focussing thinking onto particular issues which may cause concern in a development project.*

[39] Fuggle and Rabie. 2000.
[40] Fuggle and Rabie. (2000:768)
[41] Fuggle and Rabie. (2000:768)
[42] Fuggle and Rabie. (2000:768)
[43] Fuggle and Rabie. (2000:768)
[44] Fuggle and Rabie. (2000:769)
[45] Fuggle and Rabie. (2000:772)

This method could identify problem areas, which will allow effort to be applied in a constructive way to overcome problems. For this approach, two lists are compiled. One list should contain the environmental characteristics and the second list should contain the human actions. The lists are arranged at right angles to each other and a grid is drawn up in which, during the assessment process, cells are marked where a specific human action will impact on the environmental characteristic in the other list.

Fuggle and Rabie[46] further state that the identification of environmental characteristics cannot be undertaken in an abstract way. The listing of environmental characteristics should be undertaken by an interdisciplinary team of persons with appropriate backgrounds after they have conducted site visits. Fuggle and Rabie[47] also indicate that when the team compiles the list of environmental characteristics, no attempt should be made to delimit the area considered to be of concern or to bias the list of environmental characteristics by excluding any elements from consideration. They further state that construction and operational activities may differ greatly and may be compiled as separate lists for each phase of the project.

After the lists of environmental characteristics and project actions have been assimilated into a matrix format, the assessment of the impact of each action on each environmental characteristic will commence. In Fuggle and Rabie[48], it is recommended that the impacts be assessed in terms of importance, probability, time of occurrence, duration, benefit, remedial measures and risk.

A similar method was used for the purposes of this study, but the assessment criteria were changed in accordance with recommendations made in the booklet *Impact Significance*[49], which is part of the Integrated Environmental Management Information Series. These criteria are summarised in item 2.7 of this dissertation and further described in Annexure E.

[46] Fuggle and Rabie. (2000:773)
[47] Fuggle and Rabie. (2000:773)
[48] Fuggle and Rabie. (2000:774)
[49] Department of Environmental Affairs and Tourism. 2002. (f)

ANNEXURE B
LIST OF ACTIVITIES, LIST OF ENVIRONMENTS, SUMMARY LIST OF ENVIRONMENTAL CHARACTERISTICS, IEM PROCEDURE[50]

[50] Department of Environmental Affairs and Tourism. 1992 (a)

4 LIST OF ACTIVITIES

The *List of Activities* refer to the planning and development of the following (Definitions in Appendix A):

Policy and planning proposals

Note: With policy and planning proposals the IEM procedure should be implemented in such a way that it complements — rather than duplicates — existing planning and other procedures. The IEM procedure should be used to supplement existing requirements, rather than replace them.

1 Structure plans (or, in the absence thereof, town planning schemes and zoning schemes).
2 Rezoning applications.
3 Subdivisions.
4 Land acquisition for national parks, nature reserves, marine reserves, protected natural environments or wilderness areas.
5 Establishment of townships.
6 Declaration of limited development areas.
7 Any government policy on the use of natural resources.

Project proposals

8 Nuclear installations.
9 The formal disposal of waste.
10 The transportation of hazardous substances and radioactive waste.
11 Mining, mineral extraction and mineral beneficiation.
12 Power generation facilities with an output of 1 megawatt or more.
13 Electrical substations and transmission lines having equipment with an operating voltage in excess of 30 000 volts rms phase-to-phase.
14 Storage facilities for chemical products.
15 Industrial installation for the bulk storage of fuels.
16 Bulk distribution facilities.
17 Scheduled Processes under Schedule 2 of the Atmospheric Pollution Prevention Act (45/1965).
18 Industries requiring a permit under section 12 of the Water Act (54/1956).
19 Manufacture of explosives.
20 Control Measures under section 6 of the Conservation of Agricultural Resources Act (43/1983).
21 Battery and feedlot farming installations.
22 Propagation of invasive alien plant and animal species.
23 Afforestation projects.
24 Genetic modification of organisms and release of such organisms.
25 Major roads.
26 Railways.

Project proposals (continued)

27 Commercial aerodromes.
28 Ports, harbours and marinas.
29 Major pipelines.
30 Cableways and cableway stations.
31 Television and radio transmission masts.
32 Permanent racing and test tracks for cars and motor cycles.
33 Major canals, aquaducts, river diversions and water transfers.
34 Permanent flood-control schemes.
35 Major dams, reservoirs, levees and weirs.
36 Buildings with a total floor space of 500 square metres or more.
37 Public transport mode transfer facilities.
38 Establishment of armaments testing areas.
39 Reclamation of land from the sea.

5 LIST OF ENVIRONMENTS

The planning or development of activities that might affect the following areas or features (Definitions in Appendix B):

Designated areas or features

Note: "Designated areas or features" means any area or feature already declared in terms of an Act of Parliament or by agreement between land-owners and the State President or the Minister of Environment Affairs.

1 Limited development areas.
2 Protected natural environments.
3 National, provincial and municipal nature reserves.
4 Private nature reserves.
5 Mountain catchment areas.
6 Wilderness areas.
7 National monuments.
8 Shipwrecks.
9 Archaeological and palaeontological sites.
10 Graves and burial sites.
11 National gardens of remembrance.
12 Conservation areas.
13 Meteorites.
14 Off-shore islands.
15 Intertidal zone.
16 Admiralty reserve.
17 Lake areas.
18 National heritage sites.
19 Sites of conservation significance.

Demarcated areas or features

Note: "Demarcated areas or features" means any of the following areas or features which are demarcated by a central, regional or local authority.

20 Estuaries and lagoons.
21 Streams and river channels, and their banks.
22 Floodplains.
23 Wetlands.
24 Lakes.
25 Dunes.
26 Beaches.
27 Reefs.
28 Indigenous forests.
29 High-potential agricultural land.
30 Caves.
31 Green belts or public open space in municipal areas.
32 Architectural precincts.
33 Buildings.
34 Battle sites.
35 Burial sites.
36 Immovable property.
37 Landscapes.
38 Islands in rivers.
39 Biotic assemblages and communities.
40 Habitat of Red Data Book species.
41 Bird migration sites.
42 Aquifers and aquifer-recharge areas.
43 Areas with a high natural water-table.
44 Damaged land.
45 Unstable soils.
46 Natural resource areas (including minerals).
47 Sites of geological significance.
48 Geologically and geotechnically unstable areas.
49 Areas or sites of outstanding natural beauty.
50 Scenic drives and panoramic views.
51 Areas or sites of special scientific interest.
52 Areas or sites of religious or spiritual significance.
53 Areas or sites of special social, cultural or historical interest.
54 State land.

6 SUMMARY LIST OF ENVIRONMENTAL CHARACTERISTICS

- Could the proposed development have a significant impact on, or be constrained by, any of the following?

a) Physical characteristics of the site and its surroundings.
b) Ecological characteristics of the site and its surroundings.
c) Current and potential land use and landscape character.
d) Cultural resources.
e) Socio-economic characteristics of the affected public.
f) Infrastructure services.
g) Social and community services and facilities.
h) Levels of present and future environmental pollution.
i) Risk and hazard.
j) Health and safety.
k) Cumulative and synergistic effects.

- Could the proposed development be modified to significantly enhance the positive aspects of points a — k above?
- Finally, in the light of the foregoing questions, a judgement should be made as to how well the proposed development meets the following criteria:

a) Will the proposed development be efficient when all social costs are taken into account?
b) Will the proposed development be fair in the way different groups and individuals are affected?
c) Will the proposed development be sustainable and in the interests of future generations?

ANNEXURE C
SUMMARY TABLE OF INTEGRATED INDICATORS, DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM[51]

[51] Department of Environmental Affairs and Tourism. 2002. (a) http://www.environment.gov.za

SUMMARY TABLE OF INTEGRATED INDICATORS, DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM

The pages attached have been extracted from the Summary Table of Integrated Indicators published by the Department of Environmental Affairs and Tourism in 2002. The fact sheets require a key or explanation for the codes used and the descriptions of these codes are listed below:

Type of impact:

Type	Description
D	Driving force
P	Pressure
S	State
I	Impact
R	Response

Indicator levels:

Indicator levels are defined in the Summary Table of Integrated Indicators[52] as follows:

Level 1: Adequate data is available now for all components of the indicator and can be used to support the indicator without significant additional costs.

Level 2: The indicator is presently feasible, but cannot be provided without additional investment in the data collection process.

Level 3: No data currently exists for the indicator, and there is no immediate intention to collect the data.

Frequency:

The term frequency, as listed in the summary table of integrated indicators, relates to the frequency that the information or data used for each environmental indicator is updated or published by external sources such as the Department of Water Affairs and Forestry.

[52] De Wit, Ramsar, King and Schwabe. 2001.

SUMMARY TABLE OF INLAND WATER INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Limited Freshwater Resources	Surface Water Resources per Capita	IW1	S	1	5 yearly	National
	Surface Water Demand versus Available Resources	IW2	P	2	Annual	Primary catchment
	Water Use (sectoral requirements)	IW3	P	1	5 yearly	National
	Environmental Flow Requirements	IW4	S	2	5 yearly	Primary / secondary catchments
	Groundwater utilised per sector	IW5	P	2	5 yearly	National
	People supported by Groundwater	IW6	S	2	5 yearly	Provincial
	Groundwater withdrawals as % of annual recharge	IW7	P	2	5 yearly	Geo-hydrological unit
Changing Freshwater Quality	Surface Water Salinity	IW8	S	1	Annual	Water management areas
	Surface Water Nutrients	IW9	S	1	Annual	Water management areas
	Surface Water Microbiology	IW10	S	2	Annual	Water management areas
	Surface Water Toxicity	IW11	I	2	Annual	Water management areas
	Groundwater Salinity	IW12	S	1	Annual	Geo-hydrological unit
	Groundwater Nitrate	IW13	S	1	Annual	Geo-hydrological unit
	Groundwater Microbiology	IW14	S	2	Annual	Geo-hydrological unit
Degradation and Loss of Freshwater Ecosystem Integrity	Aquatic Habitat Integrity	IW15	S	2	Annual	Water management areas
	Wetland alteration	IW16	I	2/3	5 yearly	Quaternary catchment
	Aquatic biodiversity	IW17	S	1	Monthly & Annual	Water management areas
	Alien invasive organisms	IW18	P / S	3	5 yearly	Water management areas
	Riparian vegetation	IW19	S	2	5 yearly	Water management areas
Integrated Issues *	Groundwater contribution to GDP	IW20	D	2	Annual	Sectoral
	Surface water affordability	IW21	R	1	Annual	National
	Number of people affected by waterborne diseases	IW22	R	2	Annual	National
	Volume of water imported from neighbouring countries	IW23	R	1	Annual	National
	Number of people with access to sanitation	IW24	S	1	Monthly	National
	Number of people with access to water	IW25	S	1	Monthly	National

***** These indicators are dealt with in detail in the Integrated Study (Report No. 8).

SUMMARY TABLE OF MARINE AND COASTAL INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Degraded habitats and biodiversity loss	Percentage loss of coastal zone to other land uses	MC1	P	2	Annual	Provincial
	Population density increase in the coastal zone	MC2	P	1	5 yearly	National
	Reduction in freshwater inflows into coastal rivers and estuaries	MC3	P	3	Annual	National
	Coastal mining activities	MC4	P	1	Annual	National
	Number of species/communities/habitats endangered/vulnerable e.g. surveys of whales, seals, sea birds and fish	MC5	S	1	5 yearly	National
	Distribution and extent of formally protected areas (MPAs)	MC6	R	1	Annual	Regional
Unsustainable Harvesting of Resources	Changes in major fishery types and catches	MC7	P	1	Annual	National
	Distribution and abundance of resource species	MC8	S	1	Annual	National
Increased pollution into the coastal and marine environment	Alerts and oil pollution accidents along the coast	MC9	P	1	Annual	National
	Pollutant loading (in terms of *E. coli*, suspended solids, nutrients and trace metals) entering the seas from land based sources in major coastal cities	MC10	P	3	Annual	Local
	E.coli (or faecal coliform) counts at bathing beaches in major coastal cities	MC11	S	2	Annual	Local
	Concentrations of heavy metals in sediments or biological tissue in major coastal cities	MC12	S	3	Annual	Local
Integrated Issues *	Economic contribution of marine resources	MC13	S	2	5 yearly	National
	Commercial fishing rights supporting SMME development	MC14	R	2	4 yearly	National
	Litter and debris management	MC15	R	2	Annual	National

***** These indicators are dealt with in detail in the Integrated Study (Report No. 8).

SUMMARY TABLE OF BIODIVERSITY AND NATURAL HERITAGE INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Species and genetic diversity loss	Number of threatened or extinct species per taxonomic group	BD1	S	1	5 yearly	National (per biome for plants)
	Changes in disturbance regimes which drive ecosystems: fire frequency (Also relates to the Issue of Habitat change or loss)	BD2	P	3	Annual	Biomes
	Trends in populations of selected species (Also relates to the Issues of Habitat change and over-harvesting)	BD3	S	2	Annual / 5 yearly	Local (Habitat)
Habitat change or loss	Status, extent and effectiveness of protected areas	BD4	S/R	2	5 yearly	Regional (Biomes or eco-regions)
	Extent of natural area remaining per ecological region, habitat type and key ecosystem	BD5	S	2	5 yearly	Regional (Biomes or eco-regions)
Alien invasive organisms	Distribution and abundance of alien (non-indigenous) species invading natural ecosystems	BD6	P/S	2	5 yearly	National (per eco-region)
	Investment in control programmes for and research into alien species invading natural ecosystems	BD7	R	2	5 yearly	Provincial
Integrated Issues *	Contribution of control programmes for alien species to job creation	BD8	R	2	Annual	National
Loss of Natural Heritage Resources	Number and conservation status of natural heritage resources	NH1	S	2	5 yearly	National
	Investment in maintenance and research of natural heritage resources	NH2	R	2	5 yearly	National
	Trends in the number and conservation status of natural heritage resources	NH3	R	2	5 yearly	National
Integrated Issues *	Human use value of protected areas	NH4	R	2	Annual	Provincial

***** These indicators are dealt with in detail in the Integrated Study (Report No. 8).

SUMMARY TABLE OF LAND USE INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Land degradation	Soil loss	LU1	S	2	5 yearly	National
	Extent of Land Degradation	LU2	P	2	5 yearly	National
	Wasted and degraded land in mining zones	LU3	S	2	5 yearly	National
	Quality of mining operations	LU4	R	1	Annual	National
Land use management	Change in land use over time	LU5	S	2	5 yearly	National
	Enforcement of the Conservation of Agricultural Resources Act	LU6	R	1	Annual	Provincial
	Land Productivity vs Potential	LU7	S	3	5 yearly	National
	Permanent loss of agriculturally productive land	LU8	S	3	5 yearly	National
Integrated Issues *	Land degradation per GDP in the mining sector	LU9	P	1	Annual	Sectoral
	Wasted and degraded land in mining zones per GDP in the mining sector	LU10	S	2	Annual	Sectoral

SUMMARY TABLE OF HUMAN SETTLEMENTS INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Urban Decay	Percentage Public Urban Green Space per Settlement Area	HS1	S	2	5 yearly	Local
	Percentage derelict areas in urban settlements	HS2	S	2	5 yearly	Local
Urban Sprawl	Percent of non-urban land converted to urban uses	HS3	S	2	Annual	Local
Densification of Human Settlements	Urban vs rural population density	HS4	P	1	5 yearly	Local
	Percent dwelling types per settlement category	HS5	S	1	Annual	Local
	Percentage and rate of growth of rural and urban population	HS6	P	1	5 yearly	National

SUMMARY TABLE OF ATMOSPHERE AND CLIMATE INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Climate Change and Variability	Emissions of greenhouse gases (carbon dioxide, nitrous oxide and methane)	AC1	P	1	5 yearly	National
	Renewable and non-renewable energy use	AC2	P	1	Annual	National
	Change in the size of the national net carbon sink	AC3	P	1	5 yearly	National
	Malaria: morbidity and mortality	AC4	I	1	Annual	Provincial
	Annual rainfall deviations	AC5	S	1	Annual	Provincial
	Annual temperature deviations	AC6	S	1	Annual	Provincial
Stratospheric Ozone Depletion	Emissions of ozone depleting substances	AC7	D/P	1	Annual	National
	UV-B measurement	AC8	I	1	Monthly	Local
	Index of changes in total atmospheric ozone	AC9	S	1	Monthly	Local
Air Quality	Ambient Pollutant Concentrations in Urban Areas	AC10	S	2	Monthly	National (per major urban area)
	Permitted Vs. Actual Emissions Per Pollutant Per Major Industrial Complex	AC11	R	2	Annual	Regional (region = major industrial complex)
	Annual Ratio of Fuel Type Sales	AC12	D/P	1	Annual	National
Integrated Issues *	Emissions of greenhouse gases per output in the energy sector	AC13	S	1	Annual	Sectoral
	Ozone depleting substances per manufacturing output	AC14	P	1	Annual	Sectoral
	Economic cost of carbon abatement in South Africa	AC15	R	3	Annual	National
	Energy use per urban user	AC16	S	1	Annual	National
	Energy use per rural user	AC17	S	1	Annual	National

***** These indicators are dealt with in detail in the Integrated Study (Report No. 8).

SUMMARY TABLE OF WASTE MANAGEMENT INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Increase in the amount of waste produced	Total amount of solid waste produced per capita per year	WM1	S	2	Annual	Provincial
	General landfill airspace supply verses demand	WM2	P/S	2	5 yearly	Provincial
	Amount of hazardous waste produced per sector per year	WM3	S	2	Annual	Provincial
	Hazardous waste landfill airspace supply verses demand	WM4	P/S	2	5 yearly	Provincial
Lack of Appropriate Legislation and Enforcement of Legislation	Percentage of solid waste recycled per year and per material type	WM5	R	2	Annual	Provincial
	Percentage landfill permit applications and permits granted for operating and future landfills by class	WM6	R	1	Annual	Provincial

SUMMARY TABLE OF INTEGRATED INDICATORS

Issue	Indicator	Number	Type	Level	Frequency	Scale
Inland water	Groundwater contribution to GDP	IW20	D	2	Annual	Sectoral
	Surface water affordability	IW21	R	1	Annual	National
	Number of people affected by waterborne diseases	IW22	R	2	Annual	National
	Volume of water imported from neighbouring countries	IW23	R	1	Annual	National
	Number of people with access to sanitation	IW24	S	1	Monthly	National
	Number of people with access to water	IW25	S	1	Monthly	National
Marine and Coast	Economic contribution of marine resources	MC13	S	2	5 yearly	National
	Commercial fishing rights supporting SMME development	MC14	R	2	4 yearly	National
	Litter and debris management	MC15	R	2	Annual	National
Biodiversity and Natural Heritage	Contribution of control programmes for alien species to job creation	BD8	R	2	Annual	National
	Human use value of protected areas	NH4	R	2	Annual	Provincial
Land Use	Land degradation per GDP in the mining sector	LU9	P	1	Annual	Sectoral
	Wasted and degraded land in mining zones per GDP in the mining sector	LU10	S	2	Annual	Sectoral
Atmosphere and Climate	Emissions of greenhouse gases per output in the energy sector	AC13	S	1	Annual	Sectoral
	Ozone depleting substances per manufacturing output	AC14	P	1	Annual	Sectoral
	Economic cost of carbon abatement in South Africa	AC15	R	3	Annual	National
	Number of urban households with access to energy	AC16	S	1	Annual	National
	Number of rural households with access to energy	AC17	S	1	Annual	National
Emerging Issues	Distribution and abundance of GMOs invading natural ecosystems	CC1	P	3	5 yearly	National
	Sustainable utilisation of indigenous species	CC2	R	3	5 yearly	National
	Development and protection, and benefits from ‘commercially’ utilised indigenous species	CC3	R	3	5 yearly	National

Issue	Indicator	Number	Type	Level	Frequency	Scale
	Economic benefits from utilisation of indigenous species	CC4	S	3	5 yearly	National
General Environmental Management	Number of ratified multilateral agreements	CC5	R	1	Annual	National
	Budgetary allocation to resource management	CC6	R	1	Annual	National
	EIA for sensitive ecosystems	CC7	R	2	Annual	Provincial
	Inclusion of SEA into strategic planning exercises (IDPs & SDIs)	CC8	R	2	Annual	Provincial
	Research and development capacity in South Africa	CC9	S	1	Annual	National
	Implementation of ratified global agreements	CC10	R	2	Annual	National
	Environmental litigation	CC11	R	3	Annual	National
	Percentage of government research expenditure on environmental research and development	CC12	R	2	Annual	National
	Corporate environmental responsibility	CC13	R	2	5 yearly	National
	Government capacity for environmental management	CC14	R	2	Annual	National
	Government expenditure on public environmental awareness programmes	CC15	R	2	Annual	Local
	National expenditure on natural disaster relief	CC16	R	1	5 yearly	Provincial
	Protection of environmental rights of vulnerable groups	CC17	R	3	Annual	National

ANNEXURE D
BIOPHYSICAL CHARACTERISTICS OF THE SABI RIVER SUN AND SANDTON SUN & TOWERS INTER-CONTINENTAL

BIOPHYSICAL CHARACTERISTICS OF THE SABI RIVER SUN AND SANDTON SUN & TOWERS INTER-CONTINENTAL

1 Location and context

The Sabi River Sun is located in a sensitive environment as described in item 2.4, namely on the southern bank of the Sabie River. The Sandton Sun & Towers Inter-Continental is located in an urban centre and is surrounded by hotels, offices, shopping centres and conference venues.

2 Boundaries

The physical boundaries of the Sandton Sun & Towers Inter-Continental are formed by streets on two sides, the Sandton Convention Centre on its eastern boundary and the Sandton City shopping centre on its western boundary. The three buildings form one superblock and are interlinked via skywalks and pedestrian passages. The boundaries of the Sabi River Sun are the Sabie River to the north, agricultural holdings to the east and west and Road 535 between Sabie and Hazyview on the southern boundary of the site.

3 Biophysical environment

3.1 Climate

The area in which the Sabi River Sun is situated is characterised by high summer temperatures and moderate winter temperatures. Frost does not usually occur in winter. The area is characterised by summer rainfall of an average of between 600 and 1000 mm per annum. The hotel is located in a valley where temperature inversions may occur in winter.

The area where the Sandton Sun & Towers Intercontinental is situated, is characterised by typical highveld climatic conditions with moderate to high summer and low winter temperatures. Frost occurs regularly during winter. The area is characterised by summer rainfall of an average of between 650 and 750 mm per annum. The hotel is located on a rise in the topography, which reduces the risk of it being affected by temperature inversions.

3.2 Topography

The Sabi River Sun is situated in the area adjacent to the floodplain of the Sabie River. The site itself has a very even slope downwards towards the north and the Sabie River. There are no steep inclines or hills on the site. The Sandton Sun & Towers Intercontinental is situated on a high point in the topography of the Sandton central business district. The location affords views from the hotel in all directions, but also causes it to be visible from the suburbs around Sandton.

3.3 Geology

The Geology of the area where the Sabi River Sun is located is characterised by Nelspruit Migmatite and Gneiss, Terrane gneisses and granites, Karoo Sequence sediments and basalt. According to studies undertaken by van Niekerk *et al*[53] on the geomorphology of the Sabie River, the Sabie River is continuously changing on different temporal and spatial scales and displays characteristics of bedrock and alluvial channels. Therefore, in some areas, the floodplain of the Sabie River cuts through bedrock and in other areas it is characterised by alluvial soils, causing variations in the soil types and erosion characteristics of the area. In the area where the Sabie River Sun is located, a rock outcrop is situated to the south of the site, but not on the site.

The Sandton Sun & Towers is situated on granites on a rise in the general topography of the CBD of Sandton, Johannesburg. The area is characterised by shallow bedrock that requires blasting during construction.

3.4 Soils

The Sandton Sun & Towers Intercontinental is constructed on two sides of a road and the existing bare soil area has been either paved or built on. A relatively small portion of ornamental garden remains at the entrance to the hotel, where very little activity takes place reducing the risk of soil contamination and erosion.

The soils at the Sabi River Sun vary from clayey soils near the river and floodplain, which are waterlogged after rains, to sandy soils on the remainder of the site. The clay areas cause problems in terms of drainage and the sandy areas are prone to erosion if left bare.

[53] Van Niekerk, Heritage & Moon. 1995.

3.5 Hydrology

The Sabi River Sun is situated on the southern bank of the Sabie River. The site is characterised by a secondary tributary of the Sabie River, flowing near the eastern boundary of the site from the south, towards the Sabie River. Farms in the area have irrigation rights from the Sabie River, through the use of irrigation canals. One such canal flows to the south of the site and provides the potable water for the hotel. Water quality of the potable water is managed for use as drinking water by a water purification plant. All potable water is circulated through the water purification plant and tested monthly by an independent laboratory.

All overflow water not used for irrigation on the surrounding farms also flows through the site, in a roughly northeasterly direction, to join the secondary tributary on site. This overflow water has been dammed into two dams on the property and flows into a constructed meandering grassed channel. The tributary also flows into a dam constructed on the site, but the outlet joins the Sabie River. The Sabi River Sun area is characterised by very shallow groundwater and a natural spring is present on the site.

The Sabi River Sun is affected by the 1:100 year floodline, but the entire development, including the sewer treatment plant, is located above this line. During previous floods, only the pipe discharging treated effluent into the Sabie River has been washed away. The river is also used for recreational purposes such as fishing, birdwatching and river rafting. The sewer treatment plant discharges into the Sabie River, but effluent is tested monthly by an independent laboratory and the Department of Water Affairs and Forestry monitors the results.

The Sandton Sun & Towers Intercontinental is situated on a rise in the topography and is therefore not affected by any streams or rivers and the resulting floodplains. However, due to the shallow granite bedrock, the area is known for groundwater seepage affecting deep basements.

3.6 Flora

The natural vegetation of the area of the Sabi River Sun is described by van Rooyen and Bredenkamp[54] as Sour Lowveld Bushveld of the Savannah Biome. The vegetation type is described by Rooyen and Bredenkamp[55] as follows:

[54] Van Rooyen and Bredenkamp. 1996.
[55] Van Rooyen and Bredenkamp. (1996:27)

…open tree savanna is dominated by …Terminalia sericea, …Combretum collinum, … Acacia sieberiana, Parinari curatellifolia, Pterocarpus angolensis, Acacia caffra, Ficus thonningii…The shrub layer is characterised by …Dichrostachys cinerea, …Ximenia caffra, … Piliostigma thonningii, …The grass constituent is tall, tufted and relatively dense …The higher rainfall and frost-free climate allow a lush vegetation to develop.

The site itself is planted with manicured lawns for the golf course and gardens of the hotel. The shrubs and groundcovers used in the gardens are mostly exotic species such as *Ophiopogon* spp. *Vinca* spp. *Philodendron* spp., roses, etc., with a mixture of some indigenous species such as *Agapanthus praecox.* Large indigenous trees were retained throughout the hotel premises and the dense riverine vegetation retained in its natural state. At the Sabi River Sun, sensitive vegetation could be expected along the banks of the Sabie River. The site is also characterised by an invasion of declared weeds such as *Lantana camara*, bugweed and granadilla, which need to be eradicated regularly.

The Sandton Sun & Towers Intercontinental is located in an urban area, which has long been denuded of its natural vegetation, even though it falls within the Rocky Highveld Grassland of the Grassland Biome, according to Bredenkamp and van Rooyen[56]. The gardens at the entrance to the hotel are home to a collection of rare indigenous cycads of the *Encephalartos* family.

3.7 Fauna

The Sabi River Sun is known for its abundant birdlife, which is drawn to the Sabie River and associated riverine vegetation. Different species of kingfishers, louries and birds of prey were noted during the site visit. The Sabi River Sun is also known for the hippopotamuses that frequent the stream and waterhole and migrate between this area and the Sabie River. Safety precautions such as a double line of low electrified fences to safeguard guests against the hippopotamuses have been installed.

The Sandton Sun & Towers Inter-Continental is not frequented by a great variety of birds, due to its location in an urban centre, but sparrows, pigeons and wagtails have adapted to the urban environment.

[56] Bredenkamp and van Rooyen. (1996:39)

4 Socio-economic environment

4.1 Demographics

No information on demographics for the Sabie/Hazyview area or the Sandton area were obtained for this study.

4.2 Standard of living

The community of Bosbokrant and the area located between Hazyview and Nelspruit is generally of a lower income group and people have to collect potable water from central points and transport it to remote areas. The poverty contrasts dramatically with the living standard of the international and South African tourists frequenting the private game reserves and the Kruger National Park.

Generally the standard of living in Sandton is high, but the Alexandra township, where people from lower income groups live in cramped, poorly serviced areas, is located less than 5 km to the south of Sandton. The Sandton Sun & Towers Inter-Continental is located in a superblock of commercial activity, with high-end retail outlets, restaurants, conference venues and more hotels.

4.3 Employment levels

No information on employment levels for the Sabie/Hazyview area or the Sandton area were obtained for this study.

4.4 Housing and education standards

The general area around the Sabi River Sun is still a rural community characterised by farms, private nature reserves and holiday resorts. The Sandton area is characterised by large properties and houses or upmarket residential cluster developments. No information on educational standards was obtained for this study.

4.5 Services

4.5.1 Domestic waste removal

The Sabi River Sun relies on municipal waste removal, but the waste is removed to a waste site near Hazyview where no waste separation takes place. Investigations by the hotel management indicated that no recycling initiatives have been established in the area and that the hotel is situated too far from Nelspruit to make collection of recyclable materials worthwhile. The Sandton Sun & Towers Intercontinental relies on domestic waste removal by the local authority, but space in the service areas of the hotel is limited and waste yards must be managed carefully. Recycling initiatives in the Sandton central business district makes waste separation possible, provided that regular collections of the materials are undertaken.

4.5.2 Infrastructure, energy and water supply

a) Infrastructure

i. Fuel storage

Both hotels are provided with diesel back-up generators. Approximately 250 litres of diesel is stored on the premises for top-up, in addition to the volume of diesel in the priming tank of each generator. Gas is used for cooking, but both facilities use 48 kg bottles and not bulk LP gas vessels.

ii. Sewer system

The sewage effluent from the Sabi River Sun is collected into tanks located below ground but above the 1:100 year floodline on the property. Biological breakdown commences in these collection tanks, from where effluent flows through a pump chamber and into a collection dam. Fluids reaching this dam proceed through four additional settlement tanks. Solids are circulated back to the collection tanks for biological breakdown until it is able to filter through into the four collection tanks. The outflow from the fourth tank is treated with chlorine before the water is fed back to the Sabie River by gravity feed in a 110 mm diameter pipe. At the outlet from the fourth settlement tank, water quality is tested monthly by an independent laboratory. The Sandton Sun & Towers Inter-Continental is connected to the municipal waterborne sewer system.

b) Energy supply

Both the Sabi River Sun and the Sandton Sun & Towers Inter-Continental receive electricity from the municipal supply. Both hotels are provided with back-up generators which use diesel fuel.

c) Potable water supply

The potable water for the Sabi River Sun is extracted from an irrigation canal fed by the Sabie River. A pipeline feeds water by gravity feed into a cistern and from there through a water purification system. The water purification system filters the water through a charcoal filter and the water is chlorinated twice during the process. Water samples are tested by an independent laboratory on a monthly basis. The purified water is pumped to an elevated storage tank, which is also connected to an overflow holding tank. The lower third of the volume of this secondary tank is used for emergency fire fighting. Irrigation water is pumped from one of the dams on the property and is not used as potable water. The Sandton Sun & Towers Inter-Continental is supplied with municipal water that is used for potable water as well as for irrigation.

4.6 Social infrastructure

Aspects covered under this heading include liaison with the local community and social upliftment where hotels could play a role. Both the Sabi River Sun and the Sandton Sun & Towers Inter-Continental play active roles in the local communities with regular donations of condemned linen, crockery or blankets, support to local school cricket teams, providing left-over food to charities and participating in local charity drives.

4.7 Land use

The Sabi River Sun is located 1.5 km from Hazyview, a small nodal village in Mpumalanga that has developed on the intersection between the Sabie-Kruger National Park road and the Nelspruit-Bosbokrant road. The node has developed into a low-key commercial centre providing retail outlets, fast-food outlets, liquor stores, grocery stores and one or two fuel filling stations. It provides a service to the local community of Bosbokrant passing through, as well as to tourists visiting the many resorts in the area. The properties adjacent to the Sabi River Sun are still used as farmland. The Sandton Sun & Towers Inter-Continental is located in a superblock of commercial activity, with high-end retail outlets, restaurants, conference venues and more hotels.

4.8 Access and circulation

The Sabi River Sun is accessed via the road between Sabie and Hazyview and is well marked. There is only one entrance into the property, which ensures security, but complicates differentiation between construction and guest vehicles during upgrading activities. Traffic is never very heavy on the surrounding roads, making the impact of guests travelling to the hotel and/or the impact of construction vehicles on the surrounding roads fairly low.

The Sandton Sun & Towers Inter-Continental is located on the block between Maude and Fifth Streets and Alice Lane in Sandton. Traffic in this area is very busy throughout the day and peak-hour traffic backs up regularly at most intersections. Large functions that result in additional traffic or construction vehicles for upgrading activities could have a serious impact on the traffic in the area.

ANNEXURE E
CRITERIA FOR RATING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS[57]

[57] Reference for photocopies: Department of Environmental Affairs and Tourism. 2002. (f:25-28)

of people. For example, impacts can either be site-specific, local, regional, national or international.

Table 12: Examples of criteria for rating the extent or spatial scale of impacts

	Rating	
	High	Widespread. Far beyond site boundary. Regional/national/international scale.
	Medium	Beyond site boundary. Local area.
	Low	Within site boundary.

Intensity or severity of the impact

A description should be provided as to whether the intensity of the impact is high, medium, low or has no impact in terms of its potential for causing negative or positive effects. The study should attempt to quantify the magnitude of the impacts and outline the rationale used. When country-specific legal or scientific standards are not available, international standards can be used as a measure of the intensity of the impact.

Table 13: Examples of criteria for rating the intensity or severity of impacts

	Rating	
	High	Disturbance of pristine areas that have important conservation value. Destruction of rare or endangered species.
	Medium	Disturbance of areas that have potential conservation value or are of use as resources. Complete change in species occurrence or variety.
	Low	Disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety.

Duration of the impact

It should be determined whether the duration of the impact will be short term (0 to 5 years), medium term (5 to 15 years), long term (more than 15 years, with the impact ceasing after the operational life of the development) or considered permanent.

Table 14: Examples of criteria for rating the duration of impacts

	Rating	
	High (Long term):	Permanent. Beyond decommissioning. Long term (More than 15 years).
	Medium (Medium term):	Reversible over time. Lifespan of the project. Medium term (5 - 15 years).
	Low (Short term):	Quickly reversible. Less than the project lifespan. Short term (0 - 5 years).

Mitigatory potential

The potential to mitigate the negative impacts and enhance the positive impacts should be determined. For each identified impact, mitigation objectives that would result in a measurable reduction in impact should be provided. If limited information or expertise exists, estimates based on experience should be made. For each impact, practical mitigation measures that can affect the significance rating should be recommended. Management actions that could enhance the condition of the environment (i.e. potential positive impacts of the proposed project) should be identified. Where no mitigation is considered feasible, this must be stated and the reasons provided. The rating both with and without mitigation or enhancement actions should be recorded. Quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation action should be provided where appropriate.

Table 15: Examples of criteria for rating the mitigatory potential of impacts

	Rating	
	High:	High potential to mitigate negative impacts to the level of insignificant effects.
	Medium:	Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative effects.
	Low:	Little or no mechanism to mitigate negative impacts.

Acceptability

Criteria and standards that exist for acceptability are either emissions-based or they relate to the receiving environment (e.g. air quality, water quality or noise). Establishing the acceptability of a potential impact is as important as determining its significance. An impact identified as being non-significant by a specialist may be unacceptable to a particular section of the community. On the other hand, a significant impact may be acceptable if, for example, adequate compensation is given. The level of acceptability often depends on the stakeholders, particularly those directly affected by the proposed project. Ratings that can be used for acceptability are given below.

Table 16: Examples of criteria for rating the acceptability of impacts

	Rating	
	High (Unacceptable):	Abandon project in part or in its entirety. Redesign project to remove or avoid impact.
	Medium (Manageable):	With regulatory controls. With project proponent's commitments.
	Low (Acceptable):	No risk to public health.

Degree of certainty

A description should be provided of the degree of certainty of the impact actually occurring as unsure, possible, probable, or definite (impact will occur regardless of prevention measures). Where relevant, there should be some cross-reference to key indices derived from a risk analysis study.

Table 17: Examples of criteria for rating the degree of certainty of impacts

Rating	
Definite:	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.
Probable:	Over 70% sure of a particular fact or of the likelihood of that impact occurring.
Possible:	Only over 40% sure of a particular fact or of the likelihood of an impact occurring.
Unsure:	Less than 40% sure of a particular fact or the likelihood of an impact occurring.

The following additional categories can also be used:

Status of the impact
Specialists should describe whether the impact is positive (a benefit), negative (a cost) or neutral.

Legal requirements
Specialists should identify and list the specific legal and permit requirements, which could potentially be relevant to the proposed project.

6. The Use of Significance at Different Stages of the EIA Process

Evaluating the significance of environmental impacts is a critical component of impact analysis. It is linked and used throughout the EIA process and formal or intuitive evaluations can be made at different stages. An example is in the screening stage, where some countries have prescribed lists of projects, activities or threshold criteria for which an EIA is compulsory. These project lists, activities or threshold criteria are in effect definitions of environmental significance. It is a mistake to think of significance evaluation as being limited to the analysis and impact reporting stage of an EIA. The stages in the EIA process where the concept of significance is used are indicated in Table 18.

The concept of significance has different meanings at different stages of the EIA process (see Table 18). For example, in screening it is used to determine whether an EIA is required or not. In the decision-making stage, significance is used to weigh and rank impacts (positive and negative) and make compromises or trade-offs.

Table 18: Stages in the EIA process where the concept of environmental significance is used

Stage in the EIA process	Objectives	Approaches and methods
Screening	Process that determines whether a project should be subject to an EIA because of its associated potential significant impacts.	Approaches used at this stage include (1) checklists of projects, activities or impacts and/or (2) predefined criteria such as thresholds of significance.
Scoping	Process in which key (significant) issues are raised and the focus is on determining the specific issues or significant impacts that need to be addressed in the EIA.	Approaches used at this stage include (1) facilitation (2) stakeholder engagement (3) negotiation and (4) mediation.
Specialist studies	This stage involves the identification and prediction of project impacts by specialists and the evaluation of their significance.	Approaches used at this stage include (1) numerical calculations or modelling, (2) experiments or tests, (3) physical or visual simulations, (4) mapping and (5) professional judgement.
Environmental impact report	This stage involves the preparation of a report by the EIA practitioner. The EIA practitioner integrates different forms of information and uses impact description and significance criteria to present the results to the decision-maker.	Approaches used at this stage include (1) predefined criteria for evaluating impacts, (2) professional judgement, (3) verbal description, (4) visualization; (5) mapping and (6) matrices.
Decision-making	The decision-maker uses judgement to rate and determine the significance and acceptability of impacts.	Approaches used at this stage include (1) professional judgement and (2) predefined criteria for evaluating, rating and weighting significant impacts.

ANNEXURE F
ASSESSMENT OF THE SIGNIFICANCE OF OPERATIONAL ENVIRONMENTAL IMPACTS OF HOTELS

ASSESSMENT OF THE SIGNIFICANCE OF OPERATIONAL ENVIRONMENTAL IMPACTS OF HOTELS

Environmental impacts for the operational phase of hotels, as identified in Table 20 of Chapter Two of this dissertation, will be assessed in terms of significance in this Annexure. Assessment criteria used for the assessment of significance have been summarised in Annexure E. The criteria of legal requirement listed as optional in the booklet *Significance* in the Integrated Environmental Management Information Series[58], will not be included in this assessment. The assessment of the significance of environmental impacts is still a subjective method, even though the assessment is based on criteria as described in Annexure E.

The overall significance of each environmental impact was determined based on the total criteria with the same ratings, whether high, medium or low, as well as the degree of certainty of the particular impact. For example, one impact scoring a medium significance on three criteria and a high significance on two others, but with a probable degree of certainty, was allocated a medium overall significance. An impact scoring a medium significance on three criteria and high on two others but with a definite degree of certainty was allocated a high overall significance.

1 Location and context

1.1 Environmental impact: Uncontrolled access by guests into an environmentally sensitive area causing damage.

A hotel situated in or adjacent to a sensitive environment as classified in the Integrated Environmental Management (IEM) Procedure, List of Environments[59] may have activities that would negatively impact on sensitive environments, such as uncontrolled access by guests. Guests could walk over rare or endangered plants, or pick flowers and seeds and reduce the regenerative potential of the area.

Table 1: Assessment of significance of uncontrolled access into an environmentally sensitive area

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	High	No impact
Intensity of the impact	High	No impact
Duration of the impact	Medium	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

[58] Department of Environmental Affairs and Tourism. 2002 (f)
[59] Department of Environmental Affairs and Tourism. 1992. (a:12)

1.2 Environmental impact: Flooding of development and damage to structures may be caused to hotels where structures are located below floodlines. This is also a potential safety risk to guests and an insurance risk.

Table 2: Assessment of significance of location of the hotel within floodlines

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	Medium	No impact
Mitigatory potential	Medium	No impact
Acceptability	High	No impact
Degree of certainty	Definite	Definite
Status of the impact	Negative	No impact
Overall significance	**High**	**No impact**

1.3 Environmental impact: Uncontrolled access by guests into a site of cultural significance located on or adjacent to the hotel property could cause irreparable damage to artefacts or structures forming part of the cultural heritage. Guests could remove artefacts and permanently destroy or disfigure culturally significant sites.

Table 3: Assessment of significance of access to a site of cultural significance

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Low	No impact
Acceptability	High	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall Significance	**High**	**No impact**

2 Boundaries

2.1 Environmental impact: Uncontrolled access into an environmentally sensitive area located adjacent to the hotel development. This environmental impact is caused by the same activities that are affected by the location and boundaries of the development. Refer to item 1.1.

2.2 Environmental impact: Hotels located adjacent to economically poor communities could influence these communities, offer financial assistance, charity donations, education opportunities and employment opportunities, or choose to remain removed from the community with no benefit to the local people. The significance of the positive effect a hotel may have on a local community is assessed here.

Table 4: Assessment of significance of location of the hotel adjacent to poor communities

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium to high	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	High	High
Acceptability	Low	Low
Degree of certainty	Definite	Definite
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Medium**

3 Biophysical environment

3.1 Climate

3.1.1 Environmental impact: Dust particles from bare exposed soil surfaces could be blown into the air during windy conditions. Surfaces could be earth paths, unplanted exposed areas or erosion sites. Depending on the size of the area of bare soil, the dust could cause disruption to traffic, be a nuisance to guests and cause a precipitation of dust particles inside the hotel through air-conditioning inlets.

Table 5: Assessment of significance of air pollution from dust particles

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.1.2 Environmental impact: Odours and vapours released into the atmosphere from cooking activities. The odours are fairly quickly distributed and the concentration reduced, but it may be disturbing to surrounding areas or guest rooms located near the air ventilation outlets.

Table 6: Assessment of significance of air pollution from cooking odours and vapours

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.3 Environmental impact: Steam and chemical vapours released to the atmosphere from laundry activities. Concentrations are mostly low, but depending on the type of chemicals used, may cause irritation to people near ventilation outlets.

Table 7: Assessment of significance of air pollution from chemical vapours and steam from laundry

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.4 Environmental impact: Gases and particulates released into the atmosphere during operation of emergency back-up diesel generator. This will reduce in concentration with distance from source, but may affect the person operating the generator.

Table 8: Assessment of significance of air pollution from gas and particulates from diesel generator

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.5 Environmental impact: Gas may leak from the bulk gas storage vessel, gas main supply line or gas bottles into the atmosphere, causing health risks to guests. Gas is heavier than the atmosphere and will settle into low points where its accumulation could be fatal to humans.

Table 9: Assessment of significance of air pollution from gas leaks from the gas supply

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.6 Environmental impact: Refrigerants with ozone-depleting potential released via leaks in the air-conditioning system, causing damage to the ozone in the atmosphere. Older air-conditioning units still use refrigerants with higher ozone-depleting potential.

Table 10: Assessment of significance of the release of refrigerants with ozone-depleting potential from air-conditioning systems into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.7 Environmental impact: Spreading and transmitting of viruses and bacteria via the air-conditioning system, causing contamination of the internal air quality and health hazards to guests and staff.

Table 11: Assessment of significance of air pollution with viruses and bacteria from the air-conditioning system

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Medium	Medium
Duration of the impact	Medium	Medium
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.8 Environmental impact: Waste heat from the air-conditioning system will be released into the external areas around the hotel. This affects the microclimate directly adjacent to the air-conditioning outlet and may negatively affect plants growing against the buildings.

Table 12: Assessment of significance of waste heat released into the external areas of the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Permanent	Permanent
Mitigatory potential	Low	Low
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.9 Environmental impact: Particulates, CO_2, CO, NO_x and SO_x released from fireplaces and cooking fires, from burning fossil fuels during use. This will reduce in concentration from

source, but may affect people sitting in the room where the fireplace is located. The same applies where wood and other fossil fuels are used for cooking food, for example during construction.

Table 13: Assessment of significance of air pollution from fireplaces and cooking fires

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Low	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.1.10 Environmental impact: Possible leaks of refrigerants with ozone-depleting potential from refrigeration units. Older refrigerants with high ozone-depleting potential will cause more damage to atmospheric ozone than modern refrigerants with low ozone-depleting potential. Older equipment still uses refrigerants with high ozone-depleting potential.

Table 14: Assessment of significance of the release of CFCs from refrigeration units into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.11 Environmental impact: Possible release of CFCs into the atmosphere during the use of aerosol cans for housekeeping and maintenance. The use of CFCs as propellants in aerosol cans has largely been stopped, but care should be taken when stocks are purchased.

Table 15: Assessment of significance of the release of CFCs from aerosol cans

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.12 Environmental impact: Release of CO_2 from fire extinguishers during use. This is unavoidable when specific kinds of fire extinguishers are used. Extinguishers may also leak CO_2 and regular pressure tests will assist in avoiding or detecting leaks.

Table 16: Assessment of significance of the release of CO_2 from fire extinguishers

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	Low	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.13 Environmental impact: CO_2 released into the atmosphere during the use of carbonated drinks machines. Very little can be done about this, however the danger of potential leaks and ruptured gas vessels can be avoided by purchasing carbonated drinks in cans.

Table 17: Assessment of significance of the release of CO_2 from carbonated drinks machines into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.14 Environmental impact: Possible chemical vapours from chemical storage areas released into the atmosphere, either by leaks, spills or during decanting.

Table 18: Assessment of significance of the release of chemical vapours from chemical storage area into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.15 Environmental impact: CO_2, NO_x and SO_x released into the atmosphere during operation of vehicles from the vehicle fleet.

Table 19: Assessment of significance of the release of CO_2, NO_x, SO_x from vehicle fleet into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	Medium	Medium
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.16 Environmental impact: Release of particulates, CO and CO_2 into the atmosphere during the operation of boilers using fossil fuels. Neither of the hotels studied uses boilers burning fossil fuels. Electricity in South Africa is still generated by the burning of fossil fuels, but the use of electricity has a secondary impact on the release of particles and CO_2 into the atmosphere.

Table 20: Assessment of significance of the release of particulates and CO_2 into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Secondary impact	Secondary impact
Intensity of the impact	Secondary impact	Secondary impact
Duration of the impact	Secondary impact	Secondary impact
Mitigatory potential	Secondary impact	Secondary impact
Acceptability	Secondary impact	Secondary impact
Degree of certainty	Definite	Definite
Status of the impact	Secondary impact	Secondary impact
Overall significance	**Secondary impact**	**Secondary impact**

3.1.17 Environmental impact: CO_2, NO_x and SO_x released into the atmosphere from leaks or spills from fuel storage area. This may occur either during filling of the storage tanks or decanting from these storage tanks, or during accidental spills.

Table 21: Assessment of significance of the release of CO_2, NO_x and SO_x from fuel spills into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.1.18 Environmental impact: Harmful chemicals released into the atmosphere during the application of pesticides and herbicides. The scale of the negative effect on the person applying the chemical and on people in the area will depend on the type of chemical used.

Windy conditions will also assist in spreading the chemical over a larger area, therefore affecting a larger area and potentially more people.

Table 22: Assessment of significance of the release of harmful chemicals from pesticides and herbicides into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.1.19 Environmental impact: Odours and gases from sewage treatment plant released into the atmosphere as part of evaporation and the natural processes in the plant.

Table 23: Assessment of significance of the release of odours and gases from the sewage treatment plant into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Medium	No impact
Mitigatory potential	High	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.1.20 Environmental impact: Evaporation of chlorine during operation of the sewage treatment plant and water purification plant, or accidental leaking of chlorine gas from bulk storage vessel.

Table 24: Assessment of significance of the evaporation or leaking of chlorine from sewage treatment plant and water purification plant

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium to High	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.1.21 Environmental impact: Chlorine from the swimming pool released into the atmosphere during evaporation.

Table 25: Assessment of significance of the release of chlorine from the swimming pool into the atmosphere

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	Low	Low
Duration of the impact	Medium	Medium
Mitigatory potential	High	High
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Low**

3.1.22 Environmental impact: Particulates and noxious gases released into the atmosphere from burning of domestic waste in rural areas.

Table 26: Assessment of significance of the release of particulates and noxious gases into the atmosphere during burning of domestic waste

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.2 Topography

3.2.1 Environmental impact: Visual benefit to the development due to views towards surrounding areas.

Table 27: Assessment of significance of the visual benefit of views towards surrounds

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	High
Intensity of the impact	Low	Medium
Duration of the impact	Low	High
Mitigatory potential	High	Low
Acceptability	Low	Low
Degree of certainty	Probable	Definite
Status of the impact	Positive	Positive
Overall significance	**Low**	**High**

3.2.2 Environmental impact: Visual and light pollution from the development due to its visibility from surrounding areas.

Table 28: Assessment of significance of the visibility of the development from surroundings

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Medium
Intensity of the impact	Low	Medium
Duration of the impact	Low	Medium
Mitigatory potential	High	Low
Acceptability	Low	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Medium**

3.3 Soil

3.3.1 Environmental impact: Potential soil erosion due to sandy soils and increased stormwater runoff. This is caused by leaving bare soil unplanted, or poor maintenance of gravel footpaths in a rural environment.

Table 29: Assessment of significance of erosion of sandy soils and increased storm-water runoff

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.3.2 Environmental impact: Potential waterlogging and poor stormwater drainage due to clayey soils. This may cause danger or discomfort to guests as they may slip on lawns or damage their shoes. It may also cause maintenance problems in maintaining lawn in waterlogged areas where soil structure is easily damaged.

Table 30: Assessment of significance of waterlogging and poor stormwater drainage due to clayey soils

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Low	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.3.3 Environmental impact: Potential soil erosion due to increased runoff from hard surfaces has a similar environmental impact as sandy soils and will affect only those developments that have a potential for soil erosion. Refer to item 3.2.1.

3.3.4 Environmental impact: Potential contamination of bare soil and, as a secondary impact, groundwater, owing to accidental spills of chemicals such as pesticides, herbicides, chlorine or hydrochloric acid, fuel or hazardous substances.

Table 31: Assessment of significance of contamination of soil and groundwater due to accidental spills of chemicals, fuel or hazardous substances

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	Low	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.3.5 Environmental impact: Potential contamination of soil and, as a secondary impact, groundwater, owing to seepage from incorrect storage of hazardous waste and leaching from waste foodstuffs into bare soil in waste yards.

Table 32: Assessment of significance of contamination of soil and groundwater due to seepage from incorrect storage of hazardous waste and waste foodstuffs

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	Low	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.3.6 Environmental impact: Potential contamination of soil and, as a secondary impact, groundwater, owing to accidental spills of chemicals such as pesticides, herbicides, chlorine, hydrochloric acid or over-fertilisation of gardens during storage, decanting or maintenance.

Table 33: Assessment of significance of contamination of soil and groundwater due to seepage and accidental chemical spillage

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	Low	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.3.7 Environmental impact: Potential erosion and loss of topsoil due to over-watering by irrigation system.

Table 34: Assessment of significance of soil erosion and loss of topsoil due to over watering

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	High	High
Acceptability	Medium	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.3.8 Environmental impact: Potential contamination of soil and, as a secondary impact, groundwater, owing to incorrect disposal of redundant chemicals or chemical containers from beauty salon or garden maintenance activities.

Table 35: Assessment of significance of contamination of soil and groundwater due to seepage from incorrect disposal of chemicals

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Low
Duration of the impact	Low	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.3.9 Environmental impact: Potential contamination of soil and, as a secondary impact, groundwater, due to the incorrect disposal of soapy water from housekeeping onto bare soil.

Table 36: Assessment of significance of contamination of soil and groundwater due to incorrect disposal of soapy cleaning water

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.3.10 Environmental impact: Potential erosion and loss of topsoil due to lack of maintenance of gravel footpaths. The same environmental impact is discussed under item 3.3.1.

3.3.11 Environmental impact: Contamination of soil and, as a secondary impact, groundwater, due to the incorrect disposal of grease from kitchen grease trap. This may occur where grease from the grease trap is disposed of with domestic waste or buried underground on the property.

Table 37: Assessment of significance of contamination of soil and groundwater due to the incorrect disposal of grease from kitchen grease trap

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Medium
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.3.12 Environmental impact: Contamination of soil and groundwater due to oil leaks from vehicles parking on bare soil.

Table 38: Assessment of significance of contamination of soil and groundwater due to oil leaks from parked vehicles

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	Low	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.4 Hydrology

3.4.1 Environmental impact: Potential saving of water due to re-use of grey water for irrigation or from retention of stormwater on site. The Sandton Sun & Towers Inter-Continental collects water from the cooling tanks for the air-conditioning system and stores this in a tank that is used for irrigation of the gardens.

Table 39: Assessment of significance of water saving due to re-use of grey water or retention of stormwater

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Medium**

3.4.2 Environmental impact: Damage to development by floods and potential safety risk to guests caused by flooding. Due to the fact that advance warning is usually given to low-lying areas during heavy rains, guests would most probably be evacuated before the flood impacts on the facility. Structures are also all located above the floodlines, and only recreation areas are situated below the floodlines.

Table 40: Assessment of significance of damage to development by floods

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	Medium	No impact
Mitigatory potential	High	No impact
Acceptability	Medium	No impact
Degree of certainty	Definite	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.4.3 Environmental impact: Purity of water for use as drinking or irrigation water. This affects any water supply to the hotel, whether it is municipal, from a borehole or from a stream or river on the property.

Table 41: Assessment of significance of purity of water for use as drinking or irrigation water

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	High	Low
Mitigatory potential	High	Low
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Neutral	Neutral
Overall significance	**Medium**	**Low**

3.4.4 Environmental impact: Depletion of water as a natural resource by excessive use of potable water for irrigation and operation of the hotel. The effect of the excessive use will not directly impact on the hotel or guests in the short term, but may have a cumulative effect and later cause a general depletion of the resource.

Table 42: Assessment of significance of depletion of natural resource by excessive use of potable water

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.4.5 Environmental impact: Depletion of a natural resource by abstraction of water from rivers. The effect of the excessive use will not directly impact on the hotel or guests in the short term, but may have a cumulative effect and later cause a general depletion of the resource. Permits and water use volume allocations must govern the abstraction of water directly from rivers, dams or streams.

Table 43: Assessment of significance of depletion of water as natural resource

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.4.6 Environmental impact: Potential contamination of surface and/or groundwater due to accidental chemical or fuel spills.

Table 44: Assessment of significance of contamination of water due to chemical and fuel spills

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	Medium	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.4.7 Environmental impact: Potential increased siltation of rivers due to silt from bare surfaces washing into stormwater.

Table 45: Assessment of significance of increased siltation of rivers

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.4.8 Environmental impact: Potential loss of sensitive habitats and biodiversity due to uncontrolled access into wetlands or ecologically sensitive areas by guests or during maintenance activities.

Table 46: Assessment of significance of loss of sensitive habitats and biodiversity due to uncontrolled access

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	Medium	No impact
Mitigatory potential	High	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**High**	**No impact**

3.4.9 Environmental impact: Potential benefit of recharging the groundwater supply by retention of stormwater on site and a slower release into the areas downstream.

Table 47: Assessment of significance of recharging groundwater supply by stormwater retention on site

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Positive	No impact
Overall significance	**Medium**	**No impact**

3.4.10 Environmental impact: Potential contamination of surface or stormwater due to overflowing of external grease trap linked to the kitchen and caused by poor maintenance or disposal of waste food into sewage system.

Table 48: Assessment of significance of contamination of surface or stormwater due to overflowing grease traps or sewage system

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

3.4.11 Environmental Impact: Potential contamination of surface water from chemicals washed into sewage during cleaning.

Table 49: Assessment of significance of contamination of surface water due to chemicals washed into sewer during cleaning

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.4.12 Environmental impact: Potential release of waste heat into surface water from chemical reactions at sewage treatment plant. This may affect the water temperature of the river into which the effluent is discharged.

Table 50: Assessment of significance of release of waste heat from sewage treatment plant into rivers

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	High	No impact
Mitigatory potential	Low	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Low**	**No impact**

3.4.13 Environmental impact: Potential release of toxins, nutrients and pesticides into river system due to inadequate treatment of sewage at treatment plant. This will have an impact on the biodiversity of the organisms in the stream or river and may increase nutrients to encourage weed growth and choke the river.

Table 51: Assessment of significance of contamination of surface water from sewage treatment plant

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	No impact
Acceptability	High	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**High**	**No impact**

3.4.14 Environmental impact: Potential contamination of wetland areas by effluent from sewage treatment plant. This should not be a problem in a carefully designed system where the discharge from the sewage system is filtered prior to its reaching the wetland areas. However, in flood situations this could become a consideration.

Table 52: Assessment of significance of contamination of wetland due to effluent from sewage treatment plant

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**High**	**No impact**

3.4.15 Environmental impact: Potential contamination of surface and groundwater by pesticides and/or fertiliser used in garden and golf course maintenance activities.

Table 53: Assessment of significance of contamination of surface and groundwater by pesticides and fertilisers

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.4.16 Environmental impact: Potential contamination of surface water from washing of guests' vehicles. Fuel and oil leaking from these vehicles, as well as detergents entering the storm water system directly, will impact on surface water quality.

Table 54: Assessment of significance of contamination of surface water from washing of guests' vehicles

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.4.17 Environmental impact: Potential contamination of surface water by backwash water from swimming pool.

Table 55: Assessment of significance of contamination of surface water by backwash water from swimming pool

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.5 Flora

3.5.1 Environmental impact: Potential loss of biodiversity due to planting of exotic vegetation or monocultured landscapes in hotel gardens.

Table 56: Assessment of significance of loss of biodiversity due to planting exotic gardens

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Low
Duration of the impact	High	Low
Mitigatory potential	Low	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**High**	**Low**

3.5.2 Environmental impact: Potential loss of biodiversity through allowing declared alien invasive species to proliferate.

Table 57: Assessment of significance of loss of biodiversity due to alien invasive species invading hotel gardens/grounds

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Low
Duration of the impact	High	Low
Mitigatory potential	Medium	High
Acceptability	Medium	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

3.5.3 Environmental impact: Potential loss of biodiversity and natural resources through using indigenous wood as fuel in fireplaces or for African artwork and curios.

Table 58: Assessment of significance of loss of biodiversity and natural resources through use of indigenous wood at hotels

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	None
Acceptability	Medium	No impact

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

3.5.4 Environmental impact: Control of invasive exotic species through use as firewood in fireplaces and for African artwork and curios.

Table 59: Assessment of significance of control of invasive exotic species through use of exotic wood

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Low
Duration of the impact	High	Low
Mitigatory potential	Medium	Medium
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Low**

3.6 Fauna

3.6.1 Environmental impact: Potential loss of biodiversity and rare/threatened species due to change in ecological character of the area around the hotel.

Table 60: Assessment of significance of loss of biodiversity due to change in ecological character

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	High	No impact
Duration of the impact	High	No impact
Mitigatory potential	Medium	No impact
Acceptability	Medium	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

4 Socio-economic environment

4.1 Economic environment

4.1.1 Environmental impact: Economic upliftment and improved housing and education levels due to employment opportunities for members of local communities at hotels.

Table 61: Assessment of significance of economic upliftment of local communities through employment opportunities

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Medium**

4.2 Waste management

4.2.1 Environmental impact: Potential contamination of soil and groundwater and increased waste due to disposal of unsorted waste, including foodstuffs, chemical containers and organic waste from gardens.

Table 62: Assessment of significance of contamination of soil and groundwater and increased waste due to disposal of unsorted waste

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.2.2 Environmental impact: Potential contamination of soil and groundwater with hazardous waste such as fluorescent tubing and chemicals from swimming pool, beauty salon and maintenance yard.

Table 63: Assessment of significance of contamination of soil and groundwater due to incorrect disposal of hazardous waste

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	High	High
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**High**	**High**

4.2.3 Environmental impact: Possible health risk of attracting vermin and pests to poorly managed waste yard with waste foodstuffs.

Table 64: Assessment of significance of health risk of waste foodstuffs stored in waste yard

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Intensity of the impact	Medium	Medium
Duration of the impact	Medium	Medium
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.2.4 Environmental impact: Potential increase in waste to landfill and loss of potential recyclable resources from all sites at the hotel, including convenience store, maintenance yard, beauty salon, kitchen and housekeeping services.

Table 65: Assessment of significance of loss of recyclable resources and increased waste to landfill

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.2.5 Environmental impact: Potential contamination of soil and groundwater from seepage from waste yard onto bare soil.

Table 66: Assessment of significance of contamination of soil and groundwater from seepage from waste yard

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Medium	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

4.2.6 Environmental impact: Possible contamination of soil in gardens with ash from fireplaces.

Table 67: Assessment of significance of contamination of soil with ash from fireplaces

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	No impact
Intensity of the impact	Low	No impact
Duration of the impact	Low	No impact
Mitigatory potential	High	No impact
Acceptability	Low	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Low**	**No impact**

4.2.7 Environmental impact: Possible contamination of soil by hazardous waste incorrectly disposed of into the domestic waste stream, such as waste oil and lubricants from servicing of vehicle fleet.

Table 68: Assessment of significance of contamination of soil through incorrect disposal of hazardous waste

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.3 Infrastructure, energy and water supply

4.3.1 Environmental impact: Possible contamination of soil and groundwater through potential leaks or spills from fuel storage tanks.

Table 69: Assessment of significance of contamination of soil and ground water through fuel spills and/or leaks

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Low	Low
Mitigatory potential	High	High
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

4.3.2 Environmental impact: Utilising non-renewable resources such as fossil fuels to generate electricity supply to hotels. This is not an impact that could be directly influenced by hotels since electricity to both hotels is supplied by the local authorities.

Table 70: Assessment of significance of utilisation of non-renewable resources (fossil fuels) for electricity generation

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Secondary impact	Secondary impact
Intensity of the impact	Secondary impact	Secondary impact
Duration of the impact	Secondary impact	Secondary impact
Mitigatory potential	Secondary impact	Secondary impact
Acceptability	Secondary impact	Secondary impact
Degree of certainty	Probable	Probable
Status of the impact	Secondary impact	Secondary impact
Overall significance	**Secondary impact**	**Secondary impact**

4.3.3 Environmental impact: Noxious gases released into the atmosphere during the generation of electricity from fossil fuels. This is not an impact that could be directly influenced by hotels since electricity to both hotels is supplied by the local authorities.

Table 71: Assessment of significance of noxious gases released into the atmosphere through burning fossil fuels for electricity generation

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Secondary impact	Secondary impact
Intensity of the impact	Secondary impact	Secondary impact
Duration of the impact	Secondary impact	Secondary impact
Mitigatory potential	Secondary impact	Secondary impact
Acceptability	Secondary impact	Secondary impact
Degree of certainty	Probable	Probable
Status of the impact	Secondary impact	Secondary impact
Overall significance	**Secondary impact**	**Secondary impact**

4.3.4 Environmental impact: Possible reduction in the use of non-renewable resources by using alternative energy sources for the generation of electricity to the hotels. As a long-term project this could be investigated, but to date alternative energy sources for electricity generation have not been cost effective.

Table 72: Assessment of significance of reduction in the use of non-renewable resources for electricity generation

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Medium**

4.3.5 Environmental impact: Release of particulates and noxious gases into the atmosphere through using diesel back-up generators. This impact was assessed under item 3.1.4 of this Annexure.

4.3.6 Environmental impact: Utilising electricity, and indirectly non-renewable resources, for catering, washing dishes, laundry and cooling/storage of foodstuffs, making ice, lights left burning in rooms that are not in use.

Table 73: Assessment of significance of utilising electricity in services to guests and carelessness by guests

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.3.7 Environmental impact: Utilising water as non-renewable resource for cooking and laundry, taps left dripping by guests or careless maintenance.

Table 74: Assessment of significance of utilising water in services to guests and carelessness by guests and staff

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.4 Social infrastructure/community involvement

4.4.1 Environmental impact: Social upliftment through hotel participating in charity or education drives in the local community.

Table 75: Assessment of significance of social upliftment through participation of hotel in community charities or education initiatives

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	Medium	Medium
Duration of the impact	Medium	Medium
Mitigatory potential	High	High
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**Medium**	**Medium**

4.4.2 Environmental impact: Increased environmental awareness in local community and among staff through hotels supporting or initiating environmental programmes.

Table 76: Assessment of significance of increased environmental awareness through hotel actions

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	Medium	Medium
Mitigatory potential	High	High
Acceptability	Low	Low
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Overall significance	**Medium**	**Medium**

4.4.3 Environmental impact: Increased employment in local community through employment at hotel or outsourcing of services to local community members/businesses.

Table 77: Assessment of significance of increased employment through hotel actions

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	Medium
Duration of the impact	High	High
Mitigatory potential	High	High
Acceptability	Low	Medium
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**High**	**Medium**

4.5 Land use

4.5.1 Environmental impact: Potential to initiate similar developments in the area. Depending on the economic climate, this environmental impact may be positive or negative. Depending on the sensitivity of the site selected for additional development and the sensitivity of the development itself towards the environment, this impact may also be positive or negative. However, in the light of the current growth in the country's tourism market, the author of this dissertation has interpreted the environmental impact as positive.

Table 78: Assessment of significance of initiating similar developments in the area

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	High	Medium
Intensity of the impact	High	Medium
Duration of the impact	High	High
Mitigatory potential	Low	Low
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Positive	Positive
Overall significance	**High**	**Medium**

4.5.2 Environmental impact: Safety issues related to the location of the hotel in high crime-risk areas.

Table 79: Assessment of significance of safety where hotels are located in high crime-risk areas

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	High
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	High	High

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**High**	**High**

4.5.3 Environmental impact: Noise and light pollution affecting the hotel from surrounding properties with floodlights or busy roads, airports or railway lines.

Table 80: Assessment of significance of noise and light pollution on the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Low
Intensity of the impact	High	Medium
Duration of the impact	Low	Low
Mitigatory potential	Low	Low
Acceptability	High	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.5.4 Environmental impact: Noise and light pollution caused by the hotel when catering for functions or sports events in quiet surroundings.

Table 81: Assessment of significance of noise and light pollution caused by the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Medium
Duration of the impact	Low	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Medium**

4.6 Access and circulation

4.6.1 Environmental impact: Possible traffic increase and congestion due to large functions or events at hotel that will draw crowds.

Table 82: Assessment of significance of traffic congestion due to events or functions at the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Low	Medium
Intensity of the impact	Low	High
Duration of the impact	Low	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Low**	**Medium**

5 Cultural and historic environment

5.1 Environmental impact: Potential damage to structures, sensitive artefacts/areas through uncontrolled access and movement of guests.

Table 83: Assessment of significance of damage to structures, sensitive artefacts/areas

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	No impact
Intensity of the impact	Medium	No impact
Duration of the impact	High	No impact
Mitigatory potential	Low	No impact
Acceptability	High	No impact
Degree of certainty	Probable	Definite
Status of the impact	Negative	No impact
Overall significance	**Medium**	**No impact**

5.2 Environmental impact: Visual intrusion or light pollution caused by the hotel from spotlights illuminating buildings, entrances and outdoor sports facilities.

Table 84: Assessment of significance of light pollution caused by the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	High	Low
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	Medium	Low
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

5.3 Environmental impact: Potential visual intrusion by new buildings visible in the natural surroundings or new architectural style not blending into the surroundings.

Table 85: Assessment of significance of visual intrusion into the surroundings by new buildings

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Medium
Intensity of the impact	High	Low
Duration of the impact	High	High
Mitigatory potential	Medium	Medium
Acceptability	High	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**High**	**Medium**

5.4 Environmental impact: Noise pollution caused by the hotel through music played during functions or over the public address system, noisy activities or games, or players at outdoor facilities, or loud maintenance activities.

Table 86: Assessment of significance of noise pollution caused by the hotel

Criteria of impact magnitude	Sabi River Sun	Sandton Sun & Towers Inter-Continental
Extent of the impact	Medium	Low
Intensity of the impact	Medium	Low
Duration of the impact	Low	Low
Mitigatory potential	Medium	Medium
Acceptability	Medium	Medium
Degree of certainty	Probable	Probable
Status of the impact	Negative	Negative
Overall significance	**Medium**	**Low**

ANNEXURE G
PRECAUTIONS AGAINST *Legionella pneumophilia.*

PRECAUTIONS AGAINST *Legionella pneumophilia.*

The International Hotels Environment Initiative[60] stipulates precautions against *Legionella pneumophilia* :

> *Legionella is a bacterium that is widespread in natural sources of water and also exists in building water services. It colonizes many hot water recirculating systems, particularly large complex systems such as those found in hotels. It is thought to reach these systems through low-level contamination of the public water supply, through wind-blown droplets reaching open tanks and cooling towers, or through pipe work being contaminated during building construction. Sludges - such as iron oxide - in the bottom of calorifiers and elsewhere allow the bacterium to multiply.*
>
> *Susceptible people who inhale … small droplets of water contaminated by Legionella can develop a form of pneumonia. Several conditions must be met for this to occur:*
>
> 1. *the Legionella must be virulent and present in sufficient numbers to cause infection;*
> 2. *it must be carried to the host without too much injury during transport;*
> 3. *it must reach the deepest part of the lungs; and the host's defence system must be unable to stop the infection.*
>
> *The bacteria are difficult to eradicate completely, so prevention takes the form of minimizing the concentration of the bacteria in the water and preventing the occurrence of very small droplets. The temperature of stored water is critical. The optimum temperature for the bacterium to multiply is 37°C, but it ceases at 45°C although it will survive at higher temperatures -a matter of hours at 50°C and a matter of minutes above 60°C. It remains dormant below 20°C. A rise in temperature from the level where it is dormant to that where it is favourable causes active multiplication.*
>
> - *Systems should be designed with short pipe runs and no dead legs. Tanks should be connected in series to eliminate stagnant water.*
> - *Non-metallic tanks (such as fibreglass) or rubber tank linings are recommended.*
> - *Cold water should circulate at temperatures below 20C, and cold-water services should not be placed near heat sources.*

[60] International Hotels Environment Initiative. (1996:94)

- *Hot water should be stored above 60ºC and circulated above 50ºC. Lag calorifiers and hot water pipes to ensure that these temperatures are maintained.*
- *All newly installed pipe work for hot or cold-water services should be sterilized on commissioning and before being brought into use.*
- *Inspect storage tanks and calorifiers annually, remove all sludge, scale*
- *and sediment and sterilize before bringing back into use.*
- *De-scale and disinfect showerheads routinely.*
- *Cooling towers should be sited as far away as possible from air-conditioning and ventilation inlets and from opening windows and occupied areas. They should be constructed to facilitate cleaning and maintenance and use materials which do not promote bacterial growth.*
- *Cooling systems should have an established water treatment programme monitoring, logging and controlling scale and corrosion. Complementary biocides are used alternately for weekly shock treatment. Constantly blow down to limit concentration of salts.*
- *Checks for Legionella should be conducted at six-monthly intervals.*
- *All cooling systems should be stripped down, cleaned and disinfected at least twice a year in addition to regular water treatment.*
- *Disinfection is generally by chlorination so that a level of at least 20 ppm of free residual chlorine is maintained for a given period in cooling towers and higher levels for storage tanks.*
- *Particular care is needed when standby supplies are brought into service in case these are themselves contaminated.*
- *Water treatment activities should be carried out only by those suitably trained and using appropriate safety equipment, including protective clothing and with first aid facilities available. Care should be taken to avoid damage to catering and other equipment which may be affected by the chlorination process.*
- *Effluent from cleaning and maintenance should be neutralized by hose and run off to a foul sewer. Permission to discharge to sewer should be sought from the relevant authorities.*