



SUN CITY CHAIR LIFT

ENVIRONMENTAL  
MANAGEMENT PROGRAMME



**SUN CITY CHAIRLIFT  
ENVIRONMENTAL MANAGEMENT PROGRAMME**



**ENVIRONMENTAL MANAGEMENT PROGRAMME  
JANUARY 2018**

**DATE** : **January 2018**

**EMPLOYER** : **Sun City**

**PSP** : **MDT Environmental (Pty) Ltd**

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## ENVIRONMENTAL MANAGEMENT PROGRAMME

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**FLY PAGE**

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# ENVIRONMENTAL MANAGEMENT PROGRAMME

## 1. INTRODUCTION

### 1.1 **DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER**

The compilation of this Environmental Management Programme (EMPr) was prepared by Mr Deon Esterhuizen of MDT Environmental (Pty) Ltd (MDTE). For a detailed description of expertise and previous project experience of the author please refer to **Annexure A** for the curriculum vitae of the Environmental Assessment Practitioner (EAP).

### 1.2 **PROJECT BACKGROUND**

The proposed Sun City Chairlift Project involves the construction and operation of a 900 metres (m) long chairlift from a site 85 m from the Welcome Centre to the top of the Sun City Mountain. The chairlift will consist of a top and bottom station, with 30 two-seater chairs suspended from a moving wire rope. The idea would be for the chairs to move just above the tree tops. The objective of the proposed Sun City Chairlift Project is to provide the guests the opportunity to visit the Sun City Star and the Zip Line which have been constructed on top of the Sun City Mountain. The facility also includes the construction of an ablution facility that can accommodate 400 guests during peak times. Potable water and sewage will be delivered to the site via an 850m pipe network within the existing access route servitude and connecting with the existing staff accommodation sewer and potable network or the guest / hotel sewer and potable network.



This document is the EMPr for the Sun City Chairlift Project and is based on legislative requirements as per the National Environmental Management Act (No 107 of 1998) and in particular the Environmental Impact Assessment Regulations of 2014, as amended.

### 1.3 **NEED FOR THE PROJECT**

One of the key growth objectives of the Moses Kotane Local Municipality is a Heritage park, specifically the Pilanesberg/ Madikwe Corridor (Heritage Park) with the focus to create major new tourism initiatives within the Moses Kotane Local Municipality. The chairlift has the potential to act as a catalyst for greater economic investment into the municipality in support of one of the

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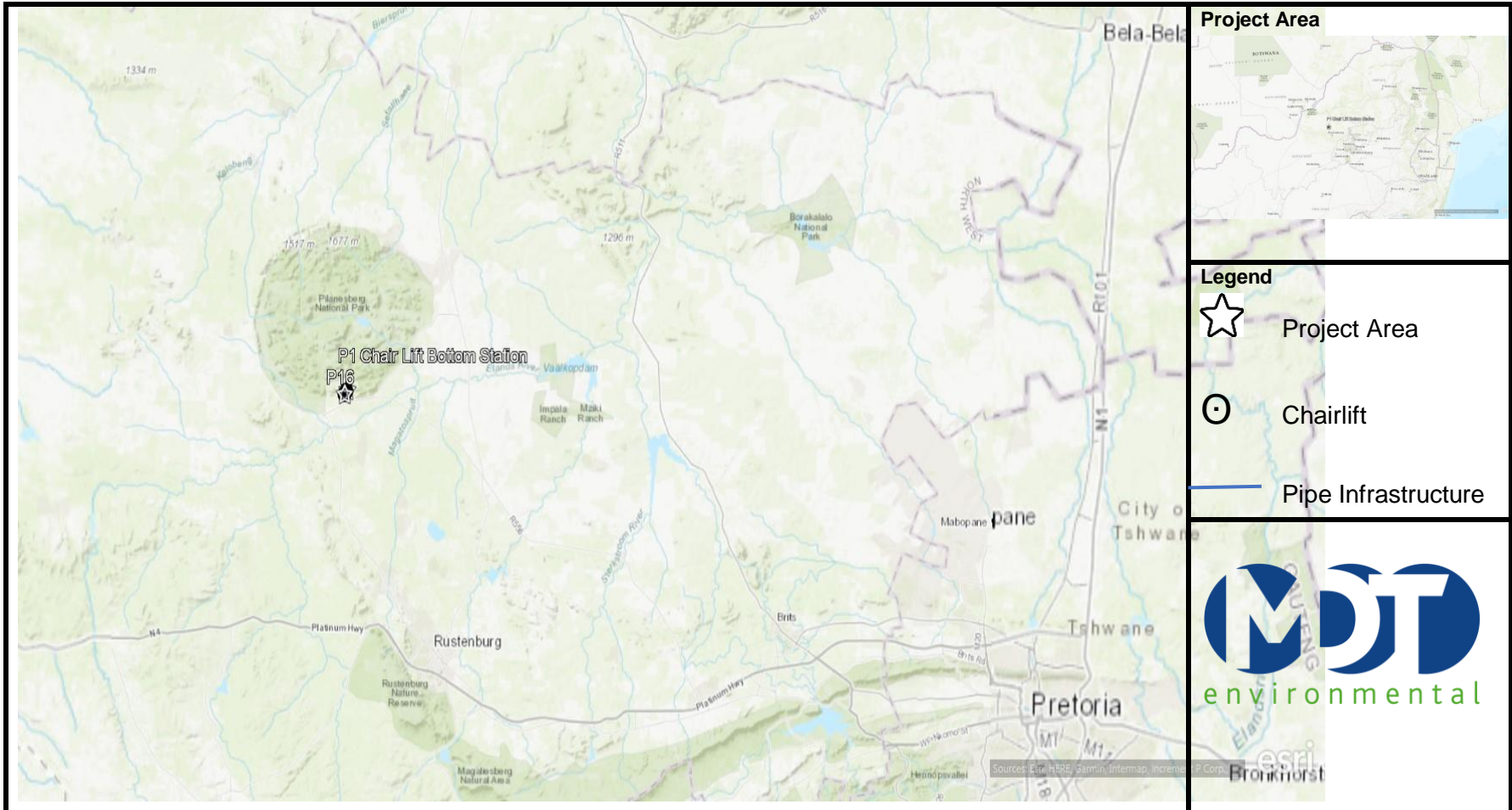
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key growth objectives identified in the Integrated Development Plan of Moses Kotane Local Municipality.

#### 1.4 **PROJECT LOCATION**



The Project is located within the Sun City Resort north of Rustenburg in the Bojanala Platinum District Municipality (**Figure 1-1**), and Moses Kotane Local Municipality, North West Province, on the farms Ledig 909 JQ, Portion 7 and the remaining extent of Portion 1 of the farm Doornhoek 910 JQ.

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**Figure 1-1: Sun City Locality**

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The Sun City Chairlift Project alignment is illustrated in more detail in **Figure 1-2** below. A contour plan, technical layout, and profile are attached as **Annexure B, C** and **D**, respectively.

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**Figure 1-2: Map indicating the location and alignment of Sun City Chairlift Project**

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## 1.5 SCOPE AND PURPOSE OF THE DOCUMENT

This document is applicable to the Sun City Chairlift Project. It is a management programme to be complied with by the developer and his contractor during the construction and rehabilitation phases of the Project and encompasses associated environmental aspects of the works.



The purpose of this document is to provide guidelines for the application of environmental best practice to Sun City and its appointed Contractor commissioned to construct the proposed project.

This document shall be seen as part of the contract with the appointed contractor. The EMPr together with appropriate enabling clauses will thus be part of the enquiry document to make recommendations and constraints, as set out in this document, enforceable under the general conditions of the contract. It must be ensured that relevant environmental management specifications as contained in the EMPr are incorporated into the tender and contract documentation. Relevant payment items must be incorporated into the bill of quantities. During the tender evaluations, the ability of the potential contractors to adequately manage the environmental issues must be assessed.

The EMPr has a long-term objective to ensure that:

- Environmental management considerations are implemented from the start of the project;
- Precautions against damage and claims arising from damage are taken timeously; and
- The completion date of the contract is not delayed due to avoidable environmental issues arising that could be mitigated through a well-structured EMPr.

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## 2. LEGISLATIVE AND OTHER REQUIREMENTS

The management and mitigation of the environmental impacts experienced during construction is governed by environmental legislation. It is of utmost importance that this project is constructed in compliance with all relevant environmental legislation whether; National, Provincial and/or Local.

The environmental legislative framework and components for South Africa can best be unpacked and summarised as follows:

### **The Constitution of South Africa (Act No 108 of 1996)**

In accordance with the Constitution, the Government of South Africa has separate national, provincial and local levels that are mutually dependant and interconnected. All three areas of government have legislative and administrative functions and thus have responsibility for the management of the environment.

The Bill of Rights (Chapter 2 of the Constitution) is a fundamental cornerstone of environmental law in South Africa and makes provisions for environmental issues.

Section 24 of the Bill of Rights states that:



“Everyone has the right -

- a. to an environment that is not harmful to their health or well-being; and
- b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
  - i.) prevent pollution and ecological degradation;
  - ii.) promote conservation; and
  - iii.) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.

### **Common Law**

South Africa’s common law is composed of the foundational Roman-Dutch legal principles as modified and interpreted by judicial precedent.

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**National Legislation pertaining to this Project:**

- National Environmental Management Act (No 107 of 1998)
- National Environmental Management: Biodiversity Act (No 10 of 2004)
- National Environmental Management: Waste Act (No 59 of 2008)
- National Water Act (No 36 of 1998)
- National Heritage Resources Act (No 25 of 1999)
- National Road Traffic Act (No 93 of 1996)
- Occupational Health and Safety Act (No 85 of 1993)
- Hazardous Substances Act (No 15 of 1973)
- Explosives Act (No 26 of 1956)
- Basic Conditions of Employment Act (No 75 of 1997)
- Promotion of Administrative Justice Act (No 3 of 2000)
- Extension of Tenure Act (No 62 of 1997)
- Prevention of Illegal Eviction and Unlawful Occupation of Land Act (No 19 of 1998)
- Development Facilitation Act (No 67 of 1995)
- Municipal Structures Act (No 117 of 1998)
- Traditional Leadership and Governance Framework Amendment Act (No 23 of 2009)
- Local Government: Municipal Systems Act (No 32 of 2000)

**Provincial Legislation pertaining to this Project:**

- North West Biodiversity Management Act (No 4 of 2016)

**Local By-laws pertaining to this Project:**

- Moses Kotane Municipality:
  - Solid Waste Bylaw (March 2014): Dumping and littering; Collection and removal of refuse; Hazardous waste, Infectious waste and industrial effluent; Storage of infectious waste; Transport of Infectious waste; Removal and disposal of infectious waste; Garden refuse; Builders' refuse, rubble and waste material.
  - Water and Sanitation Bylaw (March 2016): Water conservation and prevention of pollution; Disposal of sewage; Industrial effluent.
  - Spatial Planning and Land-Use Management (February 2016): Establishment of Township or Extension of Boundaries of Township; Rezoning of land; Subdivision and Consolidation; Land Use on Communal Land.

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## 2.1 NATIONAL LEGISLATION

### 2.1.1 National Environmental Management Act (No 107 of 1998)

The NEMA objectives include co-operative environmental governance, sustainable development, environmental justice and the “polluter pays” principle. NEMA Regulations incorporate requirements for environmental impact assessments which are approved or authorised in the form of Environmental Authorisations (EAs).

### 2.1.2 Environmental Impact Assessment Regulations, 2014, as amended

The Environmental Impact Assessment (EIA) Regulations of 2014, as amended are also published under NEMA. Section 19 of these EIA regulations requires the applicant to submit, within 90 days after receipt of the application by the competent authority, a basic assessment and EMPr.

Appendix 4 of the Regulations stipulates the required content of an EMPr. **Table 2-1** indicates these requirements and where it can be found within this EMPr.

**Table 2-1: Content of an EMPr as per the EIA Regulations**



No	Requirement	Reference in EMPr
1a	Details of <ul style="list-style-type: none"> <li>i) The EAP who prepared the EMPr; and</li> <li>ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae;</li> </ul>	Section 1.1 and Annexure A
1b	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 6
1c	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Annexures B, C, and D
1d	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development, including: <ul style="list-style-type: none"> <li>i) Planning and design;</li> <li>ii) Pre-construction activities;</li> <li>iii) Construction activities;</li> </ul>	Section 6 & 10



No	Requirement	Reference in EMPr
	iv) Rehabilitation of the environment after construction and where applicable post closure; and v) Where relevant, operation activities.	
<b>1e</b>	A description and identification of impact management outcomes required for the aspects contemplated in 1d above.	Section 10
<b>1f</b>	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in 1d and 1e above will be achieved.	Section 10
<b>1g</b>	The method of monitoring the implementation of the impact management actions contemplated in 1f above.	Section 5
<b>1h</b>	The frequency of monitoring the implementation of the impact management actions contemplated in 1f.	Section 5 & 10
<b>1i</b>	An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 4
<b>1j</b>	The time periods within the impact management actions must be implemented.	Section 10
<b>1k</b>	The mechanism for monitoring compliance with the impact management actions.	Section 5
<b>1l</b>	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Section 5 & 10
<b>1m</b>	An environmental awareness plan describing the manner in which i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Section 7
<b>1n</b>	Any specific information that may be required by the competent authority.	N/A

### 2.1.3 National Environmental Management: Biodiversity Act (No 10 of 2004)

Permit applications must be made to the relevant authority for the removal of any Red Data or Protected Species found in the proposed alignment and construction areas. These permit applications must be made in conjunction with requirements of the National Forests Act (No 84 of 1998). The identified protected species are listed later in the report.

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The Biodiversity Act also holds Sun City responsible for the eradication of any alien or invasive species which establish on site as a result of the construction activities using methods which are appropriate to the species concerned and the environment in which it occurs.

#### 2.1.4 National Environmental Management: Waste Act (No 59 of 2008)

All wastes, both general and hazardous, generated during the construction of the chairlift and associated infrastructure must be disposed of at an appropriately licensed waste disposal site such as the Sun City waste disposal site. Copies of the permits or licences must be obtained and kept on site before the commencement of construction.

#### 2.1.5 National Water Act (No 36 of 1998)

The construction of the chairlift and associated infrastructure does not require any water use licence, nor the amendment of the existing Sun City water use licence.

#### 2.1.6 National Heritage Resources Act (No 25 of 1999)

According to the NHRA archaeological and destruction permits are required for the removal of a structure or element of cultural significance as well as for the relocation of graves on site.

A Notification of Intent to Develop (NID) was submitted, as part of the HBAR, to the SAHRA and NW-PHRA. The HBAR was compiled to comply with subsection 3(3) of the NHRA.

Should anything of further cultural or heritage significance be discovered during construction, the requirements of the legislation must be followed.



#### 2.1.7 National Road Traffic Act (No 93 of 1996)

Relevant provisions of the Road Traffic Act must be complied with pertaining to the correct licensing for all drivers on site as well as the ensuring that all vehicle and plant is road worthy.

#### 2.1.8 Hazardous Substances Act (No 15 of 1973)

Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which may include the Hazardous Substances Act, the Occupation Health and Safety Act, relevant associated Regulations and applicable SANS and internal standards. The Implementer must ensure that all relevant Material Safety Data Sheets are present on site at all times.

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### 2.1.9 Occupational Health and Safety Act (No 85 of 1993)

All provisions of the Occupational Health and Safety Act must be complied with. The Act must not only provide for the health and safety of the persons connected to the construction but also the persons in the surrounding areas which are affected by the construction.



### 2.1.10 Explosives Act (No 26 of 1956)

Blasting permits must be present on site before construction can commence. These permits must be acquired from the Department of Mineral Resources in accordance with the Explosives Act (Act No 26 of 1956).

### 2.1.11 Basic Conditions of Employment Act (No 75 of 1997)

The Basic Conditions of Employment Act details employment conditions, applies to all workers and employers, and must be obeyed even if other agreements are different. It includes specifications regarding working time, leave, job information and payment, and termination of employment. The proponent and all its contractors must adhere to the requirements of this Act in the recruitment and employment of labour for construction.

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### 3. PROJECT DESCRIPTION

#### 3.1 A DETAILED VIEW OF THE PROJECT WORKS

The proposed Sun City Chairlift Project involves the construction and operation of a 900 m long chairlift from a site 85 m from the Welcome Centre to the top of the Sun City Mountain. The chairlift will consist of a top and bottom station, with 30 two-seater chairs suspended from a moving wire rope. Pylons will be located at approximately every 100 m.

The chairlift will be just above the tree tops, with some illumination (lighting) required at each pylon for night-time operation and allowing guests (200 guests per hour) to decent the mountain via foot, if preferred or required.



Ablution facilities will be included at the chairlift top station. This will be a permanent installation with water and sewer connections. This facility will make general provision for 200 guests, with a peak design for 400 guests. The ablution facility will include the supply of Cold/Hot Running Water, extraction, air conditioning, electrical and a sewerage line for removal of sewage. Provision will be made for disabled, female and male facilities, which would include one toilet and one hand wash basin for the unisex disabled facility, twelve toilets and six hand wash basins for the female facilities, and three toilets, seven urinals and three hand wash basins for the male facility.

Wastewater from these facilities will be removed via a gravity main connecting with the existing sewage network of the Sun City Complex. Two alternatives are available, which will not affect the type of installation required or the installation methods, but could affect the length of the pipeline. The pipe network will be constructed within the existing service road servitude.

A current fresh water storage reservoir is situated less than 1 km from the top of the hills with and elevation variant of approximately 100m. A new pumping station will need to be constructed and installed at the reservoir with a new pipeline laid next to the existing service road to pump water to a fresh water storage vessel on top of the hill.

Hot water for the ablution block can be generated with the use of either solar or conventional geyser systems.

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The objective of the proposed Sun City Chairlift Project is to provide the guests the opportunity to visit the Sun City Star and the Zip Line which have been constructed on top of the Sun City Mountain.

### 3.2 DESCRIPTION OF THE AFFECTED AREA

Detailed specialist assessments were conducted during the 2016 and 2017 period, and again updated during June 2018. These specialist reports were referenced in order to update the description of the affected area of the project.

Four specialist studies were undertaken by Digby Wells and Associates, including Fauna, Flora, Palaeontology and Archaeology. The results of these specialist studies are summarised below:

#### 3.2.1 Flora

A total of 42 plant species were encountered, 22 of these were trees or tall shrubs, one fern, six grass species and ten herb species.

This floristic unit Mountain Bushveld consists of woodland which has a strong resemblance to the Zeerust Thornveld vegetation type. It consists of a floristic composition that is dominated by woody species with a fairly high richness that is reminiscent of the Zeerust Thornveld vegetation type across the site. The vegetation type consists of mesophyllous woodland consisting of *Combretum molle*, *C. zeyheri*, *Croton gratissimus* and *Searsia (Rhus) leptodictya*, including various microphyllous species such as *Acacia nilotica* and *A. tortilis*.

The graminoid and herbaceous layer is dominated by species that is typical of areas subjected to grazing as evidenced by the dominance of *Eragrostis rigidior*, *E. lehmanniana* and *Heteropogon contortus*. Noteworthy forb species include *Asparagus suaveolens*, *Felicia muricata*, *Sida chrysantha* and *Barleria bremekampii*.



Common species include *Dichrostachys cinerea*, *Aristida congesta barbicolis* and *Gymnosporia senegalensis*. It is important to note that despite the pressure of grazing, the bushveld area forms an important habitat for species such as small mammals and birds forming process areas that are vital to the functioning of the ecosystem. The two main vegetation types contained in the proposed Sun City Chairlift Project areas are Mountain Bushveld on steep slopes and Mountain Bushveld on moderate slopes.

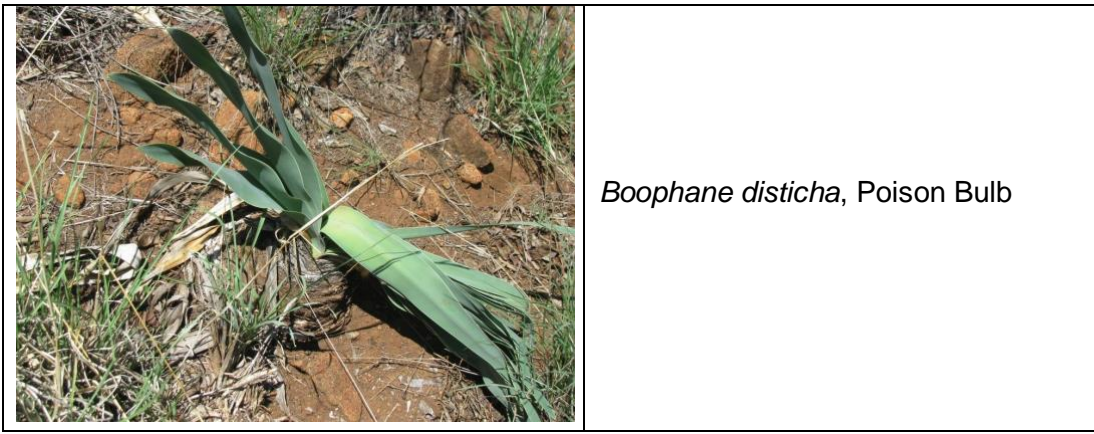
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### 3.2.2 Species of special concern

According to POSA (2016) no Red Data listed species have been recorded previously in the QDS 2527AC. However during this site visit *Boophane disticha* (Poison bulb) (**Table 3.1**), declining under SA Red Data List and *Sclerocarya birrea* (Maroela) (**Table 3.1**) protected according to the list of Protected Tree Species under the National Forest Act, 1998 (Act No. 84 of 1998) and *Spirostachys africana* (Tambotie) (**Table 3.1**) protected under Schedule 11 of the Nature Conservation Ordinance of Transvaal, 1983 (Act No. 12 of 1983) were encountered.

**Table 3.1: Species of Special Concern**

	<p><i>Spirostachys africana</i>, Tambotie</p>
	<p><i>Sclerocarya birrea</i>, Marula</p>



### 3.2.3 Fauna

Much of the terrestrial vegetation and habitat within the proposed Sun City Chairlift Project footprint area is inaccessible to most people and therefore relatively undisturbed. Certain areas have been modified by current and historical land use such as the Zip line operating area at the top of the hill and the fence and drainage lines at the bottom. It is assumed that these impacts have had a subsequent effect on the fauna species diversity and abundance. The findings of the fauna survey are used as a secondary reflection of the ecosystem health.

(a) Mammals

Actual sightings, spoor, calls, dung and nesting sites, as well as active sampling by means of motion detection cameras and Sherman traps, were used to establish the presence of mammals present on the proposed Sun City Chairlift Project site. The evidence of dung and spoor suggests that animals were present in the area although very few were recorded during this survey.

Sixteen mammal species were recorded during the field visit; however the following species are known to occur in the proposed Sun City Chairlift Project area, as confirmed by staff of the resort. Three of the below species have a high probability of occurring in the project area. See **Table 3.2** below.

**Table 3.2: Mammal Species recorded and High Probability Species**

Scientific Name	Common Name	Observation	Protection Status (IUCN 2016-2)/ NWBSP 2015
<i>Aethomys chrysophilus</i>	Red Veld Rat	Burrows	Least Concerned
<i>Atelerix frontalis</i>	South African Hedgehog	Potential to occur on site	Friedmann and Daly, Near Threatened
<i>Atilax paludinosus</i>	Marsh Mongoose	Spoor	Least Concerned
<i>Canis mesomelas</i>	Black-backed Jackal	Spoor & scats	Least Concerned
<i>Caracal caracal</i>	Caracal	Personal Communication	Least Concerned
<i>Cercopithecus pygerythrus</i>	Vervet Monkey	Spoor, Observed	Least Concerned
<i>Cryptomys hottentotus</i>	African Mole-rat.	Soil heaps	Least Concerned
<i>Galago senegalensis</i>	Lesser Bush Baby	Personal Communication	Least Concerned
<i>Galerella sanguinea</i>	Slender Mongoose	Scats	Least Concerned
<i>Genetta genetta</i>	Genet	Personal Communication	Least Concerned
<i>Hystrix africaeaustralis</i>	Cape Porcupine	Diggings & quills	Least Concerned
<i>Lepus saxatilis</i>	Scrub Hare	Droppings	Least Concerned
<i>Mastomys coucha</i>	Multimammate Mouse	Sherman trap	Least Concerned
<i>Mellivora capensis</i>	Honey Badger	Potential to occur on site	Friedmann and Daly, Near Threatened
<i>Papio cynocephalus ursinus</i>	Savanna Baboon	Motion Sensor Cameras	Least Concerned
<i>Parahyaena brunnea</i>	Brown Hyaena	Potential to occur on site	Near Threatened
<i>Paraxerus cepapi</i>	Tree Squirrel	Alarm call	Least Concerned
<i>Sylvicapra grimmia</i>	Common Duiker	Droppings & spoor	Least Concerned
<i>Tatera leucogaster/brantsii</i>	Highveld/Bushveld Gerbil	Burrows	Least Concerned

(b) Bats

One bat species (*Miniopterus natalensis*, “Near-threatened” 1) could utilize the study area during nocturnal foraging bouts. However, this species roost and breed in caves or mine adits which were absent on the proposed study site area.



(c) Data Deficient "species"

All shrew species (genera *Crocidura* and *Suncus*), the Single-striped Mouse (*Lemniscomys rosalia*), the Bushveld Gerbil (*Tatera leucogaster*) and the Short-snouted Elephant-shrew (*Elephantulus brachyrhynchus*) are "Data Deficient" and likely to occur on the study area.

(d) Avifauna

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007).

Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species. The bird species observed during the transect counts are listed in **Table 3.3**.

**Table 3.3: Avifauna species recorded**

Birds	Scientific Name	Protection Status (IUCN 2016-2)/ NWBSP 2015
Black Shouldered kite	<i>Elanus axillaris</i>	Not protected
Blacksmith Lapwing	<i>Vanellus armatus</i>	Not protected
Cape Turtle Dove	<i>Streptopelia capicola</i>	Provincially protected
Cape Glossy Starling	<i>Lamprotornis nitens</i>	Not protected
Fiscal Flycatcher	<i>Sigelus silens</i>	Not protected
Hadedda Ibis	<i>Bostrychia hagedash</i>	Not protected
Helmeted Guineafowl	<i>Numida meleagris</i>	Not protected
Laughing Dove	<i>Spilopelia senegalensis</i>	Provincially protected
Southern Grey-headed Sparrow	<i>Passer diffuses</i>	Not protected
Masked Weaver	<i>Ploceus velatus</i>	Not protected
Speckled Pigeon	<i>Columba guinea</i>	Not protected
Crested Barbet	<i>Trachyphonus vaillantii</i>	Not protected

Avifauna diversity was found to be very low, primarily due to the limited amount and diversity of habitat types available in the study area. As is discussed previously the habitat varied between mountain bushveld on steep slopes and mountain bushveld on the moderate slopes. No species

of special concern were encountered, however the species indicated in **Table 3.4**, can possibly occur on site.

**Table 3.4: Red Data Protected Bird Species that could occur in the area of concern**

Species	Global Conservation Status (IUCN 2016)	National Conservation Status (SA Red Data 2016)	Preferred Habitat	Potential Likelihood of Occurrence
<i>Anthropoides paradiseus</i> (Blue Crane)	Vulnerable	Near- threatened	Prefers open grassland, open karroid veld, as well as wetland habitats.	Unlikely to occur
<i>Alcedo semitorquata</i> (Half-collared Kingfisher)	Least Concern	Near- threatened	Clear, fast-flowing streams with dense overhanging vegetation.	Unlikely to occur
<i>Aquila rapax</i> (Tawny Eagle)	Least Concern	Endangered	Lowveld and Kalahari savanna, especially game farming areas and reserves.	Regarded as an irregular foraging visitor on the study area.
<i>Ciconia nigra</i> (Black Stork)	Least Concern	Vulnerable	Breeds on steep cliffs within mountain ranges; forages on ephemeral wetlands.	Vagrant on study area.
<i>Circus ranivorus</i> (African Marsh Harrier)	Least Concern	Endangered	Wetlands and vleis, breeds in extensive wetland systems with reedbed structure.	Unlikely to occur.
<i>Coracias garrulus</i> (European Roller)	Least Concern	Near- threatened	Open woodland and bushveld.	Common summer visitor
<i>Falco biarmicus</i> (Lanner Falcon)	Least Concern	Vulnerable	Varied, but prefers to breed in mountainous areas.	An occasional foraging visitor.
<i>Gorsachius leuconotus</i> (White-backed Night Heron)	Least Concern	Vulnerable	Clear well- vegetated perennial rivers. Prefers lowland rivers to Highveld rivers.	Unlikely to occur
<i>Gyps africanus</i> (White-backed Vulture)	Critically Endangered	Critically Endangered	Breed on tall, flat-topped trees. Mainly restricted to large rural or game farming areas	Irregular and opportunistic foraging visitor.
<i>Gyps coprotheres</i> (Cape Vulture)	Endangered	Endangered	Varied but breeds on steep south or east facing cliffs.	Irregular and opportunistic foraging visitor.

Species	Global Conservation Status (IUCN)	National Conservation Status (SA Red)	Preferred Habitat	Potential Likelihood of Occurrence
<i>Leptoptilos crumeniferus</i> (Marabou Stork)	Least Concern	Near- threatened	Varied, often near surface water or feeding on carcasses.	A vagrant to the study area.
<i>Mirafra cheniana</i> (Melodious Lark)	Near- threatened	Least Concern	A species with a preference for open dry "climax" <i>Themeda triandra</i> grassland or open primary grassland dominated by sour wiry grasses on well drained sandy substrates.	A rare resident, probably absent.
<i>Mycteria ibis</i> (Yellow-billed Stork)	Least Concern	Endangered	Prefers shoreline habitat bordering large impoundments and extensive wetland systems.	Vagrant to the study area.
<i>Oxyura maccoa</i> (Maccoa Duck)	Near- threatened	Near- threatened	Large saline pans and shallow impoundments.	Unlikely to occur
<i>Phoenicopus minor</i> (Lesser Flamingo)	Near- threatened	Near- threatened	Restricted to large saline pans and other inland water bodies.	Unlikely to occur
<i>Phoenicopus ruber</i> (Greater Flamingo)	Least Concern	Near- threatened	Restricted to large shallow pans and other inland water bodies.	Unlikely to occur
<i>Polemaetus bellicosus</i> (Martial Eagle)	Vulnerable	Endangered	Varied, from open karroid shrub to lowland savanna.	Vagrant to the study area.
<i>Sagittarius serpentarius</i> (Secretarybird)	Vulnerable	Vulnerable	Prefers open grassland or lightly wooded habitat.	Uncommon and irregular foraging visitor.
<i>Pterocles gutturalis</i> (Yellow-throated Sandgrouse)	Least Concern	Near- threatened	Prefers open grassland or agricultural land on vertic soils	Unlikely to utilise study area, although known to fly overhead.
<i>Torgos tracheliotus</i> (Lappet-faced Vulture)	Endangered	Endangered	Lowveld and Kalahari savanna; mainly on game farms and reserves	Vagrant to the study area.

Species	Global Conservation Status (IUCN)	National Conservation Status (SA Red)	Preferred Habitat	Potential Likelihood of Occurrence
<i>Tyto capensis</i> (African Grass- owl)	Least Concern	Vulnerable	Prefers rank moist grassland that borders drainage lines or wetlands.	Unlikely to occur

Species indicated in the table above all have historic records in the general area, species such as storks and birds of prey whom were recorded opportunistically. These depend on food items that must be available most often in areas such as reserves or game farms and will travel long distances to find these food items. These species are common in the nearby Pilansberg National Park and could frequent the proposed Sun City Chairlift Project area.

(e) Herpetofauna

According to Du Preez and Carruthers (2009), frogs occur throughout every habitat within Southern Africa. A number of factors influence their distribution, and they are generally restricted to the habitat type they prefer, especially in their choice of breeding site. The choices available of these habitats coincide with different biomes, these biomes in turn, are distinguished by means of biotic and abiotic features prevalent within them. Therefore a collection of amphibians associated with the Savanna Biome will all choose to breed under the prevailing biotic and abiotic features present. Further niche differentiation is encountered by means of geographic location within the biome, this differentiation includes, banks of pans, open water, inundated grasses, reed beds, trees, rivers and open ground, all of which are present within the area of interest.

No reptile or amphibian species were encountered during the field survey even though active searching was employed.

(f) Invertebrates

During the field survey, selected invertebrates were recorded using a butterfly net and opportunistic observation and photographed where possible. In support of this, transects were walked along the roads, vegetation types, and bushveld areas in order to identify any scorpion or spider nests.

The diversity and density of the invertebrates were relatively low for the proposed Sun City Chairlift Project footprint area and surroundings, however this in general could assist in

providing an indication of the health of the regional ecology. Although livestock have modified the general area, there is sufficient habitat that still remains to sustain moderate populations of the typical bushveld/savanna species of fauna. The study area is not known to overlap with the known distribution range of any threatened or near-threatened butterfly species as assessed by Mecenero et al. (2013). According to Mecenero et al. (2013), approximately 70 species could be present on the study area consisting of six skippers (*Hesperiidae*), 28 blues (*Lycaenidae*), 22 "brush-footed" butterflies (*Nymphalidae*), two swallowtails (*Papilionidae*) and 12 whites (*Pieridae*).

Dominant species include members of the genus *Junonia* (*J. hierta* & *J. oenone*), *Vanessa cardui*, *Papilio demodocus*, *Belenois aurota*, *Catopsillia florella*, *Colotis evagore*, *Eurema brigitta*, *Danaus chrysippus*, *Charaxes jasius*, *Tuxentius melaena*, *Tarucus sybaris*, *Leptotes pirithous*, *Lampides boeticus* and *Anthene definita*.

The rocky soils and outcrops associated with the mountain bushveld provide habitat for the stenotopic (habitat specialist) rock scorpion *Hadogenes troglodytes* and burrowing scorpion *Opisthophthalmus glabrifrons*. Both species are currently protected by Schedule B1 of the list of threatened and protected species issued in terms of Section 56 (1) of the NEM: BA.

### 3.2.4 Heritage and Cultural Significance

The site-specific study area forms part of the Pilanesberg Alkaline Province. Characterised by widespread alkaline volcanic and plutonic activity, this geology formed between ~1450 million years ago (Ma) and 1200 Ma. The Pilanesberg Complex has a circular outline and concentric ring structure with a 28 km east-west diameter and an areal extent of 530 km<sup>2</sup>. It consists of dislocated remnants of phonolitic and trachytic lava flows, stratified volcanoclastic lacustrine sediments, debris flows, tuff, agglomerate and volcanic breccia (Verwoerd, 2006). This geology has zero palaeontological sensitivity.

According to the SAHRIS Palaeo-Sensitivity Map (PSM), the Pilanesberg is interdigitated with geological strata with moderate palaeontological sensitivity. The Council of Geosciences has defined this as Quaternary Aged Sands associated with glacial-interglacial cycles from 2.6 Ma onwards. In general, these sands have the potential to contain fossil remains but are often sparse (Groenewald, 2016). Known fossil remains within Quaternary Age Sands include, but are not limited to:

- Mammalian bones;
- Tortoise remains;

- Non-marine mollusc shells;
- Ostracods;
- Microfossils;
- Trace fossils; and
- Plant material.

The proposed development footprint, however, is not underlain by Quaternary Aged Sand, and it is envisaged that the possible associated fossil heritage will not be impacted upon by project related activities. Therefore, a recommendation and Request for Exemption (RfE) from further palaeontological studies was made.

The potential palaeontological sensitivity of the Quaternary Aged Sands notwithstanding, the local study area is predominantly associated with heritage resources dating to the Late Farming Community (LFC) period. The remainder of this section focusses on the archaeo-historical context of the LFC period within the local and site-specific study area to provide context and inform the CS.

The farming community period correlates to the movement of Bantu-speaking agro-pastoralists into southern Africa. This period is divided into two stages to distinguish between widespread events:

- Early Farming Communities (EFC) (200 CE – 1000 CE); and
- LFC (1000 CE – 1840 CE).

Literature review results demonstrated the majority of recorded heritage resources within the local study area are associated with LFC sites. These account for ~83% of the recorded sites within 5 km of the development footprint from the sources considered in this assessment.

Identified LFC sites included the following:

- Surface scatters of both diagnostic and undiagnostic ceramics, upper and lower grinding stones, and daga; and
- Stonewalled LFC sites.

Archaeological evidence suggests that a simple Tswana origin for the Tlokwa is unlikely. Traditionally, the Tlokwa are linked to the Hurutshe, separated in time through a process of fission. Other interpretations include a western Sotho-Tswana origin in the Rustenburg region or Nguni origins south of the Vaal River (Mason, 1986; Huffman, 2007; Hall, Anderson, Boeyens, &

Coetzee, 2008). Oral traditions as captured by Ellenberger (cited in Hall, Anderson, Boeyens, & Coetzee, 2008, p. 59) provide a relative distribution of the Tlokwa capitals through time.



Situated within the site-specific study area within and adjacent to the proposed development footprint is the stonewalled settlement Itlholanoga. Recorded as Site 33/81, the settlement was excavated and reported by Mason (1986). Recovered diagnostic ceramics were reported as belonging to the Uitkomst and Buispoort facies. Huffman (2007) described Uitkomst ceramics as a mixture of Ntsuanatsatsi and Olifantspoort characterised by stamped arcades, appliqué and blocks of parallel incisions, stamping and cord impressions. Buispoort comprises rim notching, broadly incised chevrons and white bands all with red ochre.

Furthermore, the site was partly mapped by Huffman and his team between 2005 and 2006. Huffman (2007, p. 437) classified the site as consisting of two distinct patterns, an earlier Type N and later Molokwane type. Type N comprises a few cattle kraals in the centre linked by other walls, the perimeter sometimes incorporates small stock enclosures. Molokwane consists of multiple arcs in the outer wall that marks the back courtyards of households surrounding the core of cattle kraals and small livestock enclosures.

Based on the results of the early excavations and recorded settlement pattern, Huffman (2007, p. 437) postulates Itlholanoga having two occupations, an early Tlokwa occupation as indicated by earlier Type N walling and Uitkomst facies ceramics, and a later Kgatla occupation marked by the Molokwane pattern and Buispoort facies ceramics. This assertion requires further study to provide meaningful conclusions to the occupation of Itlholanoga. Considering the oral histories, stonewalling pattern and macro settlement structure discussed by Anderson (2009, p. 94) in reference to Marothodi some 20 km due west, the similarity in spatial layout allow for certain inferences to be made. These are briefly discussed below.

Ethnography suggests that a threefold division of the spatial layout of settlements was a common feature in the settlements of most Tswana chiefdoms. This will include three 'zones' of clustered settlement units/ homesteads. These 'zones' comprised:



- A central zone – increased density of stonewalling, more complexity and greater quantity of identifiable homesteads;
- An upper zone – outlying, less dense grouping of stonewalling; and
- A lower zone – outlying, less dense grouping of stonewalling.

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Furthermore, subsurface features exposed during excavations at Itlholanoga and Marothodi provide tangible examples of the type of resources associated with these stonewalled settlements. Notably these include preserved hut foundations, hearths, ceramic vessels and shards, metal artefacts and beads.

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## 4. ROLES AND RESPONSIBILITY

Effective environmental management during the design and construction of the Sun City Chair Lift Project will be critically dependent on a number of project personnel. The purpose of this section is to define roles for personnel and to detail concomitant responsibilities in the execution of the EMPr. Before doing so it is also necessary to define the various parties that bear environmental management responsibilities for the Sun City Chair Lift Project, during design and construction.

### 4.1 PROJECT OWNER – SUN CITY RESORT

Sun City Resort is the owner of the Sun City Chair Lift Project and is the independent decision making authority and ultimately accountable and responsible with respect to implementation of the contract and compliance with this EMPr.

### 4.2 CONTRACTOR (DESIGN AND CONSTRUCTION)

Sun City Resort will appoint a turnkey contractor through its normal procurement processes. The requirements of this EMPr will form part of the tender documents and Bill of Quantities to ensure that the turnkey contractor will price and fully comply with all environmental legislation and requirements.

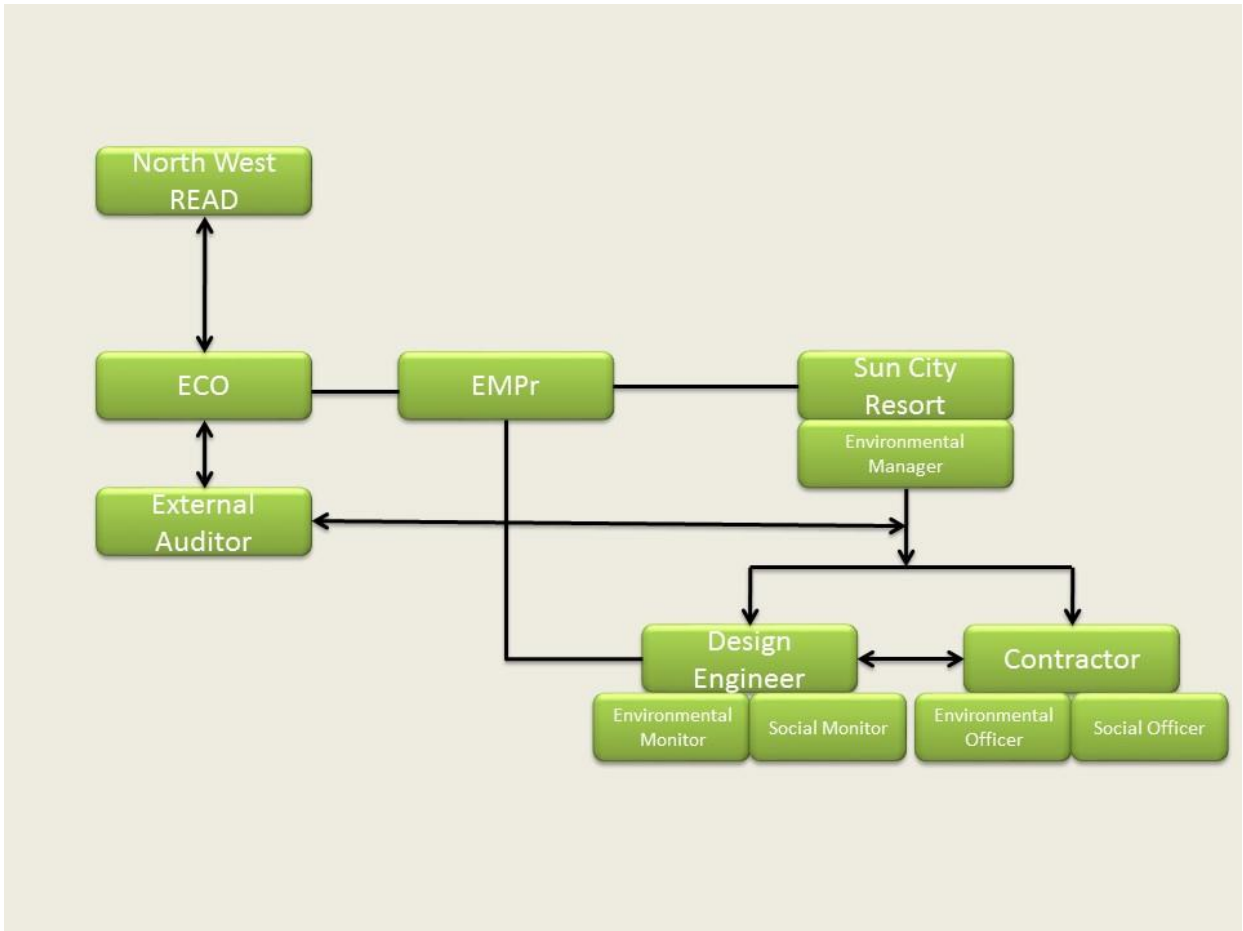
The Environmental Manager will provide environmental management and oversight for all environmental issues that arise on a day-to-day basis. The Environmental Manager is the primary point of contact on environmental and social issues for the duration of the contract. The Environmental Manager will also assist the contractor in coordination with North West Department of Rural, Environment and Agricultural Development.

### 4.3 ENVIRONMENTAL MANAGEMENT STRUCTURE

Within the above structure there will be a number of functional posts that will either directly or indirectly have an environmental management function as shown in **Figure 4-1** below and described later. Important to note, that although the functions area shown and described separately, these functions could be the responsibility of one post within the organisation,

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except for the Environmental Control Officer (ECO) post, which is an independent body reporting to READ and the external auditor.



**Figure 4-1: Environmental Management Structure**

### 4.3.1 Sun City Resort – Project Owner

As the Project Owner part of Sun City’s responsibilities is to oversee the overall implementation of the construction of the project as well as the compliance to the applicable legislation, the Environmental Authorisation and approved EMPr.

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#### 4.3.1.1 Environmental Manager

The Sun City Environmental Manager will focus on oversight and contractor compliance. The Environmental Manager reports to Sun City Resort. The role of the Environmental Manager is to support the successful implementation of the EMPr through:

- Plan and direct the implementation of the EMPr.
- Ensure that the requirements of the EMPr are communicated, understood and enforced by personnel on site.
- Ensure that contractors on site develop, implement and monitor the required environmental management functions.
- Evaluate the applicability and accuracy of the EMPr and the Method Statements throughout the construction process.
- Ensure that all statutory requirements are met.
- Manage scheduled audits and inspections on contractor's performance on site.
- Manage all public and interested and affected party complaints, claims and recommendations.

#### 4.3.1.2 External Auditor



Sun City Resort will appoint an external auditor to undertake quarterly audits to ensure that the contractor is complying with the required construction phase management measures.

The main responsibility of the Environmental Auditor is to monitor and report on Sun City Resort's compliance with the EMPr and other statutory obligations pertaining to environmental performance during construction of the project.

#### 4.3.2 Design Engineer

The Design Engineer is responsible for the design of the chair lift and associated infrastructure. It will be the responsibility of the Engineer to ensure that the Contractor adheres to construction specifications, the Environmental Authorisation and EMPr. The Engineer has the authority to stop any construction activity which is in contravention of any of the specifications within the documents mentioned above after consultation with the ECO. All major decisions which may affect the programme or costs of the project with regards to the environmental procedure or protocols must be approved by the Employer via the Engineer.

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#### 4.3.2.1 Environmental Monitor

The Environmental Monitor (EM) is employed by the Engineer and is responsible for overseeing the daily implementation of the EMPr and relevant specifications for the duration of the project. The EM should have a clear understanding of the project as well as all the environmental matters pertaining to the project and should have a good knowledge on the applicable environmental legislation and processes.

Responsibilities of the EM include:

- To advise and provide recommendations to the Environmental Officer (EO) on all environmental and related issues based on the requirements of the EMPr.
- To record and forward complaints received from the public to the Engineer and Employer.
- Resolve conflicts.
- Keep detailed and accurate records of the EMPr related activities on site.
- Report to the ECO on the monitoring of environmental issues.

#### 4.3.2.2 Social Monitor



The Social Monitor will act on behalf of the Engineer in all social matters pertaining to the project. The Environmental and Social Monitor roles could be the responsibility of one individual.

Responsibilities of the Social Monitor are:

- Resolve conflicts.
- Ensure the implementation of the Social Monitoring Plan as well as social-related requirements in the EMPr.
- Monitor the progress, impact and sustainability of the project.
- Ensure that all community and land owner complaints are reported to the Engineer and Sun City resort, recorded and dealt with in a timeous manner.

#### 4.3.3 Contractor

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In order to carry out the requirements of this EMPr, the Contractor must make sure that he has a clear understanding of all environmental matters relating to the project.

The responsibilities of the Contractor will include:

- The implementation of and adherence to the applicable environmental contract specifications in accordance with the requirements of the EMPr.
- The compliance to all national, provincial and local legislation related to the management of environmental aspects, including ensuring all applicable and required site specific permits, authorisations and licenses which are triggered by the Contractor's activities are applied for and obtained timeously. Examples of such permits include the removal of protected plant species and the storage of flammables and hazardous material.
- To ensure all Sub-contractors under his supervision adhere to the applicable environmental contract specifications in accordance with the requirements of the EMPr.
- Report any incident to the Engineer immediately and follow the initial notification with a flash report within 12 hours of the event occurring. The flash report will include details of the incident, which includes the extent, reasons, preventative actions and corrective actions taken.
- To ensure that all employees and Sub-contractors attend Environmental Awareness Training provided by the EM.
- To conduct any remedial work required in terms of this EMPr as a result of environmental negligence, mismanagement and/or non-compliance.



#### 4.3.3.1 Environmental Officer

A suitably qualified senior employee of the Contractor shall be responsible for implementing the EMS, environmental monitoring and control. This position shall be designated the Environmental Officer (EO). The EO shall be responsible for:

- Aiding the Contractor to comply with all the project environmental requirements, objectives and targets;
- Facilitating environmental activities and environmental awareness training of all personnel on site, and
- Implementing an internal environmental management system.

#### 4.3.3.2 Social Officer

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The Social Officer functions could be included in the Environmental Officer roles and responsibilities.

The duties of the SO will include:

- Aiding of the Contractor with liaison with neighbours, land occupiers and other interested and affected parties,
- Facilitating the resolution of potential and actual challenges experienced during construction where these relate to land occupiers, staff, and guests and their special requirements, and
- Aiding the Contractor in keeping accurate records pertaining to issues, complaints and the associated corrective actions.



#### 4.3.4 Environmental Control Officer

Sun City Resort must appoint a suitably qualified and experienced independent Environmental Control Officer (ECO) who will be responsible for the monthly monitoring of the project compliance with the Environmental Authorisation, EMPr and applicable environmental legislation. The contract for the ECO will extend from the commencement of the Construction Phase to the handover of the site by the Contractor to Sun City Resort.

The responsibilities of the ECO include but are not limited to:

- Undertaking a due diligence audit at least a month prior to the commencement of construction. The audit will include a site visit and a qualitative survey of the status of the area prior to construction.
- Review and analyse the monitoring data which will include but not be limited to water, dust and noise monitoring, complaints and pollution incidents and non-conformances against the limits that have been set in the environmental specifications and/or the Environmental Authorisation.
- Site inspections will be conducted in such a way that all the construction activities are covered in the month. The site inspection will include a physical visit to the construction sites. The ECO will inform Sun City Resort of the visit and will commence the visit with an opening meeting on site to gather information regarding the level of operations and a closing meeting to provide feedback to the Design Engineer and Sun City Resort. A report will be compiled to summarise the findings.



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- Every month the ECO will also provide a monitoring report to the READ based on the data gathered by the Contractor and evaluate the information against the performance targets set out in the EMPr.

It is expected that the ECO will maintain open communications with Sun City Resort to ensure that non-conformances are addressed as soon as possible on site.

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## 5. MONITORING, AUDITING, & REPORTING

### 5.1 INTRODUCTION

The purpose of monitoring, auditing and reporting is to ensure that implementation in the design, construction and operations and maintenance phases of the life-cycle of the project is accomplished in such a manner that the organisations environmental policy, objectives and targets are met as outlined in this document.

Sun City Resort has resolved to focus on environmental issues, with emphasis on attaining a high level of environmental conscience and as a responsible business take the lead in its field. The Resort recognises that every being has the right to an environment that is not harmful to their health or wellbeing and that the nature of its activities could impact on the environment. The Sun City Resort Environmental Policy is included in **Appendix E**.

The philosophy that will be followed is based on the Deming Cycle, namely; Plan, Do Check, Act, that allows for continual improvement of all activities on site. As a result there will be a strong focus on ensuring compliance with the Sun City Resort ISO14001 accredited EMS system. The objectives of the Sun City Resort EMS are:

- Υ Identify possible impacts that may emanate from its activities;
- Υ Implement mitigation measures to prevent, reduce and minimize the impacts;
- Υ Create an awareness among all employees;
- Υ Incorporate environmental issues into the company’s business strategy.

#### 5.1.1 Plan



The planning is intended to ensure that all activities of the project are carried out in a methodical fashion that allows for a concise intervention that is in concurrent with environmental management principles.

#### 5.1.2 Do

The implementation will be through the development of Management and Mitigation Plans for each significant construction activity and its aspects that may have an impact on the environment.

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### 5.1.3 Check

This EMPr can only be effectively implemented if it is accompanied by monitoring, auditing and reporting on compliance with the management and mitigation plans. The monitoring programme will be designed in a manner that ensures that all the components of the Project that have the potential to impact the environment are accurately monitored.

### 5.1.4 Act

Without acting on non-compliances and implementing corrective measures all actions on site will be fruitless. The Project will be subject to both internal monitoring, and external auditing to ensure compliance to relevant legislation and standards (including this EMPr).

The following basic elements will be included in establishing and maintaining procedures for investigating and correcting non-conformance:

- Identifying the cause of the non-conformance
- Identifying and implementing the necessary corrective action. Implementing or modifying controls necessary to avoid repetition of the non- conformance
- Recording any changes in written procedures resulting from the corrective action.

## 5.2 ENVIRONMENTAL CONTROL DOCUMENTS

### 5.2.1 Health and Safety Incidents and/or near Misses Reporting

The following actions will be followed / addressed during incidents, accidents and near misses:

- All accidents, incidents and near misses will be reported to the Sun City Resort Environmental Manager
- Accidents will be addressed in terms of the Health and Safety Plan. If injured, workers will be taken to an appropriate health care facility for treatment. The accident will be documented, including the nature and cause of the accident and the subsequent measures to prevent a similar accident from recurring.
- The corrective actions will be discussed during the next day's toolbox discussion.
- A weekly incident report will be forwarded to the Employer or his representative.

The incident report will be kept on file and will be available for review during audits.

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### 5.2.2 Environmental Monitoring and Community Complaints Records

Records are evidence of the ongoing activities of the operation. Typical records that will be kept may include:

- Declaration of understanding of Environmental Management Programme
- Environmental Incidence Register
- Environmental Incident Report
- Hazardous Waste Disposal Register
- Method Statement Proforma
- Method Statement Register
- Hazardous Substances Register
- Community / Guests / Staff Complaints Register
- Environmental Audit Report
- Environmental File Index
- Relevant Letters of Appointment
- Quarterly Environmental Report
- Environmental Induction
- Visitors Induction and Indemnity

The environmental records will be legible, identifiable, and traceable to the activity involved. Records will be maintained to demonstrate conformance to all requirements.



### 5.3 ENVIRONMENTAL MONITORING

The main objective of the monitoring programme with respect to project activities is as follows:

- To establish trends
- To ensure compliance with regulatory authorities requirements
- To assess effectiveness of the proposed mitigation measures
- To detect environmental contamination as early as possible

In order to fulfil the above mentioned objectives the monitoring programme will cover issues related to the following environmental components:

- Public health – noise, dust and construction traffic
- Protected fauna and flora species – search and rescue and destruction
- Heritage / grave protection and / or relocation

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## 6. DESCRIPTION OF PROJECT RELATED ACTIVITIES AND ASPECTS

In order to oversee the successful construction of the chairlift and associated infrastructure, various construction activities as well as their associated aspects have been identified and listed. From the identified aspects it is possible to determine the associated environmental impacts and therefore set the base to formulate measures to manage and mitigate these environmental impacts on site.

### 6.1 PRE – CONSTRUCTION ACTIVITIES

Pre – Construction follows on from final project planning tender phase and leads up to the establishment of the appointed Contractor on site. Sun City will be responsible for overseeing the implementation of the project requirements.

The Pre-Construction activities that are going to be conducted involve, but are not limited to:

- Finalise Design Requirements of the chair lift;
- Access to site;
- The surveying of the chair lift alignment;
- Walk down of the alignment with the specialists and ECO, specifically to undertake search and rescue activities;
- Acquiring of all relevant permits and licences;
- Identified Cultural Heritage Resources and Graves rescue and relocation;
- Rescue and relocation of identified red data flora;
- Social aspects related to the employment of local labour;
- Development of construction Method Statements where applicable;
- Environmental Awareness Training; and
- Photographic record of areas prior to site establishment and construction.

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## 6.2 CONSTRUCTION ACTIVITIES AND ASPECTS

Construction refers to the phase in the project during which the actual construction of the 900 m chairlift and associated infrastructure will take place.

The Construction Phase will be divided into the following activities:

- Site Establishment and Infrastructure.
- Site Operations and Construction Works.

The activities and associated aspects which have been identified for Site Establishment and Infrastructure are listed in **Table 6-1**.

**Table 6-1: Site Establishment and Infrastructure activities and associated aspects**

No.	Activity	Aspect
1	Clearing and Grubbing	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased level of noise generation</li> </ul>
2	Access to Site	<ul style="list-style-type: none"> <li>• Increased traffic volumes</li> </ul>
3	Construction and use of Temporary Access Paths / Roads	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased potential for erosion.</li> <li>• Increase in vehicle movement in area.</li> <li>• Increased level of noise generation</li> </ul>
4	Installation of parking bays for construction plant and vehicles	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Increased level of noise generation</li> </ul>
5	Installation of temporary warning signage	<ul style="list-style-type: none"> <li>• Decrease in aesthetic quality of the environment</li> <li>• Lack of visibility of signage</li> </ul>
6	Topsoil stripping and stockpiling	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased potential for erosion</li> <li>• Soil contamination</li> <li>• Encroachment and establishment of alien vegetation</li> <li>• Reduced productivity of subsistence farmland</li> </ul>
7	Provision of sanitation systems	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Ground water contamination</li> </ul>
8	Demarcation, fencing and gates	<ul style="list-style-type: none"> <li>• Loss of vegetation and habitat</li> <li>• Impede faunal movement</li> <li>• Impeded human movement and disrupted daily activities</li> </ul>
9	Provision of flammable material and other material stores	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Soil contamination</li> </ul>

The activities and associated aspects which have been identified for Site Operations and Construction Works are listed in **Table 6-2**.

**Table 6-2: Site Operations and Construction Work activities and associated aspects**



No.	Activity	Aspect
1	Blasting of hard material	<ul style="list-style-type: none"> <li>• Increased level of noise generation</li> <li>• Vibration</li> <li>• Dust generation</li> <li>• Safety</li> </ul>
2	Refuelling of construction vehicles and plant	<ul style="list-style-type: none"> <li>• Soil contamination</li> <li>• Water contamination</li> </ul>
3	Spoil material generation and management	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Decline in the aesthetic quality of the environment</li> </ul>
4	Relocation of existing services	<ul style="list-style-type: none"> <li>• Disruption in the provision of services</li> </ul>
5	Domestic and construction waste collection, storage, handling and disposal	<ul style="list-style-type: none"> <li>• Unpleasant odours</li> <li>• Increase in Waste generation</li> <li>• Decline in the aesthetic quality of the environment</li> </ul>
6	Handling, storage, disposal of hazardous waste	<ul style="list-style-type: none"> <li>• Unpleasant odours</li> <li>• Soil contamination</li> <li>• Water contamination</li> </ul>
7	Consultation with affected parties	<ul style="list-style-type: none"> <li>• Insufficient consultation</li> </ul>
8	Operation and movement of construction vehicles and plant	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increase in level of noise generation</li> <li>• Soil contamination</li> <li>• Safety</li> <li>• Vibration</li> <li>• Greenhouse gas emissions</li> </ul>
9	Road upgrades	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increased level of noise generation</li> <li>• Soil contamination</li> <li>• Safety</li> </ul>
10	Slopes and slope stabilisation	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increased potential for erosion</li> <li>• Water contamination</li> <li>• Decline in the aesthetic quality of the environment</li> <li>• Safety</li> </ul>
11	Maintenance of sanitation systems	<ul style="list-style-type: none"> <li>• Unpleasant odours</li> <li>• Mismanagement of sewerage</li> </ul>
12	Transportation of hazardous waste	<ul style="list-style-type: none"> <li>• Potential spillages of hazardous waste</li> <li>• Safety</li> <li>• Greenhouse gas emission</li> </ul>

No.	Activity	Aspect
13	Transportation and storage of pylons, pipes and associated materials at the laydown area	<ul style="list-style-type: none"> <li>• Increase in vehicle movement in area</li> <li>• Impact on the existing road conditions</li> <li>• Safety</li> <li>• Increase in the level of noise generation</li> <li>• Greenhouse gas emissions</li> </ul>
14	Use of generators	<ul style="list-style-type: none"> <li>• Increase in level of noise generation</li> <li>• Soil contamination</li> </ul>
15	Protection of archaeological findings	<ul style="list-style-type: none"> <li>• Destruction of graves and other sites of archaeological value</li> </ul>
16	Welding	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Emission of noxious fumes</li> </ul>
17	Cooking of food	<ul style="list-style-type: none"> <li>• Fire hazard</li> <li>• Illegal wood harvesting</li> </ul>
18	Employment of local labour	<ul style="list-style-type: none"> <li>• Insufficient employment of local labour</li> <li>• Presence of construction workforce</li> <li>• Influx of job – seekers</li> <li>• Loss of farm labour to construction work</li> </ul>
19	Security	<ul style="list-style-type: none"> <li>• Trespassing</li> </ul>
20	Fire Control	<ul style="list-style-type: none"> <li>• Loss of vegetation, habitat and soil fertility</li> </ul>
21	Water Use and Management	<ul style="list-style-type: none"> <li>• Water contamination</li> <li>• Misuse of available water</li> </ul>
22	Concrete mixing	<ul style="list-style-type: none"> <li>• Soil contamination</li> <li>• Water contamination</li> <li>• Misuse of available water</li> </ul>

### 6.3 REHABILITATION

Rehabilitation will run con-currently with the actual construction of the chairlift and associated infrastructure. Rehabilitation will consist of, but is not limited to, the following rehabilitation measures:



- Removal of temporary structures and infrastructures;
- Removal of inert waste and rubble;
- Hazardous waste and pollution control;
- Final shaping of disturbed areas;
- Topsoil replacement and soil amelioration;
- Ripping and scarifying;
- Planting;

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- Grassing;
- Maintenance; and
- Management of alien vegetation.

Rehabilitation measures mentioned above are dealt with in more detail later.

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## 7. COMMUNICATIONS, CONSULTATIONS, & TRAINING

### 7.1 COMMUNICATION PROCEDURES ON SITE

To ensure effective on site communication and maintained environmental performance, copies of all documentation described in the EMPr must be maintained on site at all times and be available to both the Environmental Manager, Design Engineer, the EM and ECO, and will be provided on request to authorities or stakeholders for inspection.

#### 7.1.1 Site Instruction Entries

The Site Instruction journal entries will be used for the recording of instructions as they relate to implementation of the EMPr. Entries could also include stoppage of work orders for the purposes of immediately halting any particular activities of the contractor.

#### 7.1.2 ECO Diary Entries

The purpose of these entries will be to record the comments of the EM as they relate to activities on the site. Both the Site Instruction journal and EM Diary must be available on the site at all times. These documents will be made available to all relevant authorities for inspection if requested.



#### 7.1.3 Site Meetings

Regular site meetings will be held between the Environmental Manager, Contractor and its EO, the Design Engineer and its EM, and the ECO (optional). The purposes of the meetings shall be:

- To establish the suitability of the Contractor's methods and machinery in an effort to lower the environmental, social and health risk involved;
- To discuss and resolve non-conformance to environmental legislation / policies or the EMPr;
- To assess the general state of the environment on site and discuss any environmental problems which may have arisen;

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- To act as a forum for input into the nature and environmental performance of the construction works;
- To accommodate all stakeholders in the decision-making process regarding social and environmental issues on site.

#### 7.1.4 Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the EO and EM. The EO and EM may also report non-conformances. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously as well as the effectiveness of the remediation measure in order for the non-conformance to be closed-out at the satisfaction of the EM and ECO.

#### 7.2 COMMUNITY CONSULTATION

Key stakeholders such as the Chiefs of the neighbouring areas and the representative community councillors should be informed on the progress with the implementation of the EMPr.

The stakeholders will be provided with an opportunity during construction to provide input into the project development process. The following consultation activities will be undertaken:

- Notify the Local Chiefs and the Local Community Councillors in the project area of the proposed construction start date and request them to notify their community members.
- The Community Councillors will be provided with the name of the appropriate project contact person that will deal with queries and complaints.
- Notify the community through the councillors of monitoring programmes and environmental audit results.
- Monthly meetings with the relevant councillors will be held to obtain feedback about the project from the communities.

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### 7.3 COMPLAINTS MANAGEMENT AND GRIEVANCE PROCEDURE

A protocol to address complaints includes the following aspects:

- Name of complainant;
- Contact details of complainant;
- Date of complaint;
- Nature of complaint; health or environment or safety related;
- Details of complaint; location, severity, stakeholders involved, frequency; and
- Manner in which the complaint has been resolved and a description of how this was communicated back to the communities.



### 7.4 ENVIRONMENTAL TRAINING

All site staff of all levels, as well as visitors to the site, should be made aware of the environmental management requirements for the project. This should be achieved through training as part of their induction and regular refresher courses.

An Awareness Training Plan will be prepared, that provides for the various categories of persons on site and will cover at least:

- The role and responsibility of the ECO and of other key persons on site in relation to environmental management requirements
- The construction activities that will impact both the physical and social environments
- Mitigation measures that have been put in place to avoid or minimise the anticipated impacts
- The nature and appearance of cultural heritage resource sites that may be found during construction activities and the mandatory procedures to be followed for their mitigation
- Prevention and control of waste, litter, spillages and fire, and particularly veld fires
- An outline of specific environmental management measures, such as rehabilitation of disturbed areas, fire management, prevention of water pollution and dust management

Daily toolbox talks at the start of each day with all workers onsite should be held. At these sessions relevant environmental and communications requirements should be raised to alert workers to particular concerns associated with their tasks for that day or the area which they are working.



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## 7.5 **SITE INDUCTION (SHE)**

The Contractor will provide all employees or other persons entering the site with health and safety induction training pertaining to the hazards prevalent on the site and with the necessary Personal Protective Equipment (PPE). All employees will also be informed of the relevant emergency procedures.

During the safety induction, the employees will be informed of all environmental, health and safety issues. All employees that underwent the safety induction will sign an attendance register that will be kept on file (records).

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## 8. EMERGENCY PLANNING AND RESPONSE PROCEDURES

The Contractor shall develop plans for action to be taken in the cases of emergencies. These plans should specify the emergency procedures for fire, accidental leaks and spillages and medical emergencies and be in line with the Sun City Resort existing Standard Operating Procedures. An accident register should be compiled every month.

Emergency contact numbers should be displayed in prominent places which should include the Police, Fire Department and Ambulance Services.

A designated emergency meeting point should be established and all employees should be informed of the locality and procedures.

### 8.1 FIRE CONTROL

- The Engineer and relevant authorities should be advised of a fire as soon as one starts.
- It should be ensured that all employees are aware of the procedure to be followed in the event of a fire.
- 'No smoking' areas should be marked, including the workshop and fuel storage areas.
- It should be ensured that there is basic and adequate fire-fighting equipment available on site and on all plant.

### 8.2 ACCIDENTAL LEAKS AND SPILLAGES



The existing Sun City Service Provider should be used to undertake clean-up of accidental spills onsite.

The degree and nature of any spillage should be consulted and mutually agreed between the parties, to seek the best alternative clean-up method available. The MSDS should also be consulted to determine the method of clean-up and to realise optimal utilization.

The following preventative measures should be undertaken:



- All sensitive sites should be identified such as rivers and wetlands and procedures developed to ensure proper handling of oil/fuel or chemical spillages in these areas.
- It should be ensured that all employees are aware of the procedure to be followed in case of accidental spills and leaks.

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- It should be ensured that the necessary materials and equipment for dealing with spills and leaks is available on site at all times.
- All employees should be trained to handle all accidental leaks and spillages onsite appropriately.

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## 9. REHABILITATION

The landscaping and rehabilitation of disturbed areas shall occur as soon as practically possible following the completion of the work in a specific area. Therefore the rehabilitation process will immediately be executed, per phase, upon the completion of the work within a specific area, utilising specified methods and species.



### 9.1 REMOVAL OF STRUCTURES AND INFRASTRUCTURE

- The removal of all construction facilities and materials from the construction camp will be required and rehabilitation will have to be carried out, including the removal of the following:
  - Removal of construction site and/or camp.
  - Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, fixtures, concrete and compact earth platforms, fuel storage tanks and bund areas, chemical toilets and any other temporary works.
  - Materials that will not be used again must be removed by the Contractor.
  - Ensure that all access roads utilised during construction (which are not earmarked for closure and rehabilitation) are returned to a usable state and/or a state no worse than prior to construction.
  - Ensure that all access roads earmarked for closure and rehabilitation are ripped and that all imported material is removed. Rehabilitation should follow the first out; last in principle (i.e. rehabilitation should occur as follows subsoil, topsoil, hydro seeding).

### 9.2 INERT WASTE AND RUBBLE

- Clear site of all inert waste and rubble, including surplus rock, foundations, batching plant aggregate and soil crete. After the material has been removed, the site shall be re-instated and rehabilitated.
- Load and haul excess spoil in borrow pits / dongas and inert rubble to dump sites and spoil areas as indicated / approved by the Environmental Manager.

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- Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site. Proof of this must be provided by the Contractor to the Engineer.

### 9.3 **HAZARDOUS WASTE AND POLLUTION CONTROL**

Remove from site all pollution containment structures such as temporary sanitary infrastructure, waste water disposal systems and oil separators. Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner.

### 9.4 **FINAL SHAPING**

- Make sure all dangerous excavations are safe by backfilling and grading as required.
- In general, no slopes steeper than 1(V):3(H) are permitted, unless otherwise specified by the Environmental Manager, in consultation with the Engineer. Steeper slopes require protection.
- Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil. Compact in layers for best results.
- Additional fill may only be imported from approved borrow areas as indicated by the Environmental Manager.
- Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.
- Shape all disturbed areas to blend in with the surrounding landscape.
- Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfill is removed to a dedicated spoil area.

### 9.5 **TOPSOIL REPLACEMENT AND SOIL AMELIORATION**

- The principle of “progressive reinstatement” must be followed as determined by the EM and Contractor. This includes the reinstatement of disturbed areas on an on-going basis, immediately after the specified construction activities for that area are concluded.
- Execute top soiling activity prior to the rainy season or any expected wet weather conditions.

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- Execute topsoil placement concurrently with construction where possible and as agreed by the Environmental Manager.
- Redistribute stockpiled topsoil. Replace herbaceous vegetation and reinstate grass in all areas cleared by the Contractor for the construction site, including temporary access routes and roads. Replace topsoil to the original depth.
- Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. Ensure that the soil brought in undergoes both physical and chemical tests and is to the satisfaction of the Landowner and Environmental Manager.
- The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage.
- Topsoil suspected to be contaminated with the seed of weeds must be sprayed with specified herbicides.
- Herbicides should be for selective broad leafed weeds as approved by the Environmental Manager.
- Ensure that storm water run-off is not channelled parallel to the prevailing contours.
- After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area.

## 9.6 **RIPPING AND SCARIFYING**

- Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be based on the site conditions immediately before these works begin.
- All soil to be rehabilitated shall be ripped with a mechanical ripper to a depth of 300mm or as agreed by the Environmental Manager. No section of ground shall remain undisturbed after ripping.
- Rip and/or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the Works.
- Rip and/or scarify along the contour to prevent the creation of down-slope channels.
- Do not rip and/or scarify areas under wet conditions, as the soil will not break up.



## 9.7 PLANTING

### 9.7.1 Transplanted plants

- All planting work is to be undertaken by suitably experienced personnel, making use of the appropriate equipment.
- Trees to be transplanted must be carefully removed from the soil so as to retain as large a root ball as practically possible. Use the tree's driplines as an indicator: the larger the tree the larger the root ball (and subsequently the planting hole).
- Minimise disturbance of the soil and the remaining roots in the root ball during the lifting, moving and or transportation of all species.
- Plant trees and shrubs so that their stems or trunks are at the same depth as in their original position.
- Orientate trees and shrubs in the same direction as in their original position.
- Plant aloes and bulbs in similar soil conditions and to the same depth as in their original position.
- The plant must be planted into the specified hole size with the approved soil, compost and fertiliser mix used to refill the plant hole and must cover all the roots and be well firmed down to a level equal to that of the surrounding in situ material, as per the rehabilitation specification.
- After planting, each plant must be well watered, adding more soil upon settlement if necessary.
- Place branches / brush packing on rehabilitated and seeded areas to protect new growth from grazing animals. This will also ensure the establishment of a seed bank.

## 9.8 GRASSING

- Suitably trained personnel must undertake grassing by making use of the appropriate equipment and using grass species as specified by the Environmental Manager pending availability.
- Trim areas to be grassed to the required level.
- Hydroseeding with a winter mix will only be specified where re-grassing is urgent, and cannot wait for the summer.
- Depending on soil texture and slope stability, it may be necessary to establish a temporary (annual) grass cover consisting of artificial composition to aid soil binding.

## 9.9 MAINTENANCE

- The Environmental Manager will monitor the re-growth of invasive vegetative material for one year.
- Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers (or other approved method). If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.
- Re-vegetation must match the vegetation type, which previously existed.
- Base the new carrying capacity of rehabilitated land on the status quo rather than the regional estimate.
- Control invasive plant species and weeds by means of extraction, cutting or other approved methods before the plants flower and form seeds.
- For planted areas that have failed to establish, replace plants with the same species as originally specified.
- A minimum grass cover of 80% of the planted area sown, hydro-seeded or planted shall be covered with live plants of the specified species measured as basal cover, and that there shall not be any bare patches larger than 500 mm maximum in diameter.
- Individual plants must be strong and healthy growers at the end of the Defects Notification Period.
- The entire process of rehabilitation shall be meticulously documented so that the methods used on a specific part of the alignment can be replicated on other parts or even other future projects.



## 9.10 ERADICATION OF WEEDS

All weeds spread over the entire disturbed construction footprint must be removed prior to the plants flowering and forming seeds, irrespective of its existence prior to construction. Chemical removal shall be used in accordance with manufacturer's specification for weeds. All chemicals used must be approved by the ECO. Once the weeds have perished they shall be removed mechanically by use of an offset disk plough thereby digging up the vegetation including the root ball.

**9.11 CONTROL OF WEEDS**

The remainder of the site including the re-vegetated areas shall be kept free of all weeds.

It is important that the entire process of rehabilitation shall be meticulously documented so that the methods used on a specific part of the alignment can be replicated (if necessary) on others parts or even other future projects.



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## 10. MANAGEMENT AND MITIGATION PLANS

The management of environmental issues during the construction phase are dealt with through specific management and mitigation plans for each identified environmental component that requires management and mitigation.

The specific and detailed management and mitigation plans for construction follow as separate chapters.

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## 11. ESTABLISHMENT OF CONSTRUCTION LAY DOWN AREA

### 11.1 PURPOSE

This activity includes the establishment of the site camp which includes, but is not limited to the site offices, ablutions, dedicated eating areas, material storage areas, and waste collection areas for the period that construction is to be undertaken.

During the construction phase one construction site / lay down area will be established.

The purpose of this management and mitigation plan defines the establishment and management of the construction site during the construction phase to prevent or minimise environmental impacts these might cause.

### 11.2 OBJECTIVE



The objectives are to:

- Minimise impacts associated with the establishment and operation of construction site lay down area.
- Ensure access to the construction laydown area is properly controlled.
- Ensure that the handling and disposal of contaminated water is done within the framework of applicable legislation.
- Ensure that water washing and toilet facilities are supplied complying to norms and standards.
- Ensure that the potential for communicable diseases to increase, as a result of the project, is managed and mitigated effectively.
- Ensure that hazardous materials storage is effective and compliant to norms and standards.
- Ensure that vehicle, plant and equipment refuelling is practiced in such a manner that no secondary pollution or emergency situation is created.
- Ensure that lighting pollution is controlled at construction sites ensuring that neighbours are not negatively affected.

### 11.3 TARGETS

- No complaints regarding the construction camp from residents or visitors to Sun City.
- No unauthorised access to the construction laydown area.

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- No discharge of polluting elements to any stormwater drain, stream or river.
- Sufficient ablution facilities supplied at all construction sites.
- Percentage of medical examinations of all construction workers by the Contractor.
- No construction workers to stay on site.
- Hazardous substances storage shall comply with regulatory requirements at all times.
- Storage of flammable material shall be done according to prescribed standards at all times.
- Refuelling of vehicles, plant and equipment shall be done according to prescribed standards at all times.
- No complaints regarding lighting impacts on neighbours, residents, visitors and staff.
- No runoff shall be allowed from any wash facility.

## 11.4 MANAGEMENT AND MITIGATION PLAN



### Establishment of construction sites

- A plan showing the construction layout, including the positions of all buildings, fuel storage areas and other infrastructure should be prepared. The plan should detail all pollution control measures. The site has to be demarcated by means of a security fence.
- Access to the site should be limited to authorised persons and should be security controlled. Identification cards should be issued to all workers and visitors to site.
- The placement of buildings and equipment should be done to minimise the footprint and visual impact of the sites.
- Downlighting should be used and it should be ensured that lighting on site does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding hotel guests, staff or other users of the area.
- Vehicles, plant and equipment should be subject to prestart checks and regular maintenance to identify and remedy fuel and oil leaks.
- Workers should be instructed not to dispose of cigarette butts.

### Demarcation and access control

- The construction site should be properly identified and demarcated.
- The materials and soil stockpile areas, fuels and chemical storage areas, and concrete mixing areas must be selected to ensure that they are located away from environmentally sensitive areas and protected from stormwater runoff, fire and access by unauthorised persons.

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- The access roads, temporary loading and packing areas and turning circles should be clearly indicated on a drawing.

#### Handling and disposal of contaminated water

- No discharge of pollutants such as cement, concrete, chemicals, fuels or oils should be allowed into any water resource.
- The areas around fuel tanks should be bunded in accordance with SANS 1089:1999: Part 1.
- Only above ground temporary storage tanks should be allowed on site.
- Contaminated or potentially contaminated water should be kept separated from unpolluted stormwater.
- No wash areas should be erected.

#### Water washing, toilets and sewage

- Ablution facilities provided should include shelter, toilets and hand washing facilities.
- Toilets should be provided at the preferred ratio of 1 toilet per 15 workers, and should be shown on a lay down drawing.
- Sanitation facilities shall be located within 100m of any point of work, but not closer than 50m from any water body.
- All temporary/portable toilets should be secured to the ground to prevent them toppling due to wind or any other cause.
- Entrances to toilets should be adequately screened from public view.
- Ablution facilities provided should be maintained in a hygienic state and serviced regularly to ensure proper operation.
- Toilet paper should be supplied at ablutions.
- No spillage shall be allowed when the toilets are cleaned or serviced.
- The contents of chemical toilets should be removed to an approved disposal site.
- The toilets should be serviced and cleaned on the last construction day before the builder's holiday.

#### Communicable diseases

- No accommodation at the construction site should be allowed. Workers should not be allowed to stay overnight in the construction site.
- Access control through appropriate fences and 24 hour gate control should be enforced.
- Ongoing training should be provided regarding communicable diseases.
- No alcoholic beverages should be allowed onsite.

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### Hazardous materials storage

- Materials storage areas should not be allowed in close proximity to ecologically and archaeological sensitive areas.
- Materials storage areas should be sited outside the 1:50 year flood line of watercourses.
- Hazardous chemicals or potentially hazardous chemicals used during construction should be stored in secondary containers and all relevant Material Safety Data Sheets (MSDSs) should be available on site.
- The relevant emergency procedures relevant to particular chemicals used on site, as per the MSDSs and suppliers guidelines, should be followed in the event of an emergency.

### Vehicle, Plant and equipment re-fuelling

- All liquid fuels and oils should be stored in suitable above ground storage tanks or in tanks with lids, which should be kept firmly shut and under lock and key at all times.
- Above ground fuel tanks should be at least 3,5 m from buildings, boundaries and any other combustible or flammable materials.
- Empty but externally dirty tanks should be sealed and stored where the ground has been protected.
- Any electrical or petrol-driven pumps should be equipped with a drip tray and positioned so as not to cause any danger of ignition of the product.
- Fuel dispensed from 210 l drums should be done with proper dispensing equipment to minimise spill potential.
- Under no circumstances should drums be tipped to dispense fuel.
- The siting of the installation should be done within the following guidelines:
  - The fall of ground in relation to residential areas and other risk areas that could be exposed in the event of accidental large scale spillages.
  - Access to facilities to and around the site.
  - Drainage systems, especially where these link up with the drainage system of Sun City.
  - Available water supplies.
  - Fire protection, security, and general service facilities in the area, including the fire services response time.
  - Population densities around the premises.
  - Good housekeeping e.g. the removal of flammable materials such as rubbish, dry vegetation and oil soaked soil.
- Bunding at these facilities should comply to the following guidelines:



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- A slope of at least 1:100 away from the tank is provided for at least 15m.
- The volumetric capacity of the bunded area is a minimum of 110% of the volume of the largest tank.
- The wall of the bunded area is of concrete, and has been designed to be liquid tight and to withstand a full hydrostatic head of water.
- The wall height of the bunded area has been restricted to 1.8m.

### Lighting

- Working hours should generally be restricted to daylight hours.
- If working hours are required outside of daylight hours, notification should be provided to relevant neighbours.
- Security lights are directed from the perimeter wall towards the centre of the camp with a down angle.



### Materials / Goods on site

- The store man should be responsible for stacking and storage of material.
- Bricks, sandstone blocks, building sand, plaster sand and stone will be stored “open” on site but with special care that materials are not contaminated i.e. that different types of sand are not mixed.
- Cement should be stored in a lockable and water proof container and should be stacked not more than 13 bags high. Cement should be used, as far as possible, on a first-in first-out basis.
- Reinforcing bars should be stored in the open but should be placed on timber poles to avoid “contamination” by mud or soil.
- Paint will be stored in a ventilated lockable store.

## 11.5 MONITORING & REPORTING

Daily inspections should be carried out by the EO and record findings on a weekly checklist. Monthly audits will be undertaken by the ECO and a monthly audit report prepared.

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## 12. EROSION CONTROL

### 12.1 PURPOSE

The purpose of this management and mitigation plan is to ensure that erosion is minimized that could occur as a result of construction activities.

### 12.2 OBJECTIVE

The objective is to avoid soil erosion of areas within and downstream of the construction activities.

### 12.3 TARGETS

- No formation of small erosion channels and sheet erosion.
- No flooding as a result of stormwater control measures.
- No erosion as a result of stormwater control measures.
- No silt pollution as a result of flooding and/ or stormwater control measures.

### 12.4 MANAGEMENT AND MITIGATION PLAN

Identified areas where erosion could occur should be appropriately protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other appropriate measures to prevent water from being concentrated in rivers/streams and from scouring slopes, banks or other areas.

Any erosion channels which develop during the construction period should be suitably backfilled, compacted and restored to a proper condition (i.e. vegetated etc.).

Where excavation takes place, the affected area should be properly stabilised and revegetated to minimise erosion risk.

Stormwater control measures should consider and provide for the following:



- Use of silt screens.
- Use of straw bales as filters, which are placed across the flow of overland stormwater flows.
- Channelling stormwater run-off through natural grassland buffer areas.

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- Silting of stormwater pipes in adjoining developments and Sun City properties as a result of run-off from the project area will not be allowed.
- Gabions or stormwater control structures should be used to disperse stormwater flows and/or prevent and control erosion where necessary.
- All erosion protection measures should be maintained on a continual basis
- Corrective actions should be taken as and when required to stop any signs of erosion.
- Regular inspections by competent personnel should be undertaken at especially:
  - o inlet and outlet points of drainage structures
  - o stormwater release points, and
  - o along sections where drainage structures are laid on steep slopes.
- Where possible, stormwater should be released in grassy areas which act as a natural filter and to reduce the erosion potential of the water.
- The stabilization of headcuts during the construction phase to prevent erosion and sedimentation should be undertaken through various methods to limit or eliminate erosion and sedimentation i.e. gabions, rock packing, vegetation establishment, bales and poles, and vegetation sausages.

## 12.5 MONITORING & REPORTING

Weekly visual inspections of erosion sensitive areas and daily inspections after rainfall events will be undertaken. Recording and reporting will be through inspections notes and monthly monitoring report.

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## 13. FLORA AND FAUNA MANAGEMENT

### 13.1 PURPOSE

The proposed Sun City Chairlift Project site consists of intact and relatively undisturbed Zeerus thornveld (Endemic), within this vegetation type three species of special concern was encountered.

During the construction phase (construction of surface infrastructure), mountain bushveld vegetation type, present on steep rocky slopes and more moderate footslopes will be impacted on. The impact of loss of mountain bushveld (assigned a medium-high sensitivity) will have negative impacts on biodiversity on a localised scale. It is not anticipated that any plant Species of Special Concern will be lost, as these must be avoided during the planning phase of this project.

The purpose of this management and mitigation plan is to ensure vegetation clearing is undertaken in such a manner that protected species as detailed in this report are rescued or protected.

Due to increased human movement on site during the operational phase, fauna may be disturbed due to noise and litter. Due to the presence of large bodied birds that are known to occur in the Pilansberg National Park and Waterbirds form the Sun City lake, these include, Cape Vulture (*Gyps coprotheres*), White-backed Vulture (*G. africanus*), Lappet-faced Vulture (*Torgos tracheliotus*), Verreaux's Eagle (*Aquila verreauxii*), Wahlberg's Eagle (*Hieraaetus wahlbergi*), African Hawk Eagle (*Aquila spilogaster*), Brown Snake Eagle (*Circaetus cinereus*), Black-chested Snake Eagle (*C. pectoralis*). The purpose of this management and mitigation plan is therefore also to quantify the possible interaction between them and the cables, suspended chairs and supporting pylons, as these birds are known to forage over large areas.

### 13.2 OBJECTIVE

- To ensure that no more than 9 x 3.5 m<sup>2</sup> for the pylons will be disturbed and 40 m<sup>2</sup> for the station and the ablution facilities.
- To ensure that the existing service road will be used to access the project area.

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- To ensure that the impact to habitat is restricted only to the footprint area and that protected plant and fauna species are not affected through construction and weed invasion does not take place as a result of development.
- To successfully rescue or protect species of conservation value.
- To revegetate disturbed areas after construction, inclusive of construction areas, temporary accesses, stockpile areas, and construction camps.
- The objective of management measures is to ensure that littering does not take place and faunal disturbance is kept to a minimum. Furthermore the objective is to ensure that no bird collisions take place.

### 13.3 TARGETS

- No multiple roads to access the pylons and stations.
- All protected plant species rescued.
- No evidence of erosion.
- No invasive species in areas that have been disturbed by construction activities.
- No bird collisions with pylons.

### 13.4 MANAGEMENT AND MITIGATION PLAN

- The footprint area should be kept as small as possible and therefore no additional areas will be cleared except for the immediate pylon areas and the area where the stations, ablution facilities, and trenches will be constructed.
- Existing service roads to the top of the mountain shall be used to reach the pylons, ablution facilities and stations. Vehicles should not be allowed to traverse natural areas or leave the existing service road. No additional access roads will be constructed and materials will be moved by hand from the existing service road to the pylon positions.
- As special species of concern are present in the proposed Sun City Chairlift Project area, specifically *Spirostachys africana*, (Tambotie), *Boophane disticha* (Poison Bulb) and *Sclerocaria birrea* (Maroela), care must be taken not to disturb these plant species. As pruning of protected trees are a restricted activity that requires a permit from the Provincial authority, the trees that will be affected must be quantified and permits must be obtained.
- An Alien Invasive Plant Species (AIPs) Management Plan should be implemented, whereby the disturbed site is monitored quarterly for at least two years to ensure that AIPs does not take place. Currently bush encroachment is an issue on the lower slopes of the proposed Sun City Chairlift Project area, this problem is likely to spread of uncontrolled grazing in allowed to continue in controlled.

- As seedlings emerge, they will be removed bi-annually as part of an AIPs Management Plan.
- Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species harvested from climax *Themeda* grassland and native grass species (such as *Cynodon dactylon*) are planted immediately to prevent erosion.
- Signage should be erected to indicate an expected plant and animal species, and that no disturbance of these is allowed. Bird deflectors must be installed on cables, chairs and pylons to make the structures visible to birds in flight.

### 13.5 MONITORING & REPORTING



Wherever rehabilitation is required, a detailed record will be kept of the land area that has been rehabilitated compared to the land area still to be rehabilitated. Photographic or video records should also be used to supplement this information.

The percentage rehabilitation completed will be recorded for the construction site and reported on a weekly basis.

After a slope has been vegetated it will be inspected daily for the first week. Thereafter visual inspections will be undertaken once per week until the slope is deemed to be well enough vegetated to ensure further slope stability. Specific reports on erosion or slumping and sliding will be investigated on a case by case basis, the condition of the slope recorded together with the remedial action implemented.

AIP monitoring and implementation of control/ eradication measures should take place. Monitoring, eradication and control should be initiated after constructed and should take place annually for two years to ensure that AIPs area completely removed.

The efficacy of the mitigation measures must be quantified through monitoring of Avifanua species that occur on the Sun City property that could be affected by the chairlift.

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## 14. AIR QUALITY MANAGEMENT

### 14.1 PURPOSE

The earthworks proposed during the construction phase have the potential to create a short-term dust nuisance unless properly managed. This may impact surrounding residents, construction workers and nearby vegetation. Dust may be generated from the following activities:

- earthworks associated with the development
- spillage or storage of soil and other materials
- vehicle movements along paved and unpaved roads

The impact of dust is likely to cause problems such as unpleasant visual amenity, dust on washing and dust entering houses. A potential exists for a public health impact if elevated levels persist in residential areas, however this is unlikely due to the stage nature of the project. Potential impacts on workers health and amenity will be addressed through induction and the issue of personal protective equipment.

### 14.2 OBJECTIVE

To ensure that dust emissions from construction activities do not result in adverse health or other negative effects.

### 14.3 TARGETS

- Dust fallout values shall conform to the relevant values of levels of nuisance dust against the National Environmental Management: Air Quality Act (NEMAQA) National Dust Control Regulations (GNR 827) on the boundary of the residential areas adjacent to the construction site
- Dust from construction sites not to exceed 600mg/m<sup>2</sup>/day
- No complaints regarding dust.

### 14.4 METHOD STATEMENT

Areas susceptible to dust generation include re-vegetated areas and areas in need of rehabilitation. Vegetation cover must preferably be maintained e.g. removal of vegetation should be avoided until such time as soil stripping is required. Excavation, handling and

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transport of erodible materials should be avoided during periods of excessive wind. Location and management of stockpiles is of importance.



Dust control measures from traffic and other construction activities:

- Dust generation as a result of construction activities will be minimised through all reasonable measures.
- Removal of vegetation will be avoided until actual topsoil stripping is required.
- Excavation handling and transport of erodible materials will be avoided under high wind conditions or when a visible dust plume is present.
- Soil stockpiles will as far as possible be located in sheltered areas where they will not be exposed to erosive winds.
- Appropriate dust-suppression techniques will be implemented where dust generation is unavoidable through wet suppression.
- Strict measures will apply where materials in powder form, such as cement, concrete additives, etc. are stored, handled or used, and for the proper disposal of packaging of any such materials.
- In excessive windy conditions, the dust generating activities will be stopped until wind speed drops to an acceptable level.
- All exposed surfaces will be stabilised, resurfaced or re-vegetated as soon as is practically possible.

## 14.5 MONITORING & REPORTING

Daily visual observations of dust and nuisance levels. Recording and reporting will be through inspections notes and monthly monitoring report.



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## 15. GENERAL SOLID & HAZARDOUS WASTE MANAGEMENT

### 15.1 PURPOSE

The inappropriate handling and disposal of solid waste materials can impact on both human safety and risk contamination of the natural environment. Two waste stream categories will be generated during the construction phase. These are hazardous waste and general waste. The purpose of this method statement is to manage these waste streams such that all potential negative impacts are prevented.

General waste would typically include building rubble generated during site clearance, vegetation, waste steel, wire and electrical cable off-cuts, waste wood and waste concrete.

Hazardous wastes typically include sanitary waste and used oil, oil rags, empty oil and grease containers, paint containers, degreasers, bitumen, herbicides, resins and curing agents.

### 15.2 OBJECTIVE

The objective is to avoid or minimize negative impacts on surrounding environment (soil, surface and groundwater) resulting from inappropriate waste disposal.

### 15.3 TARGETS

- Waste recycled and or reused shall be 10% of all waste generated.
- No littering on construction sites.
- Adequate containers are supplied and are easily accessible.
- Waste bins are removed and cleaned daily by the responsible Contractor.

### 15.4 METHOD STATEMENT

- Disposal instructions will be obtained from the supplier of pollutants or hazardous substances.
- An approved waste disposal company will be contracted to remove and dispose of hazardous substances. A certificate of safe disposal will be obtained from them and kept on record.
- No maintenance of vehicles will take place onsite. If used oil accumulates onsite these will be fetched by a company who recycle the oil e.g. Oilkol. Used oil will be stored in an

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enclosed area. The storage area will have an impervious surface to prevent oil contamination.

- Old containers of paint, oil, thinners, acids, poisons etc., will be disposed as per clients waste disposal procedures.
- Construction workers will be trained and informed about waste minimisation. The person dealing or who may potentially be exposed to hazardous chemical substances will be provided with a well-defined list of duties.
- Where feasible, waste materials will be recycled and the following will apply:
  - o Glass, papers and cardboard, metals (other than aluminium), aluminium, organic waste and plastic could be recycled and will be separated into different containers at the construction site.
  - o These containers will be suitably marked and stored in a covered and enclosed area to protect it from the elements and scavengers.
  - o Recycling will be done by staff wearing suitable PPE such as gloves and dust masks.
  - o Separated materials will be taken to the Sun City recycling facility and be collected by existing recycling contractors.
  - o Clear signs and separation areas for waste material will be provided.
- Appropriate records will be kept of volumes of hazardous chemical substances generated and disposed. These will include safe disposal certificates.
- Littering will not be allowed on site or at the laydown camp.
- Adequate containers or bins for litter removal will be supplied on site.
- The containers or bins will be emptied on a regular basis as required.
- Bins or containers used at the construction areas will be waterproof.
- Waste collected from these bins and containers will then be stored on site in a larger, scavenger proof and waterproof container for later disposal - disposal will be done at least once a week at the closest appropriate waste disposal site - records of proper disposal will be kept.
- If required, chicken runs will be conducted on site and at the camps to keep it litter free. This will be done at least once a week but as often as required to ensure a litter-free site.
- Care will be taken not to dispose of hazardous materials with the domestic waste - hazardous materials will be disposed of at a hazardous waste disposal site.
- Where waste is to be transported by truck, it will be covered and labelled appropriately

## 15.5 MONITORING & REPORTING

A register will be kept of all quantities of non-aqueous waste that is generated and removed for disposal from all the construction sites. The waste will be characterized as follows:



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- Domestic/general waste.
- Building rubble.
- Waste timber.
- Scrap metal.
- Hazardous chemical substances.

The disposal of these different waste types will also be recorded and tracked with waste disposal certificates.

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## 16. TRAFFIC MANAGEMENT

### 16.1 PURPOSE

The management of traffic will be essential during the construction phase and will require specific mitigation measures as described below to ensure that the impact on residents, businesses and road users are kept to a minimum.

### 16.2 OBJECTIVE

- To ensure that traffic impacts as a result of construction activities are minimised.
- To ensure that pedestrians are accommodated safely at all times where existing pedestrian walkways are affected by the construction activities.
- To use existing road infrastructure to access construction sites.



### 16.3 TARGETS

- No construction vehicles exceeding defined speed limits.
- No fines for construction vehicles committing traffic offences.
- No construction vehicles on the roads during peak traffic times.
- No replacement walkways for pedestrians that are directly exposed to vehicle movements.
- Use of existing roads must be maximised.
- Cleaning of public roads used for construction vehicles access twice a week.

### 16.4 METHOD STATEMENT

- In Sun City a speed limit of 30 km/h for heavy vehicles; and 50 km/h for other construction vehicles will be strictly enforced. On public roads the specified speed limit would be applicable.
- Where possible, construction traffic should be scheduled in off-peak traffic times.
- Appropriate traffic safety signage should be provided to warn the public of construction traffic and flagmen will be on duty where traffic merges with normal road traffic.
- Regular route monitoring on all routes utilised by construction traffic will be done by construction foreman to ensure that any material that has fallen from construction vehicles be removed immediately to prevent traffic congestion and safety hazards.
- Construction vehicles shall be limited on any road in the vicinity between 7:00 to 18:00, Monday to Friday.

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- Existing sidewalks should be used as walkways as far as possible. Where existing sidewalks are affected, alternate pedestrian walkways will be provided.
- Pedestrians should not be allowed to cross construction areas.
- Construction of temporary access roads will be minimised. Roads used will be cleared regularly of any dust and mud resulting from the use by construction vehicles. Dust and noise will be minimised and accident risk reduced by strict monitoring of speed limits.
- All gravel access roads will be watered regularly to control dust pollution.

### 16.5 **MONITORING & REPORTING**

Random checks will be done on the routes that construction vehicles follow to ensure that these vehicles only drive on the agreed roads. This should be done by following a vehicle from the construction site to its destination and vice-versa.

The routes followed must be checked at least once a month for all construction sites. The registration plate of truck, route followed and time and day will be recorded.

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## 17. HERITAGE AND CULTURAL RESOURCES MANAGEMENT

### 17.1 PURPOSE

The site forms part of the Pilanesberg Alkaline Province. Characterised by widespread alkaline volcanic and plutonic activity. This geology has zero palaeontological sensitivity management and mitigation measures are not included in this document.

Situated within the study area within and adjacent to the chairlift footprint is the stonewalled settlement *Itlholanoga*. Construction activities may result in damage and/ or destruction to surface features, i.e. stonewalling, and possible sub-surface features associated with the settlement site and the purpose is to manage and mitigate these potential impacts.

### 17.2 OBJECTIVE

The management objectives for the identified possible damage to and/or destruction of surface and sub-surface features of the site are to avoid the direct impact through implementation of project related management measures.

### 17.3 TARGETS

- No heritage resources are inadvertently damaged during construction.
- No irreparable/significant damage to chance fossil finds.
- No graves to be affected unless relevant authorities (e.g police) have been notified and relevant authorisations obtained.

### 17.4 METHOD STATEMENT

The management measures must be completed in accordance with the minimum levels prescribed in the published SAHRA minimum standards. Project design must change to avoid all direct impacts to the heritage resources and conserve the site in its entirety and managed through a Conservation Management Plan (CMP)/ Heritage Site Management Plan (HSMP). The following management measures are recommended:

- Commission an HSMP for *Itlholanoga*. The HSMP must be developed in support of a Grade II Site Nomination and for the appropriate management of the site during the construction and operation of the Project. The HSMP must aim to control the elements that make up the physical and social environment of the site, i.e. its physical condition,

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public visitors and interpretation, and promote/ enhance its conservation and maintenance through deliberate and thoughtful design.

- A Watching Brief must be undertaken by a qualified archaeologist during the construction activities of the chair lift, pipe tranching and hiking trail, specifically during the establishment of access, drilling of pylon foundations, and clearing of the proposed maintenance route and hiking trail.
- Develop project specific Chance Find Protocols (CFPs) as a condition of authorisation.
- Heritage resources within the Project development footprint are protected under Section 35 of the NHRA, and may not be impacted upon without the approval and necessary permits issued by SAHRA.
- The position of known sites will be shown on the final profiles. Such areas shall be marked as no-go areas.
- Artefacts may not be removed under any circumstances.
- Do not disturb deface, destroy or remove protected features and sites, whether fenced or not for the duration of the Contractor's presence on site unless, otherwise specified by the Environmental Manager.
- Construction must be immediately stopped, should any elements of cultural or heritage significance be found and the Environmental Manager must be informed.
- Do not resume Works in the area in question without permission from the Environmental Manager.
- A qualified and registered archaeologist must be appointed and consulted at such a finding to appropriately excavate any artefacts in agreement with the North West Province Heritage Resources Agency (NWPHRA) and the SAHRA.
- A heritage design constraints summary memorandum listing all identified heritage resources and providing a description of the status, exact co-ordinates and implications, if affected, should be drawn up.
- All construction activities, inclusive of: construction sites, temporary and permanent access routes, storage, stockpile and spoil areas will be clearly demarcated.
- Identified heritage resources not directly affected by construction activities will be demarcated with the use of fences and danger tape and a detailed photographic record will be kept of these sites.
- All construction staff working close to such a site will be properly briefed to ensure the safeguarding of the heritage resource.
- Demarcation fencing will be maintained for the duration of construction in the area, specifically at pylons, ablution facilities, bottom and top station, as well as access point



to the pylons. The existing service road and trenching activities should also be demarcated for the duration of construction activities.

- Chance finds of archaeological and/or historical materials or sites will be immediately reported by any of the construction contractors, or other parties involved in the construction phase.
- Work will be stopped in the immediate area of the chance find for up to 72 hours to allow for a site visit and an assessment by all relevant parties, and provide instructions. Work in areas adjacent to the chance find area will continue, consistent with the detail design, upon consultation with and approval of the Employer’s representative.
- Nothing will be moved or removed from site.
- Work will only recommence once full clearance has been received.
- For human remains inadvertently discovered in other situations, all activities affecting the burial must be stopped and the discovery must be reported to SAPS and SAHRA and the status of the remains must be ascertained. If the remains are forensic in nature (younger than 60yrs and perceived to be a victim of crime) recovery by the Provincial Forensic Pathology Services in conjunction with SAPS is mandated. If the remains are of cultural, historical or archaeological origin recovery will be facilitated by SAHRA by means of a Rescue Permit.
- At the onset of construction all graves that might be affected should be clearly demarcated and if possible fenced off to protect them from any accidental damage, whether they are earmarked for relocation, or not.
- Should the decision be taken to propose the relocation of the affected graves, a suitably accredited and experienced service provider must be appointed to undertake the relocation. All provisions as stipulated in section 36 of the National Heritage Resources Act (Act No 25 of 1999) must be adhered to.

## 17.5 MONITORING & REPORTING

The construction site will be monitored on a periodic basis. It is anticipated that the inspections will occur more frequently at the start of the construction works. An understanding of the area will be developed and the potential for subsurface artefacts and/or skeletal material findings during future excavation be determined. Before, during and after construction work in an area, adjacent heritage buildings will be surveyed before and after demolition activities to determine if buildings have been affected as a result of the operations.



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**APPENDIX A: CURRICULUM VITAE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER**

**Name of firm:** MDT Environmental (Pty) Ltd

**Name of Staff:** Deon Esterhuizen

**Profession:** Environmental Scientist

**Date of Birth:** 6 June 1968

**Nationality:** South African

**Professional Natural Scientist (RN: 400154/09)**

**Membership in Professional Societies:**

Registered with the South African Council for Natural Scientific Professions: Professional Natural Scientist - Environmental Science (RN: 400154/09).

Member of the International Association for Impact Assessors South Africa.

Member of the Groundwater Division of South Africa.



**KEY QUALIFICATIONS:**

Deon has a MSc in Environmental Ecology with 27 years of experience in water related projects, which include water resource management, water quality management, water use registration and licencing of water users, including project management of multi-disciplinary studies. He also has extensive experience in a wide-range of environmentally related projects, processes and applications for private, commercial and industrial clients, in addition to local, provincial and national government departments.

He has gained experience through his involvement in a number of water resources related projects, including ensuring the protection, development, conservation, management, use and control of the water resources in the Gauteng Region’s area of responsibility in a sustainable manner as well as co-ordinating the management of the quality of the water resources of a specific catchment on an ongoing basis to achieve water resource objectives during his employment at the Department of Water and Sanitation. Specific focus areas included:

- Catchment Management Strategies & Plans
- Water Quality Management Plans
- Registration and Licensing of water users
- Assessing water requirements for basic human needs and riverine ecology
- Determining stream-flow assimilative capacity for pollution loads
- Water quality guidelines
- Industrial wastewater treatment and disposal

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He has gained experience through environmental related projects as a consultant at ILISO Consulting (Pty) Ltd and BKS (Pty) Ltd in the fields listed below:

- Integrated Environmental Management (IEM) in general
- Environmental Impact Assessments (EIAs)
- Environmental Management Plans (EMPs)
- Environmental monitoring and auditing

He has been the project leader and coordinator on a number of large, strategically important and multi-disciplinary projects for various clients, including international (Africa) projects as well as fulfilling the role of an external reviewer for the Department of Water and Sanitation as well as other consulting firms.

He has gained operational knowledge and experience of applying the IFC Social and Environmental Performance Standards, specifically on the Olifants Water Resources Development Project. He developed and implemented environmental and social mitigation and management plans that have been approved by the relevant environmental authorities.

**EDUCATION:**

M.Sc (Environmental Ecology) University of Pretoria 2003  
 B.Sc (Honours), Rand Afrikaans University 1991  
 B.Sc (Botany & Zoology), Rand Afrikaans University 1990

**ADDITIONAL COURSES:**

Environmental Water Quality Monitoring 2011  
 River hydraulics, stormwater & flood management, Stellenbosch University 2009  
 Environmental Risk and Impact Assessment, Rhodes University 2006  
 Reserve Determinations and Procedures, DWAF 2000  
 Project Management, Compu-Tutor 2000

**EXPERIENCE RECORD:**



**ILISO Consulting (Pty) Ltd**  
**August 2005 to present**  
**Technical Director.**

- Environmental and Social Lead of the Olifants River Water Resources Development Project - Sub-Phases 2C. Responsible and accountable for the management of all environmental and social related tasks performed by two Environmental Monitors, two Social Monitors, and a Land Acquisition Team. This team was responsible to ensure that the Contractor executes the project

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within the guidelines of legislation, the environmental authorisation, the environmental management plan, and project specifications. Trans Caledon Tunnel Authority. January 2011 - Current.

- Environmental and Social Lead of the Olifants River Water Resources Development Project - Sub-Phases 2B, C, D, E, & F. Responsible and accountable for the management of all environmental, social and land acquisition tasks and reports directly to the Project Manager / Engineer. Numerous design related activities were completed, including the development of project environmental compliance specifications, environmental management system, stakeholder relations strategy, and resettlement action plan. Trans Caledon Tunnel Authority. December 2009 - Current.
- Compilation of an application for exemption from minimum emission standards and extension of the minimum emission standard timeframes for Eskom's Power Stations, including supporting studies. Eskom (Pty) Ltd. Preparation of the surface water specialist report. 2013 - 2014.
- Application for the rectification in terms of section 24G for the unlawful construction of facilities and infrastructure for the return of service of the Eskom Komati Power Station. 2012.
- Application for the rectification in terms of section 24G for the unlawful construction of facilities and infrastructure for the Eskom Kusile Power Station. 2012.
- Application for an integrated environmental authorisation and waste management licence in terms of the National Environmental Management Act and the Waste Act for activities on the Eskom Kusile Power Station construction site. 2012 - current.
- Mafutha Environmental Impact Assessment for Sasol (Pty) Ltd. Responsible for the Surface water specialist study and water balance development. June 2010 - June 2011.
- Feasibility study for the construction of bridges linking Okahandja to Ovitoto communal area. Ministry of Works and Transport. Undertake an environmental screening in terms of the Environmental Management Act (2007) (EMA) that was promulgated in December 2007. 2010.
- Design and construction of Botsabelo Complex - Lesotho blood transfusion services centre, National Reference Laboratory, student accommodation at the National Health Training College. The Government of the Kingdom of Lesotho Millenium Challenge Account. Development of an Environmental Protection Plan for implementation during construction. The development of method statements for key environmental construction activities. 2010.
- Stormwater Audit at Namibian Custom Smelters in Tsumeb, Namibia. Namibian Custom Smelters (Pty) Ltd. 2012.
- Braamhoek Integrated Water Use Licence Application: Peer review of the draft Integrated Water Use Licence application for the proposed Braamhoek Pump Storage Scheme. 2005.
- Integrated Stormwater Management: Boepenspruit: Environmental Impact Assessment - Scoping for a record of decision application in terms of the Environmental Conservation Act. 2005.
- Gautrain Rapid Rail Link: Part of the ISAA Joint Venture compiling the Initial Works Environmental Management Plan and Draft Final Environmental Management Plan as required by the Record of Decision issued by the Gauteng Department of Agriculture, Conservation and Environment. 2005.
- Gautrain Rapid Rail Link: Preparing the surface water specialist report in support of the variant alignment environmental impact assessment study. 2006
- Department of Water Affairs & Forestry: Mpumalanga Region. Task Leader of a multi disciplinary team to assist the Mpumalanga Regional Office: Water Quality Management with line function work. 2006.
- Gauteng Region Office Technical and Administrative Support project. Project Manager of a multi disciplinary team to assist the DWAF Gauteng Regional Office with specific technical tasks. 2006 – 2009.

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- Task Leader for preparing the Water Use Licence application for the Tshwane Metro Zeekoegat Waste Water Treatment Works. 2007 – 2010.
- Environmental specialist for a 42 month construction period of the Thune Dam in Botswana. 2007 – current.
- Preparation of an Environmental Management Plan for the Groot Letaba proposed storage dam. Department of Water Affairs and Forestry. 2007 – 2009.
- Project Manager of a multi disciplinary team to develop a National Groundwater Strategy for the Department of Water Affairs and Forestry. 2007 – 2010.
- Preparation of the surface water specialist report for the proposed Nelspruit Ring Road. 2007.
- Preparation of the surface water specialist report for the proposed expansion of ArcelorMittal in New Castle. 2008.



**BKS (Pty) Ltd, Pretoria**

**January 2000 to July 2005**

**Director.**

- Olifants River Catchment Ecological Water Requirement Assessment (Mpumalanga): Determination of the ecological reserve of the river (Management Consultant) Responsible for project co-ordination and administration. 2000-2002.
- Olifants / Doring River Rapid Reserve Assessment (Western Cape): Conducting a rapid reserve assessment of three sites in the Olifants and Doring Rivers for the provincial Department of Agriculture in the Western Cape. 2000-2002.
- Olifants / Doring River Basin Study (Western Cape): Determination of the ecological reserve of the river (Management Consultant) Responsible for project co-ordination and administration. 2000-2002.
- Assessment of Domestic Water Supplies, Volume 5: Management Guide. Development of a management guide, which forms part of a series, which is intended to provide water supply agencies, water resource managers, workers in health related fields, as well as communities throughout South Africa with guidance on domestic water quality with regard to planning a new domestic water supply scheme, implementation of a domestic supply scheme, and the management of an exiting domestic supply scheme. 2001-2002.
- DWAF, RDM-Office structure. Preparation of a strategy and plan to determine the Ecological Reserve for each significant resource, within the constraints of human and financial resources. Two components were developed namely, a structure / framework for the RDM-Office and the implementation of a control auditing system.
- Nylstroom Municipality Waste Water Treatment Plant. Licence application. Evaluation of the licence application in terms of the National Water Act. 2001.
- Thaba Chweu Municipality Waste Water Treatment Plant Licence application in terms of the National Water Act. 2002.
- Olifants River (Mpumalanga). Assisting the DWAF with the registration of all water uses in the catchment. 2001-2002.
- Leboeng Community Safety Centre. Registration of the waste water treatment facility in terms of the National Water Act. 2001.
- Mhlathuze Water. The completion of a licence application in terms of the National Water Act for two

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sea outfall pipelines into the Indian ocean. 2001-2002.

- Lower Spekboom Irrigation Board. Motivation on behalf of the Board to the DWAF requesting funds from their reserve fund for the rehabilitation of their canal system. 2002.
- Modder and Riet Rivers Catchment. Development of a Catchment Management Strategy and determination of an intermediate ecological Reserve. 2002-current.
- Water Quality Performance Assessment System. Development and implementation of a water quality performance assessment system for the DWAF Water Quality Management Directorate and the Gauteng Regional Office: Upper Vaal Water Management Area. 2002-current.
- Rietfontein WwTW (Madibeng Local Authority) Waste Water Treatment Plant Licence application in terms of the National Water Act. 2003.
- Rietfontein WwTW (Madibeng Local Authority) Waste Water Treatment Plant Environmental Impact Assessment - Scoping for a record of decision application in terms of the Environmental Conservation Act. 2003.
- Da Gama Textiles Licence application in terms of the National Water Act. 2003.
- De Beers Kimberley Mines. The redrafting of the De Beers Kimberley Mines EMPR to consolidate all the relevant information into one document, to align the mine activities and EMPR with new anticipated legal requirements, and to align the EMPR to the Kimberley Mines Environmental Management System. 2003.
- Department of Water Affairs & Forestry. Project Manager of a project to develop a Water Quality Management Plan for the Waterval River catchment, DWAF Gauteng Regional Office. 2003.
- Department of Water Affairs & Forestry. Project Manager of a multi disciplinary team to assist the Gauteng Regional Office: Water Quality Management with line function work. 2003.
- ERP Gold Mine Water Management Plan development and licence application in terms of the National Water Act. 2003.
- Olifants River Water Resources Development Project. Task Leader to assist the project co-ordinator on the management of the environmental and public participation tasks within this multi-disciplinary project. 2004
- Republic of Botswana. Ministry of Minerals, Energy and Water Affairs: Department of Water Affairs. EIA study in respect of detailed design of Lower Shashe Dam. Final EIA report. Review of issues identified and addressed in EIA report. 2004
- East-West highway Jamahiriya toll road feasibility study. Libya. Environmental Impact Assessment. 2005.

## Department of Water Affairs and Forestry, Pretoria

1991 to 1999

Assistant Director.

- He was responsible for the management in an integrated manner all water resource related issues within the Mooi River, Taai and Leeu Spruit, Vaal Barrage and Liebenbergsvlei catchments. With his knowledge gained throughout the years he lectured all new Water Quality Managers appointed at the DWAF during the internally developed orientation course for water quality managers.

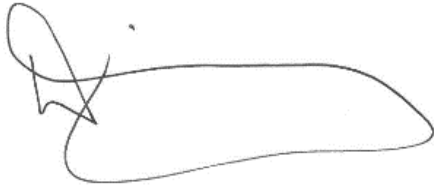
### LANGUAGES:

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	<b>Speak</b>	<b>Read</b>	<b>Write</b>
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

**CERTIFICATION:**

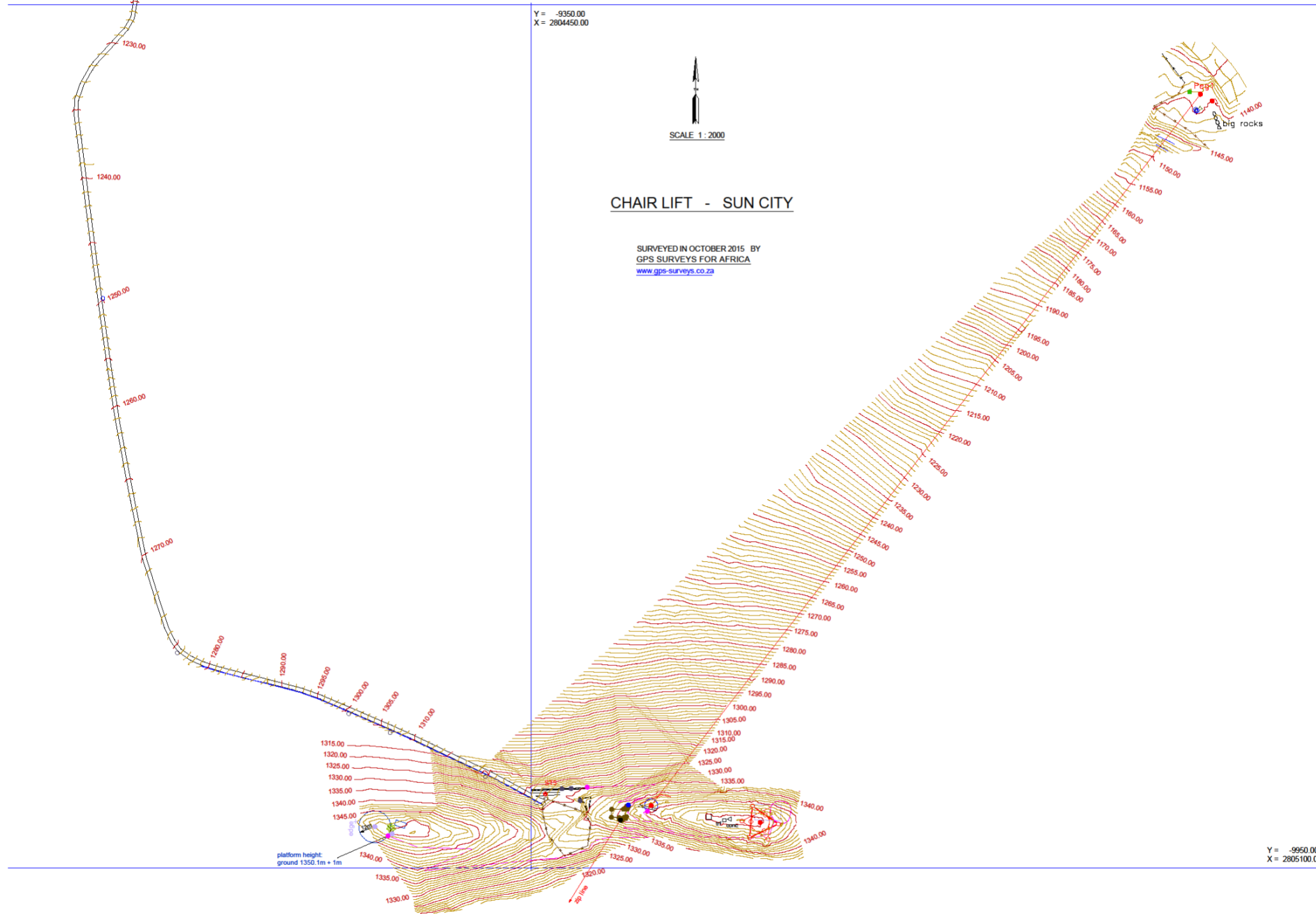
I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.



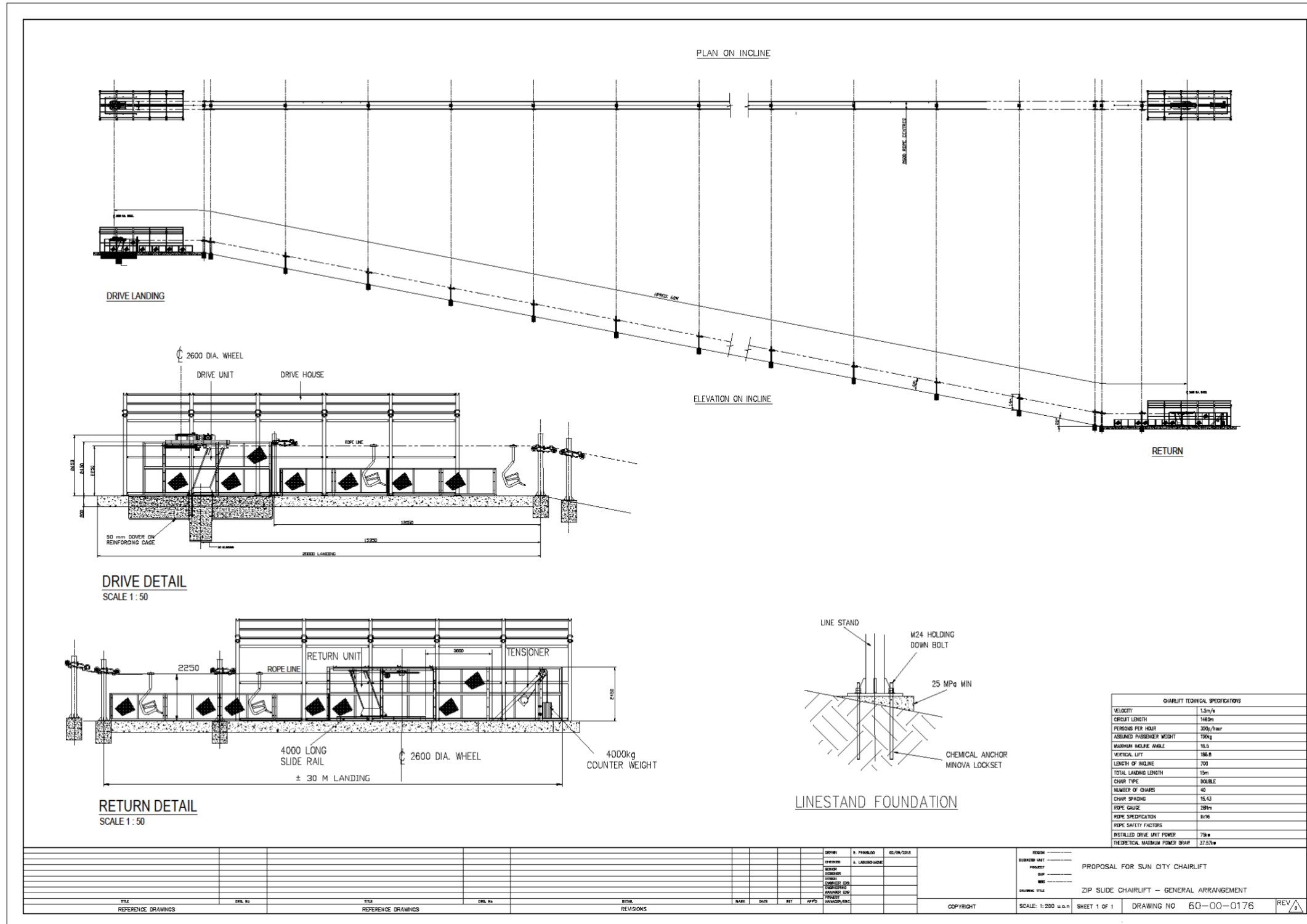

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**Deon Esterhuizen**

APPENDIX B: CONTOUR PLAN

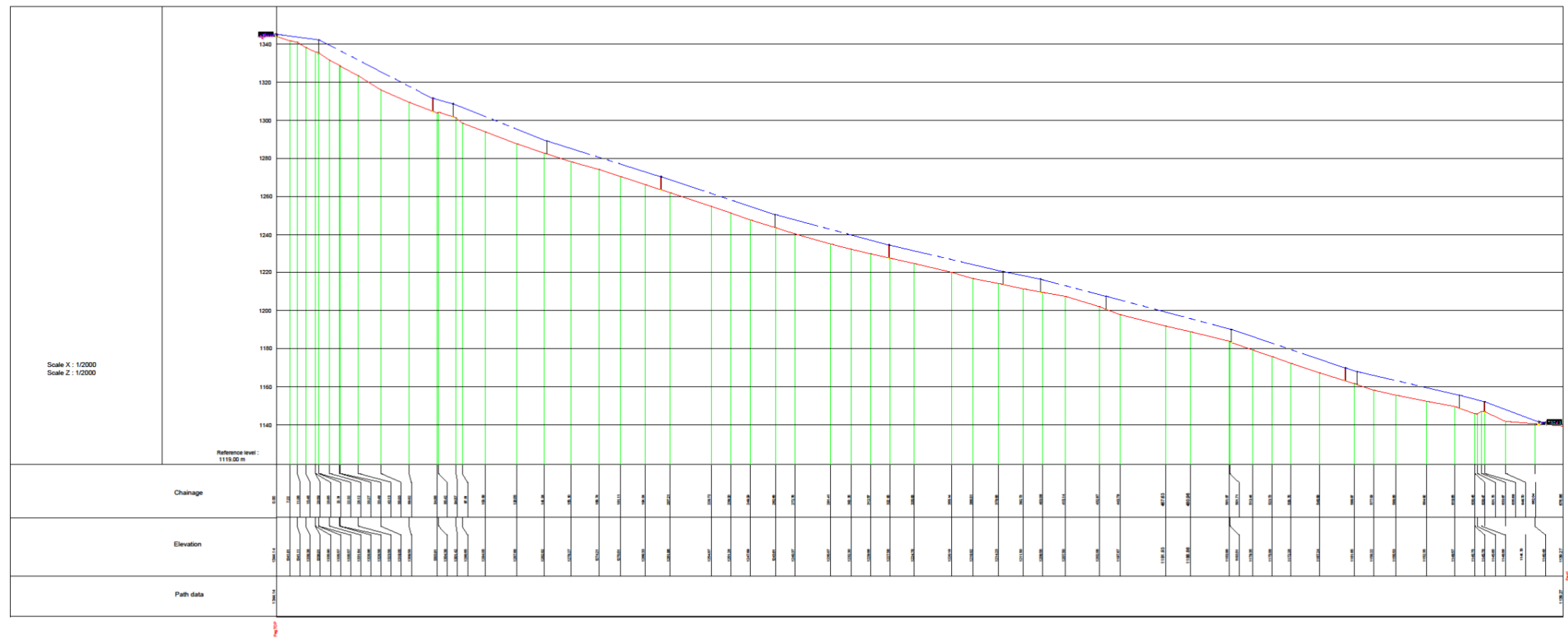




APPENDIX C: TECHNICAL LAYOUT





**APPENDIX D: SITE PROFILE**



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**APPENDIX E: SUN CITY INTERNATIONAL ENVIRONMENTAL POLICY**



**GROUP ENVIRONMENTAL POLICY**

As a leader in the leisure, entertainment, gaming and tourism industry, Sun International is committed to providing memorable experiences for its guests in a sustainable and environmentally responsible manner. As a Group we recognise and acknowledge that the development, operation and management of our properties have financial, social and environmental implications for our stakeholders. Sun International understands that the long-term future of the Group is dependent on the sustainable use of our natural resources and as a result, our environmental strategy forms an integral part of our business strategy.

Sun International is committed to minimising, and where possible preventing, its impact on the environment through:

- developing, implementing and maintaining an environmental management system that is in line with the ISO 14001 standard.
- continually improving the environmental management system in order to enhance our environmental performance.
- ensuring compliance with applicable environmental legislation, regulations and other relevant requirements and promote and monitor environmental standards within the Group.
- promoting efficient use of materials and resources throughout our facilities by:
  - ensuring responsible use of energy through energy conservation initiatives, increasing energy efficiencies and giving preference to renewable energy sources where possible;
  - developing and improving operations and on-site technologies to minimise waste generation with the aim to achieve a zero-waste-to-landfill; and
  - implementing water saving initiatives and increasing the reuse and recycling of waste water to minimise the use and dependence on clean potable water.
- setting and regularly reviewing environmental objectives and targets which are incorporated into the Group's strategic goals to ensure continual environmental improvement.
- promoting awareness of shared responsibility and accountability amongst employees, stakeholders, local communities, and other affected parties on environmental matters of mutual concern; and
- engaging and informing stakeholders of our environmental commitments through our ongoing monitoring and reporting initiatives.

Through our comprehensive Environmental Strategy, Sun International is committed to protecting the environment, minimising its environmental footprint and continually reviewing and improving its sustainability strategy.



AM Leeming  
Chief Executive  
Date: May 2017



JE Horn  
Group Sustainability Manager  
Date: May 2017

Version: 02  
Revision: 05/2017  
Environmental Policy

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