Geology	Archaeology	Thousand Millions of Years Ago	
Precambrian earliest era		4.5	Creation of the earth
		4	Formation of the primordial sea
			First life, single celled algae and bacteria, appears in w ater
		3	
		2	
		1	
		Millions of Years Ago	
			First oxygen-breathing animals appear
		800	
			Primitive organisms develop interdependent specialised cells
		600	Shell-bearing multicelled invertebrate animals appear
Palaeozoic ancient live			Evolution of armoured fish, first animals to possess backbones
		400	Small amphibians venture on to land
			Reptiles and insects arise
			Thecodont, ancestor of dinosaurs, arises
			Age of dinosaurs begins
Mesozoic middle life		200	
			Birds appear
			Mammals live in shadow of dinosaurs
			Age of dinosaurs ends
		80	
			Prosimians, earliest primates, develop in trees
Cainozoic recent life		60	
		40	Monkeys and apes evolve
		20	
			Ramapithecus, oldest know n primate w ith apparently man-like traits, evolves in India and Africa
		10	
		8	
		6	
			Australopithecus, closest primate ancestor to man, appears in Africa
		4	

Geology	Archaeology	Millions of Years Ago	
Lower Pleistocene oldest period of most recent epoch	**Lower Palaeolithic** oldest period of Old Stone Age	2	Oldest know n tool fashioned by man in Africa
		1	First true man, Homo erectus, emerges in East Indies and Africa
			Homo erectus migrates throughout Old World Tropics
		Thousands of Years Ago	
Middle Pleistocene middle period of most recent epoch		800	Homo erectus populates temperate zones
			Man learns to control and use fire
		600	
			Large-scale, organized elephant hunts staged in Europe
		400	Man begins to make artificial shelters from branches
Upper Pleistocene latest period of most recent epoch	**Middle Palaeolithic** middle period of Old Stone Age	200	
			Neanderthal man emerges in Europe
		80	
		60	Ritual burials in Europe and Middle East suggest belief in afterlife
			Wooly mammoths hunted by Neanderthals in Northern Europe
		40	Cave bear becomes focus of cult in Europe
			Cro-Magnon man arises in Europe
Last Ice Age	**Upper Palaeolithic** latest period of Old Stone Age	30	
			Man reaches Australia
			Oldest know n w ritten record, a lunar calender on bone, made in Europe
			Asian hunters cross Bering Strait to populate North and South America
			Figurines sculpted for nature w orship
			Fine artists decorate w alls and ceilings of caves in France and Spain
		20	Invention of needle makes sew ing possible
			Bison hunting begins on Great Plains of North America
Holocene present epoch	**Mesolithic** Middle Stone Ages	10	Bow and arrow invented in Europe
			Dog domesticated in North America

Geology	Archaeology	Years B.C.	
Holocene	Mesolithic	9000	Jericho settled as the first tow n
	(cont.)		sheep domesticated in Middle East
	Neolithic		
	New Stone Age	8000	Pottery first made in Japan
			Goat domesticated in Persia
			Man cultivates his first crops, w heat and barley, in Middle East
		7000	Pattern of village life grow s in Middle East
			Catal Huyuk, in w hat is now Turkey,
			becomes the first trading centre
			Loom invented in Middle East
			Agriculture begins to replace hunting in Europe
		6000	Cattle domesticated in Middle East
			Copper used in trade in Mediterranean
	Copper Age		area
			Corn cultivated in Mexico
		4000	Sail-propelled boats used in Egypt
			Oldest know n massive stone monument built in Brittany
			First cities rise on plains of Sumer
			Cylinder seals begin to be used as marks of identification in Middle East
		3500	First potatoes grow n in South America
			Wheel originates in Sumer
			Egyptian merchant trading ships start to ply the Mediterranean
			First w riting, pictographic, composed,
			Middle East
	Bronze Age	3000	Bronze first used to make tools in Middle East
			City life spreads to Nile Valley
			Plough is developed in Middle East
			Accurate calendar based on stellar
			observation devised in Egypt
			Sumerians invented potter's w heel
			Silk moth domesticated in China
			Minoan navigators begin to venture into seas beyond the Meditterranean
		2600	Variety of gods and heroes glorified in
			Gilgamesh and other epics in Middle East
			Pyramids built in Egypt
		2500	Cities rise in the Indus Valley

Geology	Archaeology	Years B.C.	
Holocene	**Bronze Age**	2400	Stonehenge, most fanous of ancient
(cont.)	*(cont.)*		stone monuments, begun in England
			Earliest w ritten code of law s draw n up
			in Sumer
		2000	Chicken and elephant domesticated in Indus Valley
			Use of bronze spreads to Europe
			Eskimo culture begins in Bering Strait
			area
			Man begins to cultivates rice in Far East
			Herdsmen of Central Asia learn to tame
			and ride horses
		1500	Invention of ocean-going outrigger
			canoes enables man to reach islands of South Pacific
			Oldest know n paved roads built in Crete
			Ceremonial bronze sculptures created in
			China
			Imperial government, ruling distant
			provinces, established by Hittites
	Iron Age	1400	Iron in use in Middle East
			First complete alphabet devised in script
			of the Ugarit people in Syria
			Hebrew s introduce concept of monotheism
		1000	Reindeer domesticated in northern Europe
		900	Phoenicians develop modern alphabet
		800	Celtic culture begins to spread use of
			Iron throughout Europe
			Nomads create a far-flung society based
			on the horse in Russian steppes
			First highw ay system built in Assyria
			Homer composes *Iliad* and *Odyssey*
		700	Rome founded
			Wheelbarrow invented in China
		200	Epics about India's gods nd heroes, the
			Mahabharata and *Ramayana*, w ritten
			Water w heel invented Middle East
		0	Christian era begins

DESCRIPTION

The Cradle of Humankind World Heritage Site (COH WHS) covers an area of over 47 000 hectares in the north -western corner of Gauteng, straddling the boundary between Gauteng and North West Provinces. The area is of outstanding universal value as it contains a complex of palaeontological and palaeo-anthropological sites which have yielded some of the most valuable evidence worldwide of the origins of modern humans.

Embedded in the rocks found in the numerous dolomitic caves in the area are the fossilised remains of hominids, their lithicultural remains and fossils of other plants, animals and pollen. These give a complete picture of the hominids and their surroundings dating back over 3.3 million years. The richness and variety of these deposits, their excellent preservation in the caves, and the age of the specimens, make this area of world significance.
Coupled with this, the area contains archaeological sites dating to the Early Stone Age, the Middle Stone Age, Late Stone Age, the Early and Lat e Iron Age, and recent history such as Anglo -Boer War relics. It also has significant ecological value containing many plant communities some of which are rare, with associated diverse animal communities. The area is largely unspoilt and scenically attract ive, making it an important potential tourism destination. It is also close to the major urban areas of Pretoria and Johannesburg, international and local airports, and the freeway system. The area already boasts a number of private nature reserves and game farms, trout farms, the oldest Gold Mine in the Witwatersrand, arts and crafts outlets, small hotels, lodges, conference centres and restaurants.
The site extends across over 30 farms, many of which have been extensively sub - divided, and of which most ar e in private hands. Therefore plans for its future management must be drawn up in close consultation with all interested and affected parties including the landowners and people living and working in the area.

1-01

SIGNIFICANCE

The global significance of the COH WHS is given in the “Application for inclusion on World Heritage List” where it is stated that:
The Sterkfontein Valley landscape comprises a number of fossil -bearing cave deposits which are considered to b e of outstanding value, because they encapsulate a superbly preserved record of the fauna, including an invaluable record of the stages in the emergence and evolution of humanity, over the past 3,5 million years. This makes it one of the most important sit es for human evolutionary studies and research.
It was the Sterkfontein fossil specimens that provided the proof that Australopithecus could be classified as a member of the Homidae (the family of humans) and that established Africa as the cradle of humankind.

1-02

1-01 Mrs. Ples *[Dacel booklet, Unearthed so far, 2000. pg5]*
1-02 View to east from site

These cave deposits provide a unique testimony of the presence, the structure, functioning and behaviour of Australopithecus africanus which shows many ape - like features and several human-like traits.

Fossils of a robust australopithecine known as Austra lopithecus robustus or Paranthropus robustus have also been recovered, for example from Kromdraai and Swartkrans. There are three scientific viewpoints as to what these fossils may represent. Some scientists hold that A. africanus was the ancestor of early Homo, but not of the robust apemen, alternatively it was the ancestor of the robust apemen but not of Homo, or that A. africanus represents the last common ancestor of both early Homo and the robust australopithecines. Also, fossils of the genus Homo from about 2.0 million years onwards have come from Sterkfontein and are associated with early stages in the stone tool cultures of Africa.

Thus it was these fossil discoveries in the Sterkfontein Valley that resulted in an understanding of the time, place an d mode of evolution of the human family. Also, given the number of fossil specimens, it has made it possible for palaeo - anthropologists to study populations of early hominids in terms of their demography, variability, growth and development, functioning, b ehaviour and ecology. The Sterkfontein Valley cave sites are also valuable for the study of extinctions of communities of animals and the conditions under which this ancient fauna either adapted or became extinct.

In addition to its global, scientific and research significance, the COH WHS is also significant in a number of other critically important aspects. Given the relative degree of land still in a natural state which has not been significantly transformed by the actions of people, the COH WHS has imp ortant ecological significance especially for the conservation of biological diversity and for ensuring that the spectrum of current ecosystems continues to be sustained into the future. The site is considered to be important for the conservation of Banken veld grassland, an example of the natural Highveld landscape, and various rare and threatened species of plants and animals.

It is these natural, aesthetic, fossil and archaeological resources that give the area its important socio-economic significance. There is little doubt that the COH WHS is a key tourist destination for local, national, and international tourist markets. It s tourism significance is not only relevant to Gauteng but to the whole of South Africa and therefore needs to be developed further in order for its full potential to be realised. The COH WHS is considered in the light of its tourism development potential to be an important and significant area for investment. In view of this development potential, the site is significant in terms of contributing to South Africa's economic growth and development plan, and in a local sense to job creation, skills development, and the establishment of SMMEs and new markets for local products.

1-03

1-03 Entrance to Sterkfontein cave

The potential is therefore for possible substantial and sustainable economic development that would significantly contribute locally, regionally and nationally. The resources of the COH WHS are also of value and significance if they are used for education and interpretation and to create learning opportunities for students and visitors to the site. The potential for creating awareness of the origins of humankind amongst people visiting the COH WHS is possibly unparalleled anywhere else. This is because of i ts richness in fossils and other resources, its easy access, and proximity to the greater Johannesburg metro area with its international airport that is the country's largest port of entry for foreign visitors.

PROTECTION, CONSERVATION, AND DEVELOPMENT OF THE CRADLE OF HUMANKIND WORLD HERITAGE SITE

Given the World Heritage Site status of the Cradle of Humankind it becomes incumbent on the South African government to fulfil its international obligations in terms of the World Heritage Convention to protect the site.
This requires that the palaeontology and palaeo -anthropology sites are preserved, that all forms of activities that may lead to a destruction of these sites and their values is avoided and prevented. Ho wever, the COH WHS also represents an important opportunity to promote both the site's outstanding universal values and the World Heritage Convention. To achieve these objectives it requires that the site is developed and managed sustainably, and economic and social development is promoted. The site also represents an opportunity to support and promote government's growth and development strategy. Arising from these opportunities and by enshrining the protection and conservation of the palaeontology, archaeology, and natural resource base, the COH WHS may be developed further to the benefit of communities and the country. These perspectives are encapsulated in the stated vision for the Cradle of Humankind World Heritage Site, which is:
"to achieve an accepta ble balance in the World Heritage Site between the conservation of cultural and natural resources, access, education, and scientific research, the interests of those living and working in the area, and its use for the economic and social benefit of the pop ulation at large, within the framework of the World Heritage Convention."

In striving to achieve this balance between protecting, conserving and developing the COH WHS, it will be essential that the South African and Gauteng provincial governments meet th e conditions contained in the World Heritage Convention and its Operational Guidelines. Developments or activities that may threaten a World Heritage Site and its values may lead to the placing of a site on the List of World Heritage in Danger by the World Heritage Committee. In essence there are two primary conditions under the Convention that State Parties are required to comply with, namely, the conditions of integrity (for natural properties) and authenticity (for cultural properties). Both of these Wor ld Heritage conditions are seen to be of critical importance to the COH WHS and its future strategic development

1-04

1-04 Swartkrans "Ape Man" Australopithecus robustus, about 1,7 million years old
[Dacel booklet, Unearthed so far, 2000. pg8]

FRAMEWORK

The Department of Agriculture, Conservation, Environment and Land Affairs (DACEL) of the Gauteng Government prepared the nomination proposal for the fossil hominid sites of Sterkfontein, Swartkrans, Kromdraai, and environs in 1998.

As part of a planning phase, DACEL appointed a team of specialists to undertake the preparation of an Integrated Environment and Conservation Management Plan. Included in this plan were a series of reports: a State of the Environment Assessment, Tourism and Marketing Plan, Infrastructure and Land Use Management Plan, a Communications and Promotions Plan, and a Stakeholder Participation Report. These reports were needed to support the nomination proposal and were prepared for submission to the World Heritage Bureau.

Due to the scope and magnitude of the COH WHS project, this Integrated Management Plan was used as framework during the research done for this dissertation project.

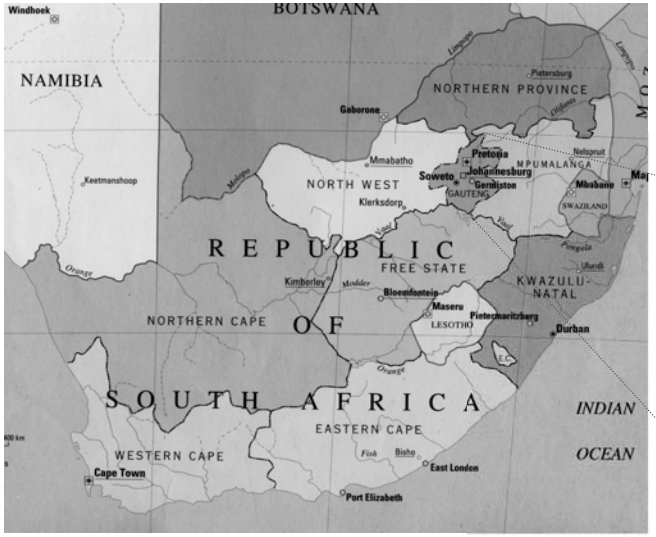
PROJECT BRIEF:

AIMS AND OBJECTIVES

- The proposal is aimed at developing an interpretative facility that:
- provide a broad contextual introduction to the natural, cultural and scientific heritage of the COH WHS and surrounding areas;
- provide opportunities for visitors to access a fossil excavation site and cave and learn more about the history and significance of palaeontological and palaeo-anthropological material, especially as it relates to humankind's search for its earliest ancestors;
- become a key tourist attraction for local residents and local and international visitors of all ages, offering an holistic interpretation of the COH WHS and surrounding areas that educates, entertains and enthrals;
- stimulate scientific research and related activity by prov iding a platform to make information about scientific processes and research findings accessible to the public, and offering facilities to support and encourage scientific research in the COH WHS and surrounding areas;
- promote educational and learning oppo rtunities for the general public, including schoolchildren as well as students, scientists and other academics, through a range of activities and programmes;
- facilitate access to the scientific, cultural and historical heritage resources of the COH WHS in a way that avoids negative impact on the fragile environment; and
- facilitate the delivery of sustainable economic development to the local community in particular and the region in general.

GUIDING PRINCIPLES

- In developing the proposals, the I&RC Technical Team was guided by the following principles:
- existing privately owned facilities and new public facilities should become integrated into an holistic network that facilitates the developme nt of an holistic and integrated interpretation strategy by bringing into play the full breadth of the cultural, historical and natural significance of the site in an interconnected and interrelated way;
- while the palaeontological and palaeo -anthropological component will be given primacy, the thematic framework allows for the inclusion of all elements of significance and interest, from so-called pre-historic times up to the present;
- interpretative facilities should be viable and sustainable and facilitate the spread of benefits, both financial and other, to all stakeholders;
- exhibitions should encompass a wide range of themes and issues and should include interactive activities;
- interpretation media, including exhibitions and related activities, are to be integrated into the design of the building;
- the organisational and management structure should be developed so as to ensure optimal institutional capacity to effect the delivery of core functions to the interpretative network (IN) as a whole;
- the financial framework should accommodate and reconcile the diverse needs and interests of all stakeholders, while at the same time maximising opportunities for investment and enabling sustainability through creative income generation strategies and efficient managemen t and organisation; and
- the staff component should provide optimal institutional capacity to deliver core services, and non -core functions should be outsourced to provide/facilitate community benefits.



1-05

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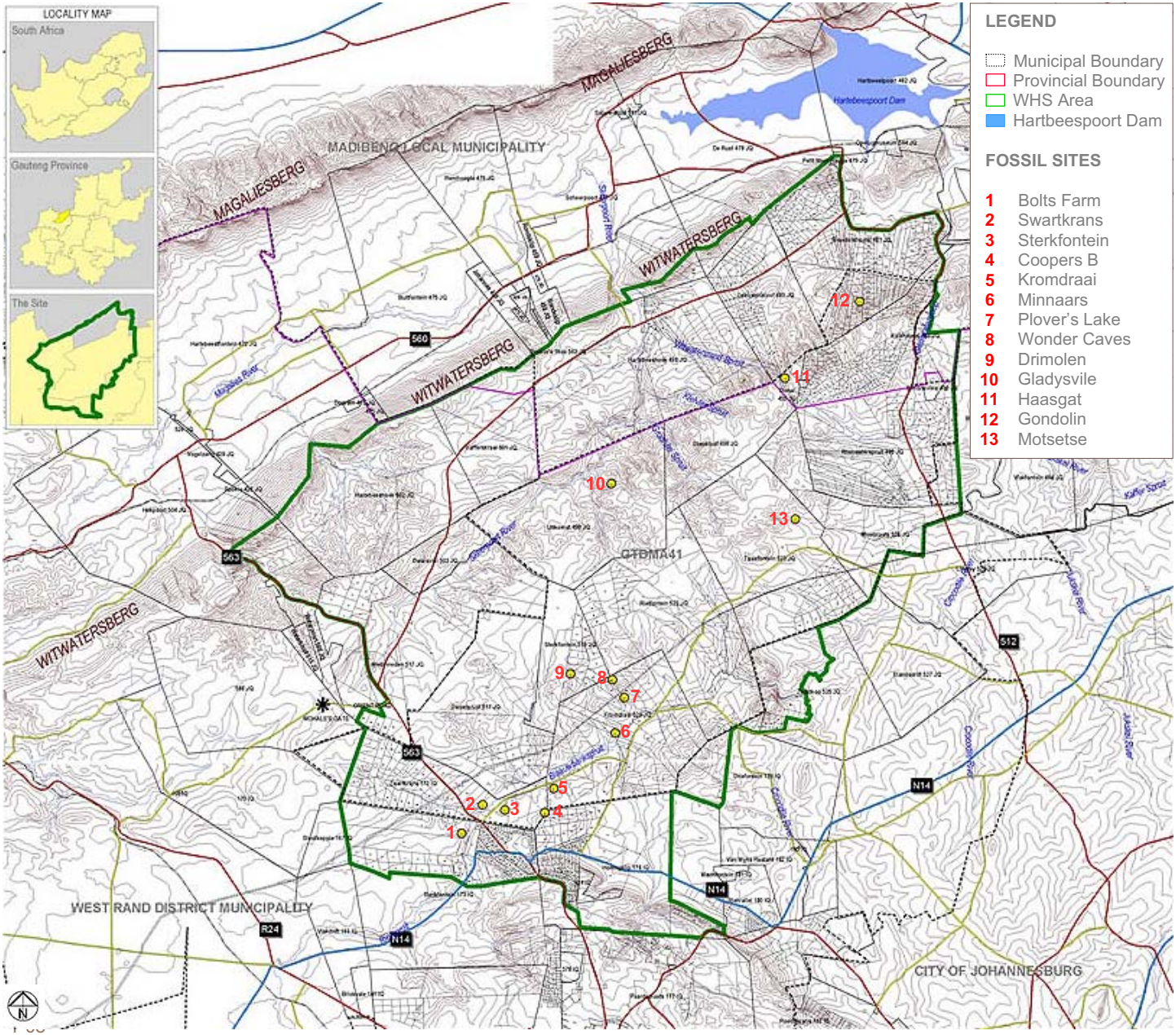
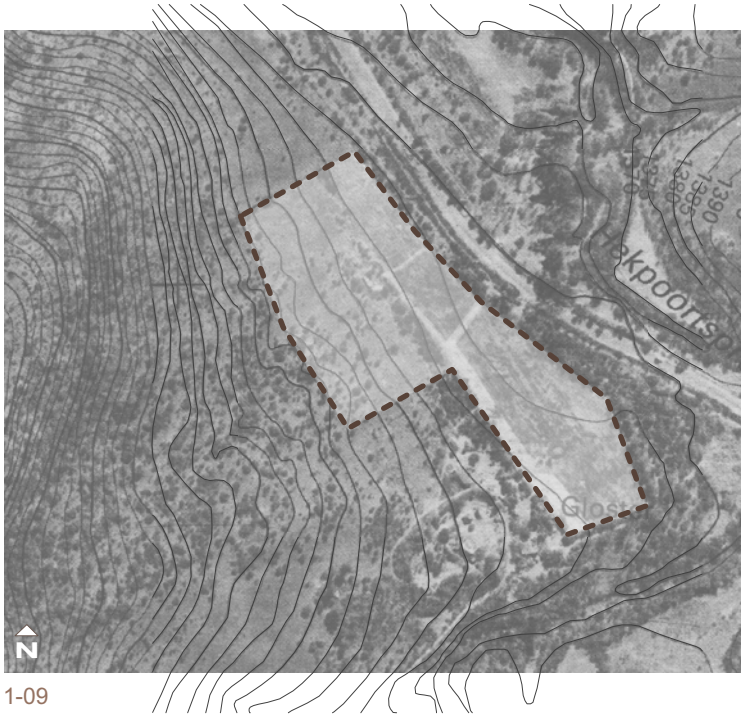
1-07

1-05 Map of South Africa *[Maskew, Miller, Longman, 1996. pg7]*
1-06 Map og Gauteng province *[Maskew, Miller, Longman, 1996. pg10]*
1-07 Aerial photo of site *[Landsurveyor General]*


LOCALITY MAP
South Africa
Gauteng Province
The Site
LEGEND
Municipal Boundary
Provincial Boundary
WHS Area
Hartbeespoort Dam
FOSSIL SITES
1 Bolts Farm
2 Swartkrans
3 Sterkfontein
4 Coopers B
5 Kromdraai
6 Minnaars
7 Plover's Lake
8 Wonder Caves
9 Drimolen
10 Gladysvile
11 Haasgat
12 Gondolin
13 Motsetse
MAGALIESBERG
MADIBENG LOCAL MUNICIPALITY
WITWATERSBERG
GTDMA41
WEST RAND DISTRICT MUNICIPALITY
CITY OF JOHANNESBURG
Hartbeespoort Dam
560
563
512
N14
R24



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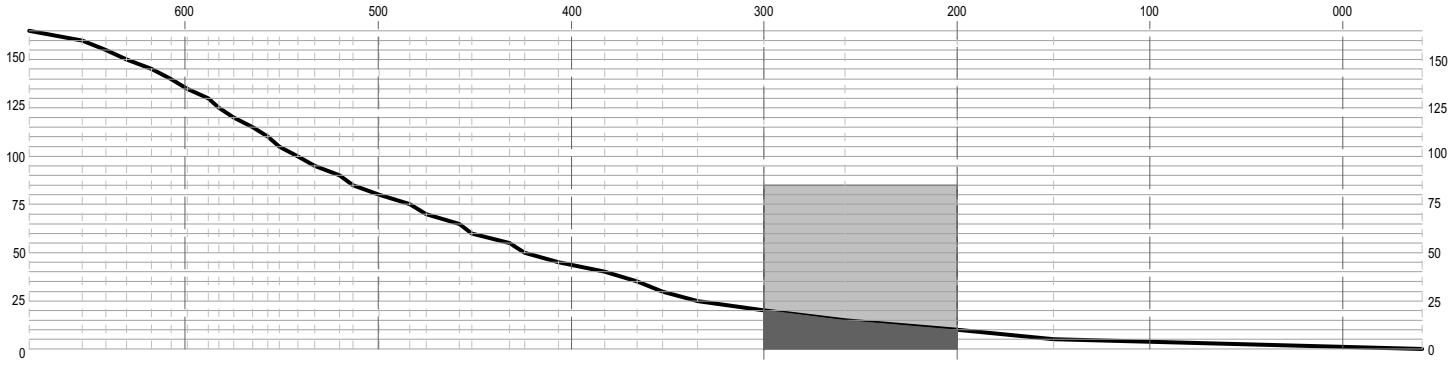
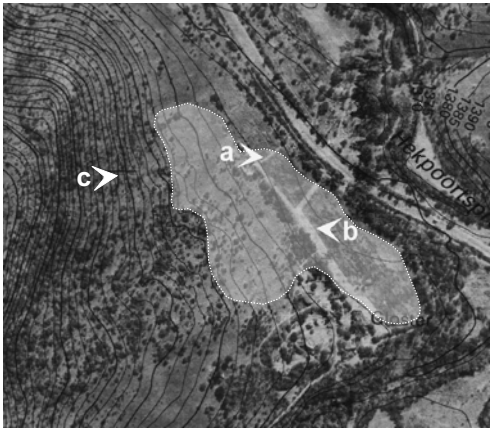


1-10

section site slope 1:11-1:12

1-09 Aerial photo of site indicating site borders and orientation
1-10 Section through site indicating the angle of slope at the location of the main building mass



1-11

1-12

1-13

1-14

1-11 Aerial photo of site indication direction of views
1-12 View facing east from lowest part of site
1-13 View facing west towards site position at base of hill
1-14 Panorama view to the east from upper western part of building site











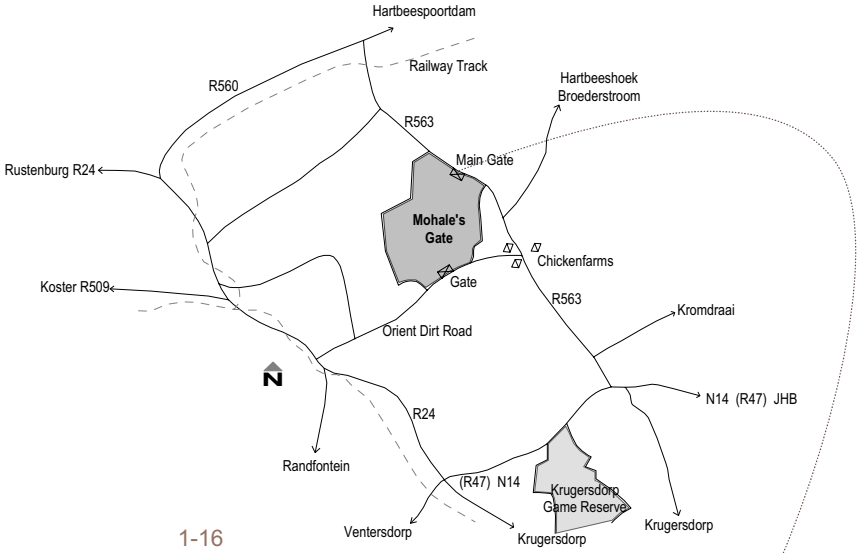









1-15 Image collage of COH WHS context



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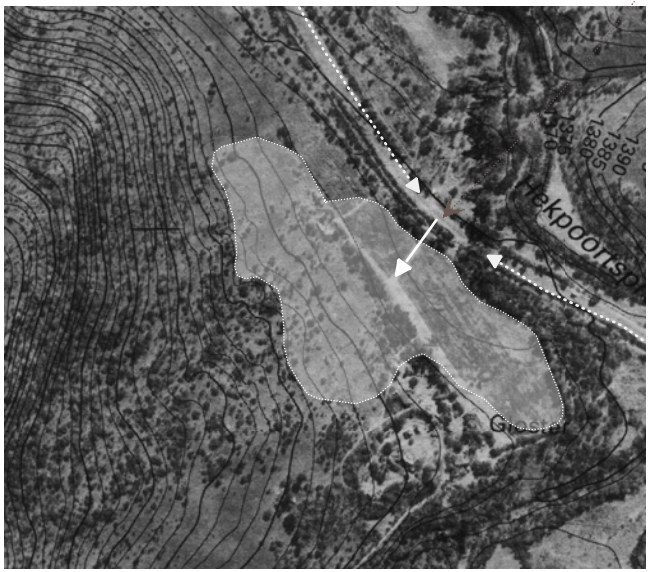


1-17

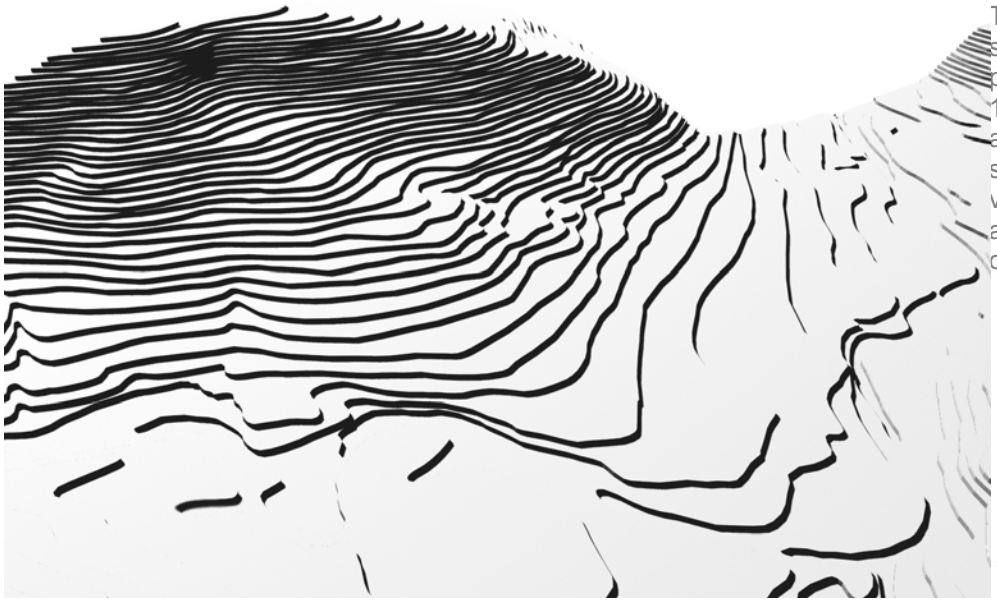
ACCESS

- Via the R563, a major road and the Orient road, a smaller un-tarred road
- Public transport limited
- Access easier for tour buses and private vehicles

1-16 Map indicating routes surrounding site
1-17 Aerial photo indicating main entrance to site from the R563 road

TOPOGRAPHY

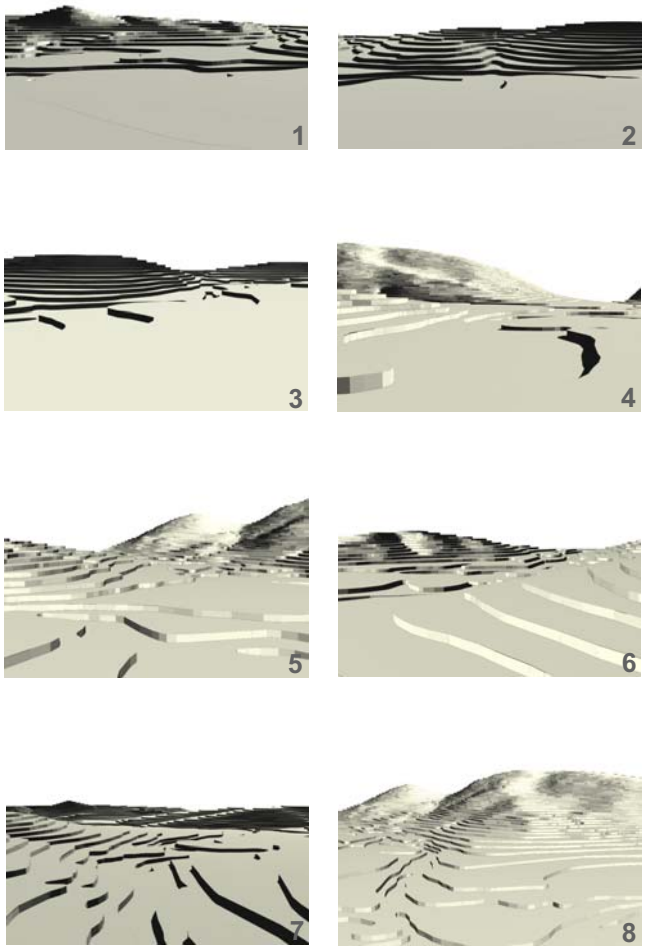
The site comprises of moderate to steep topography. The slope of the possible building site varies between 1:11 and 1:12. This requires special attention to slope stability and substrate retaining. Hiking trails in the vicinity of the Interpretation Center will award visitors with scenic panoramas of the valley and COH WHS.



1-18 3D Topographical model of site and surrounding area

TOPOGRAPHY STUDY

Topographical study of site using 3D contour model.
Contours at 5m height intervals.



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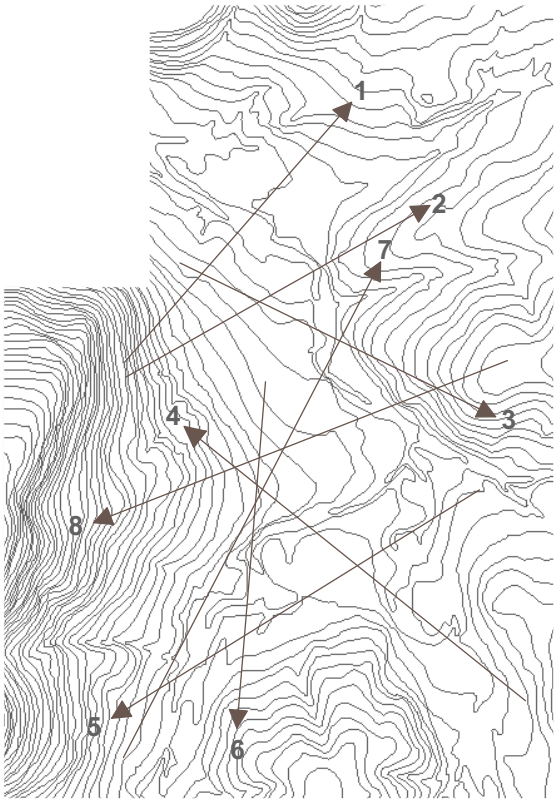


1-20

1-19 3D Topography models of site and surrounding area
1-20 Contour map indicating various view directions

CLIMATE

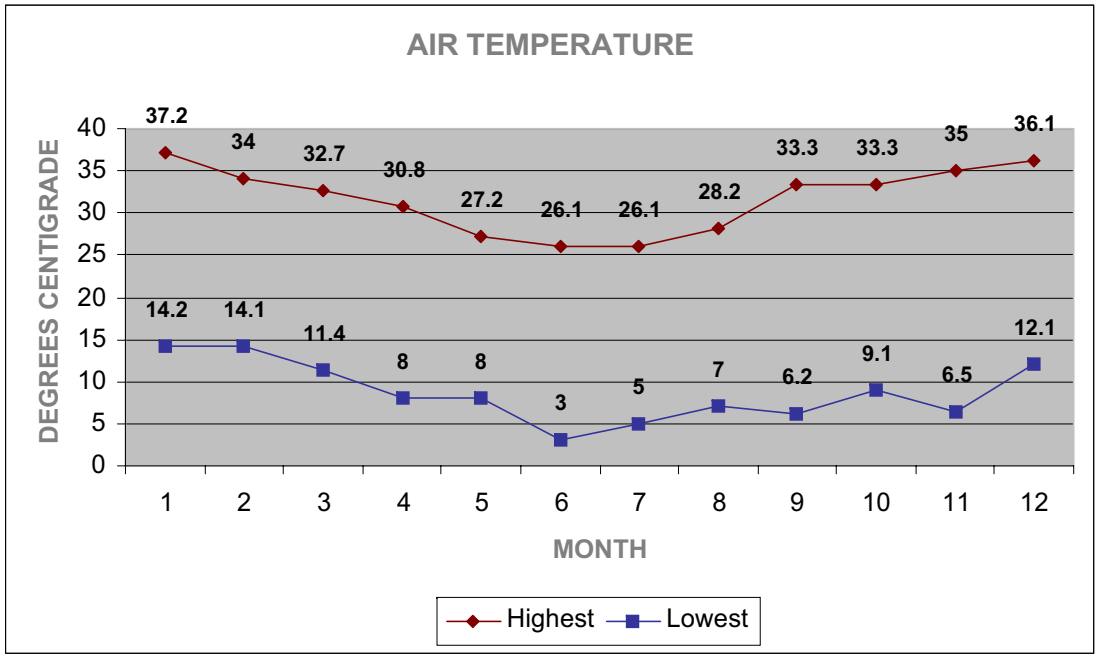
Climatic data taken at Krugersdorp, 20 km from Mohale's Gate site:

- Height- 1699 m above sea level
- Latitude- 27, 46 degrees east
- Longitude- 26, 06 degrees south

- Average humidity taken from 1951-1984- 75%

- Air temperature in degrees centigrade
- Averages taken from 1909-1984:

- Average precipitation taken from 1951-1984



1-21 Table indicating min & max temperatures annually

summer 08:00

summer 12:00

summer 16:00

winter 08:00

winter 12:00

winter 16:00

1-22

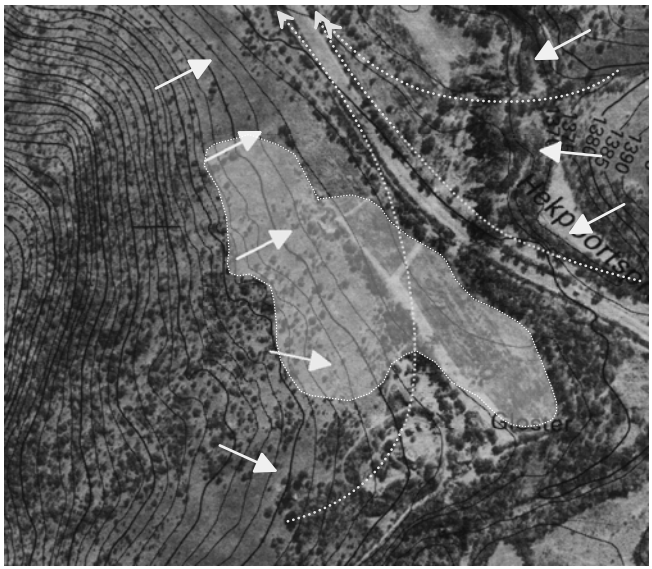
SUN ANGLES

The site can be divided into three areas with a predominant east west orientation. The site is bordered on the west by the steep slopes of the Witwatersberg. The eastern border is formed by the R 563 route with moderately steep slopes between these two borders. The site topography and sun altitude during the changing seasons will lead to varied natural light qualities and adds to the richness of the site. During the middle day hours, between 10:30 – 15:30 when visitor numbers is at its maximum, the topography will not cause drastic shadow patterns.

1-22 3D Topographical site model used to study sun-shade patterns

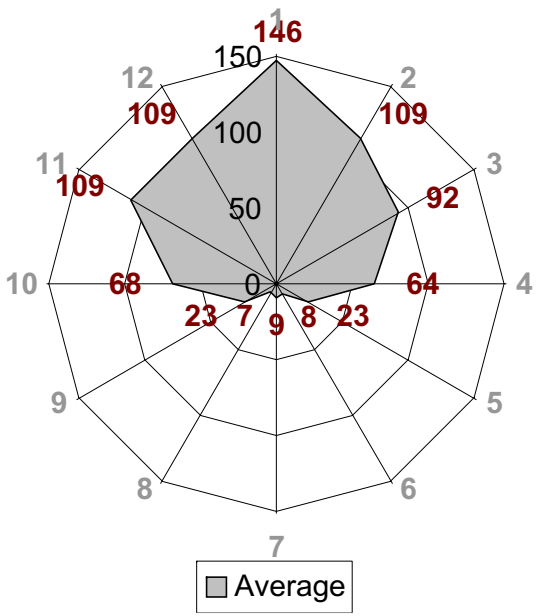
SITE HYDROLOGY

Due to the steep topography of the site, particular attention has to be given to storm water drainage. The location of hard paving must be carefully considered to avoid increased water speed and possible erosion of topsoil. The eastern bord er of the site could be considered as a possible location of rainwater storage containers.



1-23 Aerial photo of site indicating water drainage patterns

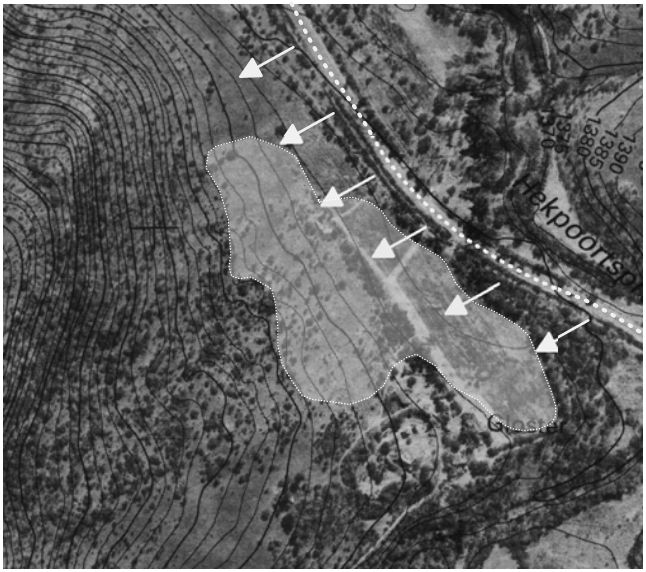
PRECIPITATION



NOISE:

The R 563 road to the east of the site is a source of linear vehicle noise. The layout of the facility must accordingly be designed to reduce the impact of this noise. An agreement with the Department of transport could lead to the lowering of spee d limits on the R563 in the vicinity of the Interpretation Center.

1-25



1-26 Aerial photo of map indicating road noise source
1-25 Views of the R 563 road in the COH WHS context

INTERPRETATION CENTRE MOHALE'S GATE				
Location	**Access**	**Geography and aspect**	**Development potential**	**Links to other sites**
Located adjacent to the R563 between the Sterkfontein Caves and Hekpoort Outside the COH WHS Well located to attract visitors to the North Western region of the COH WHS as well as traffic en-route to Magaliesburg and even to Haartebeespoort Dam	Via the R563, a major road and the Orient road, a smaller un-tarred road Public transport limited Access easier for tour buses and private vehicles	The site faces the COH WHS and overlooks, at present, a largely undeveloped natural landscape	This site would be suitable for large-scale development The site has been offered to DACEL by the owner who will continue to use and maintain the surrounding land The owner has also offered unlimited but negotiated access to the area surrounding the 1 sq km offered to the COH WHS	The site is in reasonably close proximity to Sterkfontein, although it will not necessarily attract or be visible to those visiting the caves

1-27

TOURISM PLANNING	
Advantages	**Disadvantages**
Appears to be no ecologically sensitive fauna and flora Site fits well into topography Views into site possible but at a great distance Services close by Suitable for an environmental interpretation centre with opportunity for game drives	Not visible from main roads Chicken farms and Rand Water Board in middle of viewshed Site requires archaeological investigation due to many stone walls, floors etc. within the demarcated site Not within COH WHS boundary Not on main road and ± 8 km back to nearest palaeo-site Significant road upgrade to site Soils are very thin with andasitic lava surfacing

1-28

LAND USE PLANNING				
Criteria	**Strengths**	**Weaknesses**	**Opportunities**	**Threats**
Ownership	Private but a portion offered to DACEL	Delays in transfer of site	Quick acquisition – low cost	Agreement between land owner and DACEL needs to be finalised
Land Use Rights		Consent for land use rights, subdivision and EIA required		Objection to applications, and environmental sensitivity.
Surrounding land uses	Unencumbered by development	Located away from the main road within a large farm, therefore spin-off effect many be limited	New development under control of DACEL	
Size and expansion	Large site, expansion possible	EIA may identify constraints		
Visitor access	Close to R563	Orient Road gravel, may need upgrading New access road onto site required	Located adjacent to the COH WHS	Degree of remoteness
Worker access		Remote, limited public transport		
Proximity to COH WHS	Adjacent		Views of COH WHS	
Responsible Authority	Mogale City			
Services	Near Rand Water Board Reservoir	No local authority services.		
Geology	Andesite	Geotechnical investigation required		
Surrounding Development opportunities	Located on the road to the North West Province. On link between Sterkfontein and Magaliesburg.	Single ownership of property precludes outside involvement. Off potential development corridor	DACEL can control development on the wider site.	Limited catalytic effect
Visibility	Good view of COH WHS	Visibility from main routes poor		
Topography and natural features	Moderate slopes			

INFRASTRUCTURE				
Criteria	**Strengths**	**Weaknesses**	**Opportunities**	**Threats**
Accessibility by Public Transport	On Taxi route On tourism transport corridor to the tourist destinations just west of Magaliesburg	Relatively remote from urban centres of Pretoria and Johannesburg, and from Lanseria airport	Hekpoort rail station on Spoornet line to Pretoria only 5-6 km away Advertise at Krugersdorp aerodrome Bus link with Magaliesburg railway station (Site 05) and other proposed sites	
Status of nearest main road(s)	In proximity of the R563 which links with the R560 to the tourism centres to the north and with the N14 which eventually leads to the urban centres of Johannesburg, Krugersdorp and Randfontein	Delay from slow moving trucks in hilly areas of R563 The R560 to the North West and the single carriageway portion of the N14 to the South East of the R563 have both fallen into a state of disrepair Safety and delay a serious concern on the four-way stop at the junction between the N14 and the M47 (Hendrik Potgieter)	Liaise with the Department of Transport (DoT) for the upgrade of the N14 between the R563 and the M47 (Hendrik Potgieter) and dress the shoulders of the R563 through the COH WHS; regarding Traffic channelisation on the four-way stop at the junction between the N14 and M47; for the creation of proper turn off facility on R563	R563 in average condition but deteriorating, and soon to reach capacity as it has at the Oaktree junction with the N14 Turn off from fairly busy route a safety concern
Geology and Soils	Not on dolomite going by 1:160,00 map			Instances of unstable chert rich formations in proximity to the West. A site investigation is necessary to confirm ground stability conditions

INFRASTRUCTURE				
Criteria	**Strengths**	**Weaknesses**	**Opportunities**	**Threats**
Supply of potable water		Possibility of reticulated water or sewage systems remote or expensive Low potential for ground water extraction (<1lt/sec), and systems bound to be deep because of terrain		
Topography and Landform				Moderate to steep Care required in design of storm water drains to river, suitability of residual soils and stability of cut slopes before construction
Availability of other bulk Infrastructure	Ordinary Telecomm services available Cellular phone coverage okay	A facility requiring more than 500KVA energy would require a large investment in energy owing to the large distance to the nearest ESKOM substations namely, Magalies and Springfarm, and the lack of overhead high voltage lines Neither a formal sewage reticulation system, nor a solid waste disposal system in area	Build solid waste and sewage disposal capacity in-house or out-sourced for this site	