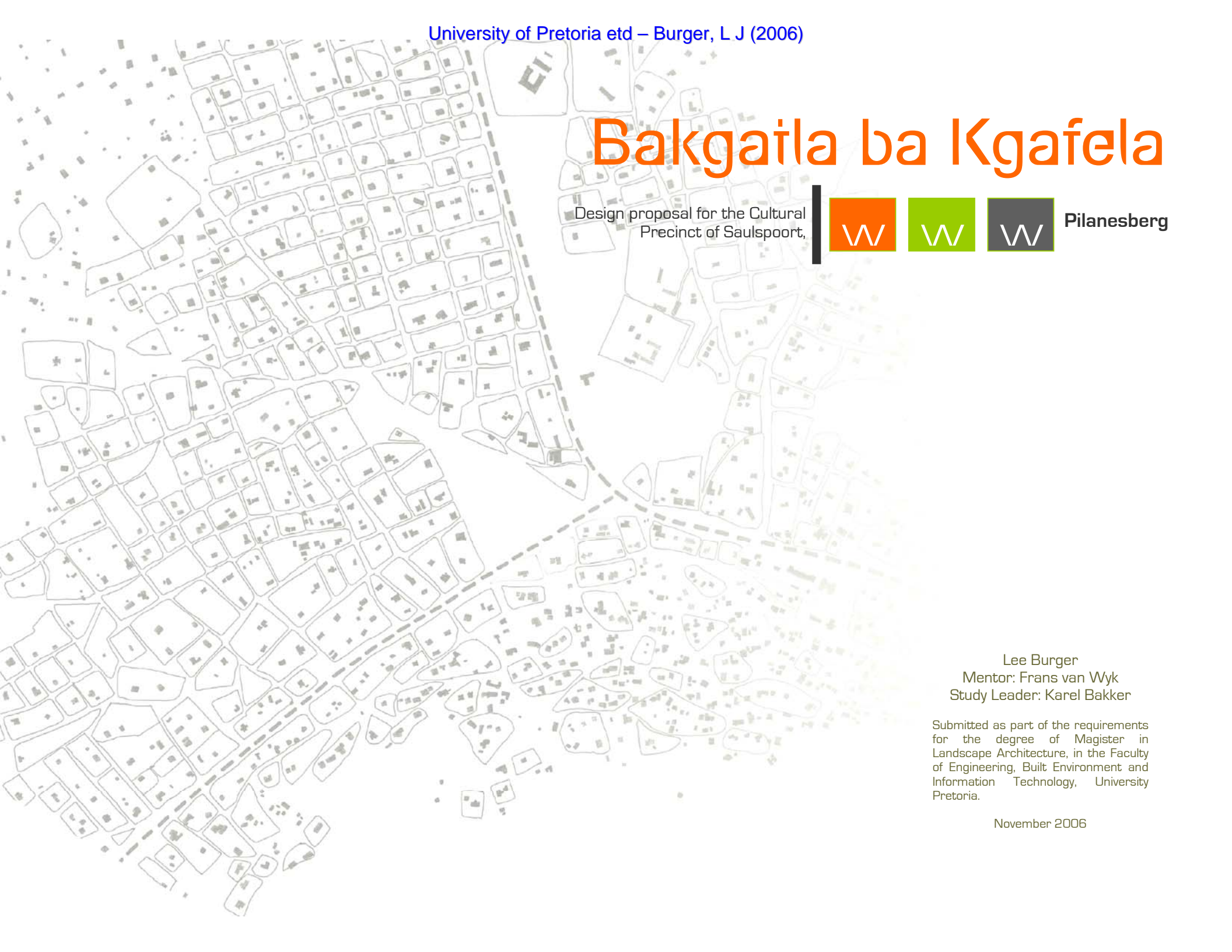


Bakgatla ba Kgafela

Design proposal for the Cultural
Precinct of Saulspoort,



Pilanesberg



Lee Burger
Mentor: Frans van Wyk
Study Leader: Karel Bakker

Submitted as part of the requirements
for the degree of Magister in
Landscape Architecture, in the Faculty
of Engineering, Built Environment and
Information Technology, University
Pretoria.

November 2006

Index

A: Brief development

Introduction		
A. 1	Brief development	5
A. 2	Project background	5
A. 3	The site	5
A. 4.1	Overall objectives	6
A. 4.2	Approach	6
A. 4.2.1	Pre-Construction to Closure/ Decommissioning	6
A. 5.1	Project aims and objectives	6
A. 5.2	Constraints	6
A. 6	Methodology	6
A. 7	The Clients	7
A. 7.1	Non place-based actors	7
A. 7.1.1	International	7
A. 7.1.2	National	7
A. 7.1.3	Regional	7
A. 7.1.4	Donors	7
A. 7.2	Place-based actors	7

B: Context analysis

Bio-physical analysis		
B. 1	Climate	13
B. 1.1	Rainfall	13
B. 1.2	Evaporation	13
B. 1.3	Wind	13
B. 1.4	Temperature	13
B. 2	Geological and mineral resources	13
B. 2.1	Reef Types	13
B. 2.2	Merensky Reef	13
B. 2.3	UG2 Chromitite	13
B. 3	Topography	13
B. 4	Soils Landform	13
B. 4.1	Description of soil-landform resources	13
B. 4.2	Identification of sensitive areas	13
B. 4.2.1.	Soil Erosion	13
B. 4.2.2.	Soil Compaction	13
B. 4.2.3	Dustiness	13
B. 4.2.4	Soil-landform stability	13
B. 5	Land capability and land use	13
B. 5.1	Land capability	15
B. 5.2	Land use	15
B. 6	Vegetation and animals	15
B. 7	Animal life	15
Historical context		
B. 8	Timeline	16
B. 9	Description of Saulspoort and its people	19
B. 9.1	Architectural facilities	19
B. 9.2	School and recreational facilities	19
B. 9.3	Hospitals	19
B. 9.4	Activity from main road	19
B. 9.5	Religion	19
B. 9.6	Transportation	19
B. 9.7	Culture	22
B. 9.8	Criticism of Saulspoort	22
Socio-economic analysis		
B. 10	North West Province in a National Context	22
B. 11	Vision and key leverage areas for the Rural Areas of the Moses Kotane Local Municipality	22
B. 12	Guiding principles/ policies and standards	22
B. 13	Demography	25
B. 14.1	Population	25
B. 14.2	Income Distribution	25
B. 14.3	Work Status	25
B. 14.4	Percentage and type of dwellings	25
B. 14.5	State of housing	25
B. 15	Economy	25

C: Tourism

Introduction		
C. 1	Pilanesberg National Park	30
C. 2	Pilane Reserve and Heritage Park	30
C. 2.1	Tourism Demand Analysis	30
C. 2.2	Survey results of the proposed products to be included in the Heritage Park	30
C. 2.3	Proposed Pilanesberg National Park expansion products	32
C. 2.4	Expected Socio-Economic Benefits	32
C. 3	Heritage Route	34
C. 4	Priority Area for Tourism Infrastructure Investment (PATII)	34
C. 5	North West Province Tourism Master Plan	34
C. 6	Platinum Spatial Development Initiative (SDI)	34
Conclusion		

D: Mining overview

Mining in general		
D. 1	Structure of the mining industry	39
D. 2	Minerals Legislation	39
D. 3	Mining Process	39
D. 3.1	Status Quo	39
D. 3.2	Pre construction phase	39
D. 3.3	Construction phase	39
D. 3.4	Operational phase	39
D. 3.5	Closure/Decommissioning	41
D. 3.6	Post closure phase	41
Kruidfontein project		
D. 4.1	Location	41
D. 4.2	Mineral deposit	41
D. 4.3	The need and the benefits of the project	41
D. 5	Life of Mine	41
D. 6	Job opportunities	41
D. 7	Hours of operation	41
D. 8	Pre-construction phase	41
D. 9	Construction phase	42
D. 9.1	Wilgespruit 2JQ & Magazynskraal 3JQ:	42
D. 9.2	Rooderand 46 JQ:	42
D. 9.2.1	Shaft systems required	42
D. 9.2.2	Roads, railways and power lines	42
D. 9.2.3	Workshops, administration and other buildings	42
D. 9.2.4	Housing, recreation and other employee facilities	42
D. 9.2.5	Proposed river diversions	42
D. 9.2.6	Immediate adjacent land use	42
D. 9.2.7	Tailings facility	42
D. 10	Operational phase	42
D. 11	Closure and decommissioning	44
Environmental impacts		
C. 12.1	Water pollution	44
C. 12.2	Dust fallout	44
C. 12.3	Soil disturbances	44
C. 12.4	Land Use and Land Capability	44
C. 12.5	Fauna and Floral displacement	44
C. 12.6	Traffic Impact	44
C. 12.7	Noise and Visual Impacts	44
C. 12.8	Socio-Economic Impacts	44
C. 12.9	Sensitive landscapes	44

E: Visual Aspects

E. 1	Description of the affected environment	53
E. 2	Topography	53
E. 3	Views/Visibility	53
E. 4	The scale of the landscape	53
E. 5	The Visual Analysis	53
E. 6	The View shed	53
E. 7	The Viewing Distance	53
E. 8	Visual Absorption Capacity	53
E. 8.1	Visual Absorption Capacity (VAC) factors and their numerical values	53
E. 8.2	Landscape type VAC factors	55
E. 9	Impact of vertical structures and general mine infrastructure	55
E. 10	Mitigation measures of vertical structures and general mine infrastructure during operational phase	55
E. 11	Current Mitigation measures of vertical structures and general mine infrastructure during decommissioning phase	55

Conclusion**F: Scenario planning**

Introduction		
F. 1	Scenario 1: linear development next to main road	61
F. 1.1	Positive outcomes	61
F. 1.2	Negative outcomes	61
F. 2	Scenario 2	62
	Development on the farm Rooderand 46 JQ	
F. 2.1	Positive outcomes	62
F. 2.2	Negative outcomes	62
F. 3	Scenario 3	63
	Development at major intersection between Saulspoort and Rooderand	
F. 3.1	Positive outcomes	63
F. 3.2	Negative outcomes	63
F. 4	Scenario 4	64
	Development in Saulspoort.	
F. 4.1	Positive outcomes	64
F. 4.2	Negative outcomes	64

Conclusion**G: Precedent studies**

Introduction		
G. 1	Constitution Court and Constitution Hill	70
G. 2	Red Location Museum	71
G. 3	Metro Mall Transport Facility and Traders Market	72
G. 4	Baragwanath Public Transport Interchange and Traders market	73
G. 5	Phillipi Public Transport Interchange	74

Conclusion**H: Design and construction discourse**

Introduction		
H. 1	What the design must do	78
H. 2	What the design is	78
H. 3	What the design is not	78
H. 4	How people will view the design?	78
H. 5	Site Background	79
H. 6	How people will experience the design	80
H. 7	To what extent the design is going to regulate?	80
H. 8	What information will guide the design?	80
H. 8.1	The beliefs	80
H. 8.2	The history	80
H. 8.3	The people	80
H. 8.4	Sustainability	80
H. 8.5	The context	80
H. 9	Design process:	
H. 9.1	Movement	82
H. 9.2	Elevation	83
H. 9.3	Space	84
H. 9.4	Legibility	85
H. 10	Site plan for the Bakgatla ba Kgafela Cultural precinct	86
H. 11	Routes and destinations	87
H. 12	Zones within the design intervention	88
H. 12.1	Gathering zone	89
H. 12.2	Trade zone	90
H. 12.3	Cultural arena wall	91
H. 13	Views of the design intervention	92
H. 14	Material use	95
H. 15	Construction details for gathering space	97
H. 16	Construction details for Trade space	98

Glossary of terms

After use	The use of which a mining site, or part of a site, is determined when mineral extraction is completed.
Closure	Closure, in the case of mining operations discontinued or abandoned prior to the coming into force of the Minerals Act, 1991, means where a closure certificate has been issued in terms of Regulation 2.11 under the Mines and Works Act, 1956, or in any other case, where a closure certificate has been issued in terms of Section 12 of the Minerals Act, 1991 or in terms of Regulation 2.11 there under, and where a closure certificate provided for in Section 32(2) of the Atmospheric Pollution Prevention Act, 1965, has been issued.
Corridor	Corridors build up along well used linkages and serve as spines for the opening up of new tourism development.
Cutanic	A property of subsurface horizons showing clay movement downwards from topsoil horizons. Cutans consist of material which is usually finer than and has an organisation different to the material that makes up the surface on which they occur. A relatively recent soil-forming process.
Decommissioning	The activity or process that begins after cessation of prospecting activities or mineral production (including metallurgical plant production) and ends with closure. It involves, inter alia, the removal of unwanted infrastructure, the making safe of dangerous excavations and surface rehabilitation with a view to minimising the adverse environmental impacts of mining activities remaining after cessation of mineral production. It includes the aftercare or maintenance that may be needed until closure.
Environmental Impact Assessment (EIA)	An EIA is an assessment of the positive and negative environmental consequences of the development of the proposed project. The primary objective of the EIA section is to aid decision-making by providing factual information on the assessment of the impacts and determining their significance and on which to base valued judgements in choosing one alternative over another.
Hillslope units	Configuration of the landform consisting of crest, scarp, midslope, footslope and valley bottom.
Identified Resource	Resources whose location, grade, quality are known, or estimated from specific geological evidence, and includes economic, marginally economic and sub-economic components. It is also encompasses demonstrated and inferred subdivisions (DME 2000c).
Landfill	Disposal of relatively inert domestic and industrial wastes by burial in holes and tips.
Magnitude of impact	Magnitude of impact means the combination of the intensity, duration and extent of an impact occurring.
Melanic	A dark-coloured, structured topsoil horizon with high base status.
Mining	Mining is the making of any excavation for the purpose of winning a mineral, and it includes any other associated activities and processes (DME 2000).
Mining area	Mining area means the area comprising the subject of mining authorization, including: <ul style="list-style-type: none"> • any adjacent surface of land; • any non-adjacent surface of land, if it is connected to such an area by means of any road, railway line, power line, pipe line, cable way or conveyer belt; and • any surface of land on which such road, railway line, power line, pipe line, cableway or conveyer belt is located, under the control of the holder of such permit or authorization and which he is entitled to use in Connection with the operations performed or to be performed under such permit or authorization.
Mineral	A mineral includes inter alia sand, soil, clay, gravel, rock, ore, coal and tailings. A mineral occurs in, on or under the earth, water or tailings, as a liquid, solid or gas (DME 2000).

Non-renewable resources	Resources that exist in a fixed quantity in the Earth's crust and thus theoretically can be completely depleted are called non-renewable resources. It must be noted that these resources can be depleted much faster than they are formed.
Overburden	Non-processable material overlying mineral deposits that must be stripped off before extraction can proceed.
Paraduplex	A soil with a relatively permeable topsoil overlying a horizon with a significant higher clay content, stronger developed structure and harder consistence.
Partial closure	The closure of a part, section or portion of a mine. the environmental management issues that need to be addressed for partial closure are the same as those required for closure of the whole mine.
Potentially renewable resource	A potentially renewable resource can be renewed fairly rapidly (hours to several decades) through natural processes. Examples of such resources include forest trees, grassland grasses, wild animals, fresh lake and stream water, fresh air, and fertile soil.
Reclamation	Process of bringing back a derelict or disused site to some productive or useful purpose.
Renewable resources	Solar, wind and wave energy is considered to be a renewable resource because on a human time scale it is essentially inexhaustible. It is expected to last at least 6,5 billion years while the sun completes its life cycle.
Restoration	Process of bringing back a derelict or disused site to a properly functioning state; often used to imply the original or similar land use.

Registered / licensed disposal facility	Registered / licensed disposal facility means a facility as determined by the Director: Mineral Development after consultation with the Department of Water Affairs and Forestry, for the disposal of waste.
Reserve base	According to DME 2000c a reserve base is defined as that of an identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth. The reserve base is the in situ demonstrated resource from which reserves are estimated. It may encompass those parts of the resource that have a reasonable potential for becoming economically available within planning horizons beyond those that assure proven technology and current economics. The reserve base includes those resources that are currently economic (Demonstrated reserves) and marginally economic (Demonstrated Marginal Reserves)
Reserves	Reserves refer to that part of the reserve base, which could be economically extracted at the time of determination
Ripping	Deep cultivation of compacted soil using a shanked ripping tool attached to a crawler tractor.
Scarification	Light cultivation of soil surface to improve the seedbeds, prevent lamination between successive soil layers and increase water infiltration.
Sensitive Area	A sensitive area or environment can be described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists or where there is a high potential for ecotourism.
Sensitive environments	Sensitive environments are the following: <ul style="list-style-type: none"> • Limited development areas (section 23 of the Environment Conservation Act, 1989 [Act No. 73 of 1989].

- Protected natural environments and national heritage sites.
- National, provincial, municipal and private nature reserves.
- Conservation areas and sites of conservation significance.
- National monuments and gardens of remembrance.
- Archaeological and palaeontological sites.
- Graves and burial sites
- Lake areas, offshore islands and the admiralty reserve.
- Estuaries, lagoons, wetlands and lakes.
- Streams and river channels, and their banks.
- Dunes and beaches.
- Caves and sites of geological significance.
- Battle and burial sites.
- Habitat of Red Data Book species.
- Areas or sites of outstanding natural beauty.
- Areas or sites of special scientific interest.
- Areas or sites of special social, cultural or historical interest.

Significant impact

An impact can be deemed significant if consultation with the relevant authorities and other interested and affected parties, on the context and intensity of its effects, provide reasonable grounds for mitigating measures to be included in the environmental management report. The onus shall be on the proponent to include the relevant authorities and other interested and affected parties in the consultation process. Present, and potential future, cumulative and synergistic effects should all be taken into account.

Soil form

Higher category of the Soil African soil classification system, defined by a unique vertical sequence of diagnostic horizons and/or materials.

Describe a programme of strategic initiatives by Government aimed at unlocking the inherent and underutilised economic development potential of certain specific spatial locations in South Africa.

Spoil

Bulk waste material produced along with the marketable mineral: production waste, substandard and unmarketable material, overburden, etc. that has to be disposed of.

Subsoil

Subsoil means those layers of soil and weathered rock immediately beneath the topsoil that overlay the hard rock formation.

Tailings

Tailings are any waste materials, slimes or residue produced from mining or the processing of minerals (DME 2000).

Topsoil

Topsoil means the layer of soil covering the earth and which provides a suitable environment for the germination of seed, allows the penetration of water, is a source of micro-organisms, plant nutrients and in some cases seed, and of a depth of 0.5 m or any other depth as may be determined by the Director: Mineral Development for each mining area.

Vertic

Soils high in expanding clay that form large cracks on drying; self-mixing.

List of abbreviations and units

Au	Gold
ACP	Anglo Platinum Converting Process
BDM	Bojanala District Municipality
BRPM	Bafokeng-Rasimone Platinum Mine
DACE	Department of Agriculture, Conservation and Environment
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
DME	Department of Minerals and Energy
EAMP	Environmental Assessment and Management Programme
EIA	Environmental Impact Assessment
EIM	Environmental Impact Management
EMP	Environmental Management Plan
EMS	Environmental Management System
EMPR	Environmental Management Programme Report
GDP	Gross Domestic Product
IEC	Independent Environmental Consultant
IEM	Integrated Environmental Management
Ir	Iridium
KP	Kruidfontein Project
LDO	Land Development Objective
LED	Local Economic Development
MAE	Mean Annual Evaporation
MAR	Mean Annual Runoff
MAP	Mean Annual Precipitation
MEM	Mining Environmental Management
MIKLIM	Moses Kotane Local Municipality
NDA	National Department of Agriculture
NEMA	National Environmental Management Act (Act No. 36 of 1998)
NWPTB	North West Parks and Tourism Board
Os	Osmium
PATII	Priority Area for Tourism Infrastructure Investment
Pd	Palladium
PGEs	Platinum Group Elements
PGM	Platinum Group Metal
PNP	Pilanesberg National Park
Pt	Platinum

Rh	Rhodium
RPM	Rustenburg Platinum Mines Limited
Ru	Ruthenium
SABS	South African Bureau of Standards
SDI	Spatial Development Initiative
tpm	tons per month
tpa	tons per annum
VAC	Visual Absorption Capacity
WTO	World Tourism Organisation

List of figures and tables

Chapter A: Brief development

Figure A.1	map of South Africa, North West province and Pilanesberg Game Reserve	[www.savenues.co.za]	p. A4
Figure A.2	the design approach	(by Author)	p. A6
Figure A.3	the design approach	(Schulz 2004: 102)	p. A7
Figure A.4	Anglo platinum insignia	(Courtesy of Anglo Platinum Ltd.)	p. A7

Chapter B: Context analysis

Figure B.1	map of South Africa, North West province and Pilanesberg Game Reserve	[www.savenues.co.za]	p. B12
Figure B.2	Ariel view of Saulspoort	[www.googleearth.com]	p. B12
Figure B.3	Moses Kotane local municipality	(S.E.F. 2001: 24)	p. B12
Figure B.4	Moses Kotane local municipality	(S.E.F. 2001:26)	p. B12
Figure B.5	Mean annual runoff	(S.E.F. 2001: 85)	p. B14
Figure B.6	Litostratigraphic map	(S.E.F. 2001: 48)	p. B14
Figure B.7	Mean annual precipitation	(S.E.F. 2001: 39)	p. B14
Figure B.8	Erodability index	(S.E.F. 2001: 58)	p. B14
Figure B.9	Sualspoort Photo collage	(by author)	p. B18
Figure B.10	Sualspoort analysis	(by author)	p. B20
Figure B.11	Cell structure analysis	(by author)	p. B21
Figure B.12	Sites of archeological importance	(S.E.F. 2001: 2.55)	p. B23
Figure B.13	Architectural Photo collage	(by author)	p. B24

Chapter C: Tourism

Figure C.1	Priority area for tourism infrastructure investment	(S.E.F. 2003)	p. C29
Figure C.2	Photo collage	(by author)	p. C31
Figure C.3	Photo collage of tourist destinations	(by author)	p. C33
Table C.1	Survey result of the proposed products to be included in the HP		p. C32
Table C.2	Proposed PNP expansion products		p. C32

Chapter D: Mining

Figure D.1	Proposed zones and footprint areas for surface infrastructure	(S.E.F. 2001:13)	p. D40
Figure D.2	Exposed limbs of the Bushveld Complex	(Eagles 2001: v)	p. D40
Figure D.3	Pre-construction components	(DME 2000:a)	p. D41
Figure D.4	Conceptual flow diagram of the concentrating plant	(RPM Ltd Union 2001)	p. D42
Figure D.5	Photo collage of mining infrastructure	(by author)	p. D43
Figure D.6	Materials balance diagram	(S.E.F. 2001:16)	p. D44
Figure D.7	BRPM regional layout	(by author)	p. D45
Figure D.8	BRPM mine component layout	(by author)	p. D46
Figure D.9	Photo collage of architectural language	(by author)	p. D47
Figure D.10	Shaft complex layout	(by author)	p. D48

Chapter E: Visual aspects

Figure E.1	Panoramic view looking north	(S.E.F. 2001: 2.61)	p. E52
Figure E.2	Viewshed	(S.E.F. 2001: 2.62)	p. E52
Figure E.3	Landscape types	(S.E.F. 2001: 2.67)	p. E54
Figure E.4	V.A.C. factors	(CKA 1998)	p. E54

Table E.1 Visual absorption capacity factors and numerical values	(S.E.F. 2001:111)	p. E53
Table E.2 Landscape type VAC factors	(S.E.F. 2001:115)	p. E55
Chapter F: Scenano planning		
Figure F.1 Linear development next to main road	(by author)	p. F51
Figure F.2 Development on the farm Rooderand	(by author)	p. F52
Figure F.3 Development at major intersection between Rooderand and Saulspoot	(by author)	p. F53
Figure F.4 Development in Saulspoot	(by author)	p. F54
Chapter G: Precedent studies		
Figure G.1 Photo collage of Constitution Court and Constitution Hill	(Deckler, Graupner, Rasmuss 2006:19-21 & Author)	p. G70
Figure G.2 Photo collage of Red Location Museum	(Deckler, Graupner, Rasmuss 2006:43-45)	p. G71
Figure G.3 Photo collage of Metro Mall Transport Facility and Traders Market	(Deckler, Graupner, Rasmuss 2006:61-63)	p. G72
Figure G.4 Photo collage of Baragwanath Public Transport Interchange and Traders market	(Deckler, Graupner, Rasmuss 2006:65-67)	p. G73
Figure G.5 Photo collage of Phillippi Public Transport Interchange	(Deckler, Graupner, Rasmuss 2006:79-81)	p. G74
Chapter H: Design discourse and construction		
Figure H.1 Background information	(by author)	p.79
Figure H.2 Photo collage	(by author)	p.81
Figure H.3 Transportation forms	(by author)	p.82
Figure H.4 Pedestrian safety	(by author)	p.82
Figure H.5 Design process: movement	(by author)	p.82
Figure H.6 Elevational expression of plan	(by author)	p.83
Figure H.7 Design process: elevation	(by author)	P.83
Figure H.8 Design process: space	(by author)	p.84
Figure H.9 Design process: legibility	(by author)	p.85
Figure H.10 Site plan	(by author)	p.86
Figure H.11 Routes and destinations	(by author)	p.87
Figure H.12 Design zones	(by author)	p.88
Figure H.13 Gathering space	(by author)	p.89
Figure H.13.1 Gathering space circulation	(by author)	p.89
Figure H.13.1 Gathering space zone 1&2	(by author)	p.89
Figure H.13.1 Gathering space zone 3	(by author)	p.89
Figure H.14 Trade zone	(by author)	p.90
Figure H.14.1 Trade zone circulation	(by author)	p.90
Figure H.14.2 Trade zone material use	(by author)	p.90
Figure H.14.3 Trade zone trading space	(by author)	p.90
Figure H.15 Cultural arena wall	(by author)	p.91
Figure H.16 Views of the design intervention	(by author)	p.92
Figure H.17.1 Material use	(by author)	p.95
Figure H.17.2 Material use	(by author)	p.96
Figure H.17.2.1 Tanalith Post Foundation	(by author)	p.96
Figure H.18 Section A-A	(by author)	p.97
Figure H.18.1 Detail of Retaining Rock wall	(by author)	p.97
Figure H.18.2 Detail of Low seating wall	(by author)	p.97
Figure H.19 Section B-B	(by author)	p.98
Figure H.19.1 Detail of concrete bench	(by author)	p.98
Figure H.19.2 Detail for Granite paver	(by author)	p.98

