AGRICULTURAL COMPLIANCE STATEMENT A PORTION OF PORTION 4 OF THE FARM WAAI KRAAL 120, WESTERN CAPE PROVINCE

PREPARED FOR

GREENMINDED

FEBRUARY 2021

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SPECIALIST CV

DR DARREN BOUWER

EDUCATION

PhD Soil Science	University of the Free State	2018
M.Sc. Soil Science	University of the Free State	2013
B.Sc. Soil Science (Hon)	University of the Free State	2009
B.Sc. Soil Science	University of the Free State	2008
Matric certificate	Queens College	2005

PROFESSIONAL AFFILIATIONS

- SACNASP- Pri Nat Sci 400081/16
- Member of the Soil Science Society of South Africa
- Member of the Soil Classification Work Group
- Member of South African Soil Surveyors Organisation

WORK EXPERIENCE

- **Digital Soils Africa** / Soil Scientist - May 2012 – Present
- **Ghent University** / Researcher- January 2016 - December 2016
- **University of the Free State**/ Assistant Researcher- January 2011- December 2015

PUBLICATIONS

Total consultancy reports:89 **Total Publications: 5**

Most relevant:

Bouwer, D., Le Roux, P. A., van Tol, J. J., & van Huyssteen, C. W. (2015). Using ancient and recent soil properties to design a conceptual hydrological response model. Geoderma, 241, 1–11.

Van Zijl, G. M., Bouwer, D., van Tol, J. J., & le Roux, P.A.L. (2014). Functional digital soil mapping: A case study from Namarroi, Mozambique. Geoderma, 219-220, 155–161.

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SPECIALIST DECLARATION

I, Darren Bouwer, declare that –

- I act as the independent specialist in this application;
- I regard the information contained in this report to be true and correct;
- I do not have a conflict of interest in this project;
- I will conduct the work relating to the project in an objective manner.

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BACKGROUND TO THE STUDY

Digital Soils Africa (Pty) LTD (DSA) were tasked by Greenmined to undertake an Agricultural Compliance Statement for the Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014. The Compliance Statement is reported according to the protocol for the specialist assessment and minimum report content requirements for the environmental impacts on agricultural resources (DEA, 2020)

Lombardskraal Doleriet (Pty) Ltd is applying for environmental authorisation (EA) and a mining permit to mine gravel on a portion of Portion 4 of the farm Waai Kraal 120, Registration Division of Beaufort West, Western Cape province.

The proposed footprint will be 4.9 ha and will be developed over an undisturbed area of the farm occasionally used for grazing. The mining method will make use of blasting, after which the material will then be loaded and hauled to the crushing plant where it will be stockpiled. The intends to win material from the area for at least 2 years with a possible extension of another 3 years.

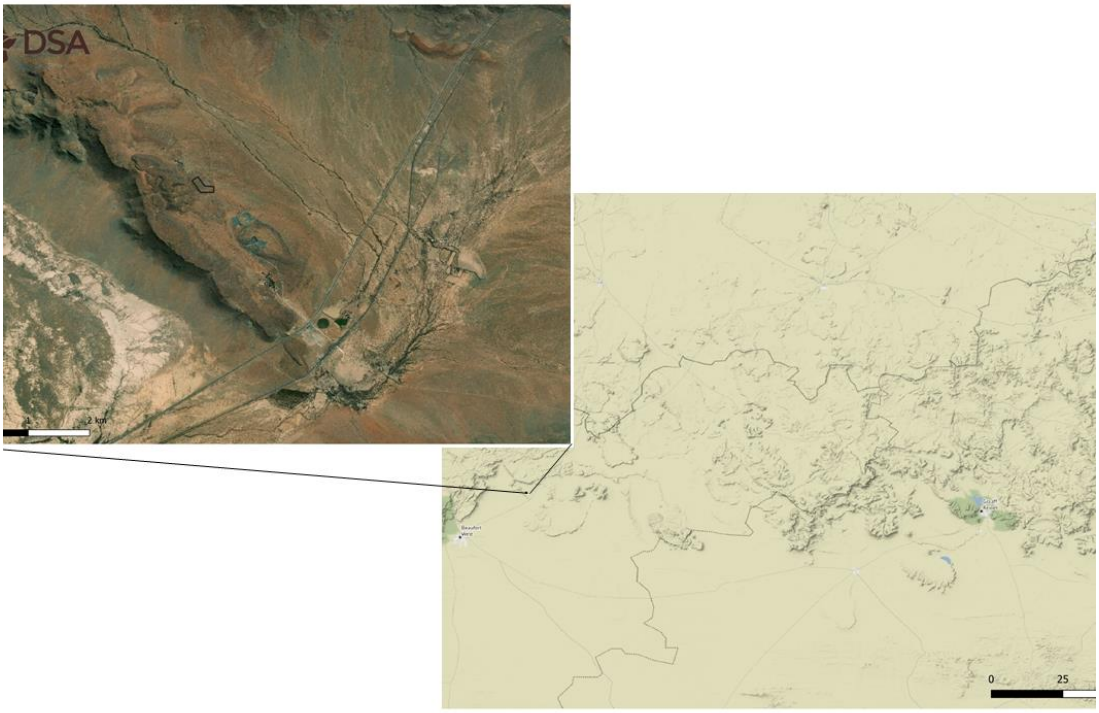
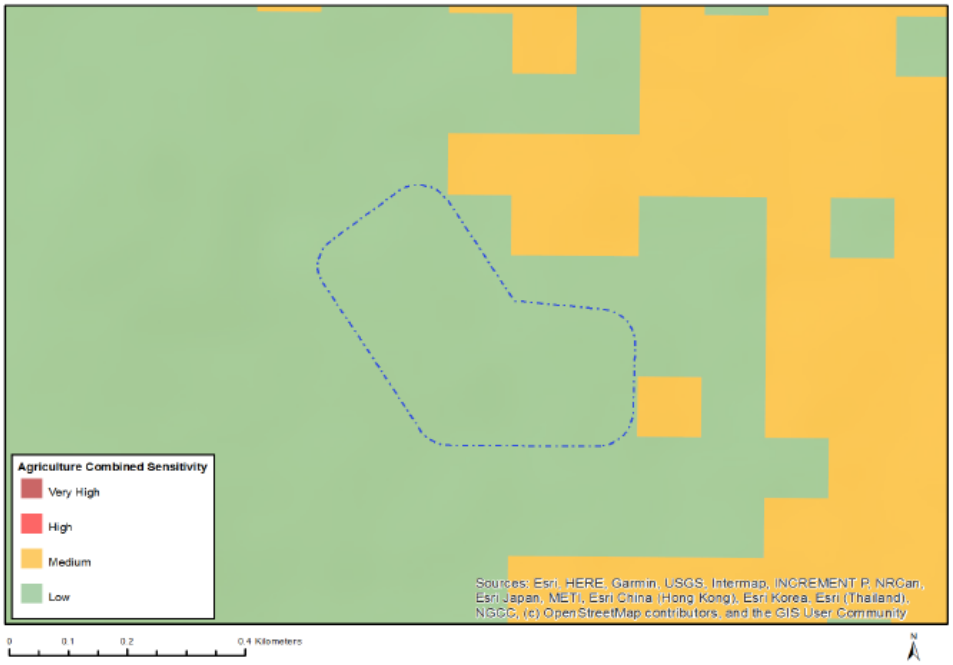


FIGURE 1: LOCATION OF THE STUDY AREA IN THE WESTERN PROVINCE.

SCREENING TOOL

The area was classified as low sensitivity by Department of Environmental Affairs (DEA) in the screening.

MAP OF RELATIVE AGRICULTURE THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low

FIGURE 2: RESULTS FROM THE DEA SCREENING TOOL.

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METHODOLOGICAL APPROACH

DESKTOP SURVEY

All information used to compile the Compliance Statement in found in

TABLE 1: LIST OF DATA USED TO COMPILE COMPLIANCE STATEMENT

Land type	Land Type Survey Staff, 1972 – 2002
Climate	Schulze (2007)
South African Nation Land Cover 2018	Department of Environmental Sciences (2018)
LONG TERM GRAZING CAPACITY MAP FOR SOUTH AFRICA 2016	Department of Agriculture, Forestry and Fisheries (2016)

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RESULTS

DESKTOP

LAND TYPE INFORMATION

There are two land types occurring in the study area, namely Ae76 and Ib255 (Figure 3) (Appendix 1). The criteria for an area to qualify for inclusion in the landtypes are given in Table 2.

TABLE 2: BRIEF DESCRIPTION OF BROAD LANDTYPES FOUND IN THE STUDY AREA.

LANDTYPE	DESCRIPTION
AE	FREELY DRAINED, RED, EUTROPHIC, APEDAL SOILS COMPRISE >40% OF THE LAND TYPE (YELLOW SOILS COMPRISE <10%)
IB	ROCK OUTCROPS COMPRISE >60% OF LAND TYPE

FIGURE 3: LAND TYPES OCCURRING IN THE STUDY AREA (LAND TYPE SURVEY STAFF, 1972 – 2002).

CLIMATE

The mean annual rainfall distribution is between 200 and 400 mm and the site falls within the arid climate.

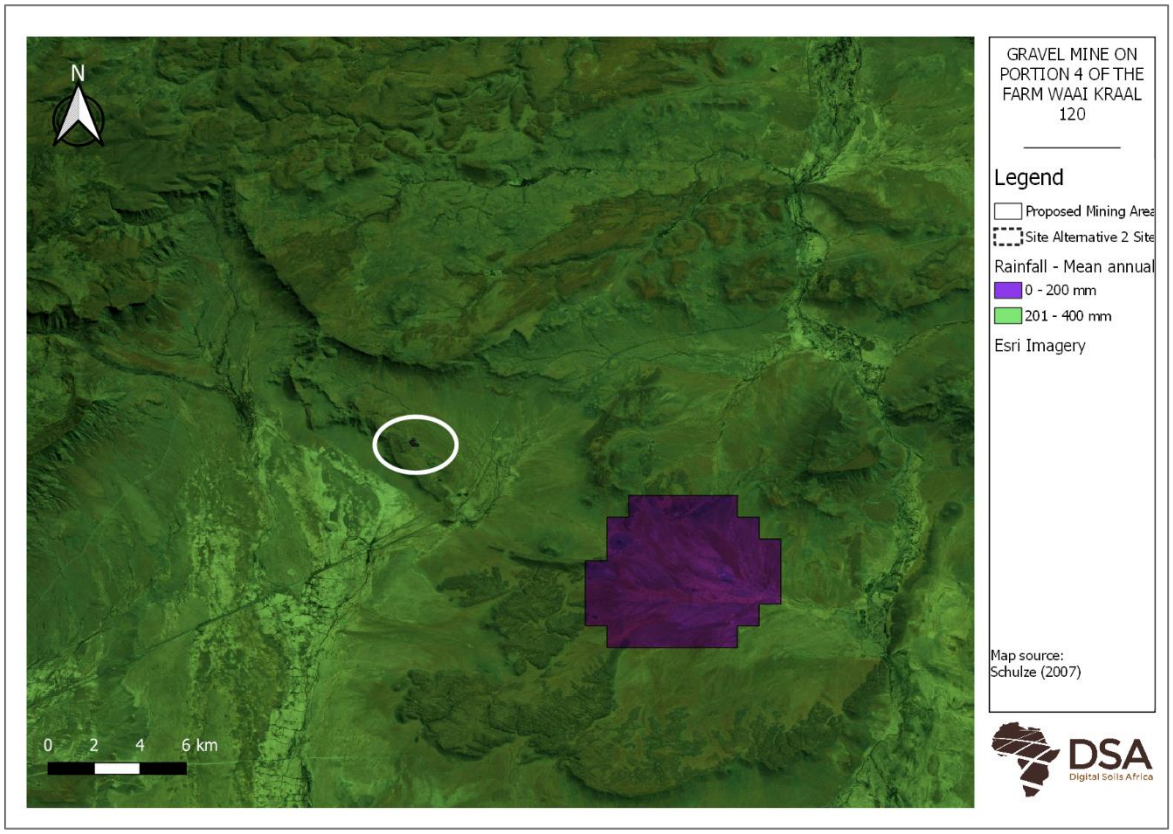

FIGURE 4: RAINFALL DISTRIBUTION AND ARIDITY ZONES OF THE SITE AND SURROUNDING AREA (SCHULZE, 2007).

LAND USE

The current land use is dominated by Nama Karoo low shrubland & and natural bare land cover (Figure 5: South African National Land-Cover 2018 (SANLC, 2018).

TABLE 3: SELECTED NATIONAL LAND-COVER LEGEND AND CLASS DEFINITIONS USED IN THE SOUTH AFRICAN LAND-COVER 2018

No.	Class Name	Class Definition
11	Low Shrubland (Nama Karoo)	This is the same as class 8, Low Shrubland, but now represents low, indigenous karoo-type vegetation communities, which have been identified using image-based spectral models, but which fall spatially *inside* the SANBI defined boundaries for Nama Karoo vegetation communities.

13	Natural Grassland	Natural and/or semi-natural indigenous grasslands, typically devoid of any significant tree or bush cover, and where the grassland component is typically dominant over any adjacent bare ground exposure. Note this this definition differs slightly from the equivalent gazetted class definition (i.e. total plant canopy cover ranges between 4 - 100%) in order to provide a more comparable content to the 1990 and 2013-14 SANLC datasets. Typically representative of low, grass-dominated vegetation communities in the Grassland and Savanna Biomes.
31	Other Bare	Other natural, semi-natural or man-created non-vegetated areas. Typically associated with permanent or near permanent bare ground sites that have insufficient spatial or temporal characteristics to be otherwise classified.

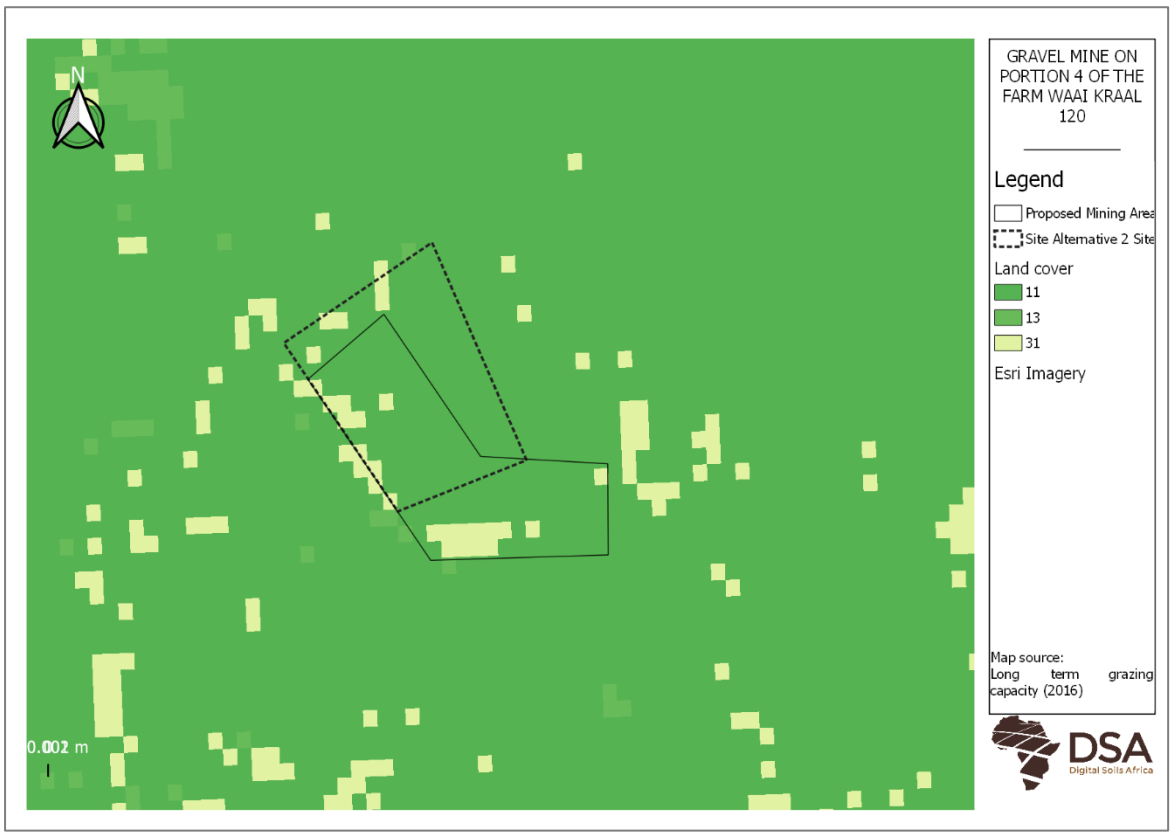

FIGURE 5: SOUTH AFRICAN NATIONAL LAND-COVER 2018 (SANLC, 2018).

GRAZING CAPACITY

The unit used in the grazing capacity is hectares per large stock unit (ha/LSU), therefore the site has a very grazing capacity of 28 ha/LSU (Figure 6).

A homogeneous unit of vegetation expressed as the area of land required (in hectares) to maintain a single animal unit (LSU) over an extended number of years without deterioration to vegetation or soil. Where a LSU = An animal with a mass of 450 kg and which gains 0,5 kg per day on forage with a digestible energy of 55%. (Trollope et. Al., 1990).

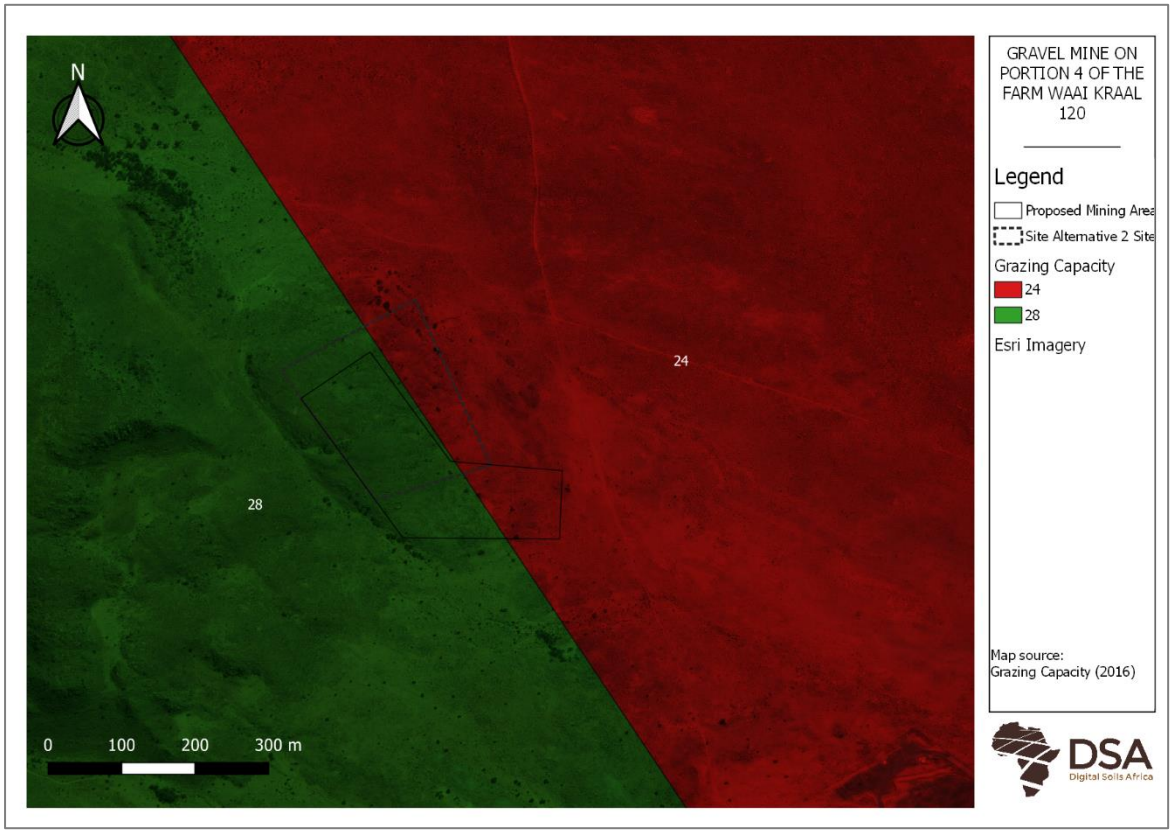

FIGURE 6: GRAZING CAPACITY OF THE SITE AND SURROUNDING AREA (DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES, 2016).

COMPLIANCE STATEMENT

The desktop study confirmed that the proposed development site is of a "low" Agricultural sensitivity, as classified by the DEA Screening Tool.

The landtypes of the area predict shallow rocky soils. This is further substantiated by satellite images of the survey area. These soils will have a low water holding capacity which will limit crop production and are not deemed suitable for irrigation.

The grazing potential of 28 ha/LSU is very low and typical of the area. This is further substantiated by the low rainfall.

It is the specialist's opinion that the proposed development site is of a low agricultural sensitivity and that the development at the proposed site will not significantly impact agricultural activities. In terms of agricultural sensitivity, the proposed development should thus be allowed to proceed at the identified site subject to recommendations provided.

Recommendations

1. Restrict the proposed development to the smallest footprint possible and do not disturb/alter areas outside the development;
2. Ensure that the mining activities and associated infrastructure is adequately fenced to prevent livestock from gaining access to the base station; and,
3. Ensure that access roads are kept clear and that construction and operational activities do not interfere with agricultural activities.

REFERENCE

Department of Agriculture, Forestry and Fisheries, 2016. 2016 Grazing Capacity map of South Africa. Pretoria

Department of Environmental Sciences, 2018. South African National Land-Cover 2018; Department of Environmental Affairs, Pretoria, South Africa.

Land Type Survey Staff. 1972 – 2002. Land types of South Africa:Digital map (1:250 000 scale) and soil inventory datases. ARC-Institute for Soil, Climate and Water, Pretoria.

Schulze, R.E. 2007. South African Atlas of Climatology and Agrohydrology. Water Research Commission, Pretoria, RSA, WRC Report 1489/1/06.

W.S.W. Trollope, Lynne A. Trollope & O.J.H. Bosch (1990) Veld and pasture management terminology in southern Africa, Journal of the Grassland Society of Southern Africa, 7:1, 52-61

APPENDIX 1: LANDTYPE

LAND TYPE / *LANDTIPE* : **Ib255**
CLIMATE ZONE / *KLIMAATSONE* : 525S
Area / *Oppervlakte* : 37337 ha
Estimated area unavailable for agriculture
Beraamde oppervlakte onbeskikbaar vir landbou : 20 ha

Occurrence (maps) and areas / *Voorkoms (kaarte) en oppervlakte* :
3222 Beaufort West (37337 ha)

Inventory by / *Inventaris deur* :
B H A Schloms
Modal Profiles / *Modale profiele* :
None / Geen

Terrain unit / *Terreineenheid*	1	2	3	4	5
% of land type / *% van landtipe*	4	1	90	2	3
Area / *Oppervlakte (ha)*	1493	373	33603	747	1120
Slope / *Helling (%)*	1 - 3	>100	10 - 40	2 - 5	1 - 3
Slope length / *Hellingslengte (m)*	50 - 250	50 - 150	1000 - 1500	50 - 200	50 - 100
Slope shape / *Hellingsvorm*	Y	X	X	X-Z	X
MB0, MB1 (ha)	0	0	0	0	0
MB2 - MB4 (ha)	1493	373	33603	747	1120

Soil series or land classes / ***Grondseries of landklasse***	**Depth** / ***Diepte*** (mm)	MB	ha	%	ha	%	ha	%	ha	%	ha	%	**Total** / ***Totaal*** ha	%	**Clay content %** / ***Klei-inhoud %*** A	E	B21	Hor	**Texture** / ***Tekstuur*** Class / ***Klas***	**Depth limiting material** / ***Diepte-beperkende materiaal***
Rock / Rots		4	746	50	373	100	25202	75	75	10	112	10	26509	71.0						
Mispah Ms10, Muden Ms20	50-100	3	448	30			3360	10	187	25			3995	10.7	6-15			A	fiSa-SaLm	R
Kanonkop Gs13, Williamson Gs16, Southfield Gs23	100-200	3	299	20			2688	8	224	30			3211	8.6	6-20		10-20	A	fiSa-SaLm	R,so
Reveillie Sw10, Skilderkrans Sw11, Uitsicht Sw20	100-200	2					1344	4	149	20			1493	4.0	6-15		20-40	B	fiSaClLm-SaCl	vr
Maitengwe Hu43, Shigalo Hu46	100-300	2					672	2	75	10	56	5	803	2.2	6-15		10-30	B	fiSaLm-SaClLm	R
Letaba Oa26, Limpopo Oa46, Allanridge Oa43	400-1200+	2									672	60	672	1.8	6-15		10-30	B	fiSaLm-SaClLm	R
Craven Va21	200-300	2					336	1	37	5	56	5	429	1.2	6-15		35-55	B	fiSaClLm-Cl	vr
Dundee Du10	400-1200+	2									224	20	224	0.6	0-6			A	fiSa	R

Terrain type / *Terreintipe* : D5
Terrain form sketch / *Terreinvormskets*

For an explanation of this table consult LAND TYPE INVENTORY (table of contents)
Ter verduideliking van hierdie tabel kyk LANDTIPE - INVENTARIS (inhoudsopgawe)

Geology: Mudstone, siltstone and sandstone of the Beaufort Group; Karoo Sequence with dolerite intrusions.

Geologie: Moddersteen, sliksteen en sandsteen van die Groep Beaufort; Opeenvolging Karoo met doleriet intrusies.

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LAND TYPE / *LANDTIPE* : **Ae76**

CLIMATE ZONE / *KLIMAATSONE* : 528S

Area / *Oppervlakte* : 45479 ha

Estimated area unavailable for agriculture
Beraamde oppervlakte onbeskikbaar vir landbou : 60 ha

Occurrence (maps) and areas / *Voorkoms (kaarte) en oppervlakte* :
3122 Victoria West (2855 ha) 3222 Beaufort West (42624 ha)

Inventory by / *Inventaris deur* :
B H A Schloms & A B Oosthuizen

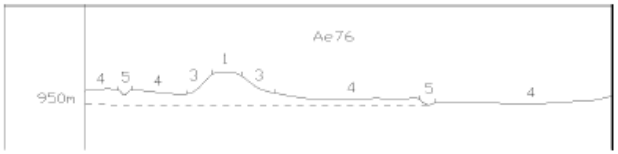
Modal Profiles / *Modale profiele* :
P1326 P1335
2195 2204

Terrain unit / *Terreineenheid*	:	1	3	4	5
% of land type / *% van landtipe*	:	3	2	75	20
Area / *Oppervlakte (ha)*	:	1364	910	34109	9096
Slope / *Helling (%)*	:	1 - 3	6 - 12	2 - 4	1 - 3
Slope length / *Hellingslengte (m)*	:	50 - 100	100 - 200	1000 - 3000	50 - 150
Slope shape / *Hellingsvorm*	:	Y	X	X-Z	Z
MB0, MB1 (ha)	:	0	91	25582	8641
MB2 - MB4 (ha)	:	1364	819	8527	455

Soil series or land classes *Grondseries of landklasse*	**Depth** *Diepte* (mm)	MB	:	ha	%	ha	%	ha	%	ha	%	**Total** *Totaal* ha	%	**Clay content %** *Klei-inhoud %* A	E	B21	Hor	**Texture** *Tekstuur* Class / *Klas*	**Depth limiting material** *Diepte-beperkende materiaal*
Rock / Rots		4	:	477	35	228	25	1705	5	455	5	2865	6.3						
Mangano Hu33, Shorrocks Hu36, Maitengwe Hu43, Shigalo Hu46	250-600	1	:			91	10	20465	60	910	10	21466	47.2	6-15		10-30	B	fiSaLm-SaClLm	R,ka
Kirkton Oa23, Letaba Oa26, Allanridge Oa43, Limpopo Oa46	500-1200	0	:					1023	3	5458	60	6481	14.3	6-15		10-35	B	fiSaLm-SaClLm	R,ka
Kanonkop Gs13, Southfield Gs23	150-300	3	:	409	30	364	40	3411	10			4184	9.2	6-15		15-35	A	LmfiSa-SaLm	so
Mispah Ms10, Loskop Ms12, Kalkbank Ms22	100-200	3	:	477	35	228	25	3411	10			4116	9.1	6-15			A	LmfiSa-SaLm	R,ka
Reveillie Sw10, Uitsicht Sw20	100-350	1	:					3411	10			3411	7.5	6-15		15-35	B	fiSaLm-SaClLm	vr
Zuiderzee Va20, Craven Va21	250-500	1	:					682	2	910	10	1592	3.5	10-20		25-40	B	fiSaClLm-SaCl	vr
Dundee Du10	500-1200+	0	:							1364	15	1364	3.0	6-10			A	fiSa-LmSa	R

Terrain type / *Terreintipe* : A2

Terrain form sketch / *Terreinvormskets*



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Geologie: Moddersteen, sliksteen en sandsteen van die Groep Beaufort; Opeenvolging Karoo met Kwaternere alluvium.

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