

VEGETATION DIVERSITY ASSESSMENT

BAUBA A HLABIRWA MINING INVESTMENTS – MOEIJELIJK CHROME MINE:

Proposed extension of existing opencast operations and establishment of a wash plant and associated facilities on the farm Moeijelijk 412 KS, Fetakgomo Local Municipality, Limpopo Province.

November 2017

Report prepared by:

ENVIRONMENT **R**ESearch **C**ONSULTING

ERC forms part of **Benah Con cc**

cc registration nr: 2005/044901/23
Postal address: PO Box 20640, Noordbrug, 2522
E-mail: albie.erc@gmail.com
Mobile: 082 789 4669
Fax: 086 621 4843

Report Reference: PR2017-02

Report author: A.R. Götze (*Pr.Sci.Nat.*)



TABLE OF CONTENTS

1	SPECIALIST INVESTIGATOR	5
2	PROFESSIONAL DECLARATION	5
3	EXECUTIVE SUMMARY	6
4	INTRODUCTION	12
4.1	Relevant Legislation & General Regulatory Requirements	12
4.2	Scope & Aims of the study	14
4.3	Assumptions and Limitations	15
4.4	Methodology	15
5	VEGETATION OF THE STUDY AREA.....	16
5.1	General Description	16
5.1.1	Sekhukhune Plains Bushveld (SVcb27)	17
5.1.2	Sekhukhune Mountain Bushveld (SVcb28)	19
5.2	Floristic diversity of the study area.....	21
5.3	Description of Broad Vegetation Units in the Study Area.....	22
5.3.1	VU1: Vegetation of the mountain crest and high slopes.....	24
5.3.2	VU2: Vegetation of lower mountain slopes.....	25
5.3.3	VU3: Transformed areas	26
5.3.4	Vegetation Units in proposed areas of development.....	28
5.4	Plant species of conservation significance.....	29
5.5	Exotic Plant Species	30
5.6	Habitat sensitivity	33
6	CONSERVATION STATUS OF LOCAL ECOSYSTEMS.....	36
7	IMPACT ASSESSMENT.....	43
7.1	Expected Impacts of Proposed Developments on Vegetation and Associated Habitats.....	43
7.2	Impact assessment.....	47
7.2.1	Impact area 1	47
7.2.2	Impact area 2	49
7.2.3	Impact area 3	51
8	FINAL COMMENTS AND RECOMMENDATIONS	54
9	REFERENCES	55
9.1	Literature sighted in this report	55
9.2	Other Literature and Field Guides Consulted.....	56
10	APPENDIX A: lists of plant families, genera and species recorded in the study area.	58
11	APPENDIX B: list of plant species occurring in QDS 2429BD according to SANBI – POSA	83

LIST OF FIGURES

Figure 1:	Google earth image indicating the local setting of the study area... 12
Figure 2:	Distribution of vegetation types according to Mucina & Rutherford (2006) in the mining rights area of Moeijelijk Chrome Mine (red dotted polygon) and beyond. 17
Figure 3:	Image depicting the different Vegetation Units recorded relative to the proposed extensions and developments in Moeijelijk Chrome Mine’s mining rights area. 23

Figure 4: VU1 on a flat crest area of the mountain on the south-western side of mining operations at Moeijelijk Chrome Mine.	24
Figure 5: VU1: soil dumps left behind by illegal mining.....	25
Figure 6: VU2: A section of north-facing slopes with well developed woody vegetation.	26
Figure 7: VU3: an old cultivated land in the study area.....	27
Figure 8: VU3: eroded drainage line with seriously degraded banks	27
Figure 9: Relative habitat sensitivity categories in the study area.....	35
Figure 10: CBA Map for Limpopo Province (Desmet et al. 2013).	36
Figure 11: CBA's and ESA's according to Desmet et al. (2013) in the study area and surrounds.....	38

LIST OF TABLES

Table 1: Dominant and other taxa associated with SVcb27 (Mucina & Rutherford, 2006).....	18
Table 2: Dominant and other taxa associated with SVcb28 (Mucina & Rutherford, 2006).....	20
Table 3: Summary of the number of plant families, genera and species recorded in the study area.	21
Table 4: Vegetation Units affected by proposed developments at Moeijelijk Chrome Mine	28
Table 5: List of plant species of conservation significance recorded in the study area.	30
Table 6: List of declared weeds and invaders recorded in the study area	31
Table 7: Description of the invasive status of exotic plant species according to CARA (1983)	31
Table 8: Description of the invasive status of exotic plant species according to NEMBA (2014).....	32
Table 9: Sensitivity rating of proposed development areas at Moeijelijk Chrome Mine	34
Table 10: Descriptions and management and land-use objectives and recommendations for CBA's and ESA's in the Limpopo Province (Desmet et al. 2013).....	39
Table 11: Impact assessment matrix and criteria followed for assessing possible impacts in the study area.....	45
Table 12: Consequence & Likelihood matrix.....	46
Table 13: Significance Rating matrix.....	46
Table 14: IMPACT ASSESSMENT: Impact area 1 (A)	47
Table 15: IMPACT ASSESSMENT: Impact area 1 (B)	48
Table 16: IMPACT ASSESSMENT: Impact area 1 (C)	48
Table 17: IMPACT ASSESSMENT: Impact area 2 (A)	49
Table 18: IMPACT ASSESSMENT: Impact area 2 (B)	50
Table 19: IMPACT ASSESSMENT: Impact area 2 (C)	50
Table 20: IMPACT ASSESSMENT: Impact area 3 (A)	51
Table 21: IMPACT ASSESSMENT: Impact area 3 (B)	52
Table 22: IMPACT ASSESSMENT: Impact area 3 (C)	53
Table 23: Plant Families and Genera recorded in the study area	59
Table 24: Fern Species – PTERIDOPHYTA	65

Table 25: Graminoids – ANGIOSPERMAE – Monocotyledonae	65
Table 26: Woody Species – ANGIOSPERMAE – Dicotyledonae	68
Table 27: Woody Species – ANGIOSPERMAE – Monocotyledonae.....	74
Table 28: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Dicotyledonae.....	74
Table 29: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Monocotyledonae	81

1 SPECIALIST INVESTIGATOR

Specialist investigator:	Albert R. Götze (<i>Pr.Sci.Nat.</i>)
Highest tertiary qualification:	M.Sc. <i>cum laude</i> (Phytosociology & Restoration Ecology, NWU, Potchefstroom)
Professional affiliation:	SACNASP
Registered field of practice:	Botanical Science

2 PROFESSIONAL DECLARATION

The specialist investigator responsible for conducting this particular specialist vegetation study declares that:

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- at the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favorable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being a member of the general public;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse the proposed development, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- I do not have any influence over decisions made by the governing authorities;
- should I, at any point, consider myself to be in conflict with any of the above declarations, I shall formally submit a Notice of Withdrawal to all relevant parties and formally register as an Interested and Affected Party;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have expertise and experience in conducting specialist reports relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;

- this document and all information contained herein is and will remain the intellectual property Louzan Trading 1 cc t/a Environment Research Consulting and the specialist investigator responsible for conducting the study. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigator.
- I will comply with the Act, regulations and all other applicable legislation;
- all the particulars furnished by me in this document are true and correct; and
- I realize that a false declaration is an offence in terms of Regulation 71 of NEMA and is punishable in terms of section 24F of the Act.



A.R. Götze (M.Sc.; *Pr.Sci.Nat.*)

3 EXECUTIVE SUMMARY

INTRODUCTION

This study was undertaken in support of an EIA for Bauba A Hlabirwa mining investments: Moeijelijk Chrome Mine, which holds mining rights over the farm Moeijelijk 412 KS in the Fetakgomo Local Municipality (Limpopo Province), for the proposed extension of existing opencast mining operations in their Mining Rights Area in order to access further ore deposits. Moeijelyk Chrome Mine also proposes to establish a wash plant and associated facilities such as residue stockpiles. This report presents the findings of the floristic diversity assessment of which the fieldwork was conducted on site on 09 November 2017.

METHODOLOGY

A visual reconnaissance of the study area was done before surveying commenced. Different homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each. A plotless sampling method was used to record data. A list of species that could potentially occur at the mine was downloaded from “Plants of Southern Africa” (POSA) on the South African Biodiversity Institute’s website, prior to visiting the site. A report of a similar study done on a neighbouring farm in February 2010, was reviewed and used as baseline for this study.

VEGETATION OF THE STUDY AREA

Two vegetation types according to Mucina & Rutherford (2006) occur in the studied area, namely the Sekhukhune Plains Bushveld (SVcb27) and the Sekhukhune Mountain Bushveld (SVcb28). About 7 km north-east of the study area, portions of the Ohrigstad Mountain Bushveld (SVcb26) vegetation type occurs.

A total of 312 plant species (from 71 plant families and 205 genera) were recorded in the studied area during the period of this study, which indicates high plant diversity in the studied area. Of this number, 101 are trees or woody shrubs (1 exotic), 59 are graminoids (none exotic) and 152 are herbs or herbaceous climbers, creepers or shrubs (11 exotic). 300 (96%) of the plant species that were recorded are indigenous to South Africa. At least 12 of these species are Red Data listed, endemic and/or protected in some or other capacity.

Information from SANBI's POSA data base lists 142 plant species for the QDS area (2429BD), which the mining rights area falls in.

Three broad vegetation units (VUs), two based on floristic differences of different topographical positions, and one based on anthropogenic transformation, were recorded in the study area and is subsequently described. The VUs are as follows:

- Vegetation Unit 1 (VU1): Vegetation of the mountain crest and high slopes
- Vegetation Unit 2 (VU2): Vegetation of lower mountain slopes
- Vegetation Unit 3 (VU3): Transformed areas

Portions of all described VU's will potentially be affected by the proposed developments at Moeijelijk Chrome Mine. The proposed developments occur in different VU's as indicated in Table A. Table A also gives an indication in terms of a percentage of the total area covered by a proposed development in relation to the VU's that occur in that area.

Table A: Vegetation Units affected by proposed developments at Moeijelijk Chrome Mine

Proposed development	Approximate % of VU affected in relation to area proposed for development (%)			
	VU1	VU2	VU3	Current mine area
New opencast UG2	100	0	0	0
New opencast UG1	100	0	0	0
New UG road	25	65	10	0
Opencast extension west	0	25	30	45
Opencast extension south	0	0	35	65
New opencast LG3	0	0	50	50
New opencast LG2	0	0	100	0
ROM extension	0	0	90	10

Proposed development	Approximate % of VU affected in relation to area proposed for development (%)			
	VU1	VU2	VU3	Current mine area
Soft overburden dump	0	0	40	60
Dry Tails Area	0	0	100	0
Plant Area	0	0	100	0
Wet Tails Area	0	0	100	0

12 plant species of conservation significance were recorded during the study and nine of these species were recorded on areas where proposed activities are planned at the mine. Seven of the species recorded are listed as red data species, six tree species are listed as nationally protected and one species is provincially protected. Six of these species are also regarded as being endemic to Sekhukhuneland. No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's list of Threatened or Protected Species, were recorded in the study area during the time of the study.

12 exotic plant species were recorded in the study area. Four of these species are classified as alien weed and invader species and the remaining eight are common ruderal and agrestal weeds.

HABITAT SENSITIVITY & CONSERVATION STATUS OF LOCAL ECOSYSTEMS

A sensitivity rating of High was attributed to VU1 and VU2. This is due to the relative undisturbed ("greenfields") nature of the natural habitat, high diversity of plant species and the number of red listed, protected and endemic species occurring or potentially occurring in those areas.

VU3, which is transformed from a habitat and floristic point of view is given a sensitivity rating of low. Only single individuals of some protected species still occur and it is overgrazed and overall in a poor ecological condition. Soil erosion is common in this VU and a large part thereof has been transformed as a result of cultivation or urban sprawl. Many exotic weeds and invaders further contribute to the transformed nature of this VU.

Figure 9 presents the sensitivity of habitats in the study area relevant to the positions of proposed developments and extensions at the mine.

Referring to the mentioned image, the sensitivity of different habitats where different developments or extensions are proposed, is summarized in Table 9.

Table B: Sensitivity rating of proposed development areas at Moeijelijk Chrome Mine

Proposed development	Approximate % of proposed developments relative to different sensitivity ratings (%)		
	High	Low	None
New opencast UG2	100	0	0
New opencast UG1	100	0	0

Proposed development	Approximate % of proposed developments relative to different sensitivity ratings (%)		
	High	Low	None
New UG road	90	10	0
Opencast extension west	25	30	45
Opencast extension south	0	35	65
New opencast LG3	0	50	50
New opencast LG2	0	100	0
ROM extension	0	90	10
Soft overburden dump	0	40	60
Dry Tails Area	0	100	0
Plant Area	0	100	0
Wet Tails Area	0	100	0

The study area falls within the Sekhukhuneland Centre of Floristic Endemism, but no ecosystems that are listed as threatened or vulnerable, according to the National Environmental Management: Biodiversity Act was recorded on and in the close vicinity of the study area.

According to the Limpopo Conservation Plan – version 2, the Mining Rights Area of Moeijelijk Chrome Mine is almost equally divided into portions of Ecological Support Areas 1 & 2 with a Critical Biodiversity Area 1 to the north-west and a permanently protected area (Potlake Nature Reserve) mostly outside the Mining Rights Area to the north-west as well. The surface covered by the mine itself, consists of about 70% ESA 1 and 30% ESA 2. According to land-use guidelines for these areas, mining is one of the incompatible land uses for ESA 1 areas and probably also for ESA 2 areas. However, the guidelines also state that certain elements of incompatible activities could be allowed subject to detailed impact assessment to ensure that developments are designed and implemented in such a way as to maintain overall ecological functioning of these areas. The design and high-quality implementation of rehabilitation for these areas will most probably be of critical importance in such a case.

IMPACT ASSESSMENT

Impacts identified and assessed, from a floristic point of view, for all areas are as follows:

- **Destruction of natural vegetation:** natural vegetation (including all recorded and any unrecorded species of conservation significance) as well as vegetation that has already established on transformed areas will be totally destroyed as a result of the clearing of vegetation, stripping of topsoil and open cast mining. Areas adjacent to the OC areas are covered in waste rock and other debris, which totally destroys the natural habitat. Even with the best rehabilitation efforts, the directly impacted areas will be permanently altered/transformed.

- Habitat fragmentation: existing flora habitats may be permanently disrupted and fragmented and may lead to isolation and/or loss of biodiversity of the directly impacted areas as well as surrounding areas may change.
- Habitat transformation: disturbance of the soil in areas related to the proposed development may further transform the vegetation in the study area and will create conditions favorable for the establishment of populations of alien and invader plant species as well as common weeds. Furthermore, disturbance of surface soil during open cast mining, excavating and stockpiling may lead to unmanaged bare open spaces and soil dumps, which will be susceptible to erosion during rain events, which will lead to topsoil loss and siltation of habitats lower down the landscape.

The proposed developments at the mine were divided into three Impact areas for assessment, based on the sensitivity of the VU's that they fall in, as follows:

Impact area 1:

- New opencast UG1 & UG2

Impact area 2:

- New UG road

Impact area 3:

- Opencast extensions west & south
- New opencast areas LG2 & LG3
- ROM extension
- Soft overburden dump
- Dry Tails Area
- Plant Area
- Wet Tails Area

FINAL COMMENTS

Based on the data presented in this report as well as observations made during the survey and comments above, the following is recommended in conclusion:

- Take note of and as far as possible comply with the mitigation measures and recommendations given in this report.
- During the planning, operational and rehabilitation phases all recommendations made and concerns raised in this document should be taken into consideration.

- It is strongly advised that an ecological specialist is appointed during the operational phase to monitor impacts and related mitigation measures regarding protected species as well as sensitive habitats from time to time.
- From a floristic point of view, mining on top of the mountain where the new open cast areas UG1 and UG2 are proposed should be avoided if possible.
- Other than this and other concerns raised, from a floristic point of view there are no major objections against the mining developments, as long as mitigation measures and recommendations are seriously considered and implemented, and as long as due diligence is practiced in terms of environmental legislation and other relevant policies and guidelines.

4 INTRODUCTION

This study was undertaken by Environment Research Consulting (ERC) in support of an EIA for Bauba A Hlabirwa mining investments: Moeijelyk Chrome Mine, which holds mining rights over the farm Moeijelijk 412 KS in the Fetakgomo Local Municipality (Limpopo Province), for the proposed extension of existing opencast mining operations in their Mining Rights Area in order to access further ore deposits. Moeijelyk Chrome Mine also proposes to establish a wash plant and associated facilities such as residue stockpiles. The residue material from the wash plant will be allowed to dry, where after it will be stockpiled, which implies that no tailings dam will be constructed for the project.

This report presents the findings of the floristic diversity assessment of which the fieldwork was conducted on site (Figure 1) on 09 November 2017.

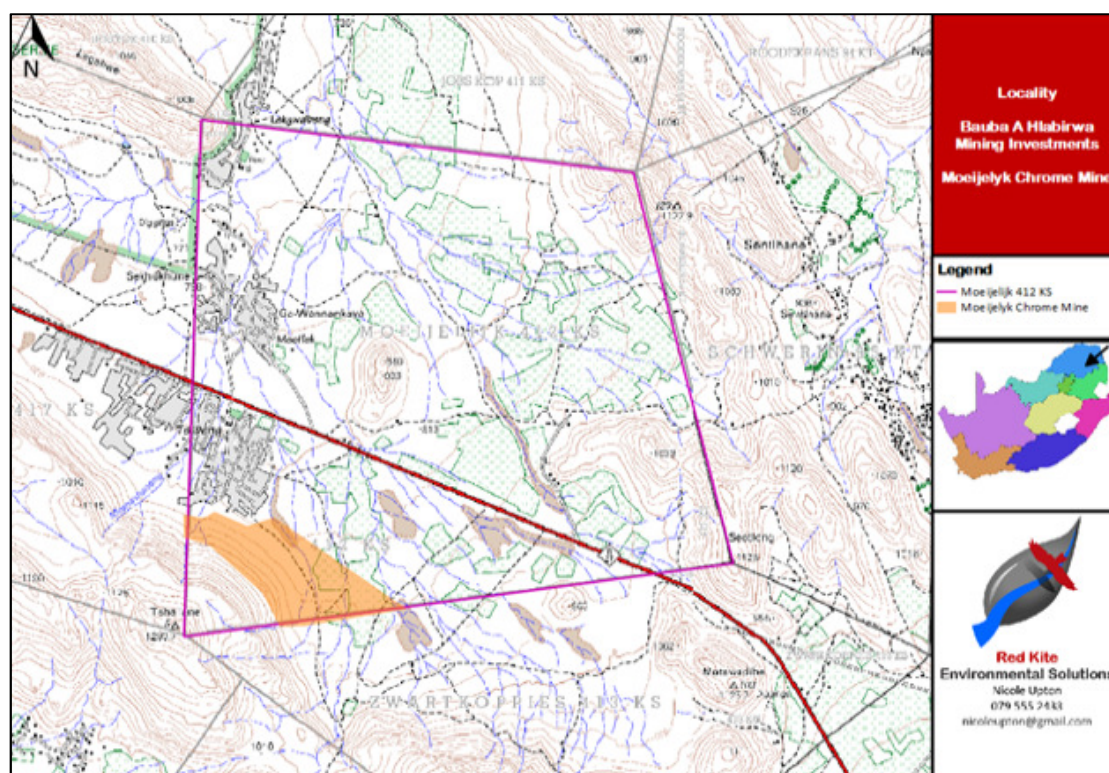


Figure 1: Google earth image indicating the local setting of the study area.

4.1 Relevant Legislation & General Regulatory Requirements

The following national and provincial legislative guidelines and requirements were followed as part of this study:

The National Environmental Management Act (107 of 1998) (NEMA)

This act embraces all three fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land-use planning and development. The environmental management principles include the duty of care for wetlands and special attention is given to management and planning procedures.

National Environmental Management Act. Regulation 543, Section 32

This report has been prepared in terms of the *National Environmental Management Act* (107 of 1998) (NEMA) and is compliant with Regulation 385 Section 33 – Specialist reports and reports on specialized processes under the Act. Relevant clauses of the above regulation are quoted below and reflect the required information in the “control sheet for specialist report”.

Regulation 33 (1): An applicant or the Environmental Assessment Practitioner managing an application may appoint a person who is independent to carry out a specialist study or specialised processes.

Regulation 33 (2): A specialist report or a report on a specialised process prepared in terms of these Regulations must contain:

- a. Details of the person who prepared the report and the expertise of that person to carry out the specialist study or specialised process;
- b. A declaration that the person is independent in a form specified by the competent authority;
- c. An indication of the scope of, and the purpose for which, the report was prepared;
- d. A description of the methodology adopted in preparing the report or carrying out the specialised process;
- e. A description of any assumptions made any uncertainties or gaps in knowledge;
- f. A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;
- g. Recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;
- h. A description of any consultation process that was undertaken during the course of carrying out the study;
- i. A summary and copies of any documents that were received during any consultation process;
- j. Any other information requested by the competent authority.

Conservation of Agricultural Resources Act (43 of 1983) (CARA, 1983)

This act regulates the utilization and protection of wetlands, soil conservation and all matters relating thereto; control and prevention of veld fires, control of weeds and invader plants, the prevention of water pollution resulting from farming practices and losses in biodiversity.

The National Forest Act (84 of 1998)

The National Forest Act (NFA, 1998):

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in South Africa;
- **Provide special measures for the protection of certain forests and protected trees;**
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promotes community forestry;
- Promotes greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

National Environmental Management: Biodiversity Act (10 of 2004)

The National Environmental Management: Biodiversity Act (10 of 2004), (NEMBA) was signed into law in mid-2004 and entered into effect on 1 September, 2004. The Act provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

Certain activities, known as Restricted Activities, are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling.

Also considered were:

- The Limpopo Conservation Plan (Version 2) of 2013 (Desmet *et al.* 2013).
- The Limpopo Environmental Management Act (Act no 7 of 2003) (LEMA, 2003).

4.2 Scope & Aims of the study

- General description of the ecology and floristic component in the study area.
- Description and mapping of the broad vegetation units (if more than one) identified in the study area.
- Determine the plant species diversity of the study area and compilation of a plant species list.
- Record the presence and diversity of plant species of conservation significance (ToPS, Red data, Protected, etc.) in the study area.
- Comment on the sensitivity of the habitat in the study area from a floristic and ecological point of view.

- Comment on plant species that can be utilized socially (medicine, food or other cultural or social purposes).
- Evaluate the impact of the proposed developments against the findings of this report.
- Recommend mitigation measures that can be implemented in order to minimize the impacts of the proposed development.

4.3 Assumptions and Limitations

- It is assumed that species flowering only during specific times of the year could be confused with a very similar species of the same genus.
- Some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.
- Due to late spring conditions encountered during the time of this study some species could only be identified up to genus level and some could not be identified at all.
- In order to obtain a comprehensive understanding of the dynamics of the vegetation of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this vegetation survey was conducted in one season.
- Data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, analysis of satellite imagery from the past until the present, generic data and a desktop analysis.
- A detailed species list of plant species recorded during a study on the neighboring farm Zwartkoppies (on which Sefateng Chrome Mine is situated), directly south of Moeijelijk, which was conducted in February 2010, was consulted and used as a baseline for this study.
- No scientific data was collected or analyzed for the calculation of ecological veld condition. Any comments or observations made in this regard are based on observations, the expert knowledge and relevant professional experience of the specialist investigator.
- The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

4.4 Methodology

A visual reconnaissance of the study area was done before surveying commenced. Different homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each. The following data was recorded:

- All identifiable indigenous and exotic plant species (Appendix A) in each identified vegetation unit.
- General ecological and habitat data that may assist in the description of the floristic component of the study area.

A plotless sampling method was used to record data. Plant species observed in the study area during the time of the study were recorded and included in the plant species lists (Appendix A). The floristic composition of each of the identified broad vegetation units are described and discussed. Plant species identification was done following the checklist of Germishuizen & Meyer (2003). Plant material was collected for identification purposes and where necessary SANBI in Pretoria and other specialists were consulted in order to assist in plant species identification. All collected plant material will, if so requested by them, be donated to the South African National Herbarium of SANBI in Pretoria for inclusion into their extensive collection.

It is standard practice in a study such as this that a list of species that could potentially occur at the site is downloaded from “Plants of Southern Africa” (POSA) on the South African Biodiversity Institute’s (SANBI) website at <http://posa.sanbi.org>, prior to visiting the site. This list is provided at a quarter degree square (QDS) level of accuracy. The species that are included in the QDS that this study area falls in (2429BD) is included in Appendix B.

A report of a similar study done on the neighbouring farm Zwartkoppies in February 2010, was reviewed and used as baseline for this study.

No formal consultation process was conducted as part of this floristic study as it was not deemed necessary at the time of the study.

5 VEGETATION OF THE STUDY AREA

5.1 General Description

Two vegetation types according to Mucina & Rutherford (2006) occur in the studied area, namely the Sekhukhune Plains Bushveld (SVcb27) and the Sekhukhune Mountain Bushveld (SVcb28) (Figure 2). About 7 km north-east of the study area, portions of the Ohrigstad Mountain Bushveld (SVcb26) vegetation type occurs.

The descriptions of SVcb27 and SVcb28 below (5.1.1 & 5.1.2), was summarized from Mucina & Rutherford (2006).

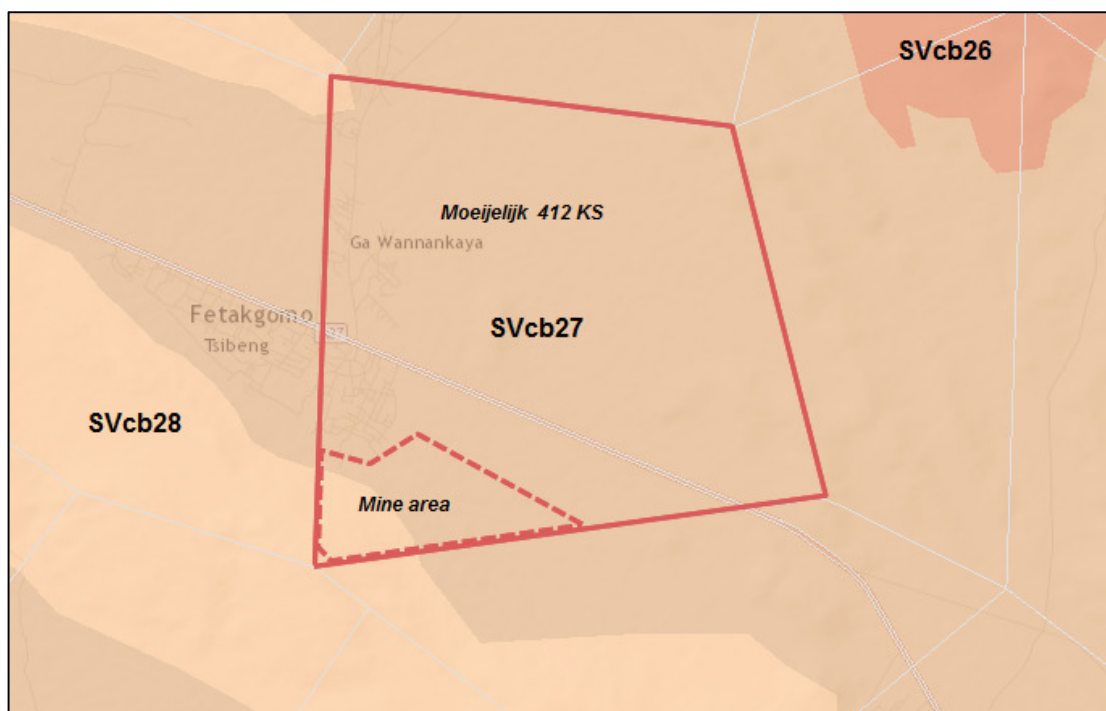


Figure 2: Distribution of vegetation types according to Mucina & Rutherford (2006) in the mining rights area of Moeijelijk Chrome Mine (red dotted polygon) and beyond.

5.1.1 Sekhukhune Plains Bushveld (SVcb27)

The distribution of the Sekhukhune Plains Bushveld (SVcb27), stretches from the lower basin of the Steelpoort River and the lowland area of Burgersfort and the in the south, through the Moste River plains to Jobskop and Legwareng (south of the Strydpoort Mountains) in the north and continuing up the basin of the Olifants River to the area around Tswaing and also up the Lepellane River and Mohlaletsi River valleys. Rainfall occurs in the hot summer months with a MAP of between 500 to 700 mm, which is highly influenced over short distances by topographical features. Winters are dry with infrequent frost.

Geologically SVcb27 is complex with mostly mafic and ultramafic intrusive rocks of the main and lower zones of the Rustenburg Layered Suite on the eastern lobe of the Bushveld Igneous Complex. The sub-suites (zones) are dominated by concentric belts of norite, gabbro, anorthosite and pyroxenite, with some localized protrusions of chromitite, serpentinised harzburgite, magnetite, shale, olivine diorite, quartzite and dolomite. Red apedal soils dominate most of the area and deep loamy Valsrivier soils characterize the plains while shallow Glenrosa soils mainly occur on the low lying, rocky hills. Patches of black, highly erodible, melanic soils are common around small mountains. Land types that mostly occur in SVcb27 are Ae, Ib, Ea and Ia.

Svcb27 forms part of the Sekhukhuneland Centre of Endemism (Van Wyk and Smith, 2001) and several endemic taxa of this vegetation type still require formal taxonomic description (Siebert *et al*, 2001). According to Breebaart and Deutschländer (1997) and Siebert *et al* (2002a), in terms of species diversity and structure, SVcb27 related to the Sekhukhune Mountain Bushveld (SVcb28), the Polokwane Plateau Bushveld (SVcb23) and the Springbokvlakte Thornveld (SVcb15) vegetation types. The vegetation of this vegetation type is also compared to Acocks' (1988) veld type 18:

Mixed Bushveld and also to the Mixed Bushveld (LR 18) described by Van Rooyen and Bredenkamp in Low and Rebelo (1996) and furthermore as *Acacia tortilis* – *Dichrostachys cinerea* Arid Northern Dry Bushveld by Siebert et al (2002b). Dominant (d) and other important taxa occurring in SVcb27 according to Mucina & Rutherford (2006) are included in Table 1.

Table 1: Dominant and other taxa associated with SVcb27 (Mucina & Rutherford, 2006)

Trees and woody shrubs: [(d) = relatively dominant taxa]		
<i>Vachellia erioloba</i>	<i>Combretum imberbe</i>	<i>Mystroxyton aethiopicum</i>
<i>V. grandicornuta</i>	<i>Commiphora glandulosa</i>	<i>Philenoptera violacea</i>
<i>V. nilotica</i> (d)	<i>Dichrostachys cinerea</i>	<i>Ptaeroxylon obliquum</i>
<i>V. tortilis</i> subsp. <i>heteracantha</i> (d)	<i>Ehretia rigida</i> subsp. <i>rigida</i>	<i>Rhigozum brevispinosum</i>
<i>Senegalia mellifera</i> subsp. <i>detinens</i> (d)	<i>Grewia bicolor</i>	<i>Rhigozum obovatum</i>
<i>Albizia anthelmintica</i>	<i>Karomia speciosa</i>	<i>Schotia brachypetala</i>
<i>Balanites maughamii</i>	<i>Maerua angolensis</i>	<i>Searsia engleri</i> (d)
<i>Boscia foetida</i> ssp. <i>rehmanniana</i> (d)	<i>Maerua decumbens</i>	<i>Ziziphus mucronata</i>
<i>Cadaba termitaria</i>	<i>Markhamia zanzibarica</i>	
Herbaceous shrubs, climbers and herbs:		
<i>Becium filamentosum</i> (d)	<i>Hibiscus praeteritus</i>	<i>Pechuel-Loeschea leubnitziae</i>
<i>Blepharis integrifolia</i>	<i>Ipomoea magnusiana</i>	<i>Phyllanthus maderaspatensis</i> (d)
<i>Coccinia rehmannii</i>	<i>Jamesbrittenia atropurpurea</i>	<i>Plinthus rehmannii</i>
<i>Corchorus asplenifolius</i>	<i>Jatropha latifolia</i> var. <i>latifolia</i>	<i>Seddera suffruticosa</i> (d)
<i>Decorsea schlechteri</i>	<i>Lantana rugosa</i>	<i>Tinnea rhodesiana</i>
<i>Felicia clavipilosa</i> (d)	<i>Melhania rehmannii</i>	<i>Triaspis glaucophylla</i>
<i>Gnidia polycephala</i>	<i>Monechma divaricatum</i>	
<i>Gossypium herbaceum</i>	<i>Myrothamnus flabellifolius</i>	
Succulent trees, shrubs, climbers and herbs:		
<i>Aloe castanea</i>	<i>Euphorbia enormis</i> (d)	<i>Sarcostemma viminale</i>
<i>Aloe cryptopoda</i> (d)	<i>Euphorbia tirucalli</i> (d)	
<i>Aloe globuligemma</i>	<i>Kleinia longiflora</i> (d)	
Geophytic herbs:		
<i>Drimia altissima</i>	<i>Sansevieria pearsonii</i>	
Graminoids:		
<i>Aristida adscensionis</i>	<i>Eragrostis barbinodes</i>	<i>Stipagrostis hirtagluma</i>
<i>Aristida congesta</i>	<i>Panicum maximum</i> (d)	<i>Tragus berteronianus</i>
<i>Cenchrus ciliaris</i> (d)	<i>Paspalum distichum</i>	<i>Urochloa mosambicensis</i> (d)
<i>Enneapogon cenchroides</i> (d)	<i>Schmidtia pappophoroides</i>	
Biogeographically important taxa: (N = Northern Sourveld Endemic; CB = Central Bushveld Endemic; SK = Sekhukhuneland endemic; D = Broadly disjunct distribution)		
<i>Amphioglossa triflora</i> ^D (low shrub)	<i>Chlorophytum cyperaceum</i> ^{SK} (geophytic herb)	<i>Orthosiphon fruticosus</i> ^{CB} (low shrub)
<i>Aneilema longirrhizum</i> ^{SK} (herb)	<i>Hibiscus barnardii</i> ^{SK} (low shrub)	<i>Petalidium oblongifolium</i> ^{CB} (low shrub)
<i>Asparagus fourei</i> ^N (low shrub)	<i>Lydenburgia cassinoides</i> ^{SK} (tree)	<i>Piaranthus atosanguineus</i> ^{CB} (succulent herb)

<i>Asparagus sekhukhuniensis</i> SK (woody climber)	<i>Nuxia gracilis</i> ^D (tall shrub / small tree)	<i>Searsia batophylla</i> ^{SK} (low shrub)
Taxa endemic to SVcb27:		
None		

The conservation status of SVcb27 is described by Mucina & Rutherford (2006) as vulnerable. The national conservation target is for 19% thereof to be conserved, however, at this stage only about 2% is statutorily conserved in the Bewaarkloof and Wolkberg Caves Nature Reserves. Approximately 25% of SVcb27 has been transformed due to mainly dry land subsistence farming as well as by mining and associated urbanization activities in the area. A high degree of degradation of natural vegetation is clearly visible and is largely attributed to unsustainable utilization and harvesting and overgrazing. Erosion is a widespread phenomenon and reaches high to very high levels of donga formation. Due to the high level of degradation a large number of alien plant species occur of which various *Agave* species, *Verbesina encelioides*, various *Opuntia* species, *Lantana camara*, *Melia azedarach*, *Nicotiana glauca*, *Caesalpinia decapetala* and *Xanthium strumarium* are the most widespread.

5.1.2 Sekhukhune Mountain Bushveld (SVcb28)

According to the Sekhukhune Mountain Bushveld (SVcb28) occurs on dry open to closed mixed micro-phyllous (small-leaved) and broad-leaved savanna in Limpopo and Mpumalanga on undulating hills and mountain sides that form concentric belts that run parallel to the north-eastern escarpment. SVcb28 is situated on high ground surrounding the vegetation of the Sekhukhune Plains Bushveld (SVcb27) and includes the steep slopes of the Leolo Mountains, the Dwarsrivier Mountains, Thaba Sekhukhune and the undulating small hills in the Steelpoort River Valley up to and alongside the Klip River flowing past Roosenekal in the south-west.

The geology of SVcb28 mainly consists of ultramafic intrusive of the lower, critical and main zones of the eastern Rustenburg Layered Suite of the Bushveld Igneous Complex. The soils are mostly shallow, rocky and clayey. Glenrosa and Mispah soils are common, with lime present in low-lying areas and rocky areas with little or no soil are common on steep slopes. Other common soil forms include moderately deep red apedal Huttons as well as highly erosive melanic soil forms Bonheim and Steendal. Land types that occur in Svcb28 mainly include Ae, Ib, Ic and Fb.

The climatic region that SVcb28 is situated in is the summer rainfall region of southern Africa with a mean annual precipitation (MAP) of between 500 and 700 mm. Day temperatures are hot in summer, especially in the valley bottoms and the mean annual potential evaporation is 2043 mm, which is more than twice the MAP. Winters are dry and cool with few occurrences of frost in low lying areas.

According to Van Wyk and Smith (2001) this mountain bushveld forms part of the Sekhukhuneland Centre of Endemism, more specifically the Steelpoort Sub-centre. This vegetation is not heavily disturbed or degraded and its vast range of habitat still harbours high plant diversity with many endemics, many of which still await formal description (Siebert et al, 2001; Mucina & Rutherford, 2006). Floristically the vegetation of SVcb28 is compared to Acocks' veld type 19: Sourish Mixed Bushveld (Acocks, 1988), also to Mixed Bushveld (LR 18) described by Van Rooyen and Bredenkamp in Low and Rebelo (1996). Siebert *et al* (2002b) describes three vegetation types of Sekhukhuneland that also describe the vegetation of SVcb28: *Kirkia wilmsii* – *Terminalia prunioides* Closed Mountain Bushveld; *Combretum hereroense* – *Grewia vernicosa* Open Mountain Bushveld; *Hippobromus pauciflorus* –

Rhoicissus tridentata Rock Outcrop Vegetation. Important taxa according to Mucina & Rutherford (2006) are included in Table 2.

Table 2: Dominant and other taxa associated with SVcb28 (Mucina & Rutherford, 2006)

Trees and woody shrubs: [(d) = relatively dominant taxa]		
<i>Senegalia ataxacantha</i>	<i>Croton gratissimus</i>	<i>Pappea capensis</i>
<i>S. nigrescens</i> (d)	<i>Cussonia transvaalensis</i>	<i>Pavetta zeyheri</i>
<i>S. senegal</i> var. <i>leiorachis</i> (d)	<i>Dichrostachys cinerea</i> (d)	<i>Rhoicissus tridentata</i> (d)
<i>Bolusanthus speciosus</i>	<i>Elephantorrhiza praetermissa</i> (d)	<i>Schotia latifolia</i>
<i>Boscia albitrunca</i>	<i>Euclea crispa</i> subsp. <i>crispa</i> (d)	<i>Searsia keetii</i>
<i>Brachylaena ilicifolia</i>	<i>Euclea linearis</i>	<i>Sterculia rogersii</i>
<i>Combretum apiculatum</i> (d)	<i>Grewia vernicosa</i> (d)	<i>Terminalia prunioides</i> (d)
<i>Combretum hereroense</i>	<i>Hippobromus pauciflorus</i>	<i>Vitex obovata</i> subsp. <i>wilmsii</i> (d)
<i>Commiphora africana</i>	<i>Kirkia wilmsii</i> (d)	<i>Ziziphus mucronata</i> (d)
<i>Commiphora mollis</i>	<i>Ozoroa sphaerocarpa</i>	
Herbaceous shrubs, climbers and herbs:		
<i>Asparagus intricatus</i>	<i>Cyphostemma woodii</i>	<i>Phyllanthus glaucophyllus</i>
<i>Barleria saxatilis</i>	<i>Hermannia glanduligera</i>	<i>Psiadia punctulata</i>
<i>Barleria senensis</i>	<i>Indigofera lydenburgensis</i>	<i>Rhynchosia komatiensis</i>
<i>Berkheya insignis</i> (d)	<i>Jatropha latifolia</i> var. <i>angustata</i>	<i>Senecio latifolius</i>
<i>Clematis brachiata</i> (d)	<i>Kyphocarpa angustifolia</i>	<i>Tinnea rhodesiana</i>
<i>Clerodendrum ternatum</i>	<i>Melhania prostrata</i>	<i>Triaspis glaucophylla</i>
<i>Commelina africana</i> (d)		
Succulent shrubs, climbers and herbs:		
<i>Aloe castanea</i> (d)	<i>Aloe marlothii</i> subsp. <i>marlothii</i>	<i>Sarcostemma viminale</i>
<i>Aloe cryptopoda</i> (d)	<i>Huernia stapelioides</i>	
Geophytic herbs:		
<i>Hypoxis rigidula</i>	<i>Sansevieria hyacinthoides</i>	
Graminoids:		
<i>Aristida canescens</i> (d)	<i>Enneapogon scoparius</i>	<i>Panicum maximum</i> (d)
<i>Aristida transvaalensis</i>	<i>Heteropogon contortus</i> (d)	<i>Setaria lindenbergiana</i> (d)
<i>Cymbopogon pospischilii</i>	<i>Loudetia simplex</i>	<i>Setaria sphacelata</i>
<i>Diheteropogon amplexans</i>	<i>Panicum deustum</i>	<i>Themeda triandra</i> (d)
Biogeographically important taxa: (CB = Central Bushveld Endemic; SK = Sekhukhuneland endemic; Z = Link to Zimbabwe)		
<i>Asparagus sekhukhuniensis</i> ^{SK} (woody climber)	<i>Lydenburgia cassinoides</i> ^{SK} (tree)	<i>Rhoicissus sekhukhuniensis</i> ^{SK} (woody climber)
<i>Chlorophytum cyperaceum</i> ^{SK} (geophytic herb)	<i>Petalidium oblongifolium</i> ^{CB} (low shrub)	<i>Searsia batophylla</i> ^{SK} (low shrub)
<i>Euclea sekhukhuniensis</i> ^{SK} (low shrub)	<i>Searsia sekhukhuniensis</i> ^{SK} (tall shrub)	<i>Raphionacme chimanimaniana</i> ^Z (geophytic herb)
Taxa endemic to SVcb28:		
<i>Acacia ormocarpoides</i> (tree)	<i>Euphorbia sekhukhuniensis</i> (succulent tree)	<i>Plectranthus porcatus</i> (herb/shrub)

Mucina & Rutherford (2006) notes the conservation status of SVcb28 as least threatened. The national target is 24%, but currently only 0.4% is statutorily conserved in Potlake Nature Reserve. 15% is transformed due to small scale cultivation and urbanization. Pressure by mining activities, especially along the Dwars River Sub-suite (Siebert *et al*, 2002c), is increasing throughout the area. Erosion is at moderate to high levels with donga formation in some places.

5.2 Floristic diversity of the study area

A total of 312 plant species (from 71 plant families and 205 genera) (Table 3 & Appendix A, Table 23) were recorded in the studied area during the period of this study, which in my view indicates high plant diversity in the studied area. Of this number, 101 are trees or woody shrubs (1 exotic), 59 are graminoids¹ (none exotic) and 152 are herbs or herbaceous climbers, creepers or shrubs (11 exotic). 300 (96%) of the plant species that were recorded are indigenous to South Africa. At least 12 of these species are Red Data listed, endemic and/or protected in some or other capacity.

From available literature (Pujol 1988; Pooley, 1998; Schmidt *et al* 2002; Shearing & Van Heerden 1994; Van Wyk *et al* 1997; Van Wyk & Gericke 2003) it was established that at least 90 of the recorded plant species in the studied areas are to some extent used for some or other social activities (medicinal, food/nourishment and/or cultural).

Information from SANBI's POSA data base lists 142 plant species for the QDS area (2429BD), which the mining rights area falls in (Appendix B).

Table 3: Summary of the number of plant families, genera and species recorded in the study area.

	Families	Genera	Species
PTERIDOPHYTA (ferns):	2	2	2
ANGIOSPERMAE (seed plants):			
<i>Dicotyledonae:</i>	58	162	233
<i>Monocotyledonae:</i>	11	41	77
Total:	71	205	312

During the survey, which was done on foot, and using the species list that was compiled on the neighboring farm Zwartkoppies (Sefateng Chrome Mine) in February 2010, as a base line, taxa that were identifiable during the time of the study were noted and included in the plant species lists in Appendix A (Tables 23 – 29). The distinct possibility exists that some plant species that emerge and bloom during summer or another time of the year or under very specific

¹ Grass-like plants (grasses, reeds, sedges, etc.)

circumstances, or species that are locally rare could have been missed during the latest survey.

The mentioned species lists contain the plant family name and scientific and common names of all plant species that was observed in the study area during the time of the study. Also included is, where applicable, the status of a species, which provides information on conservation status. Information on whether a species is utilized for medicinal, cultural or nutritional uses is also provided in the mentioned species lists.

Appendix A, Table 23 presents the diversity of plant families, genera and species recorded in the study area. A check list of plant species recorded during this study is included in Tables 24 – 29 of Appendix A.

5.3 Description of Broad Vegetation Units in the Study Area

A number of different proposed open cast (OC) mining extensions and other areas that area earmarked for possible new mining-related developments in the mining rights area, were investigated and under the prevailing conditions at the time, three broad vegetation units (VUs), two based on floristic differences of different topographical positions, and one based on anthropogenic transformation, were recorded in the study area and is subsequently described (Figure 3). The VUs are as follows:

- Vegetation Unit 1 (VU1): Vegetation of the mountain crest and high slopes
- Vegetation Unit 2 (VU2): Vegetation of lower mountain slopes
- Vegetation Unit 3 (VU3): Transformed areas

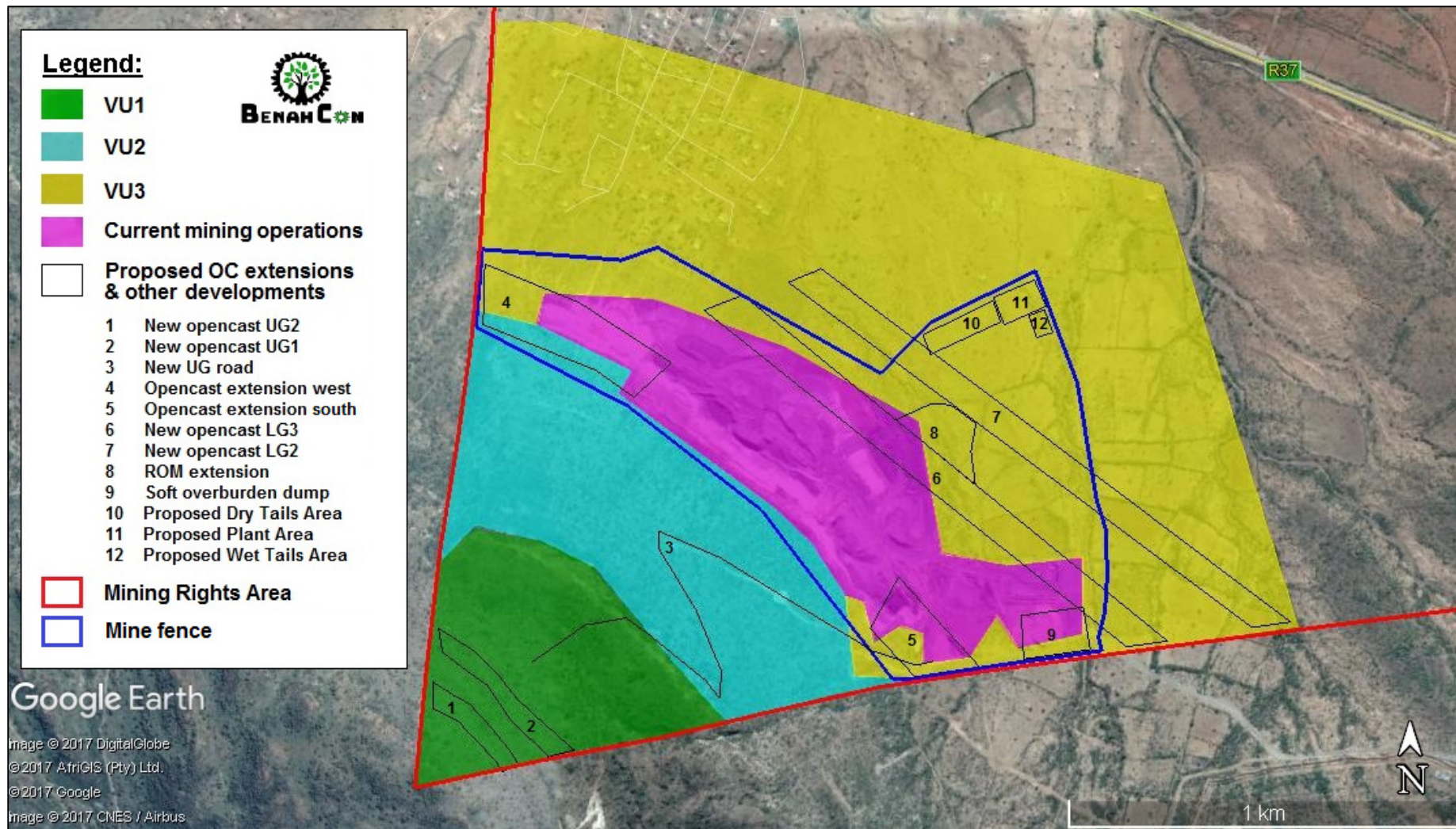


Figure 3: Image depicting the different Vegetation Units recorded relative to the proposed extensions and developments in Moeijelijk Chrome Mine’s mining rights area.

5.3.1 VU1: Vegetation of the mountain crest and high slopes

This VU (Figure 4) is mainly situated on the higher slopes and crest areas above the cliff line of the large mountain on the south-western side of the current mining operations at the mine. The habitat is characterized by moderately steep slopes to flatter areas and high soil surface rockiness. The herbaceous and woody layers are equally well developed and has the appearance of a grassland vegetation unit with a good layer of trees and shrubs. In some instances, trees and shrubs are clustered, while many trees also occur scattered on the hill sides and crest. The vegetation of this area coincides with Sekhukhune Mountain Bushveld (SVcb 28) (Mucina and Rutherford, 2006).

Dominant woody plants include the protected *Lydenburgia cassinoides*, *Brachylaena ilicifolia*, *Combretum molle*, *Elephantorrhiza praetermissa*, *Crotalaria monteiroi*, *Ozoroa albicans*, *Olea capensis* subsp. *enervis*, *Searsia sekhukhuniensis*, *Senegalia caffra*, *Vitex obovata* and *Zanthoxylum capense*. Graminoids with high cover are the grasses *Aristida canescens*, *A. junciformis*, *Brachiaria serrata*, *Cymbopogon nardus*, *C. pospischilii*, *Digitaria eriantha*, *Diheteropogon amplexans*, *Elionurus muticus*, *Setaria sphacelata* and the sedge *Cyperus obtusiflorus*. Dominant herbs are *Commelina africana*, *Clerodendrum ternatum*, *Berkheya insignis*, *Chascanum pinnatifidum*, *Dicoma anomala*, *Becium filamentosum*, *Gerbera jamesonii*, *Rhynchosia komatiensis*, *Senecio venosus*, *Tragia rupestris* and *Xerophyta retinervis*.

The vegetation of VU1 are in a pristine ecological state. The only signs of degradation that were noticed, are soil dumps and pits left by illegal mining (Figure 5). A number of natural drainage lines, which generally run from the southwest down the mountain were noticed. No exotic vegetation was recorded in this area.



Figure 4: VU1 on a flat crest area of the mountain on the south-western side of mining operations at Moeijelijk Chrome Mine.



Figure 5: VU1: soil dumps left behind by illegal mining.

181 plant species (61 woody plants, 35 graminoid species and 85 herbaceous forbs, shrubs and succulents – none exotic) were identified in VU1 during the time of the study. From available literature (Pujol 1988; Pooley 1998; Schmidt *et al* 2002; Shearing & Van Heerden 1994; Van Wyk *et al* 1997; Van Wyk & Gericke 2003), it was established that at least 66 of the plant species recorded in VU1 are utilized for some or other social activity or use (medicinal, nourishment/food, and/or cultural).

5.3.2 VU2: Vegetation of lower mountain slopes

VU2 (Figure 6) is situated on north-facing mountainous terrain south-west of the current mining operations at the mine. As with VU1, this area also forms part of the Sekhukhune Mountain Bushveld (SVcb 28). It also has high surface rockiness, but generally less so than VU1.

This VU has a very well-developed woody layer of which the dominant species are *Senegalia senegal* var. *leiorachis*, *Bauhinia tomentosa*, *Combretum apiculatum*, *Commiphora glandulosa*, *C. schimperi*, *Euclea linearis*, *Grewia vernicosa*, *Kirkia wilmsii*, *Ozoroa sphaerocarpa*, *Sclerocarya birrea* and *Vitex obovata*. Although the frequency of the mentioned species is probably the highest, most of the woody species indicated in the woody species list (Appendix A) are more or less evenly scattered all over this VU. The herbaceous layer is also well developed and is dominated by herbs and to a lesser extent grasses. The dominant herbs are *Barleria pretoriensis*, *Chascanum pinnatifidum*, *Corbichonia decumbens*, *Cleodendrum ternatum*,

Evolvulus alsinoides, *Hibiscus micranthus*, *Kyphocarpa angustifolia*, *Leucas capensis*, *Psiadia punctulata*, *Seddera suffruticosa*, *Tinnea rhodesiana* and *Waltheria indica*. The dominant grasses are *Aristida diffusa*, *A. congesta*, *Brachiaria deflexa*, *Heteropogon contortus*, *Enneapogon scoparius*, *Eragrostis cilianensis*, *Panicum deustum*, *P. maximum* and *Themeda triandra*.



Figure 6: VU2: A section of north-facing slopes with well developed woody vegetation.

During this study a total of 207 plant species (65 woody plants, 43 graminoid species and 99 herbaceous forbs, shrubs and succulents – three exotic) were identified in VU2. From available literature (Pujol 1988; Schmidt *et al* 2002; Van Wyk *et al* 1997; Van Wyk & Gericke 2003) it was established that at least 48 of these species are used for some or other social activities (medicine, food and/or cultural).

5.3.3 VU3: Transformed areas

VU3 represents all totally transformed areas in the study area, which mainly includes old and currently cultivated lands (Figure 7) and Tsibeng village to the north. Other than small fragmented pockets, individual trees and other areas where natural vegetation has spontaneously rehabilitated, no natural vegetation remains in VU3. Degradation of the soil surface in the form of compaction and erosion is visible throughout this VU. Some drainage lines cross VU3 in a northerly direction, but are all seriously degraded as the rest of the unit (Figure 8). The whole area is also overgrazed and bush encroachment by various *Vachellia* and *Senegalia* (previously *Acacia*) species, as well as *Dichrostachys*

cinerea was observed in patches throughout the unit. A small portion of the area is currently under dry land cultivation – mostly maize.



Figure 7: VU3: an old cultivated land in the study area



Figure 8: VU3: eroded drainage line with seriously degraded banks

129 plant species (117 indigenous, 12 exotic) were recorded in VU3. Dominant grasses include several pioneer and sub-climax grasses such as *Aristida adscensionis*, *A. congesta*, *Cynodon dactylon*, *Enneapogon cenchroides*, *Heteropogon contortus*, *Melinis repens* and *Tragus berteronianus*, as well as one or two climax grass species such *Panicum maximum* and *Schmidtia pappophoroides*. Herbs that are more or less dominant include the indigenous *Felicia muricata*, *F. clavipilosa*, *Heliotropium ovalifolium*, *Indigofera circinnata*, *I. daleoides*, *Gisekia africana*, *Melhania rehmannii*, *Phyllanthus maderaspatensis*, *Pechuel-Loeschea leubnitziae*, *Senna italica*, *Tribulus terrestris* and the exotic *Corchorus olitorius*, *Opuntia stricta*, *Tridax procumbens* and *Schkuhria pinnata*. Trees such as *Boscia foetida*, *Croton menyhartii*, *Dichrostachys cinerea*, *Maerua angolensis*, *Sclerocarya birrea*, *Senegalia mellifera*, *S. senegal* var. *rostrata*, *Vachellia tortillis*, *V. grandicornuta*, *V. nilotica*, *Ziziphus mucronata* generally characterize the woody vegetation. Many areas, however are mostly bare with only sparse annual pioneer vegetation.

It was established from available literature (Pujol 1988; Pooley 1998; Schmidt *et al* 2002; Shearing & Van Heerden 1994; Van Wyk *et al* 1997; Van Wyk & Gericke 2003), that at least 48 of the plant species recorded in VU3 are utilized for some or other social activity or use (medicinal, nourishment/food, and/or cultural).

5.3.4 Vegetation Units in proposed areas of development

Portions of all described VU's will potentially be affected by the proposed developments at Moeijelijk Chrome Mine. The proposed developments occur in different VU's as indicated in Table 4. Table 4 also gives an indication in terms of a percentage of the total area covered by a proposed development in relation to the VU's that occur in that area. Figure 3 also clearly illustrates this distribution.

Table 4: Vegetation Units affected by proposed developments at Moeijelijk Chrome Mine

Label on Fig. 3	Proposed development	Approximate % of VU affected in relation to area proposed for development (%)			
		VU1	VU2	VU3	Current mine area
1	New opencast UG2	100	0	0	0
2	New opencast UG1	100	0	0	0
3	New UG road	25	65	10	0
4	Opencast extension west	0	25	30	45
5	Opencast extension south	0	0	35	65
6	New opencast LG3	0	0	50	50
7	New opencast LG2	0	0	100	0
8	ROM extension	0	0	90	10
9	Soft overburden dump	0	0	40	60

Label on Fig. 3	Proposed development	Approximate % of VU affected in relation to area proposed for development (%)			
		VU1	VU2	VU3	Current mine area
10	Dry Tails Area	0	0	100	0
11	Plant Area	0	0	100	0
12	Wet Tails Area	0	0	100	0

5.4 Plant species of conservation significance

12 plant species of conservation significance were recorded during the study and nine of these species were recorded on areas where proposed activities are planned at Moeijelijk Mine (Table 5). Seven of the species recorded are listed as red data species by Raimondo *et al* (2009), six tree species are listed as protected according to the National Forest Act (NFA, 1998) and one species is listed by the Limpopo Environmental Management Act (LEMA, 2003) as protected. Six of these species are also regarded as being endemic to Sekhukhuneland.

Regarding red listed species, according to (Raimondo *et al*, 2009), the following:

- A taxon (in this case a species) is Near Threatened when available evidence indicates that it nearly meets any of the five IUCN (International Union for Conservation of Nature) criteria for Vulnerable, and is therefore likely to qualify for a threatened category in the near future.
- A taxon is Rare when it meets any of the four South African criteria for rarity, but is not exposed to any direct or plausible potential threat and do not qualify for a category of threat according to the five IUCN criteria.
- A taxon is Declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes in South Africa causing a continuing decline in the population.

No plant species listed as threatened or protected by the National Environmental Management: Biodiversity Act's (Act No. 10 of 2004) list of Threatened or Protected Species (TOPS) as published in Government Gazette no. 36375 of 16 April 2013 (TOPS, 2013), were recorded in the study area during the time of the study.

Descriptions of abbreviations used in Table 5 are as follows:

- P(SA) – Nationally protected tree species (NFA, 1998)
- P(Lim) – Provincially protected species (LEMA, 2003)
- NT – Near Threatened (Raimondo *et al*, 2009)
- D – Declining (Raimondo *et al*, 2009)
- R – Rare (Raimondo *et al*, 2009)
- End – Sekhukhuneland Endemic (Siebert *et al*, 2001)

Table 5: List of plant species of conservation significance recorded in the study area.

SPECIES NAME	COMMON NAME	SPECIES STATUS	GROWTH FORM	VU		
				1	2	3
<i>Adenia fruticosa</i> subsp. <i>fruticosa</i>	Sekhukhune Greenstem	NT, End	Shrub, climber		X	
<i>Argyrolobium</i> c.f. <i>megarrhizum</i>		NT	Herb, dwarf shrub	X		
<i>Asparagus sekukuniensis</i>		End	Herbaceous shrub		X	
<i>Balanites maughamii</i>	Green-thorn	D, P(SA)	Tree		X	X
<i>Boscia albitrunca</i>	Shepherd's Tree	P(SA)	Tree		X	
<i>Elaeodendron transvaalense</i>	Bushveld Saffron / Forest Saffron	NT, P(SA)	Tree	X		X
<i>Elephantorrhiza praetermissa</i>	Sekhukhune Elephant-root	End	Tree	X	X	
<i>Euphorbia sekukuniensis</i>	Sekhukhuni-naboom	R, End	Succulent tree	X	X	
<i>Lydenburgia cassinoides</i>	Sekhukhune Bushman's-tea	NT, P(SA), End	Tree	X	X	
<i>Rhoicissus sekhukhuniensis</i>	Sekhukhune Grape	End	Woody climber	X	X	
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Marula	P(SA)	Tree	X	X	X
<i>Searsia sekhukhuniensis</i>	Sekhukhune Currant	R, End	Tree	X	X	

5.5 Exotic Plant Species

Only 12 exotic plant species (1 trees/woody shrubs and 11 herbs or herbaceous/succulent shrubs) were recorded in the study area. According to the Conservation of Agricultural Resources Act (Act No. 43 of 1983) in Henderson (2001) and the National Environmental Management Biodiversity Act's 2014 list of proposed weeds and invaders (NEMBA, 2014), four of these species (1 trees/shrubs and 3 herbs) are classified as alien weed and invader species (Table 6) and the remaining eight are common ruderal and agrestal weeds.

All exotic plant species in the species lists (Appendix A: Tables 23 – 29) are preceded by an asterisk (*) and/or indicated by the letter "E" in the Species Status column in the case of uncategorized exotic species. In the case of

declared or proposed weeds or invaders the invasive status of the species, according to CARA (1983) (Table 7) and NEMBA (2014) (Table 8) are indicated in the Conservation Status column of the species lists in Appendix A as follows:

- C1 – declared weed category 1 (CARA, 1983)
- Cx2– proposed invader category 2 (CARA, 1983)
- N1b – NEMBA (2014) category 1b

Table 6: List of declared weeds and invaders recorded in the study area

SPECIES NAME	GROWTH FORM	COMMON NAME	INVASIVE STATUS	VU		
				1	2	3
<i>Agave americana</i>	Tree	American agave	Cx2			X
<i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Herb	White-flowered Mexican Poppy	C1 / N1b			X
<i>Datura ferox</i>	Herb	Large Thorn Apple	C1 / N1b			X
<i>Opuntia stricta</i>	Cactus / shrub	Australian Pest Pear	C1 / N1b			X

Table 7: Description of the invasive status of exotic plant species according to CARA (1983)

Invasive status (category)	Description
Declared weed (category 1) – C1 Proposed weed – CX1	<ul style="list-style-type: none"> • Prohibited on any land or water surface in South Africa. • Must be controlled or eradicated where possible (except in biological control reserves).
Declared invader (category 2) – C2 Proposed invader – CX2	<ul style="list-style-type: none"> • Allowed only in demarcated areas under controlled conditions. • Import of propagative material and trading allowed only by permit holders. • Outside demarcated areas, it must be controlled, or eradicated where possible (except in biological control reserves). • Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands unless authorization is obtained.
Declared invader (category 3) – C3 Proposed invader – CX3	<ul style="list-style-type: none"> • No further plantings of these species are allowed (except with special permission). • Trade of propagative material is strictly prohibited. • Existing plants may remain but must be prevented from spreading. • Prohibited within 30 m of the 1:50 year flood-line of watercourses or wetlands, or as directed.

Invasive status (category)	Description
Potential Transformer – C(T)	<ul style="list-style-type: none"> Plants that are already invading natural or semi-natural habitats, and have the potential to dominate a vegetation layer but not yet having a marked effect. They are either transformers elsewhere in the world or showing signs of this ability in Southern Africa.

Table 8: Description of the invasive status of exotic plant species according to NEMBA (2014)

Invasive status (category)	Description
Category 1b – N1b	<ul style="list-style-type: none"> Invasive species requiring compulsory control as part of an invasive species control program Remove and destroy These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management program No permits will be issued
Category 2 – N2	<ul style="list-style-type: none"> Invasive species regulated by area A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants No permits will be issued for these plants to exist in riparian zones
Category 3 – N3	<ul style="list-style-type: none"> Invasive species regulated by activity An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species No permits will be issued for Cat 3 plants to exist in riparian zones

5.6 Habitat sensitivity

The objective of a sensitivity mapping exercise is to determine the location and extent of all sensitive areas that must be protected from transforming land uses as far as possible. A development proposal should only be considered compatible with the biodiversity sensitivities of the site if all sensitive areas are avoided and are incorporated into an open space system (GDARD, 2014). A number of criteria are generally used to determine habitat sensitivity of which the following are some of the main ones:

- Ecological function. This relates to the degree of ecological connectivity between systems within a landscape matrix. Therefore, systems with a high degree of landscape connectivity amongst one another are perceived to be more sensitive and will be those contributing to ecosystem service (e.g. wetlands) or overall preservation of biodiversity. The potential of the habitat to deliver ecosystem services within itself and to other neighboring habitats are also taken in to consideration.
- Conservation importance. This relates to species diversity, endemism (unique species or unique processes) and the high occurrence of threatened and protected species or ecosystems protected by legislation.
- Other factors.
 - Current diversity of exotic species.
 - Degree to which the natural habitat has been degraded due to various factors.
 - Degree of habitat transformation.
 - Degree of habitat fragmentation.
 - Degree of bush encroachment.

Three ratings were considered to describe the sensitivity of the study area:

High – sensitive ecosystem with either low inherent resistance or low resilience towards disturbance factors or highly dynamic systems considered being important for the maintenance of ecosystem integrity. Most of these systems represent ecosystems with high connectivity with other important ecological systems or with high species diversity and usually provide suitable habitat for a number of species of conservation significance. These areas should be protected.

Moderate/Medium – These are slightly modified systems which occur along gradients of disturbances of low-medium intensity with some degree of connectivity with other ecological systems or ecosystems with intermediate levels of species diversity but may include potential ephemeral habitat for species of conservation significance.

Low – Degraded and highly disturbed / transformed systems with little ecological function and are generally very poor in species diversity.

A sensitivity rating of High was attributed to VU1 and VU2. This is due to the relative undisturbed (“greenfields”) nature of the natural habitat, high diversity of plant species and the number of red listed, protected and endemic species occurring or potentially occurring in those areas.

VU3, which is transformed from a habitat and floristic point of view is given a sensitivity rating of low. Only single individuals of some protected species still occur and it is overgrazed and overall in a poor ecological condition. Soil erosion is common in this VU and a large part thereof has been transformed as a result of cultivation or urban sprawl. Many exotic weeds and invaders further contribute to the transformed nature of this VU.

Figure 9 presents the sensitivity of habitats in the study area relevant to the positions of proposed developments and extensions at the mine.

Referring to the mentioned image, the sensitivity of different habitats where different developments or extensions are proposed, is summarized in Table 9.

Table 9: Sensitivity rating of proposed development areas at Moeijelijk Chrome Mine

Label on Fig. 9	Proposed development	Approximate % of proposed developments relative to different sensitivity ratings (%)		
		High	Low	None
1	New opencast UG2	100	0	0
2	New opencast UG1	100	0	0
3	New UG road	90	10	0
4	Opencast extension west	25	30	45
5	Opencast extension south	0	35	65
6	New opencast LG3	0	50	50
7	New opencast LG2	0	100	0
8	ROM extension	0	90	10
9	Soft overburden dump	0	40	60
10	Dry Tails Area	0	100	0
11	Plant Area	0	100	0
12	Wet Tails Area	0	100	0

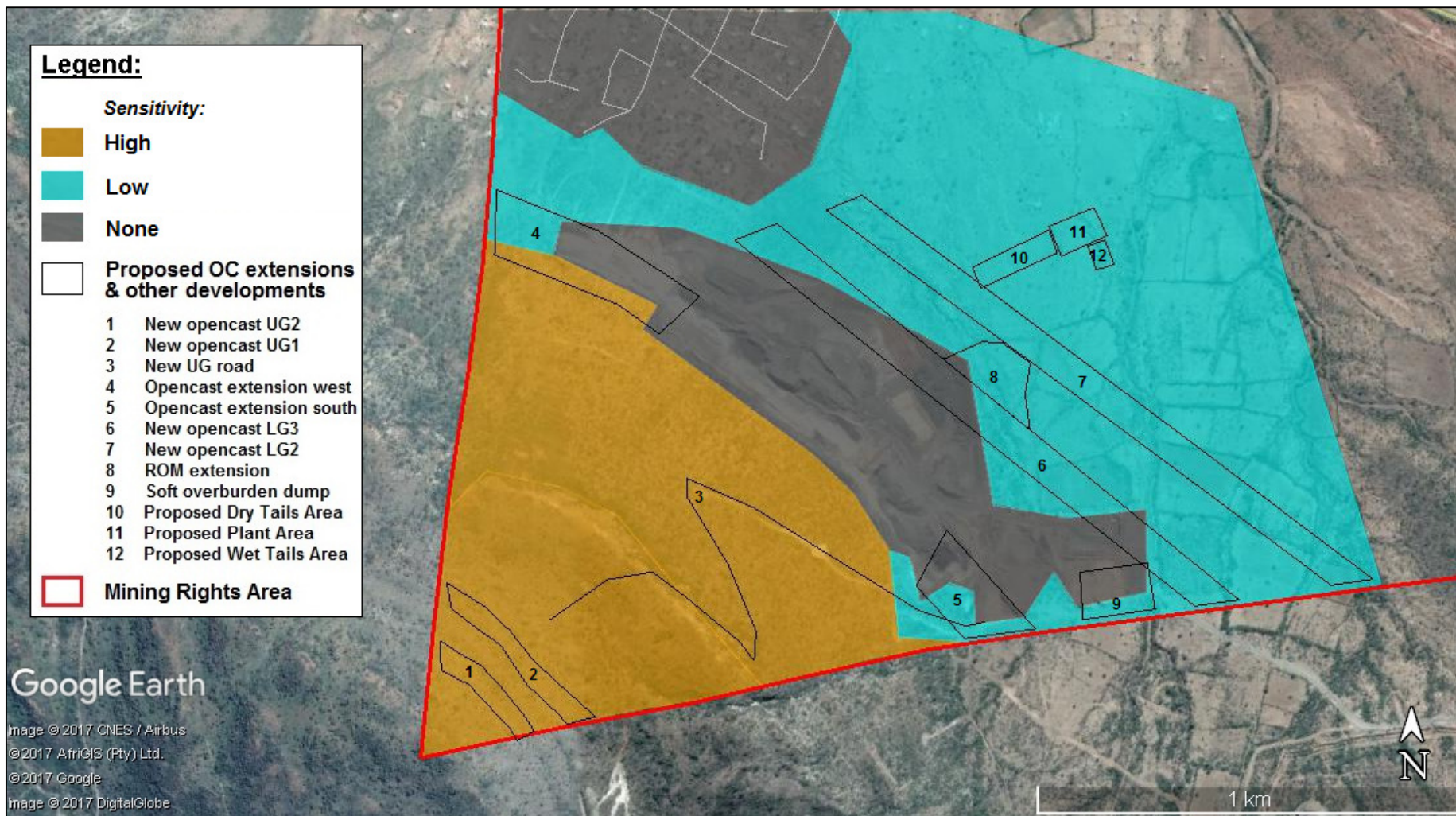


Figure 9: Relative habitat sensitivity categories in the study area.

6 CONSERVATION STATUS OF LOCAL ECOSYSTEMS

According to Van Wyk & Smith (2001), the study area falls within the Sekhukhuneland Centre of Floristic Endemism. However, no ecosystems that are listed as threatened or vulnerable, according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA, 2004) was recorded on and in the close vicinity of the study area.

No specific guidelines are given for the Limpopo province in terms of habitat sensitivity mapping. The Limpopo Conservation Plan – version 2 (LCPv2) (Desmet *et al.* 2013), however, gives guidelines regarding the conservation of different land-use areas in the Limpopo Province. For this purpose, Critical Biodiversity Areas (CBA's) and Ecological Support Areas (ESA's) were identified and mapped (Figure 10). Different management criteria and recommendations for CBA's and ESA's were developed and are presented in Table 10.

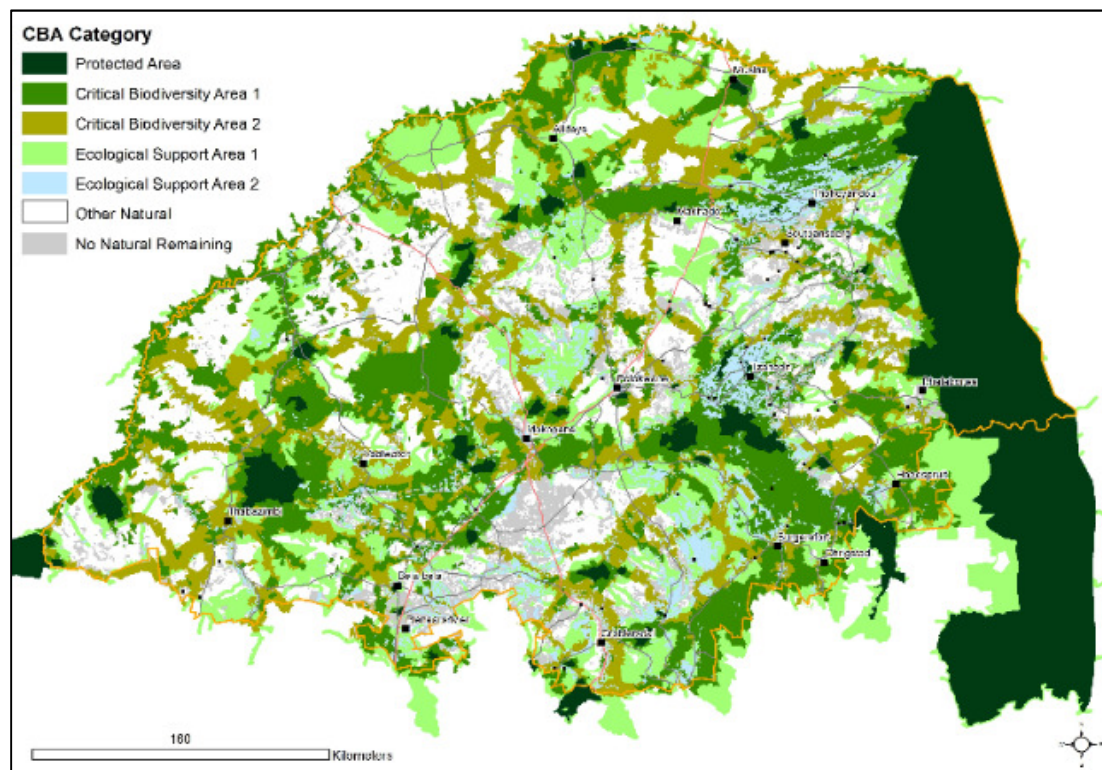


Figure 10: CBA Map for Limpopo Province (Desmet *et al.* 2013).

Note: The following paragraphs on CBA's, ESA's and land-use guidelines is a direct excerpt from the LCPv2 (Desmet, *et al* 2013).

“CBA's within the bioregion are the portfolio of sites that are required to meet the region's biodiversity targets, and need to be maintained in the appropriate condition for their category.

“Based on the LCPv2, 40% of the province is designated as CBA. These CBA's have been split into CBA 1 and CBA 2 on the basis of selection frequency and the underlying characteristics of the biodiversity features which are being protected.

“An additional 23% of the province is designated as ESA. This category has also been split on the basis of land-cover into ESA 1 (16%) and ESA 2 (7%), with ESA 1 being in a largely natural state while ESA 2 areas are no longer intact but potentially retain significant importance from a process perspective (e.g. maintaining landscape connectivity). Other Natural Areas make up 20% of the province and just over 11% is designated as formal Protected Areas.

“Land-use guidelines (Table 10) are given to provide guidance on what types of land-use activities are compatible with the biodiversity management objectives of each CBA map category. These guidelines do not grant or take away existing land-use rights or the statutory requirement for permits and environmental authorizations. It is however recommended that any planned activity within the identified sensitive conservation areas, even those not requiring specified permits or authorisations, comply with the Duty of Care obligations of Section 28 of the National Environmental Management Act No 107 of 1998.”

According to the LCPv2 (Desmet *et al.* 2013) the Mining Rights Area of Moeijelijk Chrome Mine is almost equally divided into portions of ESA 1 & 2 areas with a CBA area to the north-west and a permanently protected area (Potlake Nature Reserve) mostly outside the Mining Rights Area to the north-west as well. The surface covered by the mine itself, consists of about 70% ESA 1 and 30% ESA 2 (Figure 11).

According to the information in Table 10, land-use guidelines indicate that mining is one of the incompatible land uses for ESA 1 areas and probably also for ESA 2 areas. However, it also states that certain elements of incompatible activities could be allowed subject to detailed impact assessment to ensure that developments are designed and implemented in such a way as to maintain overall ecological functioning of these areas. The design and high-quality implementation of rehabilitation for these areas will most probably be of critical importance in such a case.

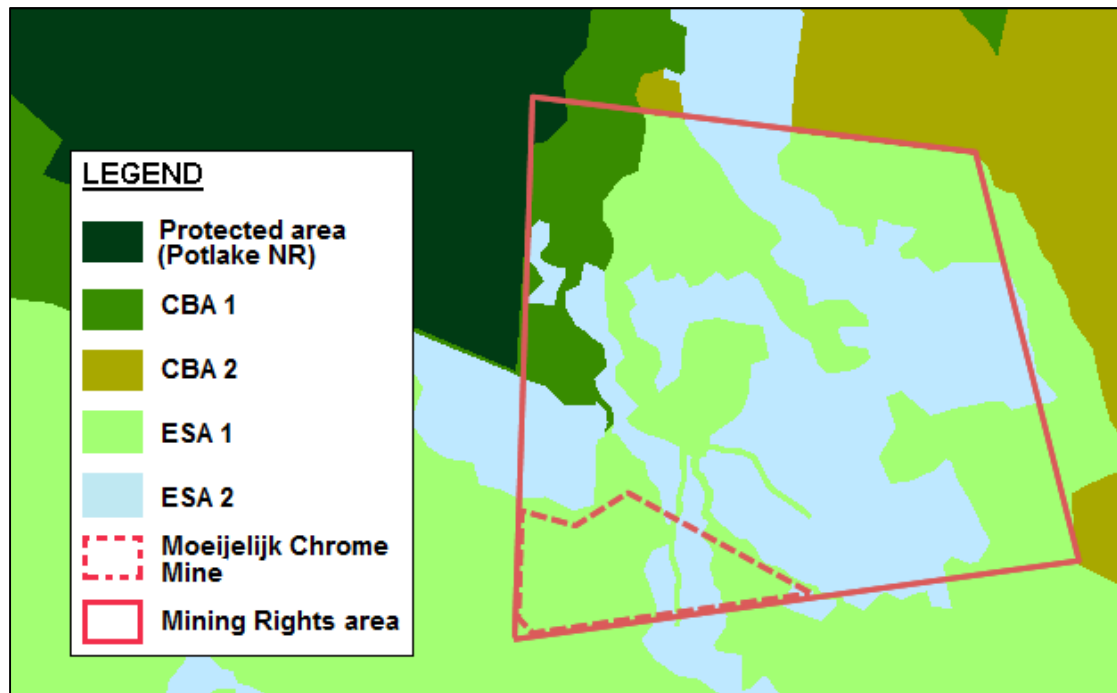


Figure 11: CBA's and ESA's according to Desmet *et al.* (2013) in the study area and surrounds.

Table 10: Descriptions and management and land-use objectives and recommendations for CBA's and ESA's in the Limpopo Province (Desmet *et al.* 2013).

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
Protected Areas	Formal Protected Areas and Protected Areas pending declaration under NEMPA.	<ul style="list-style-type: none"> - Maintain in a natural state with limited or no biodiversity loss. - Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation. - Development subject to Protected Area Objectives and zoning in a NEMPAA compliant and approved management plan. 	Maintain or obtain formal conservation protection.	Conservation and associated Activities (e.g. Eco-tourism operations), and required support infrastructure.	All other land-uses.
CBA 1	<ul style="list-style-type: none"> - Irreplaceable Sites. - Areas required to meet biodiversity pattern and/or ecological Processes targets. - No alternative sites are available to meet targets. 	<ul style="list-style-type: none"> - Maintain in a natural state with limited or no biodiversity loss. - Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation. 	<ul style="list-style-type: none"> - Obtain formal conservation protection where possible. - Implement appropriate zoning to avoid net loss of intact habitat or intensification of land use. 	<ul style="list-style-type: none"> - Conservation and associated activities. - Extensive game farming and eco-tourism operations with strict control on environmental impacts and carrying capacities, where the overall there is a net biodiversity gain. - Extensive Livestock Production with strict control on environmental impacts and carrying capacities. 	<ul style="list-style-type: none"> - Urban land uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). - Intensive Animal Production (all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures).

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
				<ul style="list-style-type: none"> - Required support infrastructure for the above activities. - Urban Open Space Systems. 	<ul style="list-style-type: none"> - Arable Agriculture (forestry, dry land & irrigated cropping). - Small holdings.
CBA 2	<ul style="list-style-type: none"> - Best Design Selected Sites. - Areas selected to meet biodiversity pattern and/or ecological process targets. - Alternative sites may be available to meet targets. 	<ul style="list-style-type: none"> - Maintain in a natural state with limited or no biodiversity loss. - Maintain current agricultural activities. - Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species. 	<p>Avoid conversion of agricultural land to more intensive land uses, which may have a negative impact on threatened species or ecological processes.</p>	<ul style="list-style-type: none"> - Current agricultural practices including arable agriculture, intensive and extensive animal production, as well as game and eco-tourism operations, so long as these are managed in a way to ensure populations of threatened species are maintained and the ecological processes which support them are not impacted. - Any activities compatible with CBA1. 	<ul style="list-style-type: none"> - Urban land uses including Residential (including golf estates, rural residential, resorts), Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). - More intensive agricultural production than currently undertaken on site. - <u>Note</u>: Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to CBA2. - Alternative areas may need to be identified to ensure the CBA network still meets the required targets.
ESA 1	Natural, near natural and degraded areas supporting CBAs by	Maintain ecosystem functionality and connectivity allowing for	- Implement appropriate zoning and land management guidelines	- Conservation and associated activities.	- Urban land uses including Residential (including golf estates),

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
	maintaining ecological processes.	limited loss of biodiversity pattern.	to avoid impacting ecological processes. - Avoid intensification of land-use. - Avoid fragmentation of natural landscape.	- Extensive game farming and eco-tourism operations. - Extensive Livestock Production. - Urban Open Space Systems. - Low density rural residential, smallholdings or resorts where development design and overall development densities allow maintenance of ecological functioning.	Business, Mining & Industrial; Infrastructure (roads, power lines, pipelines). - Intensive Animal Production (all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures). - Arable Agriculture (forestry, dry land & irrigated cropping). - <u>Note</u> : Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to maintain overall ecological functioning of ESAs.
ESA 2	Areas with no natural habitat that is important for supporting ecological processes.	Avoid additional / new impacts on ecological processes.	- Maintain current land use. - Avoid intensification of land-use, which may result in additional impact on ecological processes.	Existing activities (e.g. arable agriculture) should be maintained, but where possible a transition to less intensive land-uses or ecological restoration should be favoured.	Any land use or activity that results in additional impacts on ecological functioning mostly associated with the intensification of land use in these areas (e.g. Change of floodplain

CBA Map Category	Description	Land Management Objective	Land Management Recommendations	Compatible Land-Use	Incompatible Land-Use
					from arable agriculture to an urban land use or from recreational fields and parks to urban).
Other Natural	Natural and intact but not required to meet targets, or identified as CBA or ESA.	No management objectives, land management recommendations or land-use guidelines are prescribed. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy. Where possible existing Not Natural areas should be favoured for development before "Other natural areas" as before "Other natural areas" may later be Required either due to the identification of previously unknown important biodiversity features on these sites, or alternatively where the loss of CBA has resulted in the need to identify alternative sites.			
No Natural remaining	- Areas with no significant direct Biodiversity value. - Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure.				

7 IMPACT ASSESSMENT

7.1 Expected Impacts of Proposed Developments on Vegetation and Associated Habitats

Based on the sensitivity of the VU's that different development areas fall in, the impact assessment will assess impacts for three major impact areas, which are as follows:

Impact area 1:

- New opencast UG1 & UG2

Impact area 2:

- New UG road

Impact area 3:

- Opencast extensions west & south
- New opencast areas LG2 & LG3
- ROM extension
- Soft overburden dump
- Dry Tails Area
- Plant Area
- Wet Tails Area

Impacts identified and assessed, from a floristic point of view, for all areas (Tables 14 - 22) are described as follows:

- Destruction of natural vegetation: natural vegetation (including all recorded and any unrecorded species of conservation significance) as well as vegetation that has already established on transformed areas will be totally destroyed as a result of the clearing of vegetation, stripping of topsoil and open cast mining. Areas adjacent to the OC areas are covered in waste rock and other debris, which totally destroys the natural habitat. Even with the best rehabilitation efforts, the directly impacted areas will be permanently altered/transformed.
- Habitat fragmentation: existing flora habitats may be permanently disrupted and fragmented and may lead to isolation and/or loss of

biodiversity of the directly impacted areas as well as surrounding areas may change.

- Habitat transformation: disturbance of the soil in areas related to the proposed development may further transform the vegetation in the study area and will create conditions favorable for the establishment of populations of alien and invader plant species as well as common weeds. Furthermore, disturbance of surface soil during open cast mining, excavating and stockpiling may lead to unmanaged bare open spaces and soil dumps, which will be susceptible to erosion during rain events, which will lead to topsoil loss and siltation of habitats lower down the landscape.

The impact assessment was conducted using the matrix and criteria as presented in Tables 11 - 13.

Table 11: Impact assessment matrix and criteria followed for assessing possible impacts in the study area

Assessment	Definition	Quantification				
		1	2	3	4	5
Environment Type	Type of environment anticipated to be impacted	Degraded sites/ heavy industrial areas/ high density townships	High density residential/ retail and office complexes/ central business districts/ medium industrial/ large-scale agriculture ¹	Medium density residential/ light industrial/ office parks/ sports facilities/ medium-scale agriculture ²	Low density residential/ small-scale agricultural ³ / small holdings	Greenfield sites/ nature reserves/ protected areas/ natural recreational facilities
Nature	The potential of the impact to cause harm	Negligible Impact	Minor Impact	Moderate Impact	High Impact	Severe/ Irreversible Impact
Extent	The spatial extent or population extent of an impact	Within project area (<500m from project)	Surrounding area (500m – 1km radius)	Outside project area (1 – 5km radius)	Regional and provincial (5 – 50km radius)	National or international (>50km radius)
Duration	The period the impact will interact with the receiving environment	Immediate (days)	Short term (weeks)	Medium term (months)	Long term (years)	Beyond life of project
Frequency	How often the impact will occur	Less than once a year	Annually	Monthly	Weekly	Daily
Probability	The likelihood of the impact occurring	Rare	Unlikely	Possible	Likely	Almost certain

¹ Large Scale Agricultural viz. commercial tree plantations, etc.

² Medium Scale Agricultural viz. crop and cattle farming, etc.

³ Small Scale Agricultural viz. nurseries and fish farms, etc.

Risk assessment involves the calculation of the magnitude of potential consequences (levels of impacts) and the likelihood (levels of probability) of these consequences to occur. Risk = Consequence + Likelihood; where: (i) likelihood is the probability of occurrence of an impact that affects the environment; and, (ii) consequence is the environmental impact if an event occurs.

Consequence can be calculated as the sum of the risk levels comprising environment type, nature, extent and duration of the potential impact. Likelihood can be calculated as the sum of the risks of frequency and probability of the impact occurring. The likelihood and consequence can input into a matrix in order to identify the significance of the risk occurring. The C + L matrix method therefore combines the scores from the qualitative or semi-quantitative ratings of consequence (levels of impact) and the likelihood (levels of probability) that a specific consequence will occur (not just any consequence) to generate a risk score and risk rating.

Table 12: Consequence & Likelihood matrix

Likelihood	Consequence				
	2 – 6	5 – 8	9 – 11	12 – 15	14 – 17
	5 – 8	9 – 11	12 – 15	14 – 17	18 – 21
	9 – 11	12 – 15	14 – 17	18 – 21	20 – 23
	12 – 15	14 – 17	18 – 21	20 – 23	24 – 27
	14 – 17	18 – 21	20 – 23	24 – 27	26 – 30

The following significance rating can be derived from the ratings matrix:

Table 13: Significance Rating matrix

Environmental Significance		Description of Rating
2 – 8	Low Significance	No specific management action required
9 – 11	Medium-low Significance	Administrative management actions required
12 – 17	Medium Significance	Management and monitoring action plans required
18 – 23	Medium-high Significance	Specific management and monitoring plans required
24 – 30	High Significance	Detailed management and monitoring plans required, potential red flag impact

7.2 Impact assessment

7.2.1 Impact area 1

Table 14: IMPACT ASSESSMENT: Impact area 1 (A)

DEVELOPMENT AREA:		
New opencast UG1 & UG2		
IMPACT:		
Destruction of natural vegetation		
MITIGATION:		
<p>This area is still in a very good natural (“greenfields”) state. Some illegal mining has taken place nearby and should be rehabilitated as soon as possible (it is unclear who will be responsible for the rehabilitation). If other mining areas can be sourced this area should ideally not be mined from a vegetation point of view. If, however, mining is allowed very strict environmental policies will have to be formulated and adhered to in order to conserve neighboring vegetation and to keep the mining footprint as small as possible.</p> <p>Avoidance of unnecessary disturbance or destruction of natural habitat is an important mitigation tool for flora. Avoid encroaching on natural areas directly adjacent to proposed OC areas;</p> <p>If possible, OC areas that jeopardize any significant specimens or large populations of red listed or protected species should be planned in such a way as to avoid the specimens or populations;</p> <p>Eight plant species of conservation significance (refer to section 5.4) were recorded in this area during the study. Relocating some specimens that occur here to a suitable place where no developments are planned for the future, may be an option if soil conditions allow;</p> <p>Rehabilitation must include planting of indigenous local species, preferably sourced locally and/or grown from locally collected seed.</p>		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	5	5
Nature:	5	3
Extent:	4	1
Duration:	5	4
Frequency:	5	3
Probability:	5	3
CONSEQUENCE:	19	13
LIKELIHOOD:	10	6
SIGNIFICANCE RATING:	29 High	19 Medium-high

Table 15: IMPACT ASSESSMENT: Impact area 1 (B)

DEVELOPMENT AREA:		
New opencast UG1 & UG2		
IMPACT:		
Habitat fragmentation		
MITIGATION:		
Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages;		
Rehabilitate affected areas as soon as possible (within six months) after mining.		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	5	5
Nature:	3	1
Extent:	3	1
Duration:	5	3
Frequency:	5	3
Probability:	3	2
CONSEQUENCE:	16	10
LIKELIHOOD:	8	5
SIGNIFICANCE RATING:	24 High	15 Medium

Table 16: IMPACT ASSESSMENT: Impact area 1 (C)

DEVELOPMENT AREA:		
New opencast UG1 & UG2		
IMPACT:		
Habitat transformation		
MITIGATION:		
Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages;		
Rehabilitate affected areas as soon as possible after mining (within six months);		
Strictly monitor and eradicate populations of alien weeds and invaders as they are recorded. Do not allow these species to spread uncontrolled into natural vegetation;		
Well designed and implemented water and erosion control structures must be constructed during all mining phases – especially after rehabilitation.		
POTENTIAL IMPACT PREDICTED ON FLORA:		

Aspect	No Mitigation	With Mitigation
Environment type:	5	5
Nature:	2	1
Extent:	2	1
Duration:	5	3
Frequency:	5	3
Probability:	3	2
CONSEQUENCE:	14	10
LIKELIHOOD:	8	5
SIGNIFICANCE RATING:	22 Medium-high	15 Medium

7.2.2 Impact area 2

Table 17: IMPACT ASSESSMENT: Impact area 2 (A)

DEVELOPMENT AREA:		
New UG Road		
IMPACT:		
Destruction of natural vegetation		
MITIGATION:		
<p>Avoidance of unnecessary disturbance or destruction of natural habitat is an important mitigation tool for flora. Avoid encroaching on natural areas directly adjacent to proposed route of the road;</p> <p>If possible, OC extensions that jeopardize any significant specimens or large populations of red listed or protected species should be planned in such a way as to avoid the specimens or populations;</p> <p>Eleven plant species of conservation significance were recorded in the VU's that are crossed by the proposed route of the road. It is not expected that all these species will in fact be encountered on the route, but the possibility exists that at least four or five (or more) may be encountered. Relocating the specimens that occur in line with the proposed route to a suitable place where no developments are planned for the future or to be used in rehabilitation in future, must be seriously considered;</p> <p>Rehabilitation after the road has lost its usefulness, must include planting of indigenous local species, preferably sourced locally and/or grown from locally collected seed.</p>		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	4	4
Nature:	3	1
Extent:	2	1

Duration:	5	4
Frequency:	5	4
Probability:	3	1
CONSEQUENCE:	14	10
LIKELIHOOD:	8	5
SIGNIFICANCE RATING:	22 Medium-high	15 Medium

Table 18: IMPACT ASSESSMENT: Impact area 2 (B)

DEVELOPMENT AREA:		
New UG Road		
IMPACT:		
Habitat fragmentation		
MITIGATION:		
Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages. The cliff line that will be crossed in the construction of the road is especially sensitive.		
Rehabilitate affected areas as soon as possible after use.		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	4	4
Nature:	3	1
Extent:	2	1
Duration:	5	4
Frequency:	5	4
Probability:	2	1
CONSEQUENCE:	14	10
LIKELIHOOD:	7	5
SIGNIFICANCE RATING:	21 Medium-high	15 Medium

Table 19: IMPACT ASSESSMENT: Impact area 2 (C)

DEVELOPMENT AREA:		
New UG Road		
IMPACT:		
Habitat transformation		
MITIGATION:		
Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages. The cliff line that will be crossed in the construction of the road is especially sensitive.		

<p>Rehabilitate affected areas as soon as possible after use;</p> <p>Strictly monitor and eradicate populations of alien weeds and invaders as they are observed. Do not allow these species to spread uncontrolled into natural vegetation;</p> <p>Well designed and implemented water and erosion control structures must be constructed and very well maintained for the lifetime of the road – also after eventual rehabilitation.</p>		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	4	4
Nature:	2	1
Extent:	2	1
Duration:	5	3
Frequency:	5	3
Probability:	2	1
CONSEQUENCE:	13	9
LIKELIHOOD:	7	4
SIGNIFICANCE RATING:	20 Medium-high	13 Medium

7.2.3 Impact area 3

Table 20: IMPACT ASSESSMENT: Impact area 3 (A)

DEVELOPMENT AREA:
<p>Opencast extensions west & south New opencast areas LG2 & LG3 ROM extension Soft overburden dump Dry Tails Area Plant Area Wet Tails Area</p>
IMPACT:
<p>Destruction of natural vegetation</p>
MITIGATION:
<p>Avoidance of unnecessary disturbance or destruction of natural habitat is an important mitigation tool for flora. Avoid encroaching on natural areas directly adjacent to proposed OC and other development areas;</p> <p>If possible, OC and development areas that jeopardize any significant specimens or large populations of red listed or protected species should be planned in such a way as to avoid the specimens or populations;</p>

Individual specimens of protected tree species may occur. Relocating the few specimens that occur here to a suitable place where no developments are planned for the future, may be an option if soil conditions allow;

Rehabilitation must include planting of indigenous local species, preferably sourced locally and/or grown from locally collected seed.

POTENTIAL IMPACT PREDICTED ON FLORA:

Aspect	No Mitigation	With Mitigation
Environment type:	1	1
Nature:	3	1
Extent:	1	1
Duration:	4	3
Frequency:	5	2
Probability:	3	2
CONSEQUENCE:	9	6
LIKELIHOOD:	8	4
SIGNIFICANCE RATING:	17 Medium	10 Medium-low

Table 21: IMPACT ASSESSMENT: Impact area 3 (B)

DEVELOPMENT AREA:

Opencast extensions west & south
 New opencast areas LG2 & LG3
 ROM extension
 Soft overburden dump
 Dry Tails Area
 Plant Area
 Wet Tails Area

IMPACT:

Habitat fragmentation

MITIGATION:

Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages;

Rehabilitate affected areas as soon as possible after mining (within six months).

POTENTIAL IMPACT PREDICTED ON FLORA:

Aspect	No Mitigation	With Mitigation
Environment type:	1	1
Nature:	2	1
Extent:	2	1
Duration:	4	3
Frequency:	4	2

Probability:	3	2
CONSEQUENCE:	9	6
LIKELIHOOD:	7	5
SIGNIFICANCE RATING:	16 Medium	10 Medium Low

Table 22: IMPACT ASSESSMENT: Impact area 3 (C)

DEVELOPMENT AREA:		
Opencast extensions west & south New opencast areas LG2 & LG3 ROM extension Soft overburden dump Dry Tails Area Plant Area Wet Tails Area		
IMPACT:		
Habitat transformation		
MITIGATION:		
Avoidance of unnecessary disturbance or destruction of natural habitat – especially linear floral assemblages;		
Rehabilitate affected areas as soon as possible after mining (within six months);		
Strictly monitor and eradicate populations of alien weeds and invaders as they are recorded. Do not allow these species to spread uncontrolled into natural vegetation;		
Well designed and implemented water and erosion control structures must be constructed during all mining phases – especially after rehabilitation.		
POTENTIAL IMPACT PREDICTED ON FLORA:		
Aspect	No Mitigation	With Mitigation
Environment type:	1	1
Nature:	2	1
Extent:	2	1
Duration:	3	2
Frequency:	3	2
Probability:	1	1
CONSEQUENCE:	8	5
LIKELIHOOD:	4	3
SIGNIFICANCE RATING:	12 Medium	8 Low

8 FINAL COMMENTS AND RECOMMENDATIONS

The loss of topsoil and fragmentation of natural habitats that is virtually unavoidable with any type of development, has a negative impact on the regional ecosystem as it disrupts the natural flow of ecosystem services and affects all fauna and flora that are dependent on those habitats. Linear ridges, cliff lines, water courses, drainage lines, etc. are especially sensitive to and easily fragmented. A high conservation value is attributed to the plant communities and faunal assemblages of these areas as they contribute significantly to the biodiversity of a region. It is generally accepted that rocky ridges act as reservoirs of bio-diversity as they are less prone to degradation through overgrazing because of the general inaccessibility of grazing, especially to large animals like cattle, in these parts. Care should be taken not to unnecessarily clear or destroy natural vegetation and where possible the rehabilitation of transformed areas and restoration of degraded natural veld should take place in order to improve the ecological health of the floristic component on the property. Development should therefore be planned in such a way that totally transformed areas are chosen for major developments and natural veld is avoided as far as possible. These natural areas may be utilized and managed as areas of biodiversity conservation.

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), landowners are legally responsible for the control of such alien plants on their properties. The eradication and further spread of declared weeds and invaders must receive urgent attention throughout the mining rights area.

Based on the data presented in this report as well as observations made during the survey and comments above, the following is recommended in conclusion:

- Take note of and as far as possible comply with the mitigation measures and recommendations given in this report.
- During the planning, operational and rehabilitation phases all recommendations made and concerns raised in this document should be taken into consideration.
- It is strongly advised that an ecological specialist is appointed during the operational phase to monitor impacts and related mitigation measures regarding protected species as well as sensitive habitats from time to time.
- From a floristic point of view, mining on top of the mountain where the new open cast areas UG1 and UG2 are proposed should be avoided if possible.
- Other than other concerns raised, from a floristic point of view there are no major objections against the mining developments, as long as mitigation measures and recommendations are seriously considered and implemented, and as long as due diligence is practiced in terms of environmental legislation and other relevant policies and guidelines.

9 REFERENCES

9.1 Literature sighted in this report

- Acocks, J.P.H. 1953. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa No. 57. Department of Agriculture and Water Supply, South Africa.
- Desmet, P. G., Holness, S., Skowno, A. & Egan, V.T. 2013. Limpopo Conservation Plan v.2: Technical Report. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS.
- GDARD, 2014. Gauteng Department of Agriculture and Rural Development. Requirements for Biodiversity Assessments (Version 3). Newtown, Johannesburg.
- Germishuizen, G. & Meyer, N.L. (eds) 2003. Plants of Southern Africa: an annotated checklist. *Strelitzia* 14. National Botanical Institute, Pretoria.
- Henderson, L. 2001. Alien weeds and Invasive Plants. Plant Protection Research Institute, Agricultural Research Council. Paarl Printers, Cape Town.
- LEMA, 2003. Limpopo Environmental Management Act (Act No. 7 of 2003).
- Low, A.B. & Rebelo, A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
- Mucina, L. & Rutherford, C. 2006. The vegetation of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute. TienWah Press, Singapore.
- NEMBA, 2004. National Environmental Management: Biodiversity Act (Act no. 10 of 2004). Government Gazette No. 26436, Vol. 467, of 7 June 2004.
- NFA, 1998. List of protected tree species under the National Forests Act of 1998 (Act no.84 of 1998), Dept. of Water affairs and Forestry. Government Gazette No. 30253, Vol. 817, Pretoria.
- Pooley, E. 1998. A Field Guide to Wild Flowers of Kwazulu-Natal and the Eastern Region. Natal Flora Publications Trust, Durban.
- Pujol, J. 1988. The Herbalist Handbook – African Flora Medicinal Plants. NaturAfrica, Jean Pujol Natural Healers Foundation, Durban.
- Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama, P.A. 2009. Red List of South African Plants. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.
- Schmidt, E., Lötter, M. & McClelland, W. 2002. Trees and Shrubs of Mpumalanga and Kruger National Park. Jacana, Johannesburg.
- TOPS 2013. Publication of Lists of Species that are Threatened or Protected, Activities that are Prohibited and Exemption from Restriction. Amendment to the regulations to the National Environmental Management: Biodiversity Act (Act 10 of 2004). Government Gazette No. 36375, of 16 April 2013. Notice no. 389 of 2013.

Shearing, D. & Van Heerden, K. 1994. Karoo. South African Wild Flower Guide 6. Botanical Society of South Africa, Kirstenbosch, Claremont.

Siebert, S.J., Van Wyk, A.E. & Bredenkamp, G.J. 2001. Endemism in the flora of ultramafic areas of Sekhukhuneland, South Africa. *S. Afr. J. Sci.* 97: 529-532.

Siebert, S.J., Van Wyk, A.E. & Bredenkamp, G.J. 2002a. Vegetation ecology of Sekhukhuneland, South Africa: *Combretum hererense* – *Grewia vernicosa* Open Mountain Bushveld. *S. Afr. J. Bot.* 68: 475-496.

Siebert, S.J., Van Wyk, A.E. & Bredenkamp, G.J. 2002b. The physical environment and major vegetation types of Sekhukhuneland, South Africa. *S. Afr. J. Bot.* 68: 127-142.

Siebert, S.J., Van Wyk, A.E. & Bredenkamp, G.J. 2002c. An assessment of threatened plants and conservation in Sekhukhuneland. *PlantLife* 26: 7-18.

Van Wyk, Ben-Erik & Gericke, N. 2003. Peoples Plants, a Guide to Useful Plants of Southern Africa, Briza Publications, Pretoria.

Van Wyk, A.E. & Smith, G.F. 2001. Regions of floristic endemism in southern Africa. A review with emphasis on succulents. Umdaus Press, Hatfield, Pretoria.

Van Wyk, Ben-Erik, Van Oudtshoorn, B. & Gericke, N. 1997. Medicinal Plants of South Africa, Briza Publications, Pretoria.

9.2 Other Literature and Field Guides Consulted

The following were used for desktop studies and identification of plant species in the field and not necessarily referred to in the text of this document:

Bromilow, C. 1995. Problem Plants of South Africa. Briza Publications cc, Arcadia.

Germishuizen, G. & Fabian, A. 1997. Wild Flowers of Northern South Africa. Fernwood Press, Cape Town.

Götze, A.R. 2017. Vegetation Diversity Assessment – Sefateng Chrome Mine (Pty) Ltd: proposed extension of opencast operations and construction of a new pipeline, powerline and associated service road on the farms Waterkop 113KT and Zwartkoppies 413KS, Fetakgomo Local Municipality, Limpopo Province. Benah Con cc: Environment Research Consulting, Potchefstroom – unpublished specialist report (PR201701).

Manning, J. 2003. SASOL *Eerste Veldgids tot Parasitiese en Vleis-etende Plante van Suider Afrika*. Struik Publishers, Cape Town.

Republic of South Africa, 2007b. Government Gazette No. 29657, No. R 151, Pretoria.

Van der Walt, R. 2009. Wild Flowers of the Limpopo Valley. Retha Van der Walt, Ludwigslust Game Farms, Musina.

Van Oudtshoorn, F. 1999. Guide to the grasses of Southern Africa. Briza Publications, Pretoria.

Van Wyk, S. & Götze, A.R. 2010. Vegetation diversity survey for Corridor Mining Resources (Sefateng Chrome Mine). An extended vegetation survey on the farms Zwartkoppies 413 KS and Portion 1 and the remaining extent of the farm Waterkop 113 KT within the Fetakgomo Local Municipality. Unpublished specialist study report for an EIA.

Van Wyk, A.E. & Malan, S.J. 1997. Field Guide to the Wild Flowers of the Highveld (2ndedn.). Struik Publishers, Cape Town.

Van Wyk, B. & Van Wyk, P. 1997. Field guide to Trees of Southern Africa, Struik Publishers, Cape Town.

10 APPENDIX A: lists of plant families, genera and species recorded in the study area.

INDEX

Table 23: Plant Families & Genera recorded in the study area	p. 59
Table 24: Fern Species – PTERIDOPHYTA.....	p. 65
Table 25: Graminoids – ANGIOSPERMAE – Monocotyledonae.....	p. 65
Table 26: Woody Species – ANGIOSPERMAE – Dicotyledonae.....	p. 68
Table 27: Woody Species – ANGIOSPERMAE – Monocotyledonae.....	p. 74
Table 28: Herbaceous Shrubs & Forbs (Herbs) – Dicotyledonae.....	p. 74
Table 29: Herbaceous Shrubs & Forbs (Herbs) – Monocotyledonae.....	p. 81

Abbreviations used in Tables 24 – 29 of Appendix A are declared as follows:

Under the column SPECIES STATUS:

NT	Near Threatened (Raimondo <i>et al</i> , 2009)
Rare	Rare (Raimondo <i>et al</i> , 2009)
D	Declining (Raimondo <i>et al</i> , 2009)
End	Endemic to Sekhukhuneland (Siebert <i>et al</i> , 2001)
P(SA)	Protected in South Africa (NFA, 1998)
P(Lim)	Protected in Limpopo Province (LEMA, 2003)
E	Exotic – no formal invasive status (ruderal and agrestal weeds)
C1	Exotic – Declared weed category 1 (CARA, 1983)
Cx2	Exotic – Proposed invader category 2 (CARA, 1983)
N1b	Exotic – Category 1b (NEMBA, 2014)

Under the column SOCIAL USE:

F	–	Food/nourishment
M	–	Medicinal
C	–	Cultural

NOTE: All exotic plant taxa in the species lists (Appendix A: Tables 23 – 29) are preceded by an asterisk (*).

Table 23: Plant Families and Genera recorded in the study area

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
<u>PTERIDOPHYTA</u>				
PTERIDACEAE	1	1	<i>Pellaea</i>	1
SELAGINELLACEAE	1	1	<i>Selaginella</i>	1
Total:	2	2		2
<u>ANGIOSPERMAE</u>				
<u>MONOCOTYLEDONAE</u>				
AGAVACEAE	1	1	* <i>Agave</i>	1
ARACEAE	1	1	<i>Stylochaeton</i>	1
ASPARAGACEAE	1	1	<i>Asparagus</i>	4
ASPHODELACEAE	1	1	<i>Aloe</i>	2
COLCHICACEAE	1	1	<i>Ornithoglossum</i>	1
COMMELINACEAE	1	1	<i>Commelina</i>	4
CYPERACEAE	1	2	<i>Bulbostylis</i>	2
			<i>Cyperus</i>	1
DRACAENACEAE	1	1	<i>Sansevieria</i>	1
HYACINTHACEAE	1	2	<i>Dipcadi</i>	1
			<i>Ledebouria</i>	1
POACEAE	1	29	<i>Andropogon</i>	1
			<i>Aristida</i>	10
			<i>Bothriochloa</i>	1
			<i>Brachiaria</i>	3
			<i>Cenchrus</i>	1
			<i>Chloris</i>	1
			<i>Chrysopogon</i>	1
			<i>Cymbopogon</i>	3
			<i>Cynodon</i>	1
			<i>Dactyloctenium</i>	2
			<i>Digitaria</i>	1
			<i>Diheteropogon</i>	1
			<i>Elionurus</i>	1
			<i>Enneapogon</i>	2
			<i>Eragrostis</i>	5
			<i>Fingerhuthia</i>	1
			<i>Heteropogon</i>	1
			<i>Hyparrhenia</i>	1
			<i>Melinis</i>	2
			<i>Mosdenia</i>	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
			<i>Panicum</i>	2
			<i>Schmidtia</i>	1
			<i>Setaria</i>	3
			<i>Sporobolus</i>	2
			<i>Stipagrostis</i>	2
			<i>Themeda</i>	1
			<i>Tragus</i>	1
			<i>Tricholaena</i>	1
			<i>Urochloa</i>	3
VELLOZIACEAE	1	1	<i>Xerophyta</i>	2
Total:	11	41		77
DICOTYLEDONAE				
ACANTHACEAE	1	7	<i>Barleria</i>	4
			<i>Blepharis</i>	1
			<i>Crabbea</i>	1
			<i>Crossandra</i>	1
			<i>Justicia</i>	1
			<i>Ruellia</i>	1
			<i>Ruttya</i>	1
AMARANTHACEAE	1	2	* <i>Alternanthera</i>	1
			<i>Kyphocarpa</i>	1
ANACARDIACEAE	1	3	<i>Ozoroa</i>	2
			<i>Sclerocarya</i>	1
			<i>Searsia</i>	4
APIACEAE	1	1	<i>Heteromorpha</i>	1
APOCYNACEAE	1	5	<i>Carissa</i>	1
			<i>Gomphocarpus</i>	1
			<i>Pentarrhinum</i>	1
			<i>Pergularia</i>	1
			<i>Sarcostemma</i>	1
ARALIACEAE	1	1	<i>Cussonia</i>	2
ASTERACEAE	1	19	<i>Aspilia</i>	1
			<i>Berkheya insignis</i> (Harv.) Thell.	1
			* <i>Bidens</i>	1
			<i>Brachylaena</i>	1
			<i>Dicoma</i>	2
			<i>Emilia</i>	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
			<i>Felicia</i>	2
			<i>Geigeria</i>	1
			<i>Gerbera</i>	1
			<i>Kleinia</i>	2
			<i>Pechuel-Loeschea</i>	1
			<i>Psiadia</i>	1
			* <i>Schkuhria</i>	1
			<i>Senecio</i>	1
			<i>Tarchonanthus</i>	1
			* <i>Tridax</i>	1
			* <i>Verbesina</i>	1
			<i>Vernonia</i>	1
			* <i>Zinnia</i>	1
BALANITACEAE	1	1	<i>Balanites</i>	1
BORAGINACEAE	1	2	<i>Heliotropium</i>	1
			<i>Ehretia</i>	1
BURSERACEAE	1	1	<i>Commiphora</i>	4
BUXACEAE	1	1	<i>Buxus</i>	1
CACTACEAE	1	1	* <i>Opuntia</i>	1
CAPPARACEAE	1	5	<i>Cleome</i>	2
			<i>Boscia</i>	2
			<i>Cadaba</i>	1
			<i>Capparis</i>	1
			<i>Maerua</i>	2
CELASTRACEAE	1	4	<i>Elaeodendron</i>	1
			<i>Gymnosporia</i>	4
			<i>Hippocratea</i>	1
			<i>Lydenburgia</i>	1
CHENOPODIACEAE	1	1	* <i>Chenopodium</i>	1
COMBRETACEAE	1	2	<i>Combretum</i>	4
			<i>Terminalia</i>	1
CONVOLVULACEAE	1	4	<i>Evolvulus</i>	1
			<i>Ipomoea</i>	3
			<i>Merremia</i>	1
			<i>Seddera</i>	1
CRASSULACEAE	1	1	<i>Kalanchoe</i>	1
CUCURBITACEAE	1	4	<i>Coccinia</i>	1
			<i>Cucumis</i>	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
			<i>Kedrostis</i>	2
			<i>Zehneria</i>	1
EBENACEAE	1	2	<i>Diospyros</i>	1
			<i>Euclea</i>	2
EUPHORBIACEAE	1	7	<i>Croton</i>	2
			<i>Dalechampia</i>	1
			<i>Euphorbia</i>	3
			<i>Flueggea</i>	1
			<i>Jatropha</i>	2
			<i>Phyllanthus</i>	1
			<i>Tragia</i>	1
FABACEAE	1	21	<i>Abrus</i>	1
			<i>Albizia</i>	1
			<i>Argyrolobium</i>	2
			<i>Bauhinia</i>	1
			<i>Bolusanthus</i>	1
			<i>Chamaecrista</i>	1
			<i>Crotalaria</i>	2
			<i>Dichrostachys</i>	1
			<i>Dolichos</i>	1
			<i>Elephantorrhiza</i>	1
			<i>Indigofera</i>	7
			<i>Lotononis</i>	1
			<i>Mundulea</i>	1
			<i>Ormocarpum</i>	1
			<i>Peltophorum</i>	1
			<i>Rhynchosia</i>	3
			<i>Schotia</i>	1
			<i>Senegalia</i>	4
			<i>Senna</i>	1
			<i>Tephrosia</i>	2
			<i>Vachellia</i>	5
GISEKIACEAE	1	1	<i>Gisekia</i>	2
KIRKIACEAE	1	1	<i>Kirkia</i>	1
LAMIACEAE	1	8	<i>Becium</i>	1
			<i>Clerodendrum</i>	1
			<i>Leucas</i>	1
			<i>Syncolostemon</i>	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
			<i>Tinnea</i>	1
			<i>Karomia</i>	1
			<i>Vitex</i>	1
			<i>Plectranthus</i>	1
LORANTHACEAE	1	2	<i>Plicosepalus</i>	1
			<i>Tapinanthus</i>	1
MALPIGHIACEAE	1	2	<i>Sphedamnocarpus</i>	1
			<i>Triaspis</i>	1
MALVACEAE	1	6	<i>Abutilon</i>	1
			<i>Dombeya</i>	1
			<i>Gossypium</i>	1
			<i>Hibiscus</i>	4
			<i>Pavonia</i>	2
			<i>Sida</i>	1
MELIACEAE	1	1	<i>Turraea</i>	1
MENISPERMACEAE	1	1	<i>Antizoma</i>	1
MOLLUGINACEAE	1	1	<i>Corbichonia</i>	1
MORACEAE	1	1	<i>Ficus</i>	2
MYRSINACEAE	1	1	<i>Myrsine</i>	1
OCHNACEAE	1	1	<i>Ochna</i>	1
OLACACEAE	1	1	<i>Ximenia</i>	2
OLEACEAE	1	3	<i>Jasminum</i>	1
			<i>Olea</i>	1
			<i>Schrebera</i>	1
OROBANCHACEAE	1	1	<i>Striga</i>	1
PAPAVERACEAE	1	1	<i>*Argemone</i>	1
PASSIFLORACEAE	1	1	<i>Adenia</i>	1
PEDALIACEAE	1	1	<i>Ceratotheca</i>	1
POLYGALACEAE	1	1	<i>Polygala</i>	3
PHYTOLACCACEAE	1	1	<i>Lophiocarpus</i>	1
RHAMNACEAE	1	2	<i>Berchemia</i>	1
			<i>Ziziphus</i>	1
RUBIACEAE	1	5	<i>Kohautia</i>	1
			<i>Oldenlandia</i>	1
			<i>Gardenia</i>	1
			<i>Pavetta</i>	1
			<i>Vangueria</i>	1
RUTACEAE	1	1	<i>Zanthoxylum</i>	1

FAMILY	No. of families	No. of genera per family	GENUS	No. of species per genus
SAPINDACEAE	1	2	<i>Cardiospermum</i>	1
			<i>Hippobromus</i>	1
SAPOTACEAE	1	1	<i>Mimusops</i>	1
SCROPHULARIACEAE	1	1	<i>Aptosimum</i>	1
SOLANACEAE	1	3	* <i>Datura</i>	1
			<i>Lycium</i>	1
			<i>Solanum</i>	2
STERCULIACEAE	1	4	<i>Hermannia</i>	3
			<i>Melhania</i>	2
			<i>Sterculia</i>	1
			<i>Waltheria</i>	1
STRYCHNACEAE	1	1	<i>Strychnos</i>	1
THYMELAEACEAE	1	1	<i>Gnidia</i>	1
TILIACEAE	1	2	<i>Corchorus</i>	2
			<i>Grewia</i>	6
URTICACEAE	1	1	<i>Pouzolzia</i>	1
VERBENACEAE	1	2	<i>Chascanum</i>	1
			<i>Lantana</i>	1
VISCACEAE	1	1	<i>Viscum</i>	1
VITACEAE	1	3	<i>Cissus</i>	1
			<i>Cyphostemma</i>	3
			<i>Rhoicissus</i>	2
ZYGOPHYLLACEAE	1	1	<i>Tribulus</i>	1
Total:	58	162		233
TOTAL:	71	205		312

Table 24: Fern Species – PTERIDOPHYTA

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Pellaea calomelanos</i> (Swartz) Link var. <i>calomelanos</i>	PTERIDACEAE	Geophyte, lithophyte	Hardevaring / Bosveldvaring	Hard fern		M	X	X	
<i>Selaginella dregei</i> (C.Presl) Hieron.	SELAGINELLACEAE	Herb, geophyte, lithophyte		Resurrection Plant			X		

Table 25: Graminoids – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Andropogon chinensis</i> (Nees) Merr.	POACEAE	Grass	Harige-blougras	Hairy Blue Grass			X	X	
<i>Aristida adscensionis</i> L.	POACEAE	Grass	Eenjarige steekgras	Annual three-awn				X	X
<i>Aristida bipartita</i> (Nees) Trin. & Rupr.	POACEAE	Grass	Grootrolgras	Rolling Grass				X	
<i>Aristida canescens</i> Henrard subsp. <i>canescens</i>	POACEAE	Grass	Vaalsteekgras	Pale Three-awn			X	X	
<i>Aristida congesta</i> Roem. & Schult.	POACEAE	Grass	Katstertsteekgras	Tassel Three-awn			X	X	X
<i>Aristida diffusa</i> Trin. subsp. <i>burkei</i> (Stapf) Melderis	POACEAE	Grass	Ystergras	Iron Grass			X	X	
<i>Aristida junciformis</i> Trin. & Rupr. subsp. <i>junciformis</i>	POACEAE	Grass	Gongoni-steekgras	Gongoni Three-awn			X		
<i>Aristida meridionalis</i> Henrard	POACEAE	Grass	Langbeensteekgras	Giant Three-awn			X	X	
<i>Aristida rhiniochloa</i> Hochst.	POACEAE	Grass	Skurwesteekgras	Rough Three-awn			X	X	
<i>Aristida scabrivalvis</i> Hack.	POACEAE	Grass	Perssteekgras	Purple Three-awn				X	X
<i>Aristida stipitata</i> Hack	POACEAE	Grass	Langnaaldsteekgras	Long-awned Grass					X
<i>Bothriochloa insculpta</i> (A. Rich) A.Camus	POACEAE	Grass	Stippelgras	Pinhole Grass					X

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Brachiaria deflexa</i> (Schumach.) C.Eragrostis Hubb. ex Robyns	POACEAE	Grass	Bastersinjaalgras	False Signal Grass				X	
<i>Brachiaria nigropedata</i> (Ficalho & Hiern) Stapf	POACEAE	Grass	Swartvoetjiegras	Black-footed Grass			X	X	
<i>Brachiaria serrata</i> (Thunb.) Stapf	POACEAE	Grass	Fluweelsinjaalgras	Velvet Signal Grass			X		
<i>Bulbostylis hispidula</i> (Vahl) R.W.Haines subsp. <i>pyriformis</i> (Lye) R.W.Haines	CYPERACEAE	Sedge		Veld Bulrush			X	X	
<i>Bulbostylis humilis</i> (Kunth) C.B.Clarke	CYPERACEAE	Sedge					X	X	
<i>Cenchrus ciliaris</i> L.	POACEAE	Grass	Bloubuffelgras	Foxtail Buffalo Grass				X	
<i>Chloris virgata</i> Sw.	POACEAE	Grass	Witpluim-chloris	Feather-top chloris				X	X
<i>Chrysopogon serrulatus</i> Trin.	POACEAE	Grass	Gouebaardgras	Golden Beard Grass			X	X	
<i>Cymbopogon caesius</i> (Hook. & Arn.) Stapf	POACEAE	Grass	Breëblaarterpentyngras	Broad-leaved Turpentine Grass		C	X		
<i>Cymbopogon nardus</i> (L.) Rendle	POACEAE	Grass	Reuse-terpentyngras	Giant Turpentine Grass			X		
<i>Cymbopogon pospischilii</i> (K.Schum.) C.E. Hubb.	POACEAE	Grass	Smalblaarter- pentyngras	Narrow-leaved Turpentine Grass			X	X	
<i>Cynodon dactylon</i> (L.) Pers.	POACEAE	Grass	Kweekgras	Couch Grass					X
<i>Cyperus obtusiflorus</i> Vahl var. <i>obtusiflorus</i>	CYPERACEAE	Herb, cyperoid	Witbiesie	White-flowered Sedge			X		
<i>Dactyloctenium aegyptium</i> (L.) Willd.	POACEAE	Grass	Hoenderspoor	Common Crowfoot				X	X
<i>Dactyloctenium giganteum</i> Fisher & Schweick.	POACEAE	Grass	Reuse Hoen- derspoor	Giant Crowfoot				X	
<i>Digitaria eriantha</i> Steud.	POACEAE	Grass	Gewone-vingergras	Common Finger Grass			X	X	X
<i>Diheteropogon amplexans</i> (Nees) Clayton	POACEAE	Grass	Breëblaarblougras	Broad-leaved Bluestem			X		
<i>Elionurus muticus</i> (Spreng.) Kunth	POACEAE	Grass	Koperdraadgras	Wire Grass			X		
<i>Enneapogon cenchroides</i> (Roem. & Schult.) C.Eragrostis Hubb.	POACEAE	Grass	Negenaaldgras	Nine-awned Grass				X	X

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Enneapogon scoparius</i> Stapf	POACEAE	Grass	Kalkgras	Bottlebrush Grass			X	X	
<i>Eragrostis cilianensis</i> (All.) Vignolo ex Janch.	POACEAE	Grass	Stink-eragrostis	Stink Love Grass				X	X
<i>Eragrostis lehmanniana</i> Nees var. <i>lehmanniana</i>	POACEAE	Grass	Knietjiesgras	Lehmann's Love Grass		C		X	X
<i>Eragrostis racemosa</i> (Thunb.) Steud.	POACEAE	Grass	Smalhartjiesgras	Narrow heart Love Grass			X	X	
<i>Eragrostis rigidior</i> Pilg.	POACEAE	Grass	Breë Krulblaar	Broad Curly-leaf				X	X
<i>Eragrostis trichophora</i> Coss. & Durieu	POACEAE	Grass	Harige Pluimgras	Hairy Love Grass					X
<i>Fingerhuthia africana</i> Lehm.	POACEAE	Grass	Vingerhoedgras	Thimble grass			X	X	X
<i>Heteropogon contortus</i> (L.) Roem. & Schult.	POACEAE	Grass	Assegaaigras	Spear Grass			X	X	X
<i>Hyparrhenia hirta</i> (L.) Stapf	POACEAE	Grass	Gewone-dekgras	Common Thatching Grass		C	X	X	X
<i>Melinis nerviglumis</i> (Franch.) Zizka	POACEAE	Grass	Steekblaar Rooipluim	Bristle-leaved Red Top			X	X	
<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	POACEAE	Grass	Fluweelgras / Natal Rooipluim	Natal Red Top			X	X	X
<i>Mosdenia leptostachys</i> (Ficalho & Hiern) Clayton	POACEAE	Grass					X		
<i>Panicum deustum</i> Thunb.	POACEAE	Grass	Breëblaarbuffelsgras	Broad-leaved Panicum			X	X	
<i>Panicum maximum</i> Jacq.	POACEAE	Grass	Buffelsgras	Guinea Grass			X	X	X
<i>Schmidtia pappophoroides</i> Steud.	POACEAE	Grass	Sandkweek	Sand Quick				X	X
<i>Setaria lindenbergiana</i> (Nees) Stapf	POACEAE	Grass	Berg-setaria	Mountain Bristle Grass			X		
<i>Setaria sphacelata</i> (Schumach.) Moss var. <i>sphacelata</i>	POACEAE	Grass	Gewone-mannagras	Common Bristle Grass			X		
<i>Setaria verticillata</i> (L.) P.Beauv.	POACEAE	Grass	Klitsgras	Bur Bristle Grass				X	X
<i>Sporobolus fimbriatus</i> (Trin.) Nees	POACEAE	Grass	Fynsaadgras	Dropseed Grass			X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Sporobolus nitens</i> Stent	POACEAE	Grass	Krulblaar Fynsaadgras	Curly-leaved Dropseed					X
<i>Stipagrostis obtusa</i> (Delile) Nees	POACEAE	Grass	Kortbeen Boesmangras	Small Bushman Grass					X
<i>Stipagrostis uniplumis</i> (Licht.) De Winter var. <i>uniplumis</i>	POACEAE	Grass	Blinkblaar-boesmangras	Silky Bushman Grass			X	X	
<i>Themeda triandra</i> Forssk.	POACEAE	Grass	Rooigras	Red Grass			X	X	
<i>Tragus berteronianus</i> Schult.	POACEAE	Grass	Kousklits	Carrot-seed Grass			X	X	X
<i>Tricholaena monachne</i> (Trin.) Stapf & C.E.Hubb.	POACEAE	Grass	Blousaadgras	Blue-seed grass				X	X
<i>Urochloa brachyura</i> (Hack.) Stapf	POACEAE	Grass							X
<i>Urochloa mosambicensis</i> (Hack.) Dandy	POACEAE	Grass	Bosveldbeesgras	Bushveld Signal Grass				X	X
<i>Urochloa panicoides</i> P.Beauv.	POACEAE	Grass	Tuinbeesgras	Garden Urochloa				X	X

Table 26: Woody Species – ANGIOSPERMAE – Dicotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Albizia anthelmintica</i> (A.Rich.) Brongn.	FABACEAE	Tree	Wurmbas-valsoring	Worm-bark False-thorn		M		X	X
<i>Balanites maughamii</i> Sprague	BALANITACEAE	Tree	Groending	Green-thorn	D, P(SA)	M/C		X	X
<i>Bauhinia tomentosa</i> L.	FABACEAE	Tree	Geelbeeskrou	Yellow Bauhinia			X	X	X
<i>Berchemia zeyheri</i> (Sond.) Grubov	RHAMNACEAE	Tree	Rooi-ivoor	Red Ivory		M/F/C	X		
<i>Bolanthus speciosus</i> (L.Bolus) Harms	FABACEAE	Tree	Vanwykshout	Tree Wisteria		M/F/C			X
<i>Boscia albitrunca</i> (Burch.) Gilg & Gilg-Ben.	CAPPARACEAE	Tree	Witgat	Shepherd's Tree	P(SA)	M/F/C		X	
<i>Boscia foetida</i> Schinz subsp. <i>rehmanniana</i> (Pestal.) Tölken	CAPPARACEAE	Tree	Stinkwitgat	Stink Shepherd's Tree		M/F	X	X	X

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Brachylaena ilicifolia</i> (Lam.) E.Phillips & Schweick	ASTERACEAE	Tree	Fynbitter-blaar	Small-leaved Silver-oak		M	X		
<i>Buxus macowanii</i> Oliv.	BUXACEAE	Tree / shrub	Kaapse Buksboom	Cape Box		C	X		
<i>Cadaba termitaria</i> N.E.Br.	CAPPARACEAE	Tree	Wurmbos	Worm-bush					X
<i>Capparis tomentosa</i> Lam.	CAPPARACEAE	Tree	Wollerige Kapperbos	Woolly Caper Bush		M/C			X
<i>Carissa bispinosa</i> (L.) Desf. ex Brenan subsp. <i>bispinosa</i>	APOCYNACEAE	Shrub	Gewone Noemnoem	Common Num-num		F			X
<i>Combretum apiculatum</i> Sond. subsp. <i>apiculatum</i>	COMBRETACEAE	Tree	Rooibos	Red Bushwillow		C		X	
<i>Combretum hereroense</i> Schinz	COMBRETACEAE	Tree	Kieriekapper	Russet Bushwillow		M/C	X	X	X
<i>Combretum moggii</i> Exell	COMBRETACEAE	Tree / shrub	Rotsboswilg	Rock Bushwillow			X		
<i>Combretum molle</i> R.Br. ex G.Don	COMBRETACEAE	Tree	Fluweelbos-wilg	Velvet Bushwillow		M/C	X	X	
<i>Commiphora glandulosa</i> Schinz	BURSERACEAE	Tree	Groot Gewone Kanniedood	Tall Common Corkwood		M/F/C		X	
<i>Commiphora mollis</i> (Oliv.) Engl.	BURSERACEAE	Tree	Fluweelkanniedood	Velvet Corkwood		M/F	X	X	X
<i>Commiphora pyracanthoides</i> Engl.	BURSERACEAE	Tree / shrub	Gewone Kanniedood	Common Corkwood		M/F/C		X	X
<i>Commiphora schimperi</i> (O.Berg) Engl.	BURSERACEAE	Tree	Blinkblaar-kanniedood	Glossy-leaved Corkwood		C	X	X	
<i>Crotalaria monteiroi</i> Taub. ex Baker.f.	FABACEAE	Tree	Kleinblaar-klapperpeul	Small-leaved Rattle-pod			X	X	
<i>Croton gratissimus</i> Burch. var. <i>gratissimus</i>	EUPHORBIACEAE	Tree	Laventel-koorsbessie	Lavender Fever Berry		M	X	X	
<i>Croton menyhartii</i> Pax.	EUPHORBIACEAE	Tree	Skurweblaar-koorsbessie	Rough-leaved Croton		C			X
<i>Cussonia paniculata</i> Eckl. & Zeyh. subsp. <i>sinuata</i> (Reineke & Kok) De Winter	ARALIACEAE	Tree	Bergkiepersol	Mountain Cabbage-tree		M/F	X		
<i>Cussonia transvaalensis</i> Reyneke	ARALIACEAE	Tree	Vaalkiepersol	Grey Cabbage-tree			X		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummit	FABACEAE	Tree	Kleinblaarsekelbos	Small-leaved Sicklebush		M	X	X	X
<i>Diospyros lycioides</i> Desf.	EBENACEAE	Tree	Bloubos	Bluebush		M/F/C		X	X
<i>Dombeya rotundifolia</i> (Hochst.) Planch.	MALVACEAE	Tree	Gewone Drolpeer	Wild Pear		M	X	X	
<i>Ehretia rigida</i> (Thunb.) Druce subsp. <i>nervifolia</i> Retief & A.E.van Wyk	BORAGINACEAE	Tree	Deurmekaarbos	Puzzle-bush		F/C	X		X
<i>Elaeodendron transvaalense</i> (Burt Davy) R.H.Archer	CELASTRACEAE	Tree	Bosveld-saffraan / Bos-saffraan	Bushveld Saffron / Forest Saffron	NT, P(SA)	M	X		X
<i>Elephantorrhiza praetermissa</i> J.H.Ross	FABACEAE	Tree	Sekukune-basboontjie	Sekhukhune Elephant-root	End	C	X	X	
<i>Euclea crispa</i> (Thunb.) Gürke subsp. <i>ovata</i> (Burch.) F.White	EBENACEAE	Tree / shrub	Blougwarrie	Blue Guarri		M/F	X		
<i>Euclea natalensis</i> A.DC. subsp. <i>natalensis</i>	EBENACEAE	Tree	Harige Gwarrie	Hairy Guarri / Natal Ebony		M/C		X	
<i>Euphorbia sekukuniensis</i> R.A.Dyer	EUPHORBIACEAE	Succulent tree	Sekhukhuni-naboom	Sekhukhune Candelabra Tree	Rare, End		X	X	
<i>Euphorbia tirucalli</i> L.	EUPHORBIACEAE	Succulent tree	Kraalnaboom	Rubber-hedge Euphorbia		C		X	X
<i>Ficus abutilifolia</i> (Miq.) Miq.	MORACEAE	Tree	Grootblaarrotsvy	Large-leaved Rock Fig		F		X	
<i>Ficus thonningii</i> Blume	MORACEAE	Tree	Gewone Wildevy	Common Wild Fig		C		X	
<i>Flueggea virosa</i> (Roxb. Ex Willd.) Voigt subsp. <i>virosa</i>	EUPHORBIACEAE	Tree	Witbessiebos	White-berry Bush		M/F/C		X	X
<i>Gardenia volkensii</i> K.Schum. subsp. <i>volkensii</i> var. <i>volkensii</i>	RUBIACEAE	Tree	Transvaal-katjeepering	Bushveld Gardenia		C	X		
<i>Grewia bicolor</i> Juss. var. <i>bicolor</i>	TILIACEAE	Tree	Witrosyntjie	White Raisin		F/C		X	
<i>Grewia flava</i> DC.	TILIACEAE	Tree	Fluweelrosyntjie	Velvet Raisin		F/C	X	X	X
<i>Grewia flavescens</i> Juss. var. <i>flavescens</i>	TILIACEAE	Tree	Skurwerosyntjie	Sandpaper Raisin		F/C		X	X
<i>Grewia monticola</i> Sond.	TILIACEAE	Tree	Vaalrosyntjie	Silwer Raisin		F/C	X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Grewia occidentalis</i> L. var. <i>occidentalis</i>	TILIACEAE	Tree	Kruisbessie	Cross-berry		F/C	X		
<i>Grewia vernicosa</i> Schinz	TILIACEAE	Tree	Glansrosyntjie	Glossy Raisin		F/C	X	X	
<i>Gymnosporia buxifolia</i> (L.) Szyszyl.	CELASTRACEAE	Tree	Gewone Pendoring	Common Spike-thorn		M/C		X	X
<i>Gymnosporia glaucophylla</i> M.Jordaan	CELASTRACEAE	Tree / shrub	Bloupendoring	Blue Spike-thorn			X	X	
<i>Gymnosporia polyacantha</i> (Sond.) Szyszyl.	CELASTRACEAE	Tree	Kraalpendoring	Hedge Spike-thorn			X	X	
<i>Gymnosporia tenuispina</i> (Sond.) Szyszyl.	CELASTRACEAE	Tree	Klapperbos	Bell Spike-thorn			X		
<i>Heteromorpha arborescens</i> (Spreng.) Cham. & Schtdl var. <i>arborescens</i>	APIACEAE	Tree	Pietersieliebos	Parsley-tree		M	X		
<i>Hippobromus pauciflorus</i> (L.f.) Radlk.	SAPINDACEAE	Tree	Basterperdepis	False Horsewood		M	X	X	
<i>Hippocratea longipetiolata</i> Oliv.	CELASTRACEAE	Tree	Bosveldspaanpeul	Bushveld Paddlepod				X	X
<i>Jasminum multipartitum</i> Hochst.	OLEACEAE	Shrub / climber	Wildejasmyn	Common Wild Jasmine		F/C	X	X	
<i>Karomia speciosa</i> (Hutch. & Corbishley) R.Fern.	LAMIACEAE	Shrub	Wilde-sambreelblom	Wild Parasol Flower			X	X	
<i>Kirkia wilmsii</i> Engl.	KIRKIACEAE	Tree	Bergsering	Mountain Seringa		F/C	X	X	
<i>Lycium cinereum</i> Thunb.	SOLANACEAE	Shrub / Dwarf shrub	Kleinkriedoring / Slangbessie	Small Honey-thorn		C			X
<i>Lydenburgia cassinoides</i> N.Robson	CELASTRACEAE	Tree	Sekoekoenie-boesmantee	Sekhukhune Bushman's-tea	NT, P(SA), End	F/C	X	X	
<i>Maerua angolensis</i> DC.	CAPPARACEAE	Tree	Knoppiesboontjieboom	Bead-bean Tree					X
<i>Maerua caffra</i> (DC.) Pax	CAPPARACEAE	Tree	Gewone Witbos	Common Bush-cherry		F		X	
<i>Mimusops zeyheri</i> Sonder	SAPOTACEAE	Tree	Moepel	Red Milkwood		F/C	X		
<i>Mundulea sericea</i> (Willd.) A.Chev. subsp. <i>sericea</i>	FABACEAE	Tree	Kurkbas / Visgif	Cork Bush		M/C	X		
<i>Myrsine africana</i> L.	MYRSINACEAE	Woody shrub	Mirting	Cape Myrtle			X		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Ochna inermis</i> (Forssk.) Schweinf.	OCHNACEAE	Tree	Kreupelrooihout	Stunted Plane			X	X	
<i>Olea capensis</i> L. subsp. <i>enervis</i> (Harv. ex C.H.Wright) I.Verd.	OLEACEAE	Tree	Bosveld / Rotsysterhout	Bushveld / Rock Ironwood		C	X		
<i>Ormocarpum kirkii</i> S.Moore	FABACEAE	Tree	Krulusperboontjie	Curled Caterpillar-pod				X	
<i>Ozoroa albicans</i> R.Fern. & A.Fern.	ANACARDIACEAE	Shrub					X		
<i>Ozoroa sphaerocarpa</i> R. & A.Fern.	ANACARDIACEAE	Tree	Korenteharpuisboom	Currant Resin-tree		M	X	X	
<i>Pavetta zeyheri</i> Sond. subsp. <i>zeyheri</i>	RUBIACEAE	Tree	Fynblaarbruids-bos	Grey-leaved Brides Bush		F	X	X	
<i>Peltophorum africanum</i> Sond.	FABACEAE	Tree	Huilboom	African Wattle		M		X	X
<i>Pouzolzia mixta</i> Solms	URTICACEAE	Tree	Seepnetel	Soap-nettle				X	
<i>Rhoicissus sekhukhuniensis</i> Retief, Siebert & van Wyk	VITACEAE	Woody climber	Sekoekoeniedruif	Sekhukhune Grape	End		X	X	
<i>Rhoicissus tridentata</i> (L.f.) Wild & Drummond	VITACEAE	Woody climber	Boesmansdruif	Bushman's Grape		M/F/C		X	
<i>Ruttya ovata</i> Harv.	ACANTHACEAE	Shrub						X	
<i>Schotia brachypetala</i> Sond.	FABACEAE	Tree	Huilboerboon	Tree Fuchia /Weeping Boer-bean		M/F/C			X
<i>Schrebera alata</i> (Hochst.) Welw.	OLEACEAE	Tree / shrub	Houtpeer	Wing-leaved Wooden-pear			X		
<i>Sclerocarya birrea</i> (A.Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro	ANACARDIACEAE	Tree	Maroela	Marula	P(SA)	M/F/C	X	X	X
<i>Searsia engleri</i> Britten	ANACARDIACEAE	Tree / shrub	Fluweelkaree	Velvet Karee		F			X
<i>Searsia keetii</i> Schönland	ANACARDIACEAE	Tree	Keet-se-taaibos	Keet's Slender Currant			X	X	
<i>Searsia leptodictya</i> Diels	ANACARDIACEAE	Tree	Bergkaree	Mountain Karee		M	X		
<i>Searsia sekhukhuniensis</i> Moffet	ANACARDIACEAE	Tree	Sekoekoeni-taaibos	Sekhukhune Currant	R, End	M/F/C	X	X	
<i>Senegalia caffra</i> (Thunb.) Willd.	FABACEAE	Tree	Gewone haakdoring	Common Hook-thorn		F/C	X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Senegalia mellifera</i> (Vahl) Benth. subsp. <i>detinens</i> (Burch.) Brenan	FABACEAE	Tree	Swarthaak	Black Thorn		M/C		X	X
<i>Senegalia nigrescens</i> Oliv.	FABACEAE	Tree	Knoppies-doring	Knob Thorn				X	
<i>Senegalia senegal</i> (L.) Willd. var. <i>rostrata</i> Brenan	FABACEAE	Tree	Driehaakdoring	Three-hook Thorn			X	X	X
<i>Sterculia rogersii</i> N.E.Br.	STERCULIACEAE	Tree	Gewone Sterkastaiing	Common Star-chestnut				X	
<i>Strychnos madagascariensis</i> Poir.	STRYCHNACEAE	Tree	Swartklapper	Black Monkey-orange		F	X	X	
<i>Tarchonanthus camphoratus</i> L.	ASTERACEAE	Tree	Wildekanferbos	Wild camphor bush		M	X		
<i>Terminalia prunioides</i> M.A.Lawson	COMBRETACEAE	Tree	Sterkbos	Lowveld Cluster-leaf		C	X	X	X
<i>Turraea obtusifolia</i> Hochst.	MELIACEAE	Tree	Kleinkanferfoelie-boom	Small Honeysuckle Tree		M	X	X	
<i>Vachellia erubescens</i> Welw. ex Oliv.	FABACEAE	Tree	Blouhaak	Blue Thorn					X
<i>Vachellia grandicornuta</i> Gerstner	FABACEAE	Tree	Horingdoring	Horned Thorn					X
<i>Vachellia karroo</i> Hayne	FABACEAE	Tree	Soetdoring	Sweet Thorn		M/F/C			X
<i>Vachellia nilotica</i> (L.) Willd. ex Del. subsp. <i>kraussiana</i> (Benth.) Brenan	FABACEAE	Tree	Lekkerruik-peul	Scented Thorn		C		X	X
<i>Vachellia tortilis</i> (Forssk.) Hayne subsp. <i>heteracantha</i> (Burch.) Brenan	FABACEAE	Tree	Haak-en-steek	Umbrella Thorn		F/C		X	X
<i>Vangueria infausta</i> Burch. subsp. <i>infausta</i>	RUBIACEAE	Tree	Wildemispel	Wild-medlar		M/F/C	X	X	
<i>Vitex obovata</i> E.Mey. subsp. <i>wilmsii</i> (Gürke) C.L.Bredenkamp & D.J.Botha	LAMIACEAE	Tree	Harige Vingerblaar	Hairy Fingerleaf		M	X	X	
<i>Ximenia americana</i> L. var. <i>microphylla</i> Welw. ex Oliv.	OLACACEAE	Tree	Blousuurpruim	Blue Sourplum		F/M	X	X	X
<i>Ximenia caffra</i> Sond.	OLACACEAE	Tree	Suurpruim	Sour Plum		F/M/C	X	X	
<i>Zanthoxylum capense</i> (Thunb.) Harv.	RUTACEAE	Tree	Kleinperdepram	Small knobwood		M	X		
<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	RHAMNACEAE	Tree	Blinkblaar-wag-'n-bietjie	Buffalo-thorn		M/F/C	X	X	X

Table 27: Woody Species – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
* <i>Agave americana</i> L.	AGAVACEAE	Tree / shrub	*Garingboom	*American agave	Cx2	M/F/C			X

Table 28: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Dicotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Abrus precatorius</i> L. subsp. <i>africanus</i> Verdc.	FABACEAE	Herb, climber	Geluksboontjie	Luckybean Creeper				X	
<i>Abutilon austro-africanum</i> Hochr.	MALVACEAE	Herb							X
<i>Adenia fruticosa</i> Burtt Davy subsp. <i>fruticosa</i>	PASSIFLORACEAE	Shrub, climber	Sekoekoenie-bobejaangif	Sekhukhune Greenstem	End, NT			X	
* <i>Alternanthera pungens</i> Kunth	AMARANTHACEAE	Herb	*Kakiedubbeltjie	*Paper Thorns	E				X
<i>Antizoma angustifolia</i> (Burch.) Miers ex Harv.	MENISPERMACEAE	Herb, climber							X
<i>Aptosimum lineare</i> Marloth & Engl. var. <i>lineare</i>	SCROPHULARIACEAE	Herb					X	X	X
* <i>Argemone ochroleuca</i> Sweet subsp. <i>ochroleuca</i>	PAPAVERACEAE	Herb	*Witblom-bloudissel	*White-flowered Mexican Poppy	C1 / N1b				X
<i>Argyrobium</i> c.f. <i>megarrhizum</i> Bolus.	FABACEAE	Herb, dwarf shrub			NT		X		
<i>Argyrobium transvaalense</i> Schinz	FABACEAE	Herbaceous shrub					X		
<i>Aspilia mossambicensis</i> (Oliv.) Wild	ASTERACEAE	Herb					X	X	
<i>Barleria galpinii</i> C.B.Clarke	ACANTHACEAE	Herb					X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Barleria pretoriensis</i> C.B.Cl.	ACANTHACEAE	Herb					X	X	
<i>Barleria saxatilis</i> Oberm.	ACANTHACEAE	Dwarf shrub						X	
<i>Barleria senensis</i> Klotzsch	ACANTHACEAE	Herb							X
<i>Becium filamentosum</i> (Forssk.) Chiov.	LAMIACEAE	Herb					X	X	
<i>Berkheya insignis</i> (Harv.) Thell.	ASTERACEAE	Herb					X	X	
* <i>Bidens bipinnata</i> L.	ASTERACEAE	Herb	*Spaanse knapsekêrel	*Spanish Blackjack	E				X
<i>Blepharis subvolubilis</i> C.B.Clarke	ACANTHACEAE	Herb						X	X
<i>Cardiospermum corindum</i> L.	SAPINDACEAE	Herb, climber	Klein-blaasklimop	Small Balloon Vine			X	X	
<i>Ceratotheca triloba</i> (Bernh.) Hook.f.	PEDALIACEAE	Herb	Wildevingerhoedjie	Wild Foxglove				X	X
<i>Chamaecrista mimosoides</i> (L.) Greene	FABACEAE	Herb	Boesmanstee	Fishbone Cassia				X	
<i>Chascanum pinnatifidum</i> (L.f.) E.Mey.	VERBENACEAE	Herb		White Trumpets			X	X	
* <i>Chenopodium carinatum</i> R.Br.	CHENOPODIACEAE	Herb	*Groen-hondebossie	*Green Goosefoot	E			X	X
<i>Cissus quadrangularis</i> L. var. <i>quadrangularis</i>	VITACEAE	Succulent, climber				M			X
<i>Cleome angustifolia</i> (Forssk.)	CAPPARACEAE	Herb	Peultjiesbos	Yellow Cleome				X	
<i>Cleome monophylla</i> L.	CAPPARACEAE	Herb	Rusperbossie	Spindlepod			X	X	
<i>Clerodendrum ternatum</i> Schinz	LAMIACEAE	Dwarf shrub					X	X	X
<i>Coccinia adoensis</i> (A.Rich.) Cogn.	CUCURBITACEAE	Herb, climber	Bospampoentjie	Wild Cucumber		F/C		X	
<i>Corbichonia decumbens</i> (Forssk.) Exell	MOLLUGINACEAE	Herb					X	X	X
<i>Corchorus asplenifolius</i> Burch.	TILIACEAE	Herb				F/C	X	X	X
* <i>Corchorus olitorius</i> L.	TILIACEAE	Herb			E	F			X
<i>Crabbea hirsuta</i> Harv.	ACANTHACEAE	Herb					X		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Crossandra greenstockii</i> S.Moore	ACANTHACEAE	Herb, Dwarf Shrub	Rooibloem	Bushveld Crossandra			X		
<i>Crotalaria laburnifolia</i> L. subsp. <i>australis</i> (Baker f.) Polhill	FABACEAE	Herbaceous shrub	Bruin-en-geel-voëltjieblom	Brown-and-yellow Birdflower			X		
<i>Cucumis zeyheri</i> Sond.	CUCURBITACEAE	Herb, climber	Wildekomkommer	Wild Cucumber		F		X	
<i>Cyphostemma segmentatum</i> (C.A.Sm.) J.J.M. van der Merwe	VITACEAE	Succulent, scrambler					X	X	
<i>Cyphostemma simulans</i> (C.A.Sm.) Wild & R.B.Drumm.	VITACEAE	Succulent, climber					X	X	
<i>Cyphostemma sulcatum</i> (C.A.Sm.) J.J.M. van der Merwe	VITACEAE	Herb, scrambler					X	X	
<i>Dalechampia capensis</i> A.Spreng.	EUPHORBIACEAE	Herb		Wild Hop			X	X	
* <i>Datura ferox</i> L.	SOLANACEAE	Herb	*Grootstinkblaar	*Large Thorn Apple	C1 / N1b	M			X
<i>Dicoma anomala</i> Sond. subsp. <i>anomala</i>	ASTERACEAE	Herb	Maagbitterwortel			M	X		
<i>Dicoma macrocephala</i> DC.	ASTERACEAE	Herb					X		
<i>Dolichos trilobus</i> L. subsp. <i>Transvaalicus</i> Verdc.	FABACEAE	Herb, climber					X	X	
<i>Emilia transvaalensis</i> (Bolus) C.Jeffrey	ASTERACEAE	Herb, suffrutex					X	X	
<i>Euphorbia schinzii</i> Pax	EUPHORBIACEAE	Succulent dwarf shrub	Klipmelkbossie			M	X		
<i>Evolvulus alsinoides</i> (L.) L.	CONVOLVULACEAE	Herb		Blue Haze		M	X	X	
<i>Felicia clavipilosa</i> Grau subsp. <i>transvaalensis</i> Grau	ASTERACEAE	Dwarf shrub					X	X	X
<i>Felicia muricata</i> (Thunb.) Nees subsp. <i>muricata</i>	ASTERACEAE	Herb	Bloublommetjie					X	X
<i>Geigeria burkei</i> Harv. subsp. <i>fruticulosa</i> Merxm.	ASTERACEAE	Herb	Vermeersiektebossie					X	X
<i>Gerbera jamesonii</i> Bolus ex Adlam	ASTERACEAE	Herb					X		

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Gisekia africana</i> (Lour.) Kuntze var. <i>africana</i>	GISEKIACEAE	Herb							X
<i>Gisekia pharnacioides</i> L. var. <i>pharnacioides</i>	GISEKIACEAE	Herb						X	X
<i>Gnidia capitata</i> L.f.	THYMELAEACEAE	Herb	Gifbossie / Kerriebossie				X	X	
<i>Gomphocarpus fruticosus</i> (L.) Aiton f. subsp. <i>decipiens</i> (N.E.Br.) Goyder & Nicholas	APOCYNACEAE	Herbaceous shrub	Melkbos	Milkweed		M	X	X	X
<i>Gossypium herbaceum</i> L. subsp. <i>africanum</i> (Watt) Vollesen	MALVACEAE	Herbaceous shrub	Wildekatoen	Wild Cotton		C		X	X
<i>Heliotropium ovalifolium</i> Forssk.	BORAGINACEAE	Herb		String of Stars					X
<i>Hermannia glanduligera</i> K.Schum.	STERCULIACEAE	Herb	Pienk Gombossie				X	X	
<i>Hermannia lancifolia</i> Szyszyl.	STERCULIACEAE	Herb						X	
<i>Hibiscus caesius</i> Garcke var. <i>caesius</i>	MALVACEAE	Herbaceous shrub						X	
<i>Hibiscus coddii</i> Exell	MALVACEAE	Herb						X	
<i>Hibiscus micranthus</i> L.f. var. <i>micranthus</i>	MALVACEAE	Herb	Klein Wit-hibiscus	Tiny White Wild Hibiscus				X	X
<i>Hibiscus pusillus</i> Thunb.	MALVACEAE	Herb		Dwarf Hibiscus					X
<i>Indigofera circinnata</i> Benth. ex Harv.	FABACEAE	Herb							X
<i>Indigofera daleoides</i> Benth. ex Harv. var. <i>daleoides</i>	FABACEAE	Herb						X	X
<i>Indigofera hedyantha</i> Eckl. & Zeyh.	FABACEAE	Herb	Aambeibossie	Black-bud Indigo			X		X
<i>Indigofera hilaris</i> Eckl. & Zeyh. var. <i>hilaris</i>	FABACEAE	Herb		Red Indigo Bush			X	X	
<i>Indigofera holubii</i> N.E.Br.	FABACEAE	Herb						X	
<i>Indigofera nebrowniana</i> J.B.Gillet	FABACEAE	Herb						X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Ipomoea crassipes</i> Hook.	CONVOLVULACEAE	Herb, climber	Wildewinde	Leafy-flowered Ipomoea		M/F/C	X		
<i>Ipomoea magnusiana</i> Schinz	CONVOLVULACEAE	Herb, climber		Small Pink Ipomoea			X	X	X
<i>Ipomoea oblongata</i> E.Mey. ex Choisy	CONVOLVULACEAE	Herb, climber					X		
<i>Jatropha latifolia</i> Pax var. <i>angustata</i> Prain	EUPHORBIACEAE	Herbaceous shrub					X	X	
<i>Jatropha latifolia</i> Pax var. <i>latifolia</i>	EUPHORBIACEAE	Herbaceous shrub					X		
<i>Justicia protracta</i> (Nees) T.Anderson.	ACANTHACEAE	Herb	Witgarnaalbos	Veld Justicia			X		
<i>Kalanchoe paniculata</i> Harv.	CRASSULACEAE	Succulent herb	Hasie-oor / Krimpsiektebos	Large Orange Kalanchoe			X		
<i>Kedrostis africana</i> (L.) Cogn.	CUCURBITACEAE	Herb, climber				M	X		
<i>Kedrostis foetidissima</i> (Jacq.) Cogn.	CUCURBITACEAE	Herb, climber				F		X	
<i>Kleinia fulgens</i> Hook.	ASTERACEAE	Succulent herb	Koraalsenecio	Coral Senecio / Coral Kleinia			X		
<i>Kleinia longiflora</i> DC.	ASTERACEAE	Succulent shrub	Sambokbos			M	X		X
<i>Kohautia caespitosa</i> Schinidl.	RUBIACEAE	Herb						X	X
<i>Kyphocarpa angustifolia</i> (Moq.) Lopr.	AMARANTHACEAE	Herb						X	X
<i>Lantana rugosa</i> Thunb.	VERBENACEAE	Herb	Voëlbrandewyn	Birds' Brandy		F/C		X	
<i>Leucas capensis</i> (Benth.) Engl.	LAMIACEAE	Herb / shrub					X	X	
<i>Lophiocarpus tenuissimus</i> Hook.f.	PHYTOLACCACEAE	Herb						X	
<i>Lotononis eriantha</i> Benth.	FABACEAE	Herb		Russet Lotonotis			X		
<i>Melhania acuminata</i> Mast. var. <i>acuminata</i>	STERCULIACEAE	Herb						X	X
<i>Melhania rehmannii</i> Szyszyl.	STERCULIACEAE	Herb					X	X	X

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Merremia kentrocaulos</i> (C.B.Clarke) Rendle	CONVOLVULACEAE	Herb, climber						X	
<i>Oldenlandia herbacea</i> (L.) Roxb. var. <i>herbacea</i>	RUBIACEAE	Herb					X	X	
* <i>Opuntia stricta</i> (Haw.) Haw.	CACTACEAE	Cactus / shrub	*Suurturksvy	*Australian Pest Pear	C1 / N1b				X
<i>Pavonia burchellii</i> (DC.) R.A.Dyer	MALVACEAE	Herb		Dainty Pavonia					X
<i>Pavonia transvaalensis</i> (Ulbr.) A.Meeuse	MALVACEAE	Herb						X	
<i>Pechuel-Loeschea leubnitziae</i> (Kuntze) O.Hoffm.	ASTERACEAE	Herbaceous shrub	Bitterbos	Wild Sage				X	X
<i>Pentarrhinum inspidum</i> E.Mey	APOCYNACEAE	Herb, climber	Donkieperske	African Heartvine		M/F		X	
<i>Pergularia daemia</i> (Forssk.) Chiov. var. <i>daemia</i>	APOCYNACEAE	Herb, climber		Trellis Vine		M			X
<i>Phyllanthus maderaspatensis</i> L.	EUPHORBIACEAE	Herb	Skilpadbossie				X	X	X
<i>Plectranthus xerophilus</i> Codd	LAMIACEAE	Herbaceous shrub						X	
<i>Plicosepalus kalachariensis</i> (Shinz) Danser	LORANTHACEAE	Hemi- parasite	Kalaharikersies	Fiery Plicosepalus				X	
<i>Polygala hottentotta</i> Presl.	POLYGALACEAE	Herb		Small Purple Broom			X	X	X
<i>Polygala sphenoptera</i> Fresen. var. <i>sphenoptera</i>	POLYGALACEAE	Herb						X	
<i>Polygala uncinata</i> E. Mey. ex Meisn.	POLYGALACEAE	Herb	Wildeviooltjie	Wild Violet			X	X	
<i>Psiadia punctulata</i> (DC.) Oliv. & Hiern. ex Vatke	ASTERACEAE	Herbaceous shrub					X	X	X
<i>Rhynchosia komatiensis</i> Harms	FABACEAE	Herbaceous shrub	Vaalboontjie	Silver Rhynchosia Bush			X	X	
<i>Rhynchosia minima</i> (L.) DC. var. <i>minima</i>	FABACEAE	Herb, climber					X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Rhynchosia totta</i> (Thunb.) DC. var. <i>totta</i>	FABACEAE	Herb, climber					X	X	X
<i>Ruellia cordata</i> Thunb.	ACANTHACEAE	Herb	Veld Viooltjie	Veld Violet			X	X	
<i>Sarcostemma viminale</i> (L.) R.Br. subsp. <i>viminale</i>	APOCYNACEAE	Succulent climber	Melktou /Wolfsmelk	Caustic Vine		M		X	X
* <i>Schkuhria pinnata</i> (Lam.) Cabrera	ASTERACEAE	Herb	*Kleinkakiebos	*Dwarf Marigold	E			X	X
<i>Seddera suffruticosa</i> (Schinz) Hallier f.	CONVOLVULACEAE	Herb						X	X
<i>Senecio venosus</i> Harv.	ASTERACEAE	Herb					X		
<i>Senna italica</i> Mill. subsp. <i>arachoides</i> (Burch.) Lock	FABACEAE	Herb	Elandsertjie	Eland's Pea		M			X
<i>Sida rhombifolia</i> L. subsp. <i>rhombifolia</i>	MALVACEAE	Herb	Taaiman	Arrow-leaf Sida					X
<i>Solanum panduriforme</i> E.Mey.	SOLANACEAE	Herb	Gifappeltjie	Poison Apple				X	X
<i>Solanum tettense</i> Klotzsch var. <i>renschii</i> (Vatke) A.E.Gonç.	SOLANACEAE	Herbaceous shrub						X	
<i>Sphedamnocarpus pruriens</i> (A.Juss.) Szyszyl. subsp. <i>pruriens</i>	MALPIGHIACEAE	Herb, climber		Lesser Moth-fruit Creeper			X		
<i>Striga gesnerioides</i> (Willd.) Vatke ex Engl.	OROBANCHACEAE	Herb, hemi-parasite	Bloublom	Purple Witchweed		M	X	X	
<i>Syncolostemon transvaalensis</i> (Schltr.) D.F.Otieno	LAMIACEAE	Herbaceous shrub		Large / Transvaal Syncolostemon		M	X	X	
<i>Tapinanthus oleifolius</i> (J.C.Wendl.) Danser	LORANTHACEAE	Shrub / Hemi-parasite	Namakwakersies	Desert Tapinanthus			X	X	
<i>Tephrosia longipes</i> Meisn. subsp. <i>longipes</i>	FABACEAE	Herb					X	X	
<i>Tephrosia purpurea</i> (L.) Pers.	FABACEAE	Herb		Silver Tephrosia				X	X
<i>Tinnea rhodesiana</i> S.Moore	LAMIACEAE	Herb					X	X	
<i>Tragia rupestris</i> Sond.	EUPHORBIACEAE	Herb	Brandnetel	Stinging Nettle			X	X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Triaspis glaucophylla</i> Engl.	MALPIGHIACEAE	Shrub, climber	Blouskildvrug	Blue Shieldfruit			X	X	
<i>Tribulus terrestris</i> L.	ZYGOPHYLLACEAE	Herb	Dubbeltjie	Devil's Thorn				X	X
* <i>Tridax procumbens</i> L.	ASTERACEAE	Herb	*Aster	*Tridax Daisy	E				X
* <i>Verbesina encelioides</i> (Cav.) Benth. & Hook. var. <i>encelioides</i>	ASTERACEAE	Herb	*Wildesonneblom	*Wild Sunflower	E				X
<i>Vernonia oligocephala</i> (DC.) Sch. Bip. ex Walp.	ASTERACEAE	Herb	Bitterbossie	Bicoloured-leaved Vernonia			X		
<i>Viscum rotundifolium</i> L.f.	VISCACEAE	Hemi-parasite	Rooibessie / Voëlent	Red-berried Mistletoe			X		X
<i>Waltheria indica</i> L.	STERCULIACEAE	Herb	Meidebossie				X	X	X
<i>Zehneria scabra</i> (L.f.) Sond. subsp. <i>scabra</i>	CUCURBITACEAE	Herb, climber	Dawetjieswortel				X	X	
* <i>Zinnia peruviana</i> (L.) L.	ASTERACEAE	Herb	*Wildejakob-regop	*Redstar Zinnia	E			X	X

Table 29: Herbaceous Shrubs & Forbs (Herbs) – ANGIOSPERMAE – Monocotyledonae

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Aloe cryptopoda</i> Baker	ASPHODELACEAE	Succulent shrub	Geelaalwyn			M/C	X	X	X
<i>Aloe fosteri</i> Pillans	ASPHODELACEAE	Succulent herb				M		X	
<i>Asparagus buchananii</i> Baker	ASPARAGACEAE	Herbaceous shrub					X	X	X
<i>Asparagus schroederi</i> Engl.	ASPARAGACEAE	Herbaceous shrub					X	X	
<i>Asparagus sekukuniensis</i> (Oberm.) Fellingham & N.L.Mey.	ASPARAGACEAE	Herbaceous shrub			End			X	

SPECIES NAME	FAMILY	GROWTH FORM	COMMON NAME		SPECIES STATUS	SOCIAL USE	VU		
			AFRIKAANS	ENGLISH			1	2	3
<i>Asparagus suaveolens</i> Burch.	ASPARAGACEAE	Herbaceous shrub	Gewone Katbos / Katdoring	Bushveld Asparagus		M/F	X		X
<i>Commelina africana</i> L.	COMMELINACEAE	Herb	Geeleendagsblom	Yellow Commelina		M	X		
<i>Commelina benghalensis</i> L.	COMMELINACEAE	Herb	Blousel-blommetjie	Benghal Wandering Jew		M			X
<i>Commelina livingstonii</i> C.B.Cl.	COMMELINACEAE	Herb					X		
<i>Commelina</i> species	COMMELINACEAE	Herb					X		
<i>Dipcadi viride</i> (L.) Moench	HYACINTHACEAE	Geophyte	Gifbolletjie / Grootstymuintjie	Dainty Green Bells / Green Dipcadi			X	X	
<i>Ledebouria marginata</i> (Baker) Jessop	HYACINTHACEAE	Geophyte				M	X	X	
<i>Ornithoglossum vulgare</i> B.Nord.	COLCHICACEAE	Geophyte	Slangkop	Poison Onion			X		
<i>Sansevieria hyacinthoides</i> (L.) Druce	DRACAENACEAE	Geophyte	Skoonma-se-tong	Mother-in-law's Tongue		M/C	X	X	X
<i>Stylochaeton natalensis</i> Schott	ARACEAE	Herb		Bushveld Arum		M	X	X	
<i>Xerophyta retinervis</i> Baker	VELLOZIACEAE	Herb	Bobbejaanstert	Monkey's Tail		M/F	X	X	
<i>Xerophyta schlechteri</i> (Baker) N.L. Menezes	VELLOZIACEAE	Herb				M	X		

11 APPENDIX B: list of plant species occurring in QDS 2429BD according to SANBI – POSA

FAMILY	SPECIES	THREATENED STATUS
PTERIDOPHYTA		
EQUISETACEAE	<i>Equisetum ramosissimum</i> Desf. subsp. <i>ramosissimum</i>	LC
PTERIDACEAE	<i>Adiantum incisum</i> Forssk.	LC
SINOPTERIDACEAE	<i>Cheilanthes dolomiticola</i> (Schelpe) Schelpe & N.C.Anthony	LC
	<i>Cheilanthes nielsii</i> W.Jacobsen	LC
ANGIOSPERMAE		
MONOCOTYLEDONAE		
AMARYLLIDACEAE	<i>Crinum stuhlmannii</i> Baker	Declining
ARALIACEAE	<i>Schefflera umbellifera</i> (Sond.) Baill.	LC
ASPARAGACEAE	<i>Asparagus acocksii</i> Jessop	LC
	<i>Asparagus buchananii</i> Baker	LC
	<i>Asparagus clareae</i> (Oberm.) Fellingham & N.L.Mey.	LC
	<i>Asparagus divaricatus</i> (Oberm.) Fellingham & N.L.Mey.	LC
	<i>Asparagus laricinus</i> Burch.	LC
	<i>Asparagus lynetteae</i> (Oberm.) Fellingham & N.L.Mey.	LC
	<i>Asparagus racemosus</i> Willd.	LC
	<i>Asparagus schroederi</i> Engl.	LC
ASPHODELACEAE	<i>Aloe hardyi</i> H.F.Glen	Rare
DRACAENACEAE	<i>Sansevieria pearsonii</i> N.E.Br.	LC
POACEAE	<i>Cymbopogon pospischilii</i> (K.Schum.) C.E.Hubb.	LC
	<i>Digitaria eriantha</i> Steud.	LC
	<i>Eragrostis cilianensis</i> (All.) Vignolo ex Janch.	LC
	<i>Eragrostis curvula</i> (Schrad.) Nees	LC
	<i>Panicum deustum</i> Thunb.	LC
	<i>Perotis patens</i> Gand.	LC
	<i>Sporobolus panicoides</i> A.Rich.	LC
DICOTYLEDONAE		
ACANTHACEAE	<i>Barleria saxatilis</i> Oberm.	LC
	<i>Blepharis subvolubilis</i> C.B.Clarke	LC
	<i>Justicia odora</i> (Forssk.) Vahl	LC
	<i>Peristrophe decorticans</i> K.Balkwill	LC
	<i>Petalidium oblongifolium</i> C.B.Clarke	LC
	<i>Thunbergia atriplicifolia</i> E.Mey. ex Nees	LC
AMARANTHACEAE	<i>Kyphocarpa angustifolia</i> (Moq.) Lopr.	LC
ANACARDIACEAE	<i>Ozoroa albicans</i> R.Fern. & A.Fern.	LC
	<i>Searsia keetii</i> (Schönland) Moffett	LC
APOCYNACEAE	<i>Brachystelma coddii</i> R.A.Dyer	LC
	* <i>Catharanthus roseus</i> (L.) G.Don	
	<i>Gomphocarpus tomentosus</i> Burch. subsp. <i>tomentosus</i>	LC

FAMILY	SPECIES	THREATENED STATUS
	<i>Riocreuxia picta</i> Schltr.	LC
ASTERACEAE	<i>Dicoma tomentosa</i> Cass.	LC
	<i>Emilia transvaalensis</i> (Bolus) C.Jeffrey	LC
	<i>Felicia clavipilosa</i> Grau subsp. <i>transvaalensis</i> Grau	LC
	<i>Geigeria ornativa</i> O.Hoffm. subsp. <i>ornativa</i>	LC
	<i>Helichrysum confertifolium</i> Klatt	LC
	<i>Helichrysum umbraculigerum</i> Less.	LC
	<i>Litogyne gariepina</i> (DC.) Anderb.	LC
	<i>Schistostephium crataegifolium</i> (DC.) Fenzl ex Harv.	LC
	<i>Senecio inaequidens</i> DC.	LC
	<i>Vernonia fastigiata</i> Oliv. & Hiern	LC
	* <i>Zinnia peruviana</i> (L.) L.	
BALANITACEAE	<i>Balanites maughamii</i> Sprague subsp. <i>maughamii</i>	Declining
BORAGINACEAE	<i>Heliotropium lineare</i> (A.DC.) Gürke	LC
BURSERACEAE	<i>Commiphora marlothii</i> Engl.	LC
	<i>Commiphora neglecta</i> I.Verd.	LC
	<i>Commiphora tenuipetiolata</i> Engl.	LC
BUXACEAE	<i>Buxus macowanii</i> Oliv.	LC
CAMPANULACEAE	<i>Wahlenbergia undulata</i> (L.f.) A.DC.	LC
CAPPARACEAE	<i>Cleome hirta</i> (Klotzsch) Oliv.	LC
CELASTRACEAE	<i>Lydenburgia cassinoides</i> N.Robson	NT
CONVOLVULACEAE	* <i>Ipomoea carnea</i> Jacq. subsp. <i>fistulosa</i> (Mart. ex Choisy) D.F.Austin	
	<i>Ipomoea holubii</i> Baker	LC
	<i>Ipomoea magnusiana</i> Schinz	LC
	<i>Merremia palmata</i> Hallier f.	LC
CRASSULACEAE	<i>Cotyledon barbeyi</i> Schweinf. ex Baker	LC
	<i>Crassula expansa</i> Dryand. subsp. <i>fragilis</i> (Baker) Toelken	LC
	<i>Kalanchoe paniculata</i> Harv.	LC
CUCURBITACEAE	<i>Coccinia rehmannii</i> Cogn.	LC
	<i>Cucumis africanus</i> L.f.	LC
EBENACEAE	<i>Diospyros lycioides</i> Desf. subsp. <i>nitens</i> (Harv. ex Hiern) De Winter	LC
EUPHORBIACEAE	<i>Cephalocroton mollis</i> Klotzsch	LC
	<i>Euphorbia enormis</i> N.E.Br.	LC
	<i>Euphorbia neopolycnemoides</i> Pax & K.Hoffm.	LC
	<i>Euphorbia tirucalli</i> L.	LC
	<i>Jatropha latifolia</i> Pax var. <i>angustata</i> Prain	LC
	<i>Jatropha latifolia</i> Pax var. <i>latifolia</i>	LC
	<i>Jatropha variifolia</i> Pax	LC
FABACEAE	<i>Bauhinia tomentosa</i> L.	LC
	<i>Crotalaria sphaerocarpa</i> Perr. ex DC. subsp. <i>sphaerocarpa</i>	LC
	<i>Erythrina lysistemon</i> Hutch.	LC

FAMILY	SPECIES	THREATENED STATUS
	<i>Indigofera bainesii</i> Baker	LC
	<i>Pearsonia obovata</i> (Schinz) Polhill	LC
	<i>Rhynchosia pentheri</i> Schltr. ex Zahlbr. var. <i>pentheri</i>	LC
	<i>Tephrosia purpurea</i> (L.) Pers. subsp. <i>leptostachya</i> (DC.) Brummitt var. <i>leptostachya</i>	LC
	<i>Vigna frutescens</i> A.Rich. subsp. <i>frutescens</i> var. <i>frutescens</i>	LC
	<i>Vigna unguiculata</i> (L.) Walp. subsp. <i>unguiculata</i> var. <i>unguiculata</i>	LC
GENTIANACEAE	<i>Sebaea bojeri</i> Griseb.	LC
HYPERICACEAE	<i>Hypericum aethiopicum</i> Thunb. subsp. <i>sonderi</i> (Bredell) N.Robson	LC
HYPERICACEAE	<i>Hypericum lalandii</i> Choisy	LC
KIRKIAACEAE	<i>Kirkia wilmsii</i> Engl.	LC
LAMIACEAE	<i>Clerodendrum ternatum</i> Schinz	LC
	<i>Karomia speciosa</i> (Hutch. & Corbishley) R.Fern. forma <i>speciosa</i>	LC
	<i>Leucas capensis</i> (Benth.) Engl.	LC
	<i>Leucas sexdentata</i> Skan	LC
	<i>Ocimum tubiforme</i> (R.D.Good) A.J.Paton	LC
	<i>Orthosiphon fruticosus</i> Codd	LC
	<i>Plectranthus fruticosus</i> L'Hér.	LC
	<i>Plectranthus laxiflorus</i> Benth.	LC
	<i>Plectranthus mutabilis</i> Codd	LC
	<i>Plectranthus xerophilus</i> Codd	LC
	<i>Rabdosiella calycina</i> (Benth.) Codd	LC
	<i>Stachys graciliflora</i> C.Presl	LC
	<i>Syncolostemon obermeyeriae</i> (M.Ashby) D.F.Otieno	LC
	<i>Syncolostemon rehmannii</i> (Gürke) D.F.Otieno	LC
	<i>Tinnea rhodesiana</i> S.Moore	LC
LOPHIOPHYLLACEAE	<i>Corbichonia decumbens</i> (Forssk.) Exell	LC
LORANTHACEAE	<i>Agelanthus lugardii</i> (N.E.Br.) Polhill & Wiens	LC
LYTHRACEAE	<i>Nesaea radicans</i> Guill. & Perr. var. <i>floribunda</i> (Sond.) A.Fern.	LC
MALPIGHIACEAE	<i>Sphedamnocarpus pruriens</i> (A.Juss.) Szyszyl. subsp. <i>galphimifolius</i> (A.Juss.) P.D.de Villiers & D.J.Botha	LC
MALVACEAE	<i>Abutilon pycnodon</i> Hochr.	LC
	<i>Corchorus asplenifolius</i> Burch.	LC
	<i>Corchorus kirkii</i> N.E.Br.	LC
	<i>Hermannia boraginiflora</i> Hook.	LC
	<i>Hermannia modesta</i> (Ehrenb.) Mast.	LC
	<i>Hibiscus coddii</i> Exell subsp. <i>barnardii</i> (Exell) Leistner & P.J.D.Winter	LC
	<i>Sterculia rogersii</i> N.E.Br.	LC
	<i>Waltheria indica</i> L.	LC

FAMILY	SPECIES	THREATENED STATUS
MELIACEAE	<i>Ekebergia pterophylla</i> (C.DC.) Hofmeyr	LC
MENISPERMACEAE	<i>Tinospora fragosa</i> (I.Verd.) I.Verd. & Troupin	LC
MYRSINACEAE	<i>Rapanea melanophloeos</i> (L.) Mez	Declining
MYRTACEAE	<i>Syzygium gerrardii</i> (Harv. ex Hook.f.) Burt Davy	LC
NYCTAGINACEAE	<i>Commicarpus decipiens</i> Meikle	LC
	<i>Commicarpus pilosus</i> (Heimerl) Meikle	LC
OCHNACEAE	<i>Ochna inermis</i> (Forssk.) Schweinf.	LC
OLEACEAE	<i>Olea europaea</i> L. subsp. <i>africana</i> (Mill.) P.S.Green	LC
	<i>Schrebera alata</i> (Hochst.) Welw.	LC
OROBANCHACEAE	<i>Buttonia superba</i> Oberm.	LC
PEDALIACEAE	<i>Dicerocaryum senecioides</i> (Klotzsch) Abels	LC
PHYLLANTHACEAE	<i>Phyllanthus parvulus</i> Sond. var. <i>garipensis</i> (E.Mey. ex Drège) Radcl.-Sm.	LC
PIPERACEAE	<i>Peperomia tetraphylla</i> (G.Forst.) Hook. & Arn.	LC
RUBIACEAE	<i>Canthium armatum</i> (K.Schum.) Lantz	
	<i>Otiophora cupheoides</i> N.E.Br.	LC
	<i>Pavetta zeyheri</i> Sond. subsp. <i>zeyheri</i>	LC
RUTACEAE	<i>Zanthoxylum capense</i> (Thunb.) Harv.	LC
SCROPHULARIACEAE	<i>Aptosimum lineare</i> Marloth & Engl. var. <i>lineare</i>	LC
	<i>Hebenstretia dura</i> Choisy	LC
	<i>Selago rehmannii</i> Rolfe	LC
SOLANACEAE	<i>Solanum lichtensteinii</i> Willd.	LC
	<i>Solanum tomentosum</i> L. var. <i>tomentosum</i>	LC
THYMELAEACEAE	<i>Gnidia splendens</i> Meisn.	LC
TURNERACEAE	<i>Tricliceras longepedunculatum</i> (Mast.) R.Fern. var. <i>longepedunculatum</i>	LC
VELLOZIACEAE	<i>Xerophyta retinervis</i> Baker	LC
VERBENACEAE	<i>Chascanum hederaceum</i> (Sond.) Moldenke var. <i>natalense</i> (H.Pearson) Moldenke	LC
	<i>Chascanum incisum</i> (H.Pearson) Moldenke	LC
VITACEAE	<i>Cyphostemma segmentatum</i> (C.A.Sm.) J.J.M.van der Merwe	LC
	<i>Rhoicissus tridentata</i> (L.f.) Wild & R.B.Drumm. subsp. <i>tridentata</i>	LC