

**Botanical Assessment
for the proposed upgrading of the DR1797
Road (Redford Road), Kurland,
Western Cape Province**



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Prepared for HATCH

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National Legislation and Regulations governing this report

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, as amended.

Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by HATCH to provide specialist botanical consulting services for the assessment of the DR1797 (Redford Road) upgrade near Kurland, Western Cape Province.

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Expertise

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 40 years' experience in the field of Vegetation Science.
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 400 specialist botanical / ecological studies.
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

Curriculum Vitae – Appendix 3

Independence

The views expressed in the document are the objective, independent views of Dr McDonald and the study was carried out under the aegis of, Bergwind Botanical Surveys and Tours CC. Neither Dr McDonald nor Bergwind Botanical Surveys and Tours CC have any business, personal, commercial or other interest in the proposed development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Bergwind Botanical Surveys & Tours CC, its staff and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

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Declaration of independence:

I David Jury McDonald, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
 - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
 - am not independent, but another specialist (the “Review Specialist”) that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).



Signature of the specialist:

Bergwind Botanical Surveys & Tours CC

Name of company:

23 April 2019

Date:

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1. Introduction

HATCH appointed Bergwind Botanical Surveys and Tours CC to conduct a botanical assessment of the vegetation in the road reserve of the DR1797 (Redford Road) near Kurland in the Western Cape Province. The main objective was to identify any natural, indigenous vegetation that may be negatively affected by the proposed road upgrade. The study is conducted in terms of the National Environmental Management Act (NEMA) (No.7 of 1998) as amended and the 2014 Environmental Regulations. The purpose of the botanical impact assessment is to inform the environmental assessment process.

The principles, guidelines and recommendations of CapeNature and the Botanical Society of South Africa for proactive assessment of the biodiversity of proposed development sites have been followed (Brownlie 2005, Cadman *et al.* 2016).

2. Terms of Reference

The Terms of Reference are:

Undertake a site visit to the study area and compile a specialist report that addresses the following:

- Comply with, the substantive content requirements outlined within Appendix 6 of GN R982, as amended¹, which outlines the legal minimum content requirements for specialist studies in terms of the 2014 NEMA EIA Regulations;
- The local and regional context of the vegetation communities and plant species within the affected areas with reference to the relevant biodiversity plans, bioregional planning documents, Environmental Management Frameworks etc.
- The ecosystem status and conservation value of the vegetation communities, including the whether the potentially affected areas comprise critically endangered or endangered ecosystem(s) listed in terms of section 52 of the NEMBA;
- Any rare or endangered species encountered or likely to be or have been present;
- The presence of and proximity of the proposed site to protected area(s) identified in terms of NEMPAA and proximity to a Biosphere Reserve (where relevant).
- Confirm the approximate area (m²) of indigenous vegetation (as defined in the NEMA EIA Regulations) that would be cleared for the proposed project.
- A description of the direct, indirect, residual and cumulative botanical impacts (both before and after mitigation) and an assessment of the significance of the impacts (on a nominal scale of Neutral/ Negligible, Very Low, Low, Medium, High) by evaluating: (a) nature of the impacts (positive/ negative), (b) extent of the impacts (zero/ site specific/local/ regional/ national/ international), (c) magnitude of the impacts (zero/ Very

Low/Low/ Medium/ High), (d) duration of the impacts (none/ short/ medium/ long term) and (e) probability of occurrence of the impacts (none/ unlikely/ possible/ definite). In addition, (f) the level of confidence in findings relating to potential impacts, (g)reversibility of potential impacts (i.e. the degree to which the impact can be reversed); and (h) the degree to which the impact may cause irreplaceable loss of resources.

3. Study Area

3.1 Locality

The study area is the road reserve on both sides of the DR1797 route from the N2 north-westwards to the entrance to the Keurbooms Forest Station of the MTO Lottering Plantation. The distance of the route is 5 km (Figures 1—5).

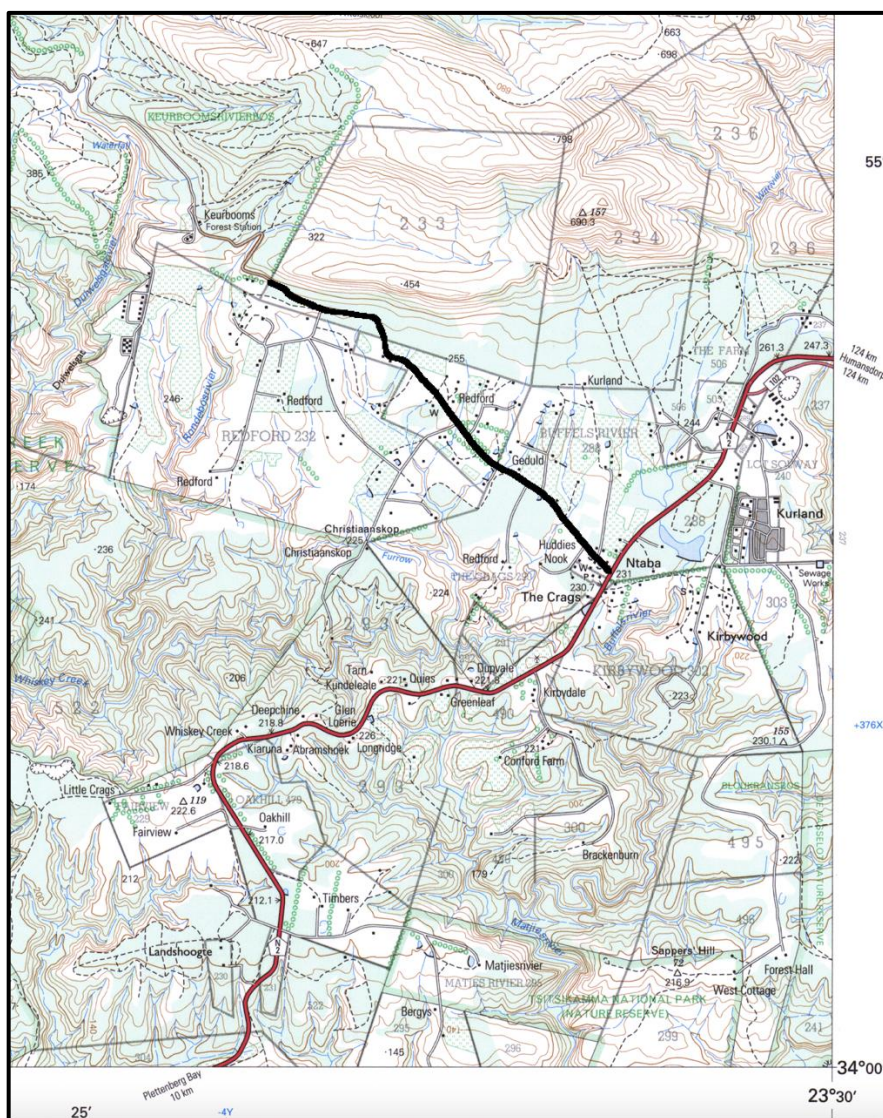


Figure 1. DR1797 (Redford Road) black line on the 1:50 000 Map 3323CD The Craggs (Map source: Chief Directorate: National Geo-spatial Information).



Figure 3. Aerial image (Google Earth Pro™) showing the DR1797 (pink line) which was the survey route with sample waypoints indicated by green pins and labels RDF#.

3.2 Topography and geology

The DR1797 (Redford Road) runs from southeast to northwest in the catchment of the Buffels River. The road is relatively flat, with occasional shallow valleys where it crosses streams that feed the Buffels River. The average elevation is 250 m above mean sea level.

The entire route of the road as surveyed lies within a zone underlain by sandstone sediments of the Nardouw Subgroup (Table Mountain Group) (Figure 4). No shale sediments of the Ceres Subgroup are found in the area surveyed.

The soils, in turn, are mostly of the Glenrosa Form and rocky (Figure 5), being derived from sandstone.

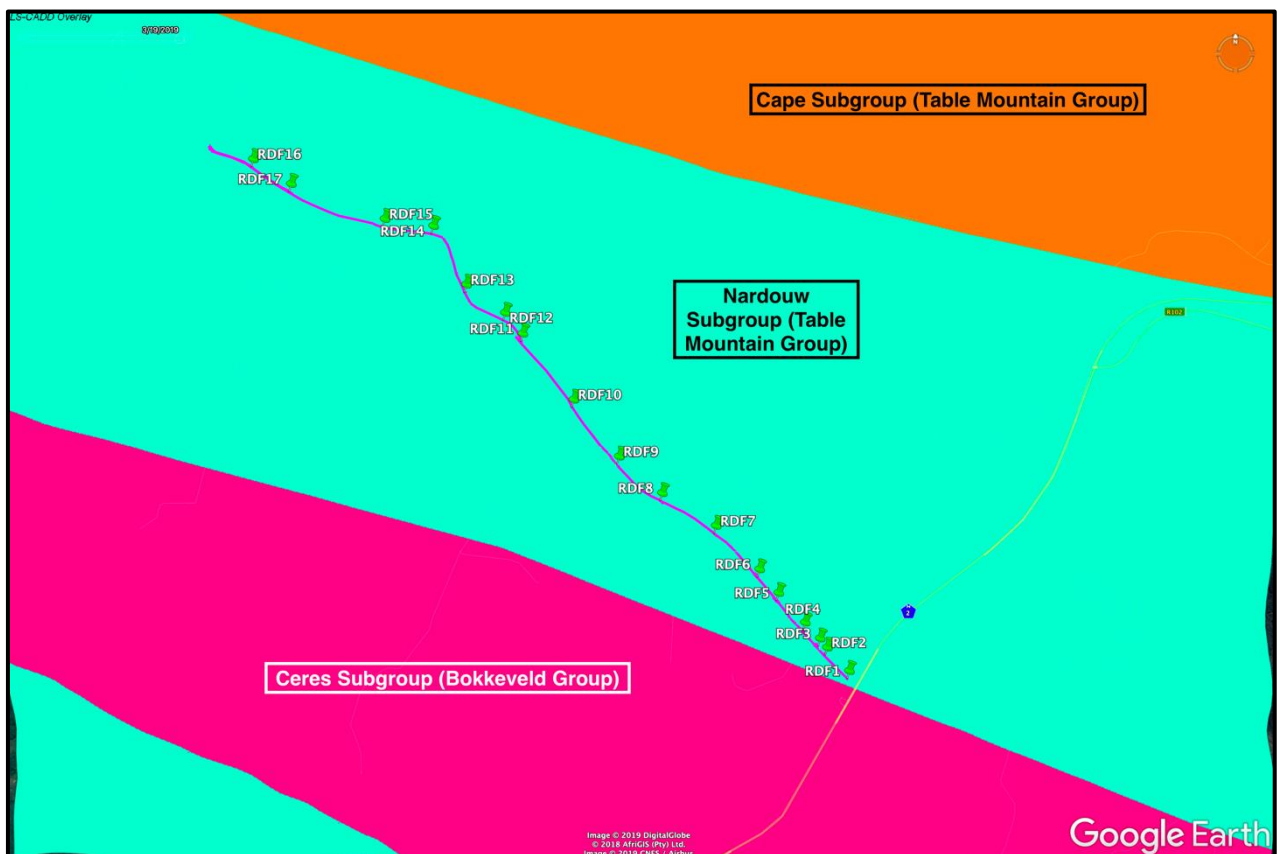


Figure 4. Geological Map (Council for Geoscience 1: 1 000 000) indicating the location of the Redford Road entirely within a zone underlain by Nardouw Subgroup sandstone.

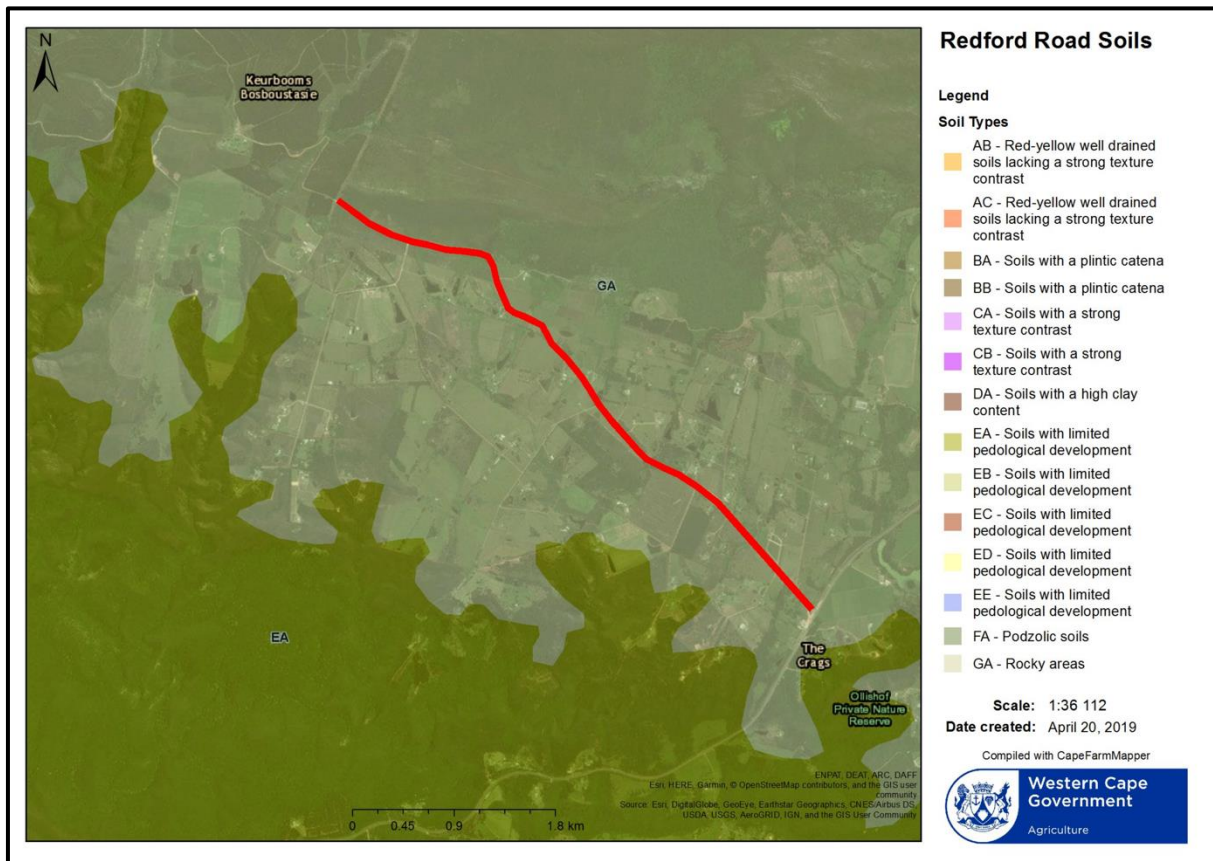


Figure 5. Soils Map (Cape Farm Mapper) with the Redford Road superimposed (red line).

3.3 Climate

The study area falls within the All-year Rainfall Region of the Western Cape Province (Southern Cape). It experiences a mesic climate with cool wet winters and warm to moderately hot summers. The climate diagram for Tsitsikamma Sandstone Fynbos (Figure 6) most closely approximates the climate of the study area from Kurland to Redford. Occasional strong, dry berg winds are experienced in winter (May-June) that can result in runaway fires.

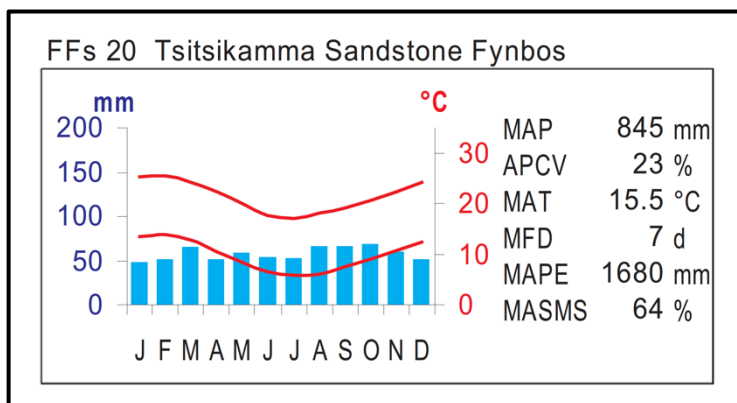


Figure 6. Climate diagram for Tsitsikamma Sandstone Fynbos, the principal vegetation type in the study area (Rebello *et al.* in Mucina & Rutherford, 2006) showing MAP – Mean Annual Precipitation; APCV = Annual Precipitation Coefficient of Variance; MAT = Mean Annual Temperature; MFD = Mean Frost Days; MAPE = Mean Annual Potential Evaporation; MASMS = Mean Annual Soil Moisture Stress.

4. Methods

4.1 Field Sampling

The field-work for the assessment of the road was carried out on 19 March 2019 and took approximately 6 hours. The DR1797 (Redford Road) was accessed from the N2 at 'The Craggs' and the vegetation was sampled at irregular intervals along the route, depending on the condition and type of vegetation. Waypoints were recorded at the sample locations using a handheld Garmin® GPSMap 62S. In total, 17 waypoints were recorded.

4.2 Desk-top analysis and reporting

The photographs obtained in the field as well as available literature and Google Earth Pro™ were used for description of the vegetation presented in this report. The National Vegetation Map (SANBI, 2012) (referred to as VEGMAP) was used as the 'base-map' to determine the principal original vegetation type.

5. Limitations and Assumptions

The weather at the time of the survey was good and there were no limitations experienced or assumptions made.

6. Disturbance regime

The Redford Road has been a gravel road for many years. The result is that the vegetation in the road reserve has not been maintained except at the entrances to various farms and small-holdings. Invasive alien plant species have thus invaded the road reserve and although there were not many specimens recorded during the survey, many have recently been removed by local landowners wishing to prevent the spread of these invasive species e.g. black wattle (*Acacia mearnsii*).

The condition of the vegetation along the road, on both sides of the road, is variable. At some places all natural or semi-natural vegetation has been removed and the road reserved has been planted with ornamental plants and trees. At other places, natural vegetation persists and in yet other places, the vegetation is semi-natural but in poor condition.

An attempt was made to sample all the vegetation along the road to obtain general picture of the vegetation while focusing on the patches of remnant indigenous vegetation of particular importance in this study.

7. The Vegetation

7.1 The vegetation in context

The original vegetation that would have occurred across the entire area where the Redford Road is aligned is Tsitsikamma Sandstone Fynbos (Figure 7). This vegetation type is a fynbos shrubland formation that occurs on the low coastal sandstone mountains, hills and plains of the Tsitsikamma Range.

As noted above, only limited remnant areas of Tsitsikamma Sandstone Fynbos remain in the road reserve of the DR1797 with most of the vegetation having been transformed by invasive aliens or removal in favour of ornamental planting.

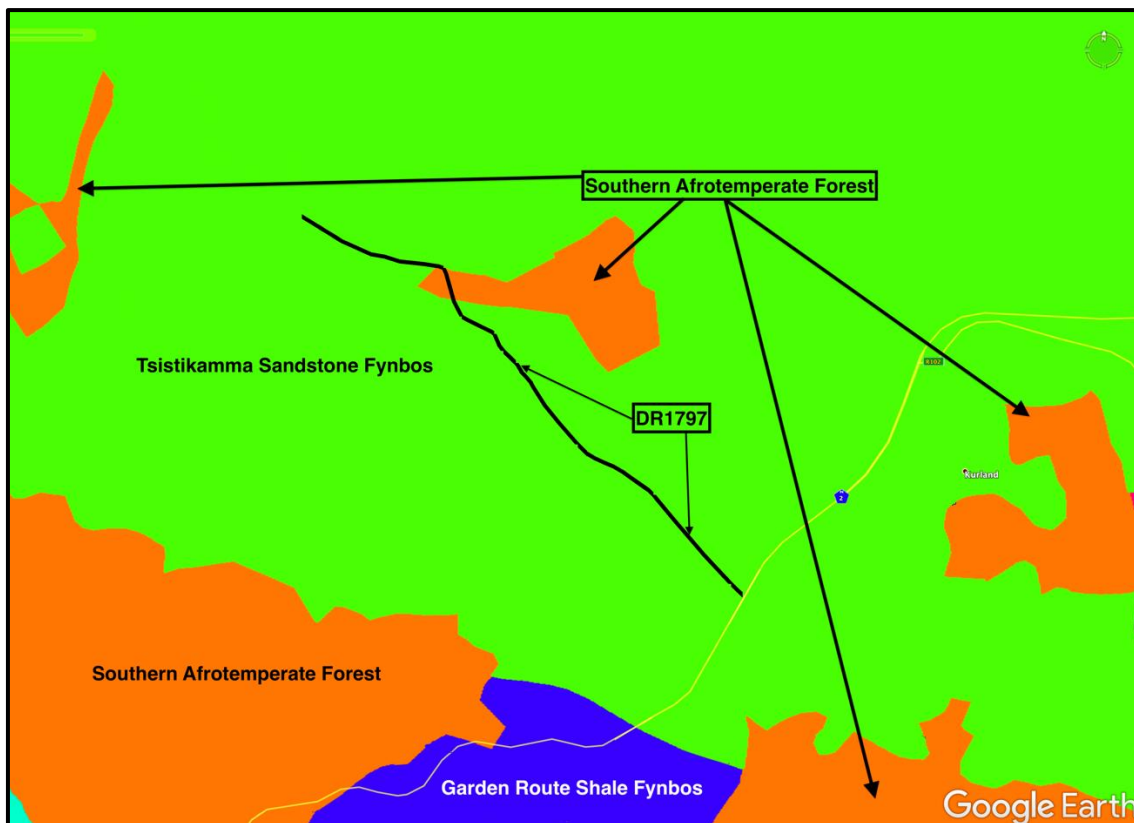






Figure 7. Portion of the *Vegetation map of South Africa, Lesotho, and Swaziland* (Mucina, Rutherford & Powrie 2005; SANBI, 2012) showing the two vegetation types, Tsitsikamma Sandstone Fynbos and Southern Afrotemperate Forest mapped as occurring along the DR1797.



7.2 The vegetation alongside the DR1797 road



The vegetation in the road reserve as surveyed is described in the notes given in Table 1. Three maps are presented in Figures 8—11 indicating the relative condition of the habitat on the northeast and southwest side of the road.



Table 1. Descriptions of vegetation at the survey waypoints.



Waypoint	Notes	Illustration
RDF1: S 33° 57' 16.0" E 23° 28' 27.9"	<p>Northeast side: The vegetation is disturbed and has a mix of indigenous, indigenous pioneer and exotic weedy species. Species recorded include, <i>Anthospermum aethiopicum</i>, <i>Aspalathus</i> sp., <i>Cliffortia</i> sp., <i>Conyza bonariensis</i>, <i>Conyza scabrida</i>, <i>Digitaria eriantha</i>, <i>Erica canaliculata</i>, <i>Lobelia</i> sp., <i>Passerina rigida</i>, <i>Searsia chirindensis</i>, <i>Senecio</i> sp., <i>Stenotaphrum secundatum</i></p>	
RDF1: S 33° 57' 16.0" E 23° 28' 27.9"	<p>Southwest side: On the southwest side, the vegetation is disturbed and similar to that on the northeast side but with a few addition species. Species recorded here include, <i>Acacia mearnsii</i> (seedlings), <i>Arctotheca calendula</i>, <i>Cheilanthes</i> sp., <i>Conyza scabrida</i>, <i>Cynodon dactylon</i>, <i>Digitaria eriantha</i>, <i>Erica canaliculata</i>, <i>Helichrysum cymosum</i>, <i>Metalasia</i> sp., <i>Phyllica</i> sp., <i>Searsia chirindensis</i>, <i>Stenotaphrum secundatum</i>, <i>Taraxacum</i> sp.</p>	



<p>RDF2: S 33° 57' 11.6" E 23° 28' 22.8"</p>	<p>Northeast side: Highly disturbed with tall <i>Eucalyptus</i> sp. trees. The vegetation below the trees is weedy and not sensitive. Species recorded include, <i>Euryops virgineus</i>, <i>Digitaria eriantha</i>, <i>Stenotaphrum secundatum</i>, <i>Acacia mearnsii</i> (seedlings), <i>Diospyros dichrophylla</i>.</p>	
<p>RDF2: S 33° 57' 11.6" E 23° 28' 22.8"</p>	<p>Southwest side: A stand of invasive black wattle (<i>Acacia mearnsii</i>) lies adjacent to the road reserve that is highly disturbed and does not support much vegetation. It has very low sensitivity.</p>	

<p>RDF3: S 33° 57' 09.9" E 23° 28' 21.2"</p>	<p>Northeast side: The vegetation consists of some exotic trees (<i>Eucalyptus ficifolia</i>) and a few indigenous shrubs but the road reserve here is generally highly disturbed. The species recorded apart from the trees are, <i>Calopsis</i> sp., <i>Cynodon dactylon</i>, <i>Diospyros dichrophylla</i>, <i>Hypoxis hemerocallidea</i>, <i>Osteospermum moniliferum</i>, <i>Selago dolosa</i>, <i>Stenotaphrum secundatum</i>.</p>	
<p>RDF3: S 33° 57' 09.9" E 23° 28' 21.2"</p>	<p>Southwest side: The road reserve is generally disturbed with low botanical sensitivity. Plant species recorded include <i>Acacia mearnsii</i>, <i>Agapanthus praecox</i>, <i>Anthospermum aethiopicum</i>, <i>Cynodon dactylon</i>, <i>Digitaria eriantha</i>, <i>Helichrysum petiolare</i>, <i>Searsia chirindensis</i>, <i>Selago dolosa</i>, <i>Stenotaphrum secundatum</i>.</p>	



<p>RDF4: S 33° 57' 6.9" E 23° 28' 17.8"</p>	<p>Northeast side: Generally disturbed with water furrow. Trees and shrubs have been planted and cultivated. The road reserve is manicured. Plants species present, <i>Digitaria eriantha</i>, <i>Ficus cf. natalensis</i>, <i>Halleria lucida</i>, <i>Stenotaphrum secundatum</i>, <i>Syzigium sp.</i>, <i>Tarchonanthus camphoratus</i>, <i>Osteospermum moniliferum</i>.</p>	
<p>RDF4: S 33° 57' 6.9" E 23° 28' 17.8"</p>	<p>Southwest side: Mowed <i>Stenotaphrum secundatum</i> with mowed sedges and <i>Hypoxis hemerocallidea</i>. A few trees of exotic <i>Pinus radiata</i> along the fence.</p>	



<p>RDF5: S 33° 57' 01.3" E 23° 28' 11.7"</p>	<p>Northeast side: The road dips here towards a stream and a remnant patch of Tsitsikamma sandstone Fynbos is present. The vegetation is shrubby and dense and extends from this waypoint 'through' the stream to the NE side. Plant species recorded include <i>Aspalathus sp.</i>, <i>Digitaria eriantha</i>, <i>Erica discolor</i>, <i>Pittosporum viridiflorum</i>, <i>Pteridium aquilinum</i>, <i>Searsia chirindensis</i>, <i>Searsia lucida</i>.</p> <p><i>Pittosporum viridiflorum</i> is a protected tree and must be avoided.</p> <p>The vegetation has moderate sensitivity.</p>	
<p>RDF5: S 33° 57' 01.3" E 23° 28' 11.7"</p>	<p>Southwest side: The shrub vegetation has mostly been removed on the southwest side that has introduced a high level of disturbance. However, the field stratum still supports numerous indigenous species. Some trees have been planted. Species recorded include, <i>Acacia mearnsii</i> (invasive- seedling), <i>Athanasia trifurcata</i>, <i>Digitaria eriantha</i>, <i>Ekebergia capensis</i> (planted), <i>Eragrostis capensis</i>, <i>Eragrostis curvula</i>, <i>Lobelia coronopifolia</i>, <i>Pteridium aquilinum</i>, <i>Searsia chirindensis</i>, <i>Syzigium sp.</i> (planted), <i>Watsonia sp.</i></p>	



<p>RDF6: S 33° 56' 56.7" E 23° 28' 07.3"</p>	<p>Northeast side: Dense ericaceous fynbos (Tsitsikamma Sandstone Fynbos) dominated by <i>Erica discolor</i> and <i>Erica canaliculata</i>. Other species include, <i>Acacia mearnsii</i> (seedling), <i>Aspalathus</i> sp. (tall), <i>Cheilanthes</i> sp., <i>Euryops virgineus</i>, <i>Halleria lucida</i>, <i>Helichrysum cymosum</i>, <i>Helichrysum foetidum</i>, <i>Helichrysum petiolare</i>, <i>Searsia chirindensis</i>, <i>Stenotaphrum secundatum</i>.</p> <p>This vegetation extends in a northerly direction beyond the entrance to 'The Perfect Place'.</p>	
<p>RDF6: S 33° 56' 56.7" E 23° 28' 07.3"</p>	<p>Southwest side: The southwest side also has dense ericaceous fynbos that is moderately disturbed and not sensitive. Similar vegetation extends on the southwest side to beyond the 1 km marker post. Species recorded include,</p> <p><i>Anthospermum aethiopicum</i>, <i>Cassythia ciliolata</i>, <i>Cliffortia</i> sp., <i>Digitaria eriantha</i>, <i>Erica discolor</i>, <i>Helichrysum cymosum</i>, <i>Helichrysum petiolare</i>, <i>Lobelia coronopifolia</i>, <i>Metalasia densa</i>, <i>Passerina rigida</i>, <i>Polygala</i> sp., <i>Senecio hastatus</i>, <i>Stenotaphrum secundatum</i>.</p>	



<p>RDF7: S 33° 56' 48.5" E 23° 27' 57.3"</p>	<p>Northeast side: The northeast side of the road has been heavily disturbed and now has low shrubs of <i>Aspalathus</i> sp. and <i>Helichrysum cymosum</i>. <i>Aloe</i> sp. (cf. <i>Aloe ferox</i>) has been planted.</p> <p>The road reserve here has low sensitivity.</p>	
<p>RDF7: S 33° 56' 48.5" E 23° 27' 57.3"</p>	<p>Southwest side: The vegetation on the south-west side is very grassy; dominated by <i>Eragrostis curvula</i>. Other species include, <i>Acacia mearnsii</i> (seedlings), <i>Anigozanthos</i> sp. (kangaroo paw – invasive), <i>Bobartia</i> sp., <i>Calopsis membranaceus</i>, <i>Cynodon dactylon</i>, <i>Digitaria eriantha</i>, <i>Erica canaliculata</i>, <i>Helichrysum petiolare</i>, <i>Metalasia densa</i>, <i>Pentaschistis</i> sp., <i>Senecio hastatus</i>, <i>Stenotaphrum secundatum</i>, <i>Themeda triandra</i>.</p> <p>The road reserve vegetation is not sensitive.</p>	

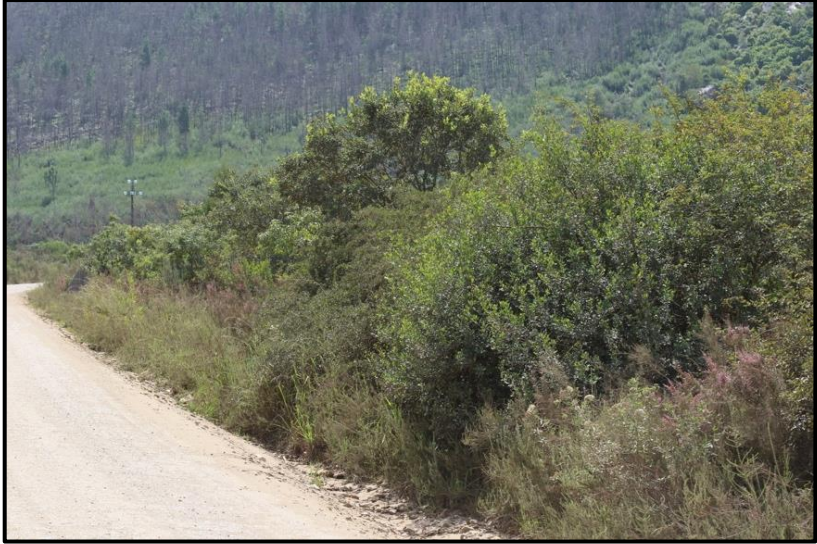

<p>RDF8: S 33° 56' 42.3" E 23° 27' 45.0"</p>	<p>Northeast side: No vegetation present. The road reserve has been cleared and is highly disturbed.</p>	
<p>RDF8: S 33° 56' 42.3" E 23° 27' 45.0"</p>	<p>Southwest side: Within the road reserve indigenous vegetation is present with moderate disturbance and low sensitivity. Species recorded include, <i>Acacia mearnsii</i> (exotic invasive), <i>Cliffortia strobilifera</i>, <i>Digitaria eriantha</i>, <i>Eragrostis curvula</i>, <i>Erica canaliculata</i>, <i>Helichrysum petiolare</i>, <i>Pennisetum clandestinum</i> (exotic invasive), <i>Pteridium aquilinum</i>, <i>Rubus rigidus</i> (exotic invasive), <i>Stenotaphrum secundatum</i>.</p>	



<p>RDF9: S 33° 56' 35.3" E 23° 27' 35.2"</p>	<p>Northeast side: Disturbed and cleared of vegetation at entrance to farm.</p>	
<p>RDF9: S 33° 56' 35.3" E 23° 27' 35.2"</p>	<p>Southwest side: At 2 km marker post, the vegetation has moderate to low sensitivity. Species recorded include, <i>Eragrostis curvula</i>, <i>Erica canaliculata</i>, <i>Osteospermum moniliferum</i>, <i>Helichrysum cymosum</i>, <i>Digitaria eriantha</i>, <i>Erica discolor</i>.</p>	



<p>RDF10: S 33° 56' 24.5" E 23° 27' 24.8"</p>	<p>Northeast side: Shrubby fynbos dominated by <i>Osteospermum moniliferum</i> and <i>Erica canaliculata</i>. Grassy understorey. Additional species are <i>Euryops virgineus</i> and <i>Lobelia coronopifolia</i>.</p> <p>The vegetation is moderately sensitive.</p>	 A photograph showing a dirt road on the right side, bordered by dense, green and brown shrubby fynbos vegetation. The background shows a clear sky and some distant trees.
<p>RDF10: S 33° 56' 24.5" E 23° 27' 24.8"</p>	<p>Southwest side: Similar fynbos occurs on the southwest side with a grassy understorey and the shrub <i>Passerina rigida</i> dominant. <i>Erica discolor</i> and <i>Erica canaliculata</i> are prominent.</p> <p>The vegetation is moderately sensitive.</p>	 A photograph showing a dirt road on the right side, bordered by fynbos vegetation. In the background, there is a large, dark, forested hill under a clear sky.



<p>RDF11: S 33° 56' 12.0" E 23° 27' 13.1"</p>	<p>Northeast side: Shrubby fynbos dominated by tall <i>Aspalathus sp.</i> and <i>Erica canaliculata</i>.</p> <p>Low sensitivity.</p>	
<p>RDF11: S 33° 56' 12.0" E 23° 27' 13.1"</p>	<p>Southwest side: The fynbos is lower on the southwest side than on the northeast side. It is also more disturbed with low sensitivity. It is grassy with emergent <i>Aspalathus sp.</i>, <i>Conyza scabrida</i>, <i>Erica canaliculata</i>, <i>Searsia chirindensis</i>.</p>	

<p>RDF12: S 33° 56' 08.1" E 23° 27' 09.1"</p>	<p>Northeast side: At 3 km marker near the entrance to Redford House. The road runs through a depression with a dam on the east side.</p> <p>The same type scrubby fynbos (Tsitsikamma Sandstone Fynbos) as described from other waypoints with <i>Erica canaliculata</i>, <i>Aspalathus</i> sp. etc. <i>Watsonia knysnana</i> was recorded here.</p> <p>Low sensitivity.</p>	
<p>RDF12: S 33° 56' 08.1" E 23° 27' 09.1"</p>	<p>Southwest side: The vegetation on the southwest side is thicket consisting of a dense stand of <i>Searsia lucida</i> and <i>Diospyros dichrophylla</i> with a low grass-dominated scrub immediately alongside the road that has low sensitivity.</p>	

<p>RDF13: S 33° 56' 02.8" E 23° 27' 00.1"</p>	<p>Northeast side: Opposite the entrance to Simply Green Nursery. Small trees of <i>Searsia chirindensis</i> and <i>Dais cotinifolia</i> occur along the fence. The low vegetation is dominated by <i>Erica canaliculata</i>. Other species include <i>Cliffortia</i> sp., <i>Conyza scabrada</i>, <i>Digitaria eriantha</i>, <i>Eragrostis curvula</i>, <i>Searsia pallens</i>.</p> <p>Low sensitivity.</p> <p>(Further long on the NE side adjacent to Kleinberg Farm, the vegetation has been completely cleared in the road reserve).</p>	
<p>RDF13: S 33° 56' 02.8" E 23° 27' 00.1"</p>	<p>Southwest side: The vegetation is dense tall thicket on the boundary of Simply Green Nursery. It consists of a mix of forest elements and plants grown as ornamentals. Species recorded here include, <i>Dais cotinifolia</i>, <i>Podocarpus falcatus</i>, <i>Searsia chirindensis</i>, <i>Searsia pallens</i>, <i>Tecoma capensis</i>.</p> <p>The vegetation has low sensitivity but disturbance of the <i>Afrocarpus falcatus</i> (Outeniqua yellowwood) trees must be avoided.</p>	

<p>RDF14: S 33° 55' 51.7" E 23° 26' 52.8"</p>	<p>Northeast side: The waypoint is on the edge of a wide firebreak on the lower slopes of Kleinberg. The edge of the firebreak has dense <i>Pteridium aquilinum</i> (bracken fern) and <i>Digitaria eriantha</i>.</p> <p>Low sensitivity.</p>	
<p>RDF14: S 33° 55' 51.7" E 23° 26' 52.8"</p>	<p>Southwest side: The vegetation here is remnant Southern Afromontane Forest. It is not well-developed. Species recorded include, <i>Diospyros dichrophylla</i>, <i>Halleria lucida</i>, <i>Osteospermum moniliferum</i>, <i>Rapanea melanophloeos</i>, <i>Searsia chirindensis</i>, <i>Searsia lucida</i>, <i>Trimeria grandifolia</i>.</p> <p>Low sensitivity.</p>	

<p>RDF15: S 33° 55' 50.4" E 23° 26' 41.8"</p>	<p>Northeast side: Cleared firebreak. Low grassy fynbos along verge. Low sensitivity.</p>	
<p>RDF15: S 33° 55' 50.4" E 23° 26' 41.8"</p>	<p>Southwest side: Fynbos / thicket at the 4 km marker. Species recorded include, <i>Cannomois sp.</i>, <i>Conyza scabrida</i>, <i>Digitaria eriantha</i>, <i>Erica canaliculata</i>, <i>Halleria lucida</i>, <i>Laurophyllus capensis</i>, <i>Polygala myrtifolia</i>, <i>Pteridium aquilinum</i>, <i>Searsia chirindensis</i>, <i>Searsia lucida</i>. Low sensitivity.</p>	

<p>RDF16: S 33° 55' 39.3" E 23° 26' 12.1"</p>	<p>Northeast side: At the end of the route at the entrance to the Lottering Plantations. The vegetation of the firebreak was burnt and is now recovering.</p> <p>Low sensitivity.</p>	 A photograph showing a dirt road on the right side, leading up a grassy hillside. The vegetation is a mix of green grasses and some taller, thin trees, indicating a recovering firebreak. The sky is clear and blue.
<p>RDF16: S 33° 55' 39.3" E 23° 26' 12.1"</p>	<p>Southwest side: The west side of the road was also burnt. The vegetation is now extremely weedy with young black wattle (<i>Acacia mearnsii</i>), <i>Eucalyptus</i> sp., <i>Paraserianthes lophantha</i> (stinkbean) etc.</p> <p>Low sensitivity.</p>	 A photograph showing a dirt road on the left side, with a dense thicket of weedy vegetation on the right. The vegetation includes tall grasses and various shrubs. The sky is overcast.



<p>RDF17: S 33° 55' 43.9" E 23° 26' 20.6"</p>	<p>Northeast side: Grassy firebreak at the edge of the plantation. Burnt in the last fire.</p>	
<p>RDF17: S 33° 55' 43.9" E 23° 26' 20.6"</p>	<p>Southwest side: Highly disturbed by alien vegetation and fire. The dominant species is the grass <i>Digitaria eriantha</i>.</p> <p>Low to very low sensitivity.</p>	



Figure 8. Aerial image (Google Earth™) of the DR1797 Route (Section 1) showing the sensitivity of the habitat. Pink = not sensitive; Green = low sensitivity to moderate sensitivity with indigenous vegetation present.

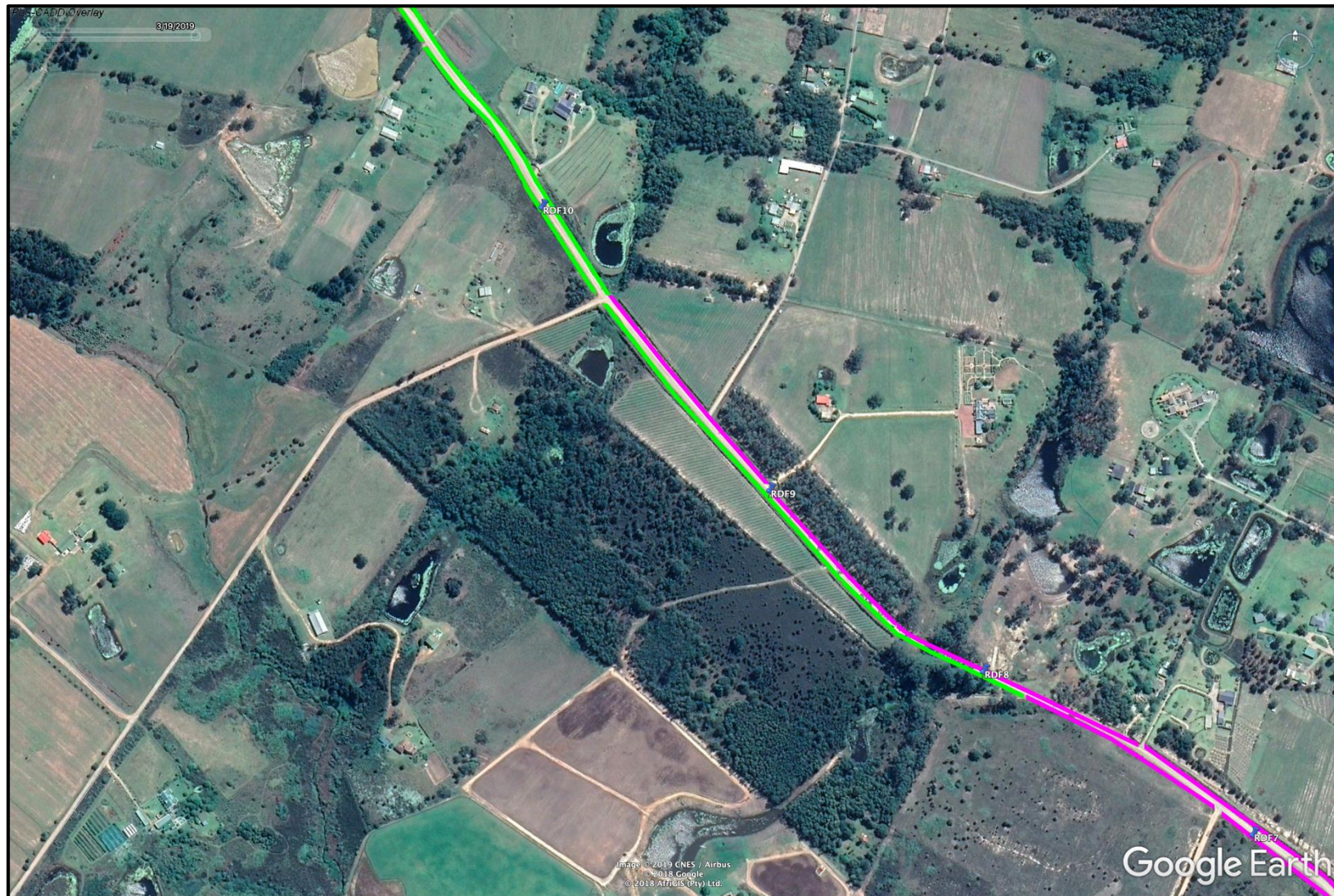


Figure 9. Aerial image (Google Earth™) of the DR1797 Route (Section 2) showing the sensitivity of the habitat. Pink = not sensitive; Green = low sensitivity to moderate sensitivity with indigenous vegetation present.



Fynbos 10. Aerial image (Google Earth™) of the DR1797 Route (Section 3) showing the sensitivity of the habitat. Pink = not sensitive; Green = low sensitivity to moderate sensitivity with indigenous vegetation present.

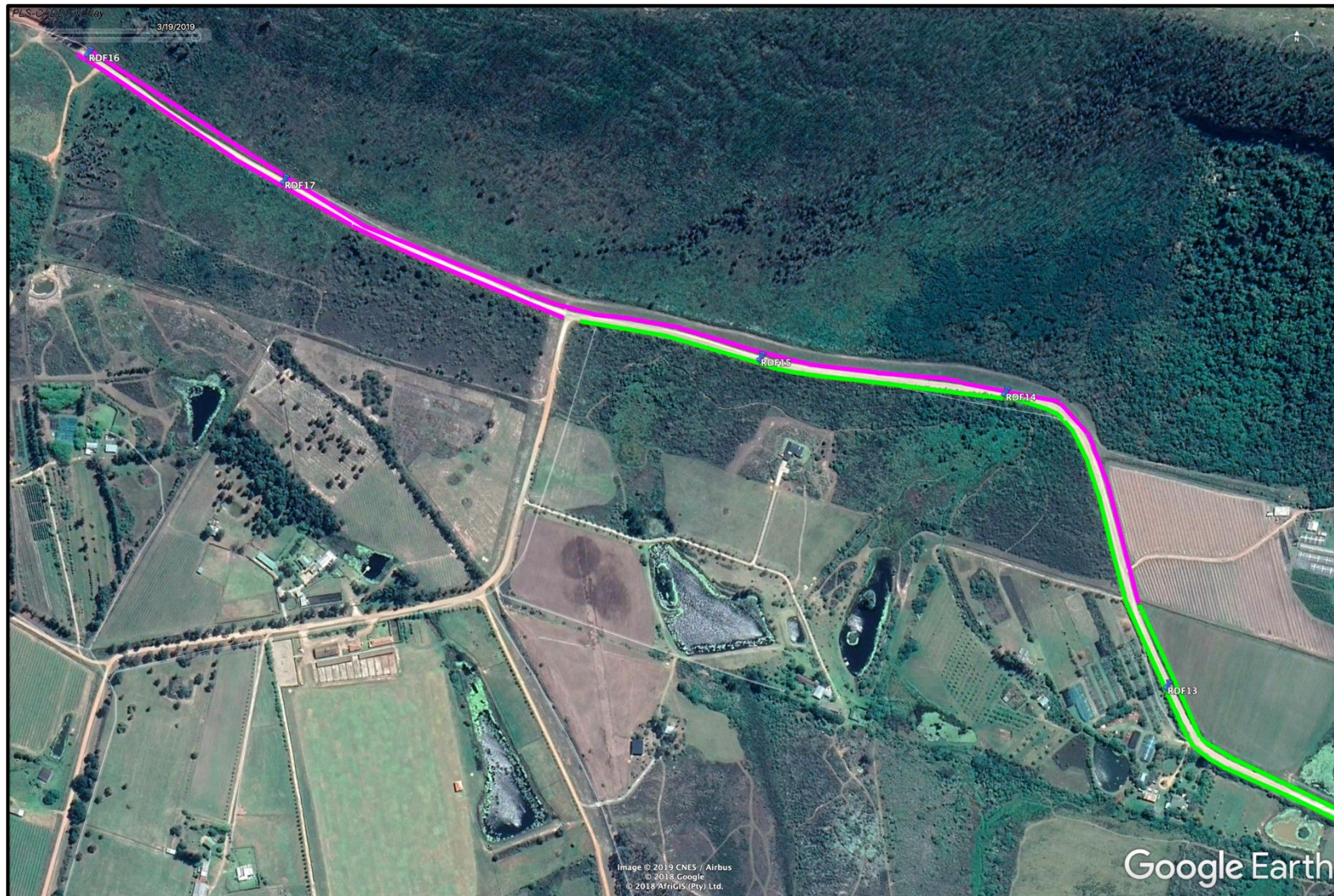


Figure 11. Aerial image (Google Earth™) of the DR1797 Route (Section 4) showing the sensitivity of the habitat. Pink = not sensitive; Green = low sensitivity to moderate sensitivity with indigenous vegetation present.

8. Conservation status

Examination of Figure 12 shows that the Redford Road does not impact any critical biodiversity areas (red shading) as in the Western Cape Biodiversity Spatial Plan (Pence 2014; 2017) and mostly traverses ecological support areas [1] (ESA1) light-blue shading and ecological support areas [2] (ESA2), purple shading. The ESA1 areas are terrestrial vegetation whereas the ESA2 areas are watercourses, streams and rivers.

In the case of the ESA1 areas in the study area, the reason for this classification is for water source protection. According to Pool-Stanvliet *et al.* (2017), the following applies: “A water source area [is] not selected for meeting targets but which is essential for delivering ecosystem services, and may support the functioning of Pas or CBAs. Consists of important catchment areas.”

The ESA2 areas are classified for the following purpose (Pool-Stanvliet *et al.* (2017): “These areas may be degraded but still play an important role in supporting the functioning of PAs or CBAs, and are essential for delivering ecosystem services.”

In addition, there is more flexibility for compatible land uses with ESAs than with CBAs. However, the aim is to maintain ecological functionality of ESAs and they should be maintained in a near natural state but some loss of biodiversity is acceptable (Pool-Stanvliet *et al.* 2017).

Therefore, in the case of Redford Road, ideally the patches of natural and semi-natural vegetation should be maintained as far as possible to function as ecological corridors. However, some loss would be acceptable given the nature of road-building and that the vegetation in question is within a designated road-reserve.

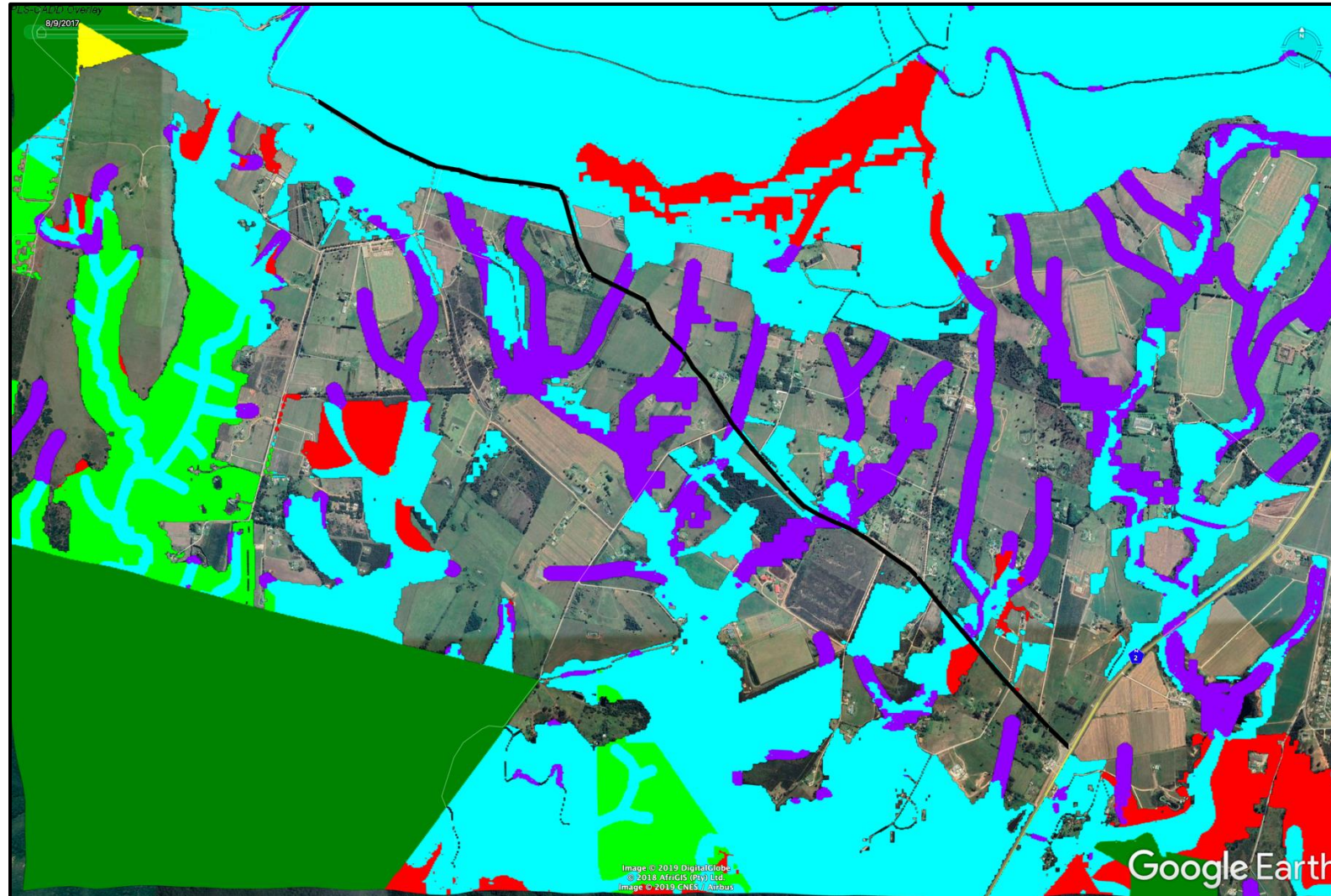


Figure 12. Aerial photo (Google Earth™) with superimposed Critical Biodiversity Areas Map (CapeNature, 2017). The scarlet red areas are Critical Biodiversity Areas 1 (CBA1); the light blue areas are Ecological Support Areas 1 (ESA1); the purple areas are Ecological Support Areas 2 (ESA2); the light green areas are 'Other Natural Areas' (ONA); the dark green area is a Protected Area (in perpetuity). The DR1797 is shown by the black line.

9. Impact Assessment

Impacts on the vegetation are assessed for the construction and operation of the upgraded DR1797 (Redford Road).

9.1 'No Go' Alternative

In the case of the “**No Go**” alternative where there would be no change (upgrade) of the road configuration. The *status quo* would persist and the use of the road would continue in much the same way as at present. The 'no development' alternative or 'No Go' alternative would thus have a **Negligible** impact on the natural vegetation with no significant further loss in the short- to long-term.

The 'No Go' alternative is included in Table 2.

9.2 Direct Impacts

Direct impacts are those that would occur directly on any patches of natural or semi-natural vegetation along the road route. The rating system used is given in Appendix 1. In addition to determining the individual impacts using various criteria, mitigation is also brought into the assessment.

The impacts of the proposed road upgrade are considered with respect to loss of vegetation type and habitat including plant species due to construction and operational activities. Ecological processes are intrinsic to the habitat and are not separated here for assessment but rather the assessment incorporates the effect on ecological processes as part of the affected habitat.

9.2.1 Loss of vegetation type and habitat including plant species due to construction and operational activities of proposed upgrade of the DR1797 (Redford Road)

The construction works for the upgrade of the DR1797 would be mostly on the existing disturbed road footprint and marginally within the road reserve on both sides. It is envisaged that the impact would be **Low Negative** on the remaining natural plant communities (patchy Tsitsikamma Sandstone Fynbos) and with mitigation the impact could be reduced to **Very Low Negative** (Table 2).

Table 2. Impact and Significance – Loss of natural vegetation and habitat during construction and operational phases of the upgrade of the DR1797 (Redford Road).

CRITERIA	'NO GO' ALTERNATIVE		PREFERRED ALTERNATIVE Upgrade of DR1797	
	WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Nature of direct impact (local scale)	Loss of Tsitsikamma Sandstone Fynbos			
Extent	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term
Intensity	Low	Low	Low	Very low
Probability of occurrence	Probable	Probable	Probable	Probable
Confidence	High	High	High	High
Significance	Negligible	Negligible	Low negative	Very low negative
Nature of Cumulative impact	Loss of Tsitsikamma Sandstone Fynbos			
Cumulative impact prior to mitigation	Negligible			
Degree to which impact can be reversed	Partially reversible			
Degree to which impact may cause irreplaceable loss of resources	Very low			
Degree to which impact can be mitigated	Medium			
Proposed mitigation	Avoidance of natural vegetation patches			
Cumulative impact post mitigation	Very low negative			
Significance of cumulative impact (broad scale) after mitigation	Very low negative			

10.2.2 Mitigation

Proposed mitigation would mainly be to avoid disturbance to the patches of natural vegetation wherever possible. No restoration work is proposed.

9.3 Indirect impacts

By definition indirect impacts occur away from the 'action source' i.e. away from the development site. The impact assessed here is specifically how the proposed road upgrade would have an indirect impact on vegetation and flora away from the development site.

Indirect impacts would be insignificant.

10.4 Cumulative impacts

The receiving environment into which the proposed development will be imposed is already highly altered by long use of the road and activities of landowner e.g. removal of natural vegetation and manicuring of the road reserve. Only fragments of the natural ecosystem still remain and even those are degraded in most places. In general, with careful avoidance of the remaining patches of natural and semi-natural vegetation there will be no further loss of

any intact vegetation communities and consequently cumulative impacts would be **Very Low Negative to Negligible**.

10. General Assessment and Recommendations

- The two vegetation types that would have originally occurred in the study area are Tsitsikamma Sandstone Fynbos and Southern Afromontane Forest. Only degraded remnants of fynbos and one patch of poorly-defined Southern Afromontane Forest remain along the DR1797 road. The vegetation types are not threatened according to the National List of Threatened Ecosystems (Government Gazette, 2011) and there will be no further significant loss of these ecosystems.
- When scrutinizing the WCBSP 2017 map as shown in Figure 11, it is clear that the only areas that would be affected are ESA1 and ESA2 areas and the road works in these areas would be acceptable since the ecological functionality of the vegetation within the road reserve can largely be preserved.
- The anticipated direct impacts would be **Low Negative** and with mitigation (avoidance where possible of natural vegetation) the impact can be reduced to **Very Low Negative**.
- Alien invasive plants were found in the road reserve and the disturbance caused by roadworks could enhance the spread of these species. Caution must be exercised when removing any alien species. They must be disposed of correctly.
- No rare or threatened plant species were found during the survey. However, a specimen of *Afrocarpus falcatus* (protected tree species) is located at S 33°56' 2.8" E 23° 27' 0.5" and must be avoided. In addition, a cheesewood tree (*Pittosporum viridiflorum*) was found at S 33° 57' 0.8" E 23° 28' 11.5" and must also be avoided.

11. Conclusions

The vegetation occurring in remnant patches along the DR1797 road is generally not sensitive and no 'red flags' were found. The proposed upgrade of the Redford Road is thus supported from a botanical perspective with no specific mitigation measures apart from avoidance of the natural vegetation in the road reserve where possible. No monitoring would be necessary since once the roadworks are complete the vegetation in the road reserve should revert to more-or-less as it is at present.

12. References

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- South African National Biodiversity Institute (SANBI) 2012, Vegetation Map of South Africa, Lesotho and Swaziland [vector geospatial dataset] 2012. Available from the Biodiversity GIS website <http://bgis.sanbi.org/SpatialDataset/Detail/18>.

Appendix 1: Impact Assessment Methodology

The assessment of impacts needs to include the determination of the following:

- The nature of the impact – see Table 1.1
- The magnitude (or severity) of the impact – see Table 1.2
- The likelihood of the impact occurring - see Table 1.2

The degree of confidence in the assessment must also be reflected.

Table 1.1 Impact assessment terminology

Term	Definition
<i>Impact nature</i>	
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Negative	An impact that is considered to represent an adverse change from the baseline, or introduces a new undesirable factor.
Direct impact	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
Cumulative impact	Impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

Assessing significance

There is no statutory definition of ‘*significance*’ and its determination is, therefore, somewhat subjective. However, it is generally accepted that significance is a function of the magnitude of the impact and the likelihood of the impact occurring. The criteria used to determine significance are summarized in *Table 1.2*

Table 1.2 Significance criteria

<i>Impact magnitude</i>	
Extent	<p><i>On-site</i> – impacts that are limited to the boundaries of the rail reserve, yard or substation site.</p> <p><i>Local</i> – impacts that affect an area in a radius of 20km around the development site.</p> <p><i>Regional</i> – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem.</p> <p><i>National</i> – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.</p>
Duration	<p><i>Temporary</i> – impacts are predicted to be of short duration and intermittent/occasional.</p> <p><i>Short-term</i> – impacts that are predicted to last only for the duration of the construction period.</p> <p><i>Long-term</i> – impacts that will continue for the life of the Project, but ceases when the Project stops operating.</p> <p><i>Permanent</i> – impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.</p>

Intensity	<p>BIOPHYSICAL ENVIRONMENT: <i>Intensity can be considered in terms of the sensitivity of the biodiversity receptor (ie. habitats, species or communities).</i></p> <p>Negligible – the impact on the environment is not detectable. Low – the impact affects the environment in such a way that natural functions and processes are not affected. Medium – where the affected environment is altered but natural functions and processes continue, albeit in a modified way. High – where natural functions or processes are altered to the extent that it will temporarily or permanently cease.</p> <p><i>Where appropriate, national and/or international standards are to be used as a measure of the impact. Specialist studies should attempt to quantify the magnitude of impacts and outline the rationale used.</i></p> <p>SOCIO-ECONOMIC ENVIRONMENT: <i>Intensity can be considered in terms of the ability of project affected people/communities to adapt to changes brought about by the Project.</i></p> <p>Negligible – there is no perceptible change to people’s livelihood Low - People/communities are able to adapt with relative ease and maintain pre-impact livelihoods. Medium - Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support. High - Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.</p>
	<i>Impact likelihood (Probability)</i>
Negligible	The impact does not occur.
Low	The impact may possibly occur.
Medium	Impact is likely to occur under most conditions.
High	Impact will definitely occur.

Once a rating is determined for magnitude and likelihood, the following matrix can be used to determine the impact significance.

Table 7.5 Example of significance rating matrix

SIGNIFICANCE RATING					
	LIKELIHOOD	Negligible	Low	Medium	High
MAGNITUDE	Negligible	Negligible	Negligible	Low	Low
	Low	Negligible	Negligible	Low	Low
	Medium	Negligible	Low	Medium	Medium
	High	Low	Medium	High	High

In Table 7.6, the various definitions for significance of an impact is given.

Table 7.6 Significance definitions

Significance definitions	
Negligible significance	An impact of negligible significance (or an insignificant impact) is where a resource or receptor (including people) will not be affected in any way by a particular activity, or the predicted effect is deemed to be ‘negligible’ or ‘imperceptible’ or is indistinguishable from natural background variations.
Minor significance	An impact of minor significance is one where an effect will be experienced, but the impact magnitude is sufficiently small (with and without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.

Moderate significance	An impact of moderate significance is one within accepted limits and standards. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that 'moderate' impacts have to be reduced to 'minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major significance	An impact of major significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. A goal of the EIA process is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a development. It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors such as employment, in coming to a decision on the Project.

Once the significance of the impact has been determined, it is important to qualify the **degree of confidence** in the assessment. Confidence in the prediction is associated with any uncertainties, for example, where information is insufficient to assess the impact. Degree of confidence can be expressed as low, medium or high.

Appendix 2: Botanical Assessment Content Requirements of Specialist Reports, as prescribed by Appendix 6 of GN R326.

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (a)	(i) The specialist who prepared the report; and	Cover & Page 2
	(ii) The expertise of that specialist to compile a specialist report, including a CV.	Page 2 & Appendix 3
1 (1) (b)	A declaration that the specialist is independent in a form as may be specified by the competent authority.	Page 4
1 (1) (c)	An indication of the scope of, and purpose for which, the report is prepared.	Page 6
1 (1)(cA)	An indication of the quality and age of base data used for the specialist report.	Page 12
1 (1)(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Page 12
1 (1) (d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	Page 12
1 (1) (e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used.	Page 12
1 (1) (f)	Details of an assessment of the specifically identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	Pages 37 & 38
1 (1) (g)	An identification of any areas to be avoided, including buffers.	Not applicable
1 (1) (h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers.	Pages 8, 9, 10,11,13, 31, 32, 33, 34, 36
1 (1) (i)	A description of any assumptions made and any uncertainties or gaps in knowledge.	Page 12
1 (1) (j)	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	Page 14--30
1 (1) (k)	Any mitigation measures for inclusion in the EMPr.	Page 38
1 (1) (l)	Any conditions for inclusion in the environmental authorisation.	Not applicable
1 (1) (m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Not applicable

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (n)	A reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; and	Page 39
	(iA) regarding the acceptability of the proposed activity or activities; and	
	(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Page 39
1 (1) (o)	A description of any consultation process that was undertaken during the course of preparing the specialist report	Not applicable
1 (1) (p)	A summary and copies of any comments received during any consultation process and where applicable, all responses thereto	Not applicable
1 (1) (q)	Any other information requested by the competent authority	Not applicable

Appendix 3: Curriculum Vitae

Dr David Jury McDonald Pr. Sci. Nat.

Name of Company: Bergwind Botanical Surveys & Tours CC. (Independent consultant)

Work and Home Address: 14 A Thomson Road, Claremont, 7708

Tel: (021) 671-4056 **Mobile:** 082-876-4051 **Fax:** 086-517-3806

E-mail: dave@bergwind.co.za

Website: www.bergwind.co.za

Profession: Botanist / Vegetation Ecologist / Consultant / Tour Guide

Date of Birth: 7 August 1956

Employment history:

- 19 years with National Botanical Institute (now SA National Biodiversity Institute) as researcher in vegetation ecology.
- Five years as Deputy Director / Director Botanical & Communication Programmes of the Botanical Society of South Africa
- Thirteen years as private independent Botanical Specialist consultant (Bergwind Botanical Surveys & Tours CC)

Nationality: South African (ID No. 560807 5018 080)

Languages: English (home language) – speak, read and write
Afrikaans – speak, read and write

Membership in Professional Societies:

- South Africa Association of Botanists
- International Association for Impact Assessment (SA)
- South African Council for Natural Scientific Professions (**Ecological Science, Registration No. 400094/06**)
- Field Guides Association of Southern Africa

Key Qualifications:

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute).
- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.
- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.

- Further tasks involved the day-to-day management of a large non-profit environmental organisation.
- **Independent botanical consultant** (2005 – to present) over 300 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

Higher Education

Degrees obtained

and major subjects passed:

B.Sc. (1977), University of Natal, Pietermaritzburg
Botany III
Entomology II (Third year course)

B.Sc. Hons. (1978) University of Natal, Pietermaritzburg
Botany (Ecology /Physiology)

M.Sc. - (Botany), University of Cape Town, 1983.
Thesis title: 'The vegetation of Swartboschkloof,
Jonkershoek, Cape Province'.

PhD (Botany), University of Cape Town, 1995.
Thesis title: 'Phytogeography endemism and diversity of the
fynbos of the southern Langeberg'.

Certificate of Tourism: Guiding (Culture: Local)
Level: 4 Code: TGC7 (Registered Tour Guide: WC
2969).

Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own
company: **Bergwind Botanical Surveys & Tours CC**

August 2000 - 2005 : Deputy Director, later Director Botanical & Communication Programmes,
Botanical Society of South Africa

January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National
Botanical Institute

January 1979—Dec 1980 : National Military Service

Further information is available on my company website: www.bergwind.co.za

ADDENDUM – JUNE—JULY 2020

A.1 Introduction

Subsequent to the submission of a botanical report (McDonald, 2019) for the DR1797 (Redford Road) in 2019, the engineers involved with the design of the road upgrade determined that it would be necessary to expropriate private land at a number of locations along the road. Bergwind Botanical Surveys & Tours CC was approached for further input to the project to determine the sensitivities of the vegetation at the proposed expropriation locations. Initially a desktop study was mooted but after careful consideration, it was decided that a second field exercise would be necessary to verify the vegetation sensitivity at the proposed expropriations and to make recommendations where necessary to mitigate the impacts for the expropriation.



A.2 Second site visit and methodology



A second site visit was undertaken on 25 June 2020 and the ten locations where expropriation is proposed were specifically targeted. The weather was fine and there were no limitations on the resurvey of the respective locations. The expropriation sections were numbered from 1 to 9 starting at the location closest to the N2 highway and working sequentially to the most inland location at Simply Green Nursery. Photographs were taken of the vegetation and notes were made to augment those made in 2019 during the initial survey.



Waypoints were recorded at the beginning of each expropriation section first on the southwest side of the road and then on the northeast side of the road. The notation followed is e.g. 1 (Section number); “a” (southwest side), “b” (northeast side) and 1 = start of section and 2 = end of section. The only exception is 8b1 where the location of the waypoint is in the centre of the section proposed for expropriation.



The data collected are presented in Table A.2.1. Included in the table are comments about the sensitivity of the section and any relevant recommendations.


Table A.2.1 Botanical observations at nine 'expropriation sections' of Redford Road.



Section location	Waypoint	Observations and comments	Illustration
1a1	<p>RED1: S33.95299 E 23.472662</p>	<p>Grazed paddock with exotic kikuyu grass (<i>Pennisetum clandestinum</i>). A small amount of natural vegetation occurs in the road reserve. A few young <i>Searsia chirindensis</i> trees are found but they are common. This section is not sensitive.</p>	
1a2	<p>RED2: S33.952307 E 23.471947</p>	<p>At a side-road intersection with the Redford Road. The photo is the view looking back over the paddock of Section 1. Low sensitivity.</p>	



<p>2a1</p>	<p>RED3: S33.951057 E 23.470570</p>	<p>An electric fence is present at Section 2A. Young plants of exotic <i>Syzigium paniculatum</i> (brush cherry) have been planted inside the fence to establish a hedge. These plants would have to be moved. The other vegetation is a dense stand of the grass <i>Eragrostis curvula</i>. Low sensitivity.</p>	
<p>2a2</p>	<p>RED4: S33.950813 E 23.470340</p>	<p>The vegetation is the same as that at waypoint RED3. The entire section has low sensitivity.</p>	



<p>3a1</p>	<p>RED5: S33.950680 E 23.470255</p>	<p>At this waypoint the vegetation is relatively undisturbed natural veld. There is an abundance of <i>Watsonia</i> sp. <u>These plants MUST be rescued and replanted at a safe site.</u> The section has moderate sensitivity.</p>	
<p>3a2</p>	<p>RED6: S33.949394 E 23.468966</p>	<p>This location is on the north side of the stream depression where the road dips significantly. All the vegetation is indigenous and of moderate sensitivity. As above all <i>Watsonia</i> sp. and other geophytes (bulbous plants) must be saved and transplanted at a safe site. (<i>The Simply Green Nursery could be approached for assistance with this operation</i>).</p>	



<p>3b1</p>	<p>RED7: S33.950405 E 23.470060</p>	<p>This waypoint is on the NE side of the road at the entrance to Parklands. There is mostly indigenous vegetation of moderate to high sensitivity. <u>The <i>Watsonia</i> sp. and <i>Kniphofia</i> sp. (red-hot pokers) must be rescued.</u></p>	
<p>3b2</p>	<p>RED8: S33.949689 E 23.469298</p>	<p>At this waypoint at the end of Section 3 there is tall, old fynbos with <i>Erica canaliculata</i>, <i>Erica discolor</i>, <i>Helichrysum crispum</i> and <i>Watsonia</i> sp. The sensitivity is moderate to high. It would not be possible to salvage the fynbos species, but the geophytes must be saved.</p>	



<p>4b1</p>	<p>RED9: S33.947191 E 23.466651</p>	<p>Hybrid aloes (<i>Aloe ferox</i> x <i>Aloe arborescens</i>) have been planted in the road reserve and the vegetation is semi-natural. It has moderate sensitivity. All the aloes must be carefully removed and kept for replanting. Inside the fence, the landowner has planted a hedge of <i>Dovyalis caffra</i> (Kei apple) for security purposes (This species has significant thorny spines). Arrangements would have to be made with the landowner as to the how these plants will be saved for later planting to restore the security hedge.</p>	
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4b2	RED10: S33.94600 E 23.464628	The expropriation will affect the entrance to Rosenoaks. The photo shows the <i>Dovyalis caffra</i> shrubs behind the boundary fence.	
5b1	RED11: S33.945035 E 23.461321	The fynbos in the road reserve is not sensitive. The expropriation would require removal of some exotic <i>Eucalyptus</i> trees. This section has low sensitivity.	

<p>5b2</p>	<p>RED12: S33.943223 E 23.459803</p>	<p>This waypoint is at the entrance with large white pillars and black gate (see waypoint RDF9 in the main report). The road reserve is grassy and not sensitive. It is possible that some gum trees would have to be removed. The private property here also has shrubs of <i>Dovyalis caffra</i> that would have to be removed and replanted.</p>	
<p>6a1</p>	<p>RED13: S33.940776 E 23.457341</p>	<p>At this location dense fynbos is found in the road reserve characterized by <i>Erica canaliculata</i>, <i>Erica discolor</i> and <i>Diospyros dichrophylla</i>. Inside the fence is a narrow firebreak and then old fynbos that also contains geophytes that need search and rescue. THIS SECTION IS SENSITIVE.</p>	

<p>6a2</p>	<p>RED14: S33.940214 E 23.456913</p>	<p>Similar to the vegetation at the start of the section at RED13 but with the addition of <i>Osteospermum moniliferum</i> and <i>Searsia pallens</i> and a fair amount of <i>Anthospermum aethiopicum</i>.</p>	
<p>7b1</p>	<p>RED15: S33.939272 E 23.456232</p>	<p>At the start of Section 7b there is natural vegetation in the road reserve that includes the following species; <i>Cortaderia selloana</i> (exotic pampas grass), <i>Cliffortia</i> sp., <i>Diospyros dichrophylla</i>, <i>Erica canaliculata</i>, <i>Erica discolor</i>, <i>Nuxia floribunda</i>, <i>Searsia chirindensis</i>, <i>Stenotaphrum secundatum</i>, <i>Stoebe</i> sp.</p>	

<p>7b2</p>	<p>RED16: S33.938125 E 23.455155</p>	<p>The vegetation is the same as that at RED15, having low sensitivity. The photo illustrates the field adjacent to the road reserve. It is grazed and has a cover of a mix of grasses with very low sensitivity.</p>	
<p>8b1</p>	<p>RED17: S33.936996 E 23.453821</p>	<p>This waypoint is at the central point of the Section (NE side) . The vegetation in the road reserve is a mix of Kikuyu grass (<i>Pennisetum clandestinum</i>) and degraded fynbos. It has low sensitivity. Over the fence is cultivated land with very low sensitivity.</p>	

<p>9b1</p>	<p>RED18: S33.934842 E 23.450839</p>	<p>At this location the vegetation is densely shrubby in the road reserve with <i>Searsia chirindensis</i>, <i>Diospyros dichrophylla</i>, <i>Euryops virgineus</i> typifying the plant community. It is not sensitive and the planted pasture in the adjacent field has very low sensitivity.</p>	
<p>9b2</p>	<p>RED19: S33.934283 E 23.450157</p>	<p>The vegetation at this waypoint is much the same as that at waypoint RED18.</p>	

<p>9a1</p>	<p>RED20: S33.934403 E 23.450245</p>	<p>Section 9a (southwest side) has a very dense stand of natural vegetation including two <u>protected tree species</u> namely <i>Pittosporum viridiflorum</i> (cheesewood) and <i>Afrocarpus falcatus</i> (Outeniqua yellowwood). This section of dense vegetation is alongside Simply Green Nursery and it is sensitive. The nursery operation is immediately inside the fence on the private land.</p>	
<p>9a2</p>	<p>RED21: S33.933281 E 23.449647</p>	<p>This waypoint is near the 'back' entrance to Simply Green Nursery. The entire section of the road reserve is sensitive.</p>	

A.3 Conclusions and Recommendations

The main conclusion is that the majority of the locations where expropriation is proposed would be acceptable from a botanical viewpoint as long as mitigation measures are strictly applied. There is only one Section that is not recommended for expropriation and in fact strongly discouraged and that is Section 9a, along the boundary of Simply Green Nursery. Disturbance of this would result in the unnecessary loss of semi-natural vegetation including two trees that are **protected** in terms of the National Forests Act 1998 (Act No. 84 of 1998) namely *Afrocarpus falcatus* (Outeniqua Yellowwood) and *Pittosporum viridiflorum* (Cheesewood). Permits would be required from the Department of Environment, Forestry and Fisheries for disturbance (cutting or removal) of these trees.

The main mitigation measures that would be necessary area as follows:

- Sections where fynbos vegetation occur should be scanned for bulb populations by a trained horticulturalist or nurseryman and the geophytes (bulbous plants) should be removed and replanted at a safe site prior to any roadworks.
- Where aloes have been planted within the road reserve, they should be removed, kept in a nursery and replanted once the roadworks have been completed. These plants transplant well.
- Where *Dovyalis caffra* (Kei Apple) has been planted on private property to form security hedges, the plants should be removed and also kept in a nursery for later replanting. This must be negotiated with the respective landowners.

The proprietors of Simply Green Nursery have indicated to me while I was conducting fieldwork that they would be interested in assisting with 'Search & Rescue' activities, and since they are located along the road this appears to me to be a sensible proposal.

Further details, as required, of each expropriation section and the road in general are to be found in the tables both in the main report and this addendum.

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