

**Terrestrial Biodiversity Assessment,
Franschhoek Sky-Tram
Stellenbosch Municipality
Western Cape Province**



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Prepared for Doug Jeffery Environmental Consultants

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i. 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, in compliance with the Specialist Protocols (2020).

ii. Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by Doug Jeffery Environmental Consultants to provide specialist terrestrial biodiversity consulting services for the proposed Franschhoek Sky-Tram, Franschhoek Pass, Western Cape Province. The consulting services comprise a study of the terrestrial biodiversity to determine possible 'Red Flags' and to provide a constraints analysis, scoping assessment and finally an impact assessment for the proposed development on the terrestrial ecosystem.

iii. Details of Specialist

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Professional registration: South African Council for Natural Scientific Professions No. 400094/06

iv. 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 and Ecology.
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 600 specialist botanical / ecological studies
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request).

v. 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.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of the report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must refer to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

vi. Terms of Reference

- Consider the existing biological reports that were used to inform the development of a layout that would accommodate the identified constraints;
- Conduct a terrestrial biodiversity impact assessment of the proposed Hartenbos Garden Estate development that take the following into consideration:
 1. Sensitive habitats i.e., sensitive plant communities and sensitive animal biota (including invertebrates);
 2. Any biota of conservation concern (SCC);
 3. Relevant environmental regulations / policies / plans stipulated by the Department of Environmental Affairs and CapeNature in terms of, amongst others, the National Environmental Management Act (NEMA) and the National Environmental Management Biodiversity Act (NEMBA);
 4. Comments from Cape Nature.

vii. Limitations and Assumptions

Since this report is a composite assemblage (summary) of information from numerous specialist studies, it stands to reason that there are some gaps where brevity prevented elaboration as in the specialist reports. It is assumed that the historical specialist reports for the area of the proposed development would be read by anyone adjudicating the environmental application, so an attempt has

been made to avoid repetition. All limitations in the reviewed specialist reports thus equally apply to this report.

viii. Declaration of Independence:

The views expressed in the document are the objective, independent views of Dr McDonald and the survey 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, financial or other interest in the proposed development apart from fair remuneration for the work performed.

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;
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all 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:

Company: Bergwind Botanical Surveys & Tours CC

Date: 23 January 2024

Curriculum Vitae: Appendix 3.

1. Introduction and Background

It is well-recognized that natural habitats are underpinned by plant species that respond to the abiotic environment, forming interacting communities that in turn support the existence of other biota in a given area. This is roughly the biological diversity or 'biodiversity' which is the diversity of organisms that inhabit a specified space. The non-plant organisms that contribute to any specified area, range from soil micro-organisms to fungi to invertebrates to vertebrates such as reptiles, birds and mammals. The study of the interaction of these biota with each other and their host environment is most-often complex and not easily teased out and described. Therefore, an assessment of the biodiversity, and more specifically the terrestrial biodiversity is only possible at a coarse level in a general assessment. It is limited by the number of studies of different biota in a specified area and is really only a superficial overview of the biodiversity of any specific area.

Plans to develop a cable-way at Franschhoek Pass were tabled in 2021. This project has subsequently been named the Franschhoek Sky-Tram. Bergwind Botanical Surveys & Tours CC (Bergwind) [Dr D.J. McDonald] was appointed to carry out the botanical and terrestrial biodiversity impact assessments.

The applicable botanical study that has been concluded for the project is referred to as McDonald (2023).

A number of iterations of the proposed development layouts and constraints have been considered and they are discussed and assessed in this report, with respect to terrestrial biodiversity.

This terrestrial biodiversity assessment takes careful note of the requirements and recommendations of CapeNature and the Botanical Society of South Africa for proactive assessment of the biodiversity of proposed development sites and follows published guidelines for evaluating potential impacts on the biodiversity in an area earmarked for some form of development (Brownlie 2005, Cadman *et al.* 2016). The requirements and recommendations of CapeNature for assessment of biodiversity of proposed development sites have also been considered and the 2020 Species Environmental Assessment Best Practice Guideline and protocols for terrestrial biodiversity specialists (Government Gazette, 2020; SANBI, 2020) have been applied.

There is of necessity, a considerable amount of overlap between this report and the botanical impact assessment report (McDonald, 2023). This duplication of information is necessary so that each report is supported by the biological information collected in the study area.

2. Project Description

A project aimed at constructing a cableway from Haute Cabrière Wine Estate, located near the foot of Franschhoek Pass, Stellenbosch Municipality, to Middagkransberg, at 1029 m above mean sea level (a.m.s.l.) in Mont Rochelle Nature Reserve (owned by Stellenbosch Municipality) in the Franschhoek Mountains has been proposed. The proposed cableway, now named the Franschhoek Sky-Tram would ferry tourists from the lower station at the winery at Haute Cabrière Wine Estate to the top of Middagkransberg overlooking the Franschhoek Valley on the west side and the valley to the east leading to Theewaterskloof Dam.

3. Terms of Reference

- Consider the existing biological assessment reports that were used to inform the development of a layout that would accommodate the identified constraints ;
- Conduct a terrestrial biodiversity impact assessment as per the Specialist Protocols (NEMA – 2020) of the proposed Franschhoek Sky-Tram development that takes the following into consideration:
 - (i) Sensitive habitats;
 - (ii) Any biota of conservation concern;
 - (iii) Relevant environmental regulations / policies / plans stipulated by the Department of Environmental Affairs and CapeNature in terms of, amongst others, the National Environmental Management Act (NEMA) and the National Environmental Management Biodiversity Act (NEMBA);
 - (iv) Comments from Cape Nature.

3. Location and Physiography

3.1 Haute Cabrière Wine Estate

Haute Cabrière Wine Estate, currently owned by the Von Arnim Family, is located at S 33° 54' 51.1" E 19° 08' 07.7" at 372 m a.m.s.l., at the foot of Franschhoek Pass, off the R45 (Figures 1 & 2). It is a well-established estate, having been in existence since 1694 when it was established by the French Huguenot, Pierre Jourdan. The proposed Lower Station would be established at the Haute Cabrière Wine Cellar.

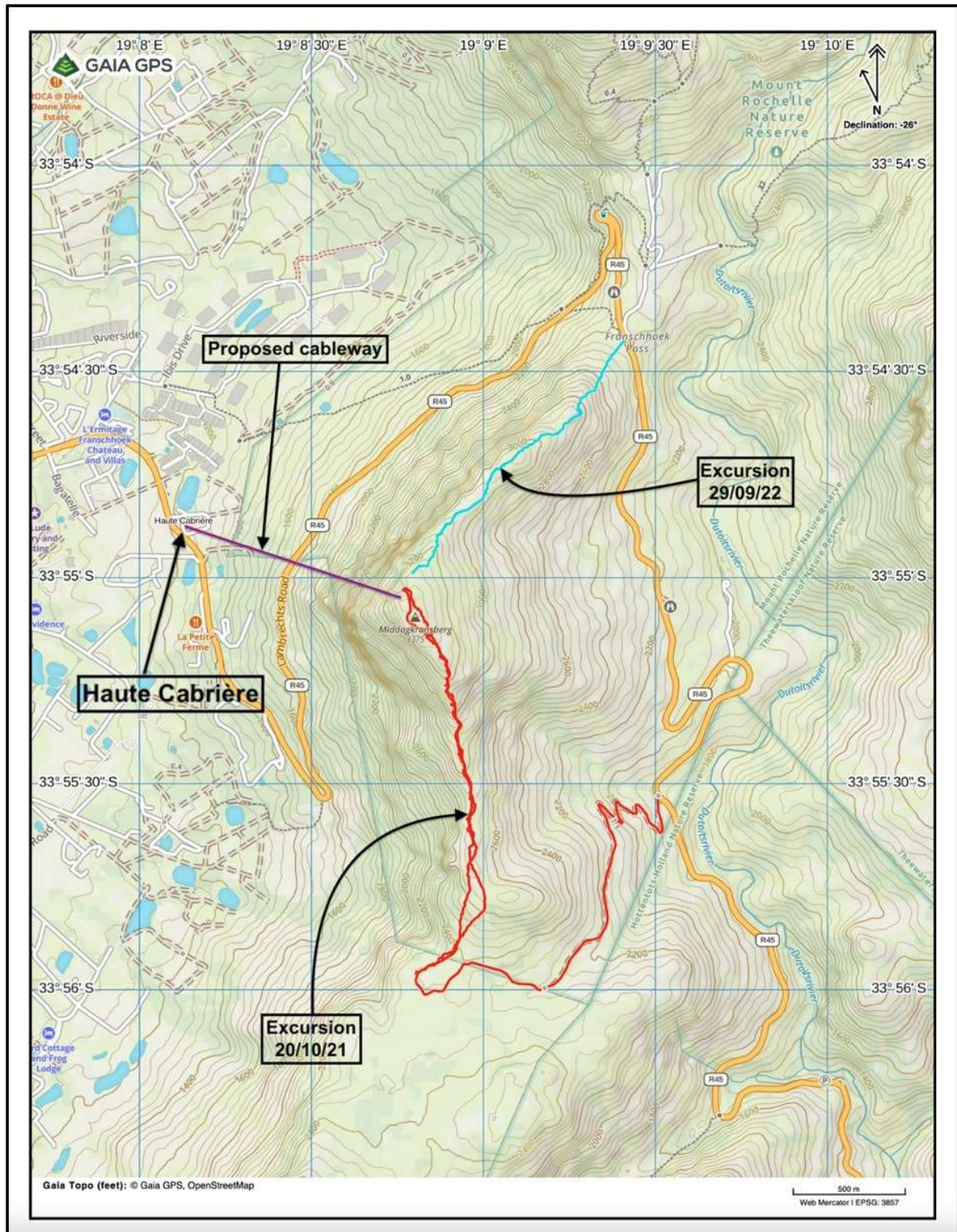


Figure 1. Topographic locality map showing the location of the proposed Sky-Tram (purple line), the tracks followed for the two field excursions (Source map: GaiaGPS).

3.2 Middagkransberg

3.2.1 Topography

The Franschhoek Mountains lie between the Hottentots-Holland Mountains at Jonkershoek to the southwest and the Wemmershoek Mountains to the northeast. These mountains are occasionally referred to as the Boland Mountain Complex.

Middagkransberg is the highest peak above Franschhoek, at 1029 m above mean sea level (a.m.s.l.) (Figure 2). The west-facing slopes consist of steep cliffs and high angle scree and rocky slopes. Owing to the steepness, Middagkransberg is not practically accessible from the west side but rather from the north, south or east sides where the slopes are more easily negotiated.

A satellite aerial photo with superimposed 20 m contour lines (Figure 2) emphasizes the steepness of the west-facing slopes and the moderate gradient of the northern eastern and southern approaches.

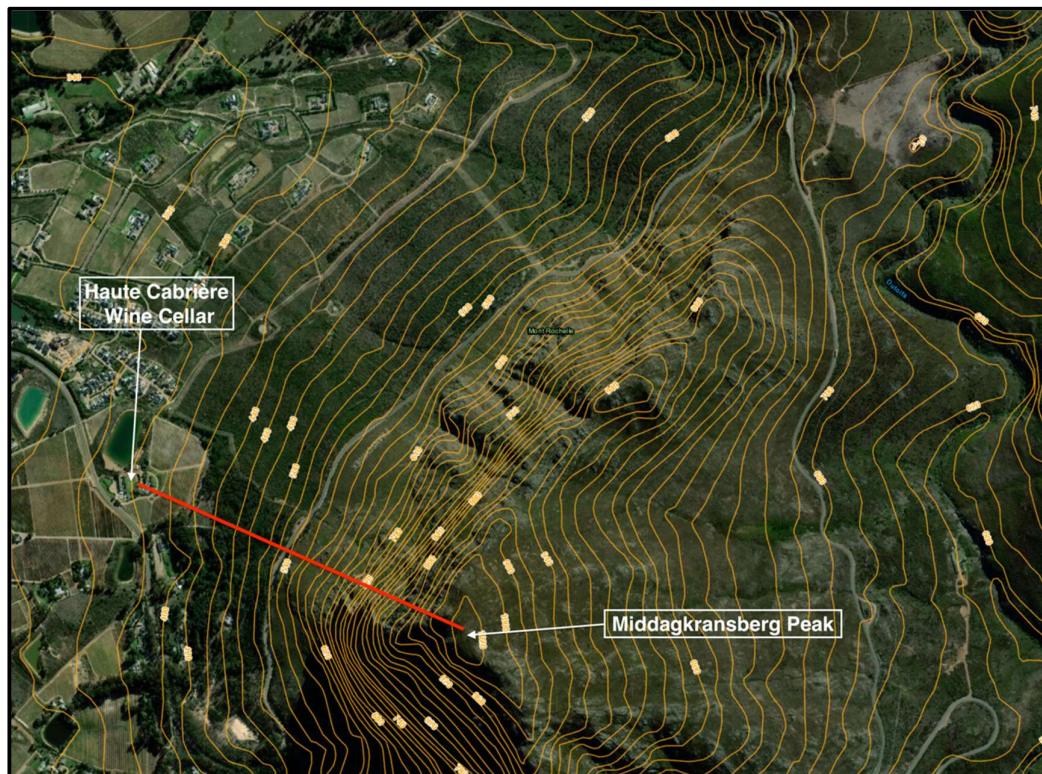


Figure 2. Aerial photo with superimposed 20 m contour lines, showing the location of Haute Cabrière and Middagkransberg joined by the proposed cableway (red line) (Source: Cape Farm Mapper).

4. Methods

4.1 Approach – for the botanical study.

Haute Cabrière was first visited on 20 October 2021. The area proposed for the Lower Station and parking is completely transformed, so no further attention was given to that, since no natural habitat would be affected at this site and the level of biodiversity is very low.

From Haute Cabrière, on the same day, an excursion was undertaken to Middagkransberg, by a team of biological specialists and others. The mountain was accessed by using a two-spoor track leading from the east side of the Franschhoek Pass Road, up to a saddle to the south of Middagkransberg. The 4x4 vehicles were parked at this point and the remainder of the excursion was on foot to the peak following the route shown in Figure 2.

The first excursion (20 October 2021) was a scoping exercise to consider the location for the placement of the Sky-Tram upper station and an access route to permit transport of building materials, and later, service vehicles to the restaurant. A suitable route on the east-facing slopes of Middagkransberg could not be found since any road built on those slopes would strongly negatively impact the streams and wetlands on the slopes. The proposal for an access road has thus been abandoned.

The second site visit (Figure 2) was undertaken by the author and Mr Doug Jeffery on 29 September 2022. Initially Middagkransberg was enveloped in mist from the southeast wind, but it cleared by mid-morning to permit a successful botanical evaluation of the proposed Upper Station site. Approximately four hours were spent at the site and the surrounding slopes.

On both excursions, numerous photographs were taken, and notes were made about the vegetation and other biota on the proposed alternative sites for the Upper Station at Middagkransberg. That information provided the basis for the biodiversity assessments.

A third excursion was taken by the author to check the Upper Station site for the occurrence of the rare species of conservation concern, *Gladiolus rhodanthus*, as was mentioned in the botanical impact assessment report. There was no sign of this species on or near the footprint of the Upper Station.

4.2 Approach – faunal studies including vertebrates and invertebrates.

Dr Jonathan Colville (invertebrate and mammal specialist), Dr Callan Cohen (avifaunal specialist) and Mr Vincent Ward (avifaunal specialist) were members of the party on the first excursion on 20 October 2020. They paid particular attention to birds, mammals and insects on the walk up to the summit of Middagkransberg. Various methods were applied by these biologists that included sweep-netting for insect fauna (butterflies, monkey-beetles, grasshoppers etc) whereas reptiles and birds were recorded as incidental observations. From October 2020 onwards, Vincent Ward carried out a monthly bird flightpath study for 12 months, mainly to determine whether the cableway cables would pose a risk to Verreaux Eagles and other raptors that may fly along the west face of Middagkransberg in search of prey.

The faunal study has been comprehensively reported by the above three biologists in their parallel report to this:

Colville, J.F., Cohen, C., Ward, V. 2023. *Faunal Impact Assessment for Project Franschhoek Skytram, Franschhoek*. Prepared for Doug Jeffery – _Environmental Consultants; Updated Report. 05 September 2023.

Reference should be made to this report for further details.

5. The Vegetation

Vegetation underpins all terrestrial ecosystems as it responds to abiotic factors and thus provides a habitat for numerous other biota. Collectively this may be referred to as the ‘terrestrial biodiversity’ of a given area. Biodiversity is a broad and an all-encompassing term for all the biota at a site and consequently must be defined for any particular site.

The Vegetation Map of South Africa, Swaziland (now Eswatini) and Lesotho, abbreviated to VEGMAP, recognizes the vegetation of the Franschhoek Mountain as Kogelberg Sandstone Fynbos, a Critically Endangered vegetation type and Cape Winelands Shale Fynbos, also Critically Endangered (Government Gazette, 2022) as the two vegetation types that would be affected the project. Boland Granite Fynbos (Endangered) also occurs in the area but would not be affected by the project. In the case of Cape Winelands Shale Fynbos, it would have occurred at Haute Cabrière, but is now completely absent due to vineyards.

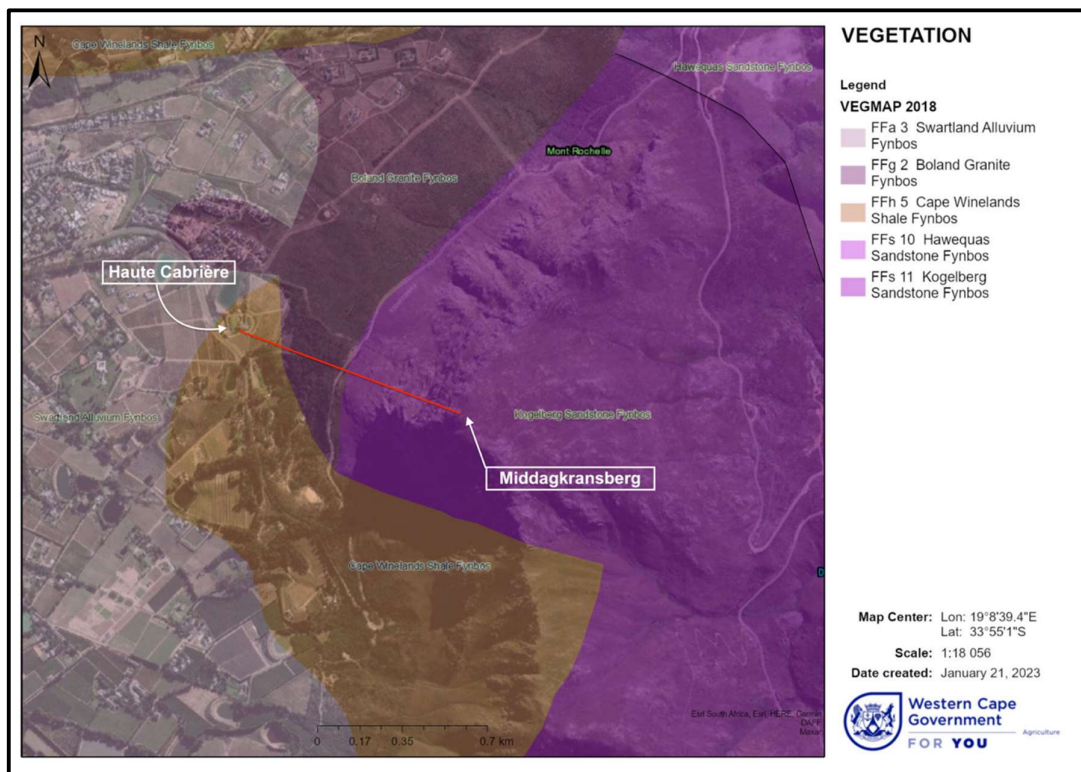


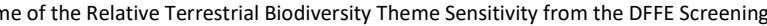
Figure 3. Portion of the Vegetation Map of South Africa, Lesotho & Swaziland (SANBI, 2018) overlaid on aerial imagery using Cape Farm Mapper. According to this classification Haute Cabrière is in an area originally of Cape Winelands Shale Fynbos, and Middagkransberg has undisturbed Kogelberg Sandstone Fynbos.

6. Sensitivities identified from the DFFE Online Screening Tool

6.1 Relative Terrestrial Biodiversity Theme Sensitivity

The relative terrestrial biodiversity theme sensitivity is given as **Very High** in Figure 4. This classification is based on the five sensitivity features; FEPA Sub-catchments, Strategic Water-source Areas, Endangered ecosystem, Hawequas Mountain Catchment and Mont Rochelle Nature Reserve.

The above are broad-scale features, whereas the focus should really be on a relatively small footprint that would be impacted by the Upper Station and associated pathways and other 'infrastructure'. It may be argued that despite the high biodiversity sensitivity, the receiving environment can tolerate the proposed development with a low negative impact when taken over a broad scale, notwithstanding the high negative impact within the development footprint.



7.1 The Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan [WCBSP] (Pence, 2017; Pool-Stanvliet *et al.* 2017) was applied to determine conservation status and critical biodiversity areas at the footprint of the proposed Sky-Tram development. The required shapefiles were obtained from the South African National Biodiversity Institute (SANBI) BGIS website and then the critical biodiversity areas (CBA) map for Franschhoek Mountains was overlaid on a Google Earth™ image and carefully examined to compare what was observed in the field with the aerial image when overlaid with the CBA map.

Therefore, Middagkransberg falling within the Mont Rochelle Nature Reserve, as well as other sensitivities given above, results in the study area having high to very high sensitivity by default.

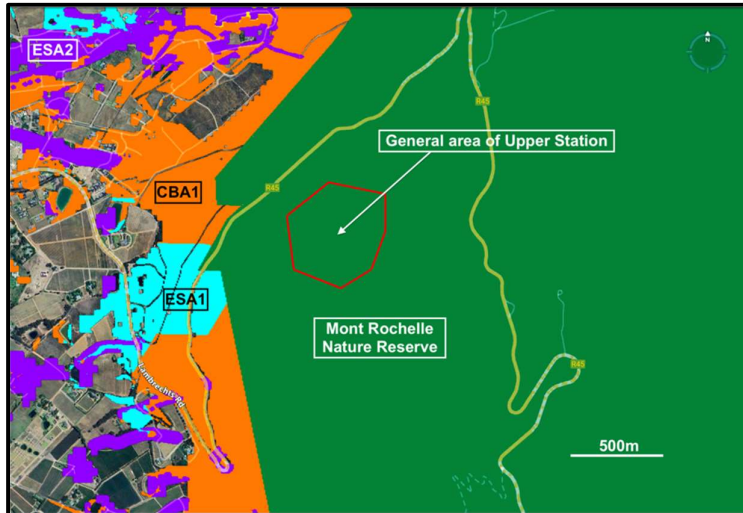


Figure 5. The Western Cape Biodiversity Spatial Plan as it pertains to the area of interest for the Franschhoek Sky-Tram.

7.2 Red Listed Ecosystems

An appraisal of remnants of important ecosystems of South Africa was carried out by Skowno *et al.* (2019) and published by SANBI (2021) as the 'Red List of Ecosystems' (RLE). The available shapefile was overlaid on a Google Earth Pro™ image together with the generalized footprint of the proposed Franschhoek Sky-Tram development. The resulting composite image (Figure 6) shows that the proposed development footprint (general area) is entirely within a Critically Endangered area.

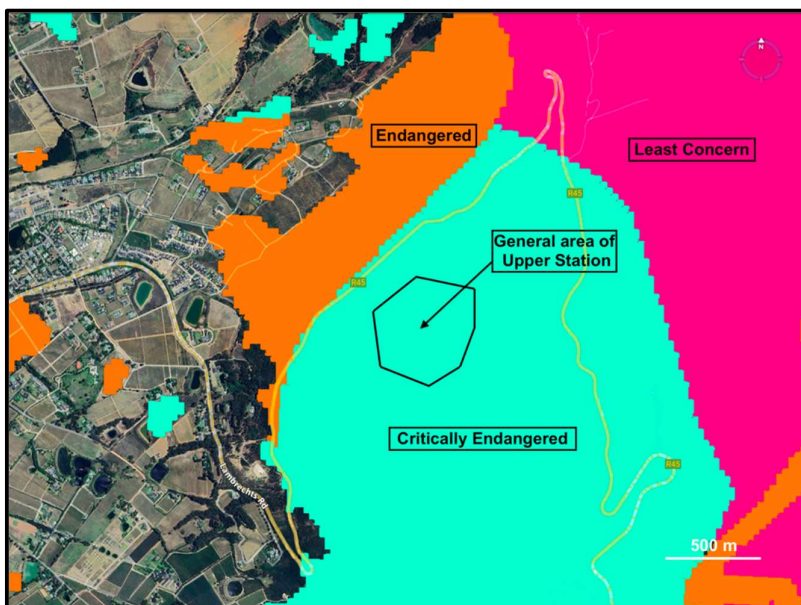


Figure 6. Google Earth Pro™ with the Red List Ecosystem (RLE) [Critically Endangered] mapped as light green shading. The area of the Upper Station would be within the CR area.

7.3 Plant Species of Conservation Concern

The Upper Station footprint and surrounds were searched for plants and it can be confidently stated that no plant species of conservation concern (SCC) were found on the site. There was an outside possibility that the rare (SCC), *Gladiolus rhodanthus*, would occur on the site. A specific site visit to verify the presence or absence of *G. rhodanthus* was carried out on 14 January 2024 and it was confirmed that it definitely does not occur there.

8. Site Ecological Importance

The Species Environmental Assessment Guidelines (SANBI 2020) require that Site Ecological Importance is calculated for each habitat on site and provides a methodology for making this calculation. The dominant vegetation (single habitat) in the footprint of the proposed Sky-Tram Upper Station is Kogelberg Sandstone Fynbos.

As per the Species Environmental Assessment Guidelines (SANBI 2020), Site Ecological Importance (SEI) is calculated as a function of the Biodiversity Importance (BI) of the receptor site and its resilience to impacts ($SEI = BI + RR$). The Biodiversity Importance (BI) in turn is a function of Conservation Importance (CI) and Functional Integrity (FI), i.e. $BI = CI + FI$.

Table 1. Site ecological importance for the habitat found in the study area.

Habitat (H)	Conservation importance (CI)	Functional integrity (FI)	Receptor resilience (RR)	Site Ecological Importance (BI)
Kogelberg Sandstone Fynbos	<p>HIGH</p> <p>No confirmed or highly likely populations of SCC.</p> <p>No confirmed or highly likely populations of range-restricted species.</p> <p>➤ >50% of receptor contains natural habitat.</p>	<p>HIGH</p> <p>Large (>100 ha intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types.</p>	<p>HIGH</p> <p>Habitat can recover reasonably quickly.</p>	<p>HIGH</p> <p>(BI = HIGH)</p>

Table 2. Guidelines for interpreting SEI in the context of the proposed development activities:

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/ not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The Site Ecological Importance (SEI) of the fynbos of the development footprint has thus been determined as **HIGH**.

A **multi-taxon SEI analysis** was not carried out but is inferred from the habitat analysis.

9. Impact assessment of the proposed development

The ‘no-development’ or ‘No-Go’ scenario is one of the alternatives in this assessment. Under this alternative, the site would remain as is with a limited amount of fire management and limited alien vegetation clearing.

9.1 Direct Impacts

The ‘No Go’ (Alternative 1) would result in no change to the *status quo*. In this case the target area for the Upper Station would be left undeveloped. It is speculative to suggest that the habitat would improve or degrade but it is possible that it may degrade in the future due to continued invasion by alien invasive plants. If left undeveloped, the ecological processes currently in play on the site would continue unhindered except if there were negative influences such as alien invasion and lack of suitable fire management. To determine how the ecology would be affected would take concerted research investigation over many years, so no valid comment can be put forward here as to the future of the site except to say that it would probably remain in a natural state. The ‘No Go’ alternative would thus have a **LOW Negative to Neutral** impact.

9.2 Direct Impacts

Direct impacts for Alternatives 1 & 2 for both the Lower Station and the Upper Station are assessed. It should be understood that all the amenities for all alternatives are simultaneously assessed as part of each alternative.

9.2.1 Alternative 2 (preferred) versus Alternative 1

The Lower Station would be constructed on an area that has already been highly disturbed with VERY LOW biodiversity sensitivity. Therefore, any further disturbance due to construction and operation of the Lower Station would not result in any further negative effects on the terrain or any biodiversity. The impact would thus be **Very Low Negative** (Table 3) and no mitigation would be required to compensate for any negative impacts. This would apply to all alternatives i.e. no difference.

The cable between the Lower Station and the Upper Station would result in minimal disturbance during construction and no disturbance during operation. This would also apply to both alternatives i.e. no difference.

The Upper Station for Alternative 1 would be built on 'Level 1007'. The construction impact of the Alternative 1 Upper Station and amenities on the biodiversity would be **Low Negative** at a local scale (Table 4). The development would result in the loss of $\pm 4\,787\text{m}^2$ on the mountain ridge of Middagkransberg. Very little opportunity would be available for mitigation of the negative impact and what little mitigation could be carried out, e.g. possible translocation of a few plants, would have no bearing on lowering negative impacts on biodiversity.

From a biodiversity conservation viewpoint, there would be very little difference between the impact on the ecosystem at 'Level 1007' compared with that at 'Level 1017' where the Alternative 2 (preferred) Upper Station and associated amenities would be constructed ($4\,789\text{m}^2$). The habitat is similar at the footprint of each of the alternatives. The result would be a similar impact on the habitat along the mountain ridge. Mitigation for Alternative 2 would be very limited. However, the context of the Upper Station must be appreciated since it will be 'embedded' in an extensive ecosystem that is found on the mountains southwards and northwards of the site. Given the extensive distribution of the sandstone fynbos, at a regional scale, the impact would be **Low Negative** in terms of biodiversity (Table 4).

The preference of Alternative 2 over Alternative 1 at the Upper Station is based on visual factors. Either of the alternatives can be considered for construction from a biodiversity perspective since there is little difference in the biodiversity at the two sites.

Since a fire-break would be required, regardless of the development alternative, it is assumed that this forms part of each alternative (i.e. the same negative impact) for the sake of the impact assessment.

Assessment of the alternatives for the **construction phase** is presented in Tables 3 and 4 for the Lower Station and Upper Station respectively.

The operational phase would involve the management of tourists in terms of their impact on the habitat (diversity) beyond the footprint of the Upper Station and associated amenities and the proposed footpaths. It is possible that some people would opt to walk down to the R45 and it is the intention establish a dedicated and well-designed path. In this instance, the aim should be to ensure that hikers remain on a single path and do not make *ad hoc* paths down the mountain slopes. The impact of such use on biodiversity in the operational phase is rated as **Medium Negative** for all alternatives and, with mitigation by management of tourist activities, the impact could be reduced to **Low Negative** in the operational phase.

Assessment of the alternatives for the **operational phase** is presented in Tables 5 and 6 for the Lower Station and Upper Station respectively.

Table 3. Impact: The loss of natural habitat and biodiversity during the **construction phase** at the Lower Station site.

CRITERIA	‘NO GO’ ALTERNATIVE	Alternative 1 Lower Station with amenities at Haute Cabrière		Alternative 2 (preferred) Lower Station with amenities at Haute Cabrière	
Nature of direct impact (local scale) – Construction Phase	Loss of biodiversity				
		WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term	Long-term
Intensity	Very Low	Very Low	Very Low	Very Low	Very Low
Probability of occurrence	Probable	Definite	Definite	Definite	Definite
Confidence	High	High	High	High	High

Significance	Very Low Negative	Very Low Negative	Very Low Negative	Very Low Negative	Very Low Negative
Nature of cumulative impact	Loss of biodiversity				
Cumulative impact prior to mitigation	N/A	Very Low Negative	Very Low Negative	Very Low Negative	Very Low Negative
Degree to which impact can be reversed	N/A	Very Low	Very Low	Very Low	Very Low
Degree to which impact may cause irreplaceable loss of resources	N/A	Very Low	Very Low	Very Low	Very Low
Degree to which impact can be mitigated	N/A	Not required	Not required	Not required	Not required
Proposed mitigation	N/A	N/A	N/A	N/A	N/A
Cumulative impact post mitigation	N/A	Very Low Negative	Very Low Negative	Very Low Negative	Very Low Negative
Significance of cumulative impact (broad scale) after mitigation	N/A	Very Low negative	Very Low Negative	Very Low Negative	Very Low Negative

Table 4. Impact: The loss of natural habitat and biodiversity during the construction phase at the Upper Station site.

CRITERIA	'NO GO' ALTERNATIVE	Alternative 1 Upper Station with amenities		Alternative 2 (preferred) Upper Station with amenities	
Nature of direct impact (local scale) – Construction Phase	Loss of biodiversity				
		WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term	Long-term
Intensity	Very Low	Low	Low	Low	Low
Probability of occurrence	Probable	Definite	Definite	Definite	Definite
Confidence	High	High	High	High	High
Significance	Very Low Negative	Low Negative	Low Negative	Low Negative	Low Negative
Overall Assessment					

Nature of cumulative impact	Loss of biodiversity		
Cumulative impact prior to mitigation	N/A	Low Negative	Low Negative
Degree to which impact can be reversed	N/A	Low	Low
Degree to which impact may cause irreplaceable loss of resources	N/A	Low	Low
Degree to which impact can be mitigated	N/A	Low	Low
Proposed mitigation	N/A	Minimal search and rescue of plants especially geophytes	Minimal search and rescue of plants especially geophytes
Cumulative impact post mitigation	N/A	Small loss of Kogelberg Sandstone Fynbos	Small loss of Kogelberg Sandstone Fynbos
Significance of cumulative impact (broad scale) after mitigation	N/A	Low negative	Low negative

Table 5. Impact: The loss of biodiversity during the operational phase at the Lower Station site.

CRITERIA	‘NO GO’ ALTERNATIVE	Alternative 1 Lower Station with amenities at Haute Cabrière		Alternative 2 (preferred) Lower Station with amenities at Haute Cabrière	
Nature of direct impact (local scale) Operational Phase	Loss of biodiversity				
		WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term	Long-term
Intensity	Very Low	Very Low	Very Low	Very Low	Very Low
Probability of occurrence	Probable	Definite	Definite	Definite	Definite
Confidence	High	High	High	High	High
Significance	Very Low Negative	Low Negative	Very Low Negative	Low Negative	Very Low Negative
Nature of cumulative impact	Loss of biodiversity				
Cumulative impact prior to mitigation	N/A	Very Low Negative		Very Low Negative	
Degree to which impact can be reversed	N/A	Very Low		Very Low	

Degree to which impact may cause irreplaceable loss of resources	N/A	Very Low	Very Low
Degree to which impact can be mitigated	N/A	Not required	Not required
Proposed mitigation	N/A	None	None
Cumulative impact post mitigation	N/A	None	None
Significance of cumulative impact (broad scale) after mitigation	N/A	Very Low negative	Very Low Negative

Table 6. Impact: The loss of biodiversity during the **operational phase** at the Upper Station site.

CRITERIA	‘NO GO’ ALTERNATIVE	Alternative 1 Upper Station with amenities		Alternative 2 (preferred) Upper Station with amenities	
Nature of direct impact (local scale) – Operational Phase	Loss of biodiversity				
		WITHOUT MITIGATION	WITH MITIGATION	WITHOUT MITIGATION	WITH MITIGATION N
Extent	Local	Local	Local	Local	Local
Duration	Long-term	Long-term	Long-term	Long-term	Long-term
Intensity	Very Low	High	High	High	High
Probability of occurrence	Probable	Definite	Definite	Definite	Definite
Confidence	High	High	High	High	High
Significance	Very Low Negative	Low Negative	Very Low Negative	Low Negative	Very Low Negative
Nature of cumulative impact	Loss of biodiversity				
Cumulative impact prior to mitigation	N/A	Low Negative		Low Negative	
Degree to which impact can be reversed	N/A	Low		Low	
Degree to which impact may cause irreplaceable loss of resources	N/A	Low		Low	

Degree to which impact can be mitigated	N/A	Low	Low
Proposed mitigation	N/A	Management of tourist footprint on areas around the Upper Station	Management of tourist footprint on areas around the Upper Station
Cumulative impact post mitigation	N/A	No loss of natural habitat (biodiversity)	No loss of natural habitat (biodiversity)
Significance of cumulative impact (broad scale) after mitigation	N/A	Very Low negative	Very Low negative

Table 7. Impact Assessment Summary Table: Mammals & Invertebrates

	WITHOUT MITIGATION		WITH MITIGATION	
	Construction	Operation	Construction	Operation
ALTERNATIVE 1	Very Low Negative	Very Low Negative	Very Low Negative	Very Low Negative
ALTERNATIVE 2 (preferred)	Medium Negative	Very Low Negative	Very Low Negative	Very Low Negative

9.3 Indirect impacts

By definition, indirect impacts occur away from the 'action source' i.e., away from the development site. The impact here is specifically how the proposed Franschhoek Sky-Tram would have indirect impacts on the biodiversity away from the development area. No indirect impacts are obvious for any of the alternatives.

9.4 Cumulative impacts

The proposed development of the Franschhoek Sky-Tram would be in an area of the Boland known for its natural beauty. However, as has been demonstrated above, the footprint of the development at the Lower Station would be restricted to substrates that are transformed. The loss of habitat (biodiversity) at the Upper Station would be small in terms of the extent of the habitat type on the Franschhoek Mountains and beyond.

10. General Assessment and Recommendations

- No natural habitat (therefore no sensitive biodiversity) would be impacted at the Lower Station. A single vegetation type, Kogelberg Sandstone Fynbos, is found at the Upper

Station site and loss of biodiversity at the site and its immediate surrounds would result in a HIGH Negative impact at the site specific scale but a Very Low Negative impact at a broad scale.

- No rare or threatened mammals and reptiles were documented for the site.
- The National Web-based Environmental Screening Tool for the terrestrial biodiversity overestimates the sensitivity **specifically of the development footprint** which has been determined by on-site evaluation and the application of the Site Ecological Importance (SEI) equation to have **High Ecological Importance** for the habitat. However, when considered in the broad context, the habitat has no more than **Medium** sensitivity.
- Based on the data collected and analyzed for the target area for the development of the Franschhoek Sky-Tram, no fatal flaws or any other obstacles were found with respect to the terrestrial biodiversity as a whole.

11. Conclusions

A simple definition of biological diversity or biodiversity is “the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable” (Oxford Languages on Google). There are various types of biodiversity, and this report has not addressed the intricacies of ecological interconnectivity that result from interaction between different organisms. It merely attempts to address the biodiversity, at a high level, of the receiving environment of the Franschhoek Sky-Tram development.

The report is also biased in terms of botanical aspects due to the author’s own bias but also the understanding that plants (fungi notwithstanding) are the primary producers that create the habitat and living conditions for other biota.

The results of this terrestrial biodiversity assessment show that the “No Go” alternative (Alternative 1) would have a **Very Low Negative** impact. The Alternative 2 (preferred) would have a **Low Negative** impact for biodiversity after mitigation. Based on this, the proposed development of the Franschhoek Sky-Tram is supported.

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Report submitted: 23 January 2024

Appendix 1: Impact Assessment Methodology (from GIBB Environmental)

The objective of the assessment of potential impacts is to identify and assess all the significant, potential impacts that may arise as a result of the project.

For each of the main project phases the existing and potential future impacts and benefits (associated only with the project) will be described using the criteria listed below. The assignment of ratings has been undertaken based on past experience of the team, as well as through research. Subsequently, mitigation measures will be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Table 1: Impact Assessment Criteria

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the effect of the impact related to the proposed development
	Negative	
Extent	Footprint	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur
	Site	The extent of the impact is rated as site as it will affect only the development area
	Local	The extent of the impact is rated as Local as it affects the development area and adjacent properties
	Regional	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries
	National	The extent of the impact is rated as National as the effects of the impact extends beyond more than 2 regional/ provincial boundaries
	International	The extent of the impact is rated as International as the effect of the impact extends beyond country borders
Duration	Temporary	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary
	Short term	The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term
	Medium term	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term
	Long term	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term
Severity	High negative	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.

Criteria	Rating Scales	Notes
	Moderate negative	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	Low negative	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Low positive	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved
	Moderate positive	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.
Potential impact on irreplaceable resources	No	No irreplaceable resources will be impacted.
	Yes	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources
	Highly detrimental	
	Moderately detrimental	
	Slightly detrimental	
	Negligible	
	Slightly beneficial	
	Moderately beneficial	
	Highly beneficial	
Likelihood of the impact occurring	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	It is between 50 and 75 % certain that the impact will occur.
	Definite	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance	Very high - negative	A function of Consequence and Likelihood
	High - negative	
	Moderate - negative	

Criteria	Rating Scales	Notes
	Low - negative	
	Very low	
	Low - positive	
	Moderate - positive	
	High - positive	
	Very high - positive	

Table 2: Impact Assessment Criteria and Rating Scales

Duration		Extent		Irreplaceable Resources		Severity		Consequence = (Duration + Extent + Irreplaceable Resources) x Severity		Likelihood		Significance (Consequence x Likelihood)	Confidence	
1	Temporary	1	Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2	Site	0	No	-2	Moderate negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3	Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4	Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5	National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6	International			2	Moderate positive							
						3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
								7 to 12	Slightly beneficial			19 to 36	Low - positive	
								13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
								19 to 24	Highly beneficial			55 to 72	High - positive	
								25 to 33	Extremely beneficial			73 to 99	Very high - positive	

Ascribing Significance for Decision-Making

The best way of expressing these cost benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)¹ of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked and likelihood to be defined of that consequence.

In **Table 3** below a scoring system for consequence ranking is shown. Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

Table 3: Ranking of Consequence

Environmental Cost	Inherent risk
Human health – morbidity/ mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – High
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – Low
Negative change – with no other consequences	Low
Environmental Benefits	Inherent benefit

¹ Because 'probability' has a specific mathematical/empirical connotation the term 'likelihood' is preferred in a qualitative application and is accordingly the term used in this document.

Net improvement in human health and welfare	Medium – High
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate – Low
Positive change – with no other benefits	Low

Likelihood

Although the principle is one of probability, the term ‘likelihood’ is used to give expression to a qualitative rather than quantitative assessment, because the term ‘probability’ tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in **Table 4** below.

Table 4: Likelihood Categories and Definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical ‘average’ of the causes but rather a qualitative estimate in its own right.

Residual Risk

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in **Table 5** below where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in **Table 6** below.

Table 5: Residual Risk Categories

Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 6: Implications for Decision-Making of the different Residual Risk Categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

Appendix 2. Curriculum Vitae

Dr David Jury McDonald Pr.Sci.Nat.

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

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

Mobile: 082-876-4051

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
- Seventeen 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 600 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 website: www.bergwind.co.za