BOTANICAL ASSESSMENT

24G Application: The Lair Trust (Farm Orange Falls)

A Botanical Assessment of the area impacted during the expansion and development of additional agricultural land on Portion 91 of the Farm Orange Falls No. 16, Augrabies.

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SUMMARY - MAIN CONCLUSIONS

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VEGETATION EXPECTED	Bushmanland Arid Grassland (Least Threatened)
CONSERVATION STATUS	Least Threatened, (NSBA, 2006). More than 99% of this vegetation still remains in its natural state, but at present only 4% is formally protected.
VEGETATION ENCOUNTERED	The vegetation encountered on the remainder of the property is still in fairly good condition, although drought impacted.
RED-LISTED PLANT SPECIES	No red-listed species observed.
PROTECTED SPECIES	Trees protected in terms of the National Forest Act, Act 84 of 1998 • *Boscia albitrunca* – occasionally observed on the remainder of the property Plants protected in terms of the Northern Cape Nature Conservation Act, Act 9 of 2009: • *Aloe claviflora*. Only two patches of the Kraanaalwyn were observed. • *Boscia foetida*. Occasionally observed.
MAIN CONCLUSION	The impact assessment took into account that the vegetation type is not considered vulnerable or endangered and no red-listed plants were observed, although protected plants were observed. No special habitats were likely to be impacted (apart from the ephemeral drainage lines). However, a portion of the development is located within an ecological support area. According to the impact assessment it is considered highly unlikely that the development would have contributed significantly to any of the following: • Significant loss of vegetation type and associated habitat. • Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities. • Loss of local biodiversity and threatened plant species. • Loss of ecosystem connectivity Apart from the protected species that might have been impacted no other botanical features of significance were observed.
NO-GO OPTION	Since the development is relative small and localised (even though located within an ESA) the no-go option would not have contributed significantly to national or provincial conservation targets.

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INTRODUCTION

Between 2010 and 2016 the owners of The Lair Trust developed approximately 10 ha of new vineyards on the Portion 91 of the farm Orange Falls no. 16, Augrabies (the property). Development was done as follows:

- 5ha were developed during 2010;
- 2.5 ha were developed during 2012, and
- A further 2.5 ha were developed during 2016.

The development of these vineyards constitutes a listed activity under the National Environmental Management Act, (Act 107 of 1998) (NEMA) and the EIA regulations (as amended during this period). A 24G application was lodged in order to rectify the unlawful development.

PB Consult was appointed to perform a botanical scan of the site in order to determine the impact of the development on botanical features. The terms of reference for this appointment were to evaluate the development footprint in order to determine:

- The vegetation status of the footprint area.
- Whether any significant botanical features were be impacted as a result of the development.
- Whether the development led to irreversible impacts on significant ecosystems or irreplaceable loss of species.

A desktop study coupled with a site visit on the 1st of June 2017 was performed in order to evaluate the potential impacts of the development.

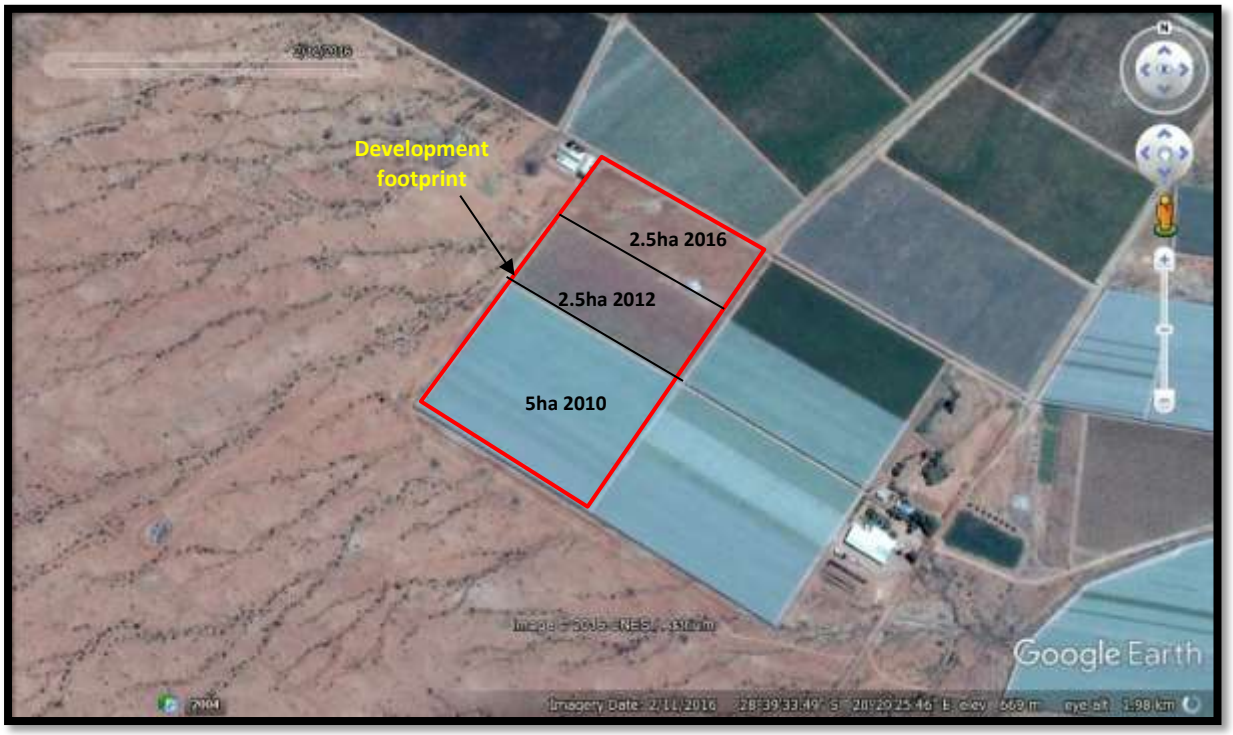
LOCATION & LAYOUT

The development footprint is located on Farm Orange Falls No. 16/91 (Augrabies), approximately 410 km west-north-west off the Augrabies, off the R359 (Khai Garib Local Municipality) and also south (about 10 km) of the Augrabies Falls National Park (Refer to Figure 1).

- The **farm** (Portion 91 of Orange Falls No. 16) is approximately **81.003 ha** in size.
- The **development footprint** within the farm is approximately **10 ha in size** (Refer to Figure 2).

Figure 1: Location map indicating the approximate location of the property in relation to nearby towns

Figure 2: The development footprint (red) on the property



NATURAL VEGETATION EXPECTED

According to the 2012 (beta 2) version of the Vegetation map of SA (Mucina & Rutherford, 2006) property would falls within a vegetation type known as Bushmanland Arid Grassland (Refer to Figure 3), a vegetation type classified as "Least Threatened", according to the *National list of ecosystems that are threatened and in need of protection* (GN 1002, 9 December 2011).

Figure 3: Vegetation map of South Africa (2012 beta 2 version), indicating the location of the farm

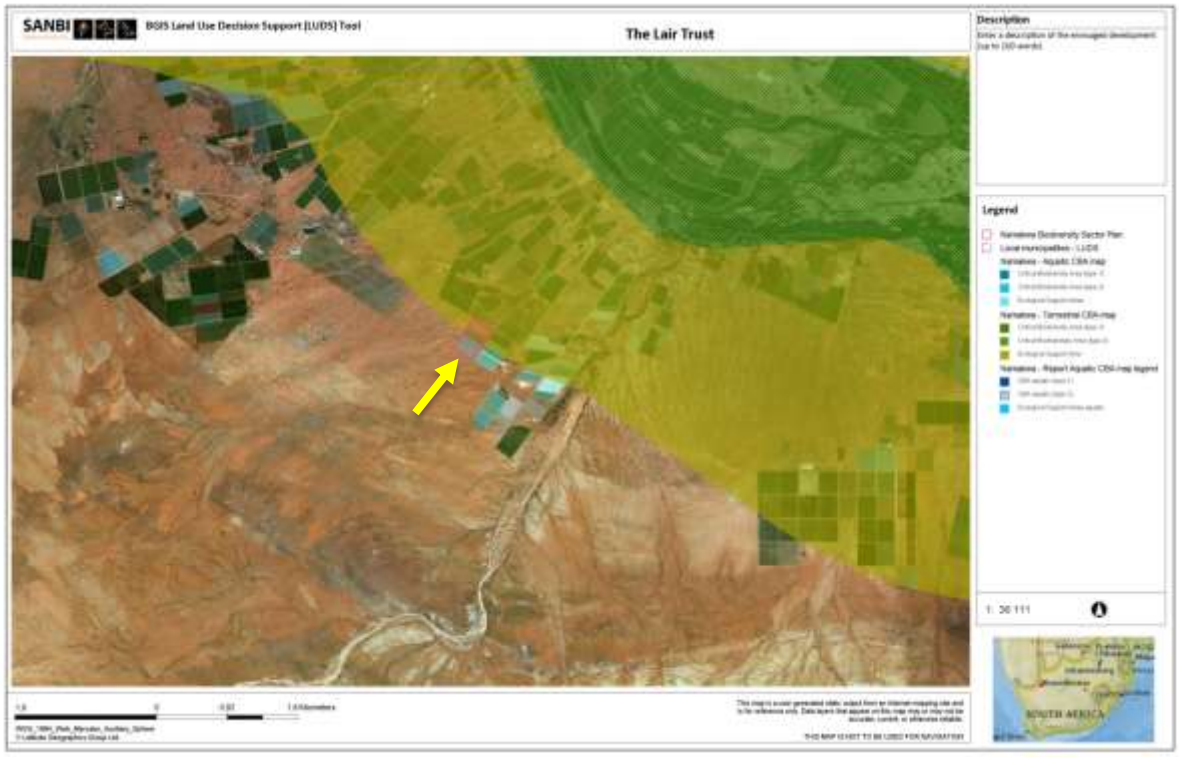
According to Mucina & Rutherford (2006), Bushmanland Arid Grassland is found widespread in the Northern Cape from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the northwest this vegetation unit borders on desert vegetation (northwest of Aggeneys and Pofadder). It is described as sparsely vegetated grassland dominated by white grasses with a semi-desert "steppe" character. Good rains can lead to rich displays of annual herbs.

According to the 2004 National Spatial Biodiversity Assessment (Mucina & Rutherford, 2006) the Conservation target for this vegetation type is 21%. Even though the vegetation is classified as "Least Threatened", only small patches (about 4%) of this vegetation type are currently statutorily conserved, mainly in the Augrabies Falls National Park and the Goegab Nature Reserve, meaning that the conservation target has not yet been reached. Fortunately, very little of the area has been transformed.

CRITICAL BIODIVERSITY AREAS MAPS

The Namakwa District Biodiversity Sector Plan (2008) gives both aquatic and terrestrial Critical Biodiversity Areas (CBAs) and ecological support areas for the Namakwa District Municipality (Refer to Figure 4).

Figure 4: The Namakwa District Biodiversity Sector Plan (2008), fine scale maps, indicating the location of the development (red)



According to Namakwa District Biodiversity Sector Plan (2008), the development borders on and also slightly encroach on an ecological support area (ESA) which was established as a terrestrial migration corridor associated with the Orange River corridor. However, it must be noted that most of this corridor in this vicinity is compromised as a result of existing agricultural development. Most of the neighbouring areas to the west, north and east of the Lair Trust farm have already been transformed into agricultural land. To the south of the property (falling outside of the ESA) natural is still encountered.

VEGETATION ENCOUNTERED

A site visit was performed on the 1st of June 2017, during which the author drove through the vineyards and walked the natural veld surrounding the development in order to get a feel for the condition of the remaining natural veld (Refer to Figure 5). The property is about approximately 81 ha in size of which a total of approximately 20-25 ha are presently developed into agricultural land and associated infrastructure (including homestead and pack houses). The agricultural land can be described as transformed with no natural veld left, but the remainder of the property still supports natural veld, most of which is still in fairly good condition.

The property and its surroundings are located on an almost flat plain with very little slope. As a result it shows the typical ephemeral drainage lines that are so typical of the Northern Cape. These alluvial fans are the result

of flash floods (thunderstorm events) draining the surroundings plains. Very rarely will they result in the formation of significant watercourses.

Figure 5: Shows the property (in red) and the route walked and droved during the site visit

At the time of the site visit the area was dry, but a number of herbs were observed, indicating that that the area did receive some recent rains, although the grassy cover was not yet that prominent (Photo 1). The vegetation can be described as a sparse low shrubland, with larger shrubs and occasionally trees (like *Parkinsonia africana* and *Ozoroa dispar*) observed next to the ephemeral drainage lines.

The plant species observed are typical species expected for this vegetation type and includes: *Acanthopsis disperma*, *Aloe claviflora* (Kraalalwyn), *Aptosimum spinescens*, *Aristida congesta*, *Boscia albitrunca* (occasionally), *Boscia foetida*, *Cynanchum viminale*, *Hermannia gariepina*, *Hirpicium* species, cf. *Hoffmannseggia burchellii*, *Hypertelis salsoloides*, *Justicia australis*, *Justicia spartioides*, *Kleinia longiflora*, *Limeum aethiopicum*, *Lycium cinereum*, *Ptycholobium biflorum*, *Rhigozum trichotomum*, *Rogeria longiflora*, *Salsola* species, *Schmidtia kalahariensis*, *Senegalia mellifera* (Black-thorn) more often acting as host for the hemiparasitic plant *Tapinanthus oleifolius* (Nam-nambos), *Stipagrostis* species *Thesium lineatum, Tribulus cristatus* and *Zaluzianskya* cf. *benthamiana*.

Photo 1 shows the remaining vegetation to the south of the property adjacent to the new development, while Photo 2 shows the vegetation to the northwest of the new development.

Photo 1: Typical vegetation encountered on site (to the south of the new vineyard blocks)

Photo 2: Vegetation encountered to the northwest of the new vineyard development

The area impacted as a result of the vineyard development would have been covered by similar vegetation as encountered on the rest of the site (described above).

FLORA ENCOUNTERED

Probably the most significant aspect of the vegetation encountered on the property is the fact that a number of plant species observed is protected in terms of national or provincial legislation.

South Africa has become the first country to fully assess the status of its entire flora. The Red List of South African Plants Online provides up to date information on the national conservation status of South Africa's indigenous plants. **No red-listed species** was observed during the site visit. Also, **no plants protected in terms of the National Environmental Management: Biodiversity Act**, Act 10 of 2004 and its "Lists of critically endangered, endangered, vulnerable and protected species" (GN. R. 152 of 23 February 2007) were encountered on the site.

One plant is protected in terms of the National Forest Act, Act 84 of 1998 (Protected tree species) namely:

- *Boscia albitrunca*. Although the Shepherds tree was not common on the remainder of the property it is possible that a small number of these trees might have been removed in order to develop the site.

Two plant species protected in terms of the Northern Cape Nature Conservation Act, Act 9 of 2009 was also encountered namely:

- *Aloe claviflora.* Only two patches of the Kraanaalwyn were observed, indicating that their numbers are relatively low. Still it is likely that the development would have impacted on a number of these plants.
- *Boscia foetida*. Again the numbers of the smelly Shepherds observed were very low and they were then mostly associated with the ephemeral drainage lines. Still it is likely that some of these plants might also have been impacted as a result of the development.

IMPACT ASSESSMENT METHOD

The objective of this study was to evaluate the botanical diversity of the property area in order to identify significant environmental features which might have been impacted as a result of the development. The Ecosystem Guidelines for Environmental Assessment (De Villiers *et. al*., 2005), were used to evaluate the botanical significance of the property with emphasis on:

- Significant ecosystems
    - Threatened or protected ecosystems
    - Special habitats
    - Corridors and or conservancy networks
- Significant species
    - Threatened or endangered species
    - Protected species

DETERMINING SIGNIFICANCE

Determining impact significance from predictions of the nature of the impact has been a source of debate and will remain a source of debate. The author used a combination of scaling and weighting methods to determine significance based on a simple formula. The formula used is based on the method proposed by Edwards (2011). However, the criteria used were adjusted to suite its use for botanical assessment. In this document significance rating was evaluated using the following criteria.

Significance = Conservation Value x (Likelihood + Duration + Extent + Severity) (Edwards 2011)

***Conservation value*:** Conservation value refers to the intrinsic value of an attribute (e.g. an ecosystem, a vegetation type, a natural feature or a species) or its relative importance towards the conservation of an ecosystem or species or even natural aesthetics. Conservation status is based on habitat function, its vulnerability to loss and fragmentation or its value in terms of the protection of habitat or species (Refer to Table 1 for categories used).

Table 1: Categories used for evaluating conservation status

CONSERVATION VALUE	
Low (1)	The attribute is transformed, degraded not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
Medium/low (2)	The attribute is in good condition but not sensitive (e.g. Least threatened), with unlikely possibility of species loss.
Medium (3)	The attribute is in good condition, considered vulnerable (threatened), or falls within an ecological support area or a critical biodiversity area, but with unlikely possibility of species loss.
Medium/high (4)	The attribute is considered endangered or, falls within an ecological support area or a critical biodiversity area, or provides core habitat for endemic or rare & endangered species.
High (5)	The attribute is considered critically endangered or is part of a proclaimed provincial or national protected area.

Likelihood refers to the probability of the specific impact occurring as a result of the proposed activity (Refer to Table 2, for categories used).

Table 2: Categories used for evaluating likelihood

LIKELIHOOD	
Highly Unlikely (1)	Under normal circumstances it is almost certain that the impact will not occur.
Unlikely (2)	The possibility of the impact occurring is very low, but there is a small likelihood under normal circumstances.
Possible (3)	The likelihood of the impact occurring, under normal circumstances is 50/50, it may or it may not occur.
Probable (4)	It is very likely that the impact will occur under normal circumstances.
Certain (5)	The proposed activity is of such a nature that it is certain that the impact will occur under normal circumstances.

Duration refers to the length in time during which the activity is expected to impact on the environment (Refer to Table 3).

Table 3: Categories used for evaluating duration

DURATION	
Short (1)	Impact is temporary and easily reversible through natural process or with mitigation. Rehabilitation time is expected to be short (1-2 years).
Medium/short (2)	Impact is temporary and reversible through natural process or with mitigation. Rehabilitation time is expected to be relative short (2-5 years).
Medium (3)	Impact is medium-term and reversible with mitigation, but will last for some time after construction and may require ongoing mitigation. Rehabilitation time is expected to be longer (5-15 years).
Long (4)	Impact is long-term and reversible but only with long term mitigation. It will last for a long time after construction and is likely to require ongoing mitigation. Rehabilitation time is expected to be longer (15-50 years).
Permanent (5)	The impact is expected to be permanent.

Extent refers to the spatial area that is likely to be impacted or over which the impact will have influence, should it occur (Refer to Table 4).

Table 4: Categories used for evaluating extent

EXTENT	
Site (1)	Under normal circumstances the impact will be contained within the construction footprint.
Property (2)	Under normal circumstances the impact might extent outside of the construction site (e.g. within a 2 km radius), but will not affect surrounding properties.
Surrounding properties (3)	Under normal circumstances the impact might extent outside of the property boundaries and will affect surrounding land owners or –users, but still within the local area (e.g. within a 50 km radius).
Regional (4)	Under normal circumstances the impact might extent to the surrounding region (e.g. within a 200 km radius), and will regional land owners or –users.
Provincial (5)	Under normal circumstances the effects of the impact might extent to a large geographical area (>200 km radius).

Severity refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur (Refer to Table 5).

Table 5: Categories used for evaluating severity

SEVERITY	
Low (1)	It is expected that the impact will have little or no affect (barely perceptible) on the integrity of the surrounding environment. Rehabilitation not needed or easily achieved.
Medium/low (2)	It is expected that the impact will have a perceptible impact on the surrounding environment, but it will maintain its function, even if slightly modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium (3)	It is expected that he impact will have an impact on the surrounding environment, but it will maintain its function, even if moderately modified (overall integrity not compromised). Rehabilitation easily achieved.
Medium/high (4)	It is expected that the impact will have a severe impact on the surrounding environment. Functioning may be severely impaired and may temporarily cease. Rehabilitation will be needed to restore system integrity.
High (5)	It is expected that the impact will have a very severe to permanent impact on the surrounding environment. Functioning irreversibly impaired. Rehabilitation often impossible or unfeasible due to cost.

SIGNIFICANCE CATEGORIES

The formal NEMA EIA application process was developed to assess the significance of impacts on the surrounding environment (including socio-economic factors), associated with any specific development proposal in order to allow the competent authority to make informed decisions. Specialist studies must advise the environmental assessment practitioner (EAP) on the significance of impacts in his field of specialty. In order to do this, the specialist must identify all potentially significant environmental impacts, predict the nature of the impact and evaluate the significance of that impact should it occur.

Potential significant impacts are evaluated, using the method described above, in order to determine its potential significance. The potential significance is then described in terms of the categories given in Table 6.

Table 6: Categories used to describe significance rating (adjusted from DEAT, 2002)

SIGNIFICANCE	DESCRIPTION
Insignificant or Positive (4-22)	There is no impact or the impact is insignificant in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or the impact may be positive.
Low (23-36)	An impact barely noticeable in scale or magnitude as a result of low sensitivity to change or low intrinsic value of the site, or will be of very short-term or is unlikely to occur. Impact is unlikely to have any real effect and no or little mitigation is required.
Medium Low (37-45)	Impact is of a low order and therefore likely to have little real effect. Mitigation is either easily achieved. Social, cultural and economic activities can continue unchanged, or impacts may have medium to short term effects on the social and/or natural environment within site boundaries.
Medium (46-55)	Impact is real, but not substantial. Mitigation is both feasible and fairly easily possible, but may require modification of the project design or layout. Social, cultural and economic activities of communities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long term effect on the social and/or natural environment, within site boundary.
Medium high (56-63)	Impact is real, substantial and undesirable, but mitigation is feasible. Modification of the project design or layout may be required. Social, cultural and economic activities may be impacted, but can continue (albeit in a different form). These impacts will usually result in medium to long-term effect on the social and/or natural environment, beyond site boundary within local area.
High (64-79)	An impact of high order. Mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted and may come to a halt. These impacts will usually result in long-term change to the social and/or natural environment, beyond site boundaries, regional or widespread.
Unacceptable (80-100)	An impact of the highest order possible. There is no possible mitigation that could offset the impact. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. The impact will result in permanent change. Very often these impacts are un-mitigatable and usually result in very severe effects, beyond site boundaries, national or international.

IMPACT ASSESSMENT

The impact assessment took into account that the vegetation type is not considered vulnerable or endangered and no red-listed plants were observed, although protected plants were observed. No special habitats were likely to be impacted (apart from the ephemeral drainage lines). However, a portion of the development is located within an ecological support area.

Aspect	Short description	CV	Lik	Dur	Ext	Sev	Sign.	Short discussion
Geology & soils	The development had a direct impact on approximately 10 ha of soils associated with Bushmanland Arid Grassland vegetation. However, no other sensitive geological habitats were observed (e.g. termite mounts or true quartz patches).							
	Significance	2	1	4	2	1	16	No significant features observed
Landuse and cover	The development impacted on approximately 10ha of a remaining 65 to 70ha of natural veld on an operating farm. The only viable alternative land-use is livestock grazing by the owners. However, since the grazing potential of the veld is very low, and the farm is relatively small, intensive agriculture will be much more viable than livestock grazing (the development might thus be considered a positive impact in terms of landuse).							
	Significance	2	1	4	2	1	16	No alternative landuse was observed (e.g. livestock grazing).
Vegetation type	The development footprint is relatively small and the vegetation classified as Least Threatened.							
	Significance	2	2	4	1	1	16	Impact considered very small and localized.
Conservation priority areas and connectivity	A portion of the property falls within an ecological support area which aims at the protection of terrestrial migration corridors associated with the Orange River corridor. But the property itself is located within an agricultural landscape.							
	Significance	2	3	4	1	2	20	Impact considered very small and localized.
Watercourses and wetlands	Ephemeral drainage lines are present on the property, but no significant watercourse was observed or expected to have been impacted. However, stormwater management will have to be part of the management.							
	Significance	1	2	4	1	1	8	Impacted on small ephemeral drainage lines but no significant watercourses.
Flora	No red-listed species was encountered but a number of protected species is likely to have been impacted.							
	Significance	3	3	4	1	2	30	Development without the necessary flora permits.
Cumulative impacts	Cumulative impacts refer to the sum of all impacts associated with the proposed development. In this case it was measured in terms of its potential impact on the vegetation type, red-listed species and protected species.							
	Significance	3	3	4	2	2	33	Development without mitigation.

According to the impact assessment it is unlikely that the development would have had any significant impact on botanical features and it is very unlikely that the development would have been disallowed on the basis of botanical issues.

Taken the above into consideration it is highly unlikely that the development contributed significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g. migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity

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