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BOTANICAL ASSESSMENT OF PORTION 18 FARM 238 STORMSVLEI

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1. INTRODUCTION

This specialist botanical assessment was completed to assist decision making for the proposed development of a chicken farm on Portion 18 of Farm 238 Stormsvlei.
The proposal involves the staggered development of 12 X 1000m^2 or 6 X 2000m^2 chicken rearing houses. This will involve an approximate 12 000m^2 development area.
The study site lies directly on the north embankment side of the Sonderend River just outside the town of Stormsvlei on the R317 to Robertson. This is an approximately 211hectare area at an altitude range of 100 to 180masl and is variously used for livestock grazing. The site is surrounded by privately owned properties. No declared private mountain catchment abuts the site. The floodplain area of the Sonderend River forms the southern boundary of the site.

2. LIMITATIONS AND METHODOLGY

The site was visited on the 19 and 20 February 2011. This is at the lowest flowering season for both renosterveld and fynbos and as such identification to the species level was significantly constrained. This was especially so for the geophytic component. The botanical assessment therefore focused on:

- the condition and rarity of the vegetation type/s,
- the degree of species diversity,
- ecological viability and connectivity,

to assess conservation value and botanical sensitivity. A relatively accurate assessment of key indicator species and diversity patterns of the vegetation was obtained.

To obtain a more comprehensive species specific and thus Red List (RL) species assessment a botanical survey of the site need to be conducted in the peak late winter to spring flowering months. No RL data was available from the CREW (Custodians of Rare and Endangered Wildflowers) of SANBI for the area or near adjacent area. Specific RL species known from the vegetation type were researched before the site visit.

The primary assessment objective was to determine placement areas for the proposed chicken pens with regards to botanical considerations and constraints. Potential impacts were assessed with regards to nature, extent, duration, intensity and probability of occurrence, significance and cumulative impact.

The botanical impact of the no-go for this development option was also assessed.

3. TERMS OF REFERENCE

The standard CapeNature terms of reference for biodiversity specialists was used and included assessment to the degree possible, given the limitations.

- Describe the broad ecological characteristics of the site.
- A baseline analysis of the botanical attributes of the site as a whole including a map of sensitive areas and constraints.
- In terms of biodiversity pattern identify and describe:
    - any significant landscape features;
    - the main vegetation types;
    - threatened or vulnerable ecosystems;
    - Red Listed plant species and population size and viability;
    - the likelihood of additional Red listed species;
    - the extent of alien plant cover;
    - condition of the site in terms of past and present use.
- In terms of biodiversity process:
    - key drivers of the ecosystem such as fire, pollination;
    - upland-lowland gradients;
    - corridors.
- Significance of the potential impact of the proposed project with and without mitigation on the biodiversity patterns and process on the site, landscape and regional scale.
- Recommend actions that should be taken to prevent or mitigate impacts.
- Indicate actions that can ensure long-term protection, management and restoration of the affected ecosystems and biodiversity.
- Indicate limitation and assumptions, particularly in relation to seasonality.

4. REGIONAL CONTEXT OF THE VEGETATION

The study area is located within the Fynbos Biome of the Cape Floristic Region, widely acknowledge as a critical global centre of plant diversity and endemism. Within this floristic area it is the lowland and renosterveld habitats and associated plant species and processes that are under the most pressure from agriculture, urbanization and alien plant invasion, reducing the intact habitats to small remnant fragments.

5. SITE VEGETATION

The natural vegetation on site has been classified and mapped for the Vegetation of South Africa (Mucina and Rutherford, 2006) as **Cental Reuns Shale Renosterveld** on an underlying Bokkeveld Shale geology. This vegetation type occurs over the area of the central Overberg from Greyton to Stromsvlei, lying between the Eastern and Western Reuns Shale Renosterveld. A thin band of mountainous Northen Sonderend Sandstone Fynbos with further Breede Shale Renosterveld vegetation occurs to the north.

Central Reuns Shale Renosterveld vegetation type is nationally recognized as Critically Endangered in terms of the present Draft National List of Threatened Ecosystems (Gov. Gazette No. 32689 GN 1477 of 2009). The target conservation of 27% cannot be met since 87% of the area has already been transformed by cultivation.The vegetation type exists as fragments throughout its range mainly on the steeper sides of hills. Small patches are conserved in the Agulhas National Park. (Mucina and Rutherford 2006). As such all remaining natural vegetation within this ecosystem type is to be regarded as of high conservation value.

The site occur at the eastern end of the Central Reuns Shale Renosterveld and as such the vegetation has ecotonal characteristics with Western Reuns Shale Renosterveld indicated by the occurrence of *Aloe Ferox.* There are also fynbos elements with the Restio family, *Ischyrolepis capensis* and the Protea family *Serruria acrocarpa*, *Protea repens*. Exposed surfaces of gravels occur in patches with the Mesemb *Cheiridopsis sp.*

The condition of the vegetation on the study site ranges from totally transformed to areas that are in a good botanical condition. All intact natural areas can be expected to support a varying and significant number of conservation value plant species.

Excluding the floodplain area, the site is most significantly divided into two areas of vegetation condition with regards to the extent of degradation and species diversity. These two areas are demarcated by an existing fence line (GPS 34° 04' 36.1" S : 20° 06' 08.2" E to 34° 04' 25.3" S : 20° 06' 18.4" E) on the west side of the road through the south –north width of the study site.

The **western section** of the site comprising some 45 hectares (excl floodplian) referred to as **section A** has been heavily disturbed by grazing and significant removal of the rock cover. The veld is dominated by the few disturbance tolerant species of *Athanasia trifurcata*, *Cliffortia ruscifolia* and *Elytropappus rhinocerotis* that occur at varying density through out this section. Within this area and to the south of the existing warehouse is a small isolated patched of vegetation, section A1, with a medium diversity of species and habitat condition. This patch has

no direct ecological connectivity to the relatively well intact vegetation of the eastern section of the site.

Within section A the floodplain area has been the most heavily disturbed and exists almost exclusive as a grazed grass cover. Given that this is the floodplain area it is presumed that it is not open to development by the chicken pens. The Sonderend River banks are heavily (100%) infested with *Eucalyptus* and *Acacia mearnsii* trees.

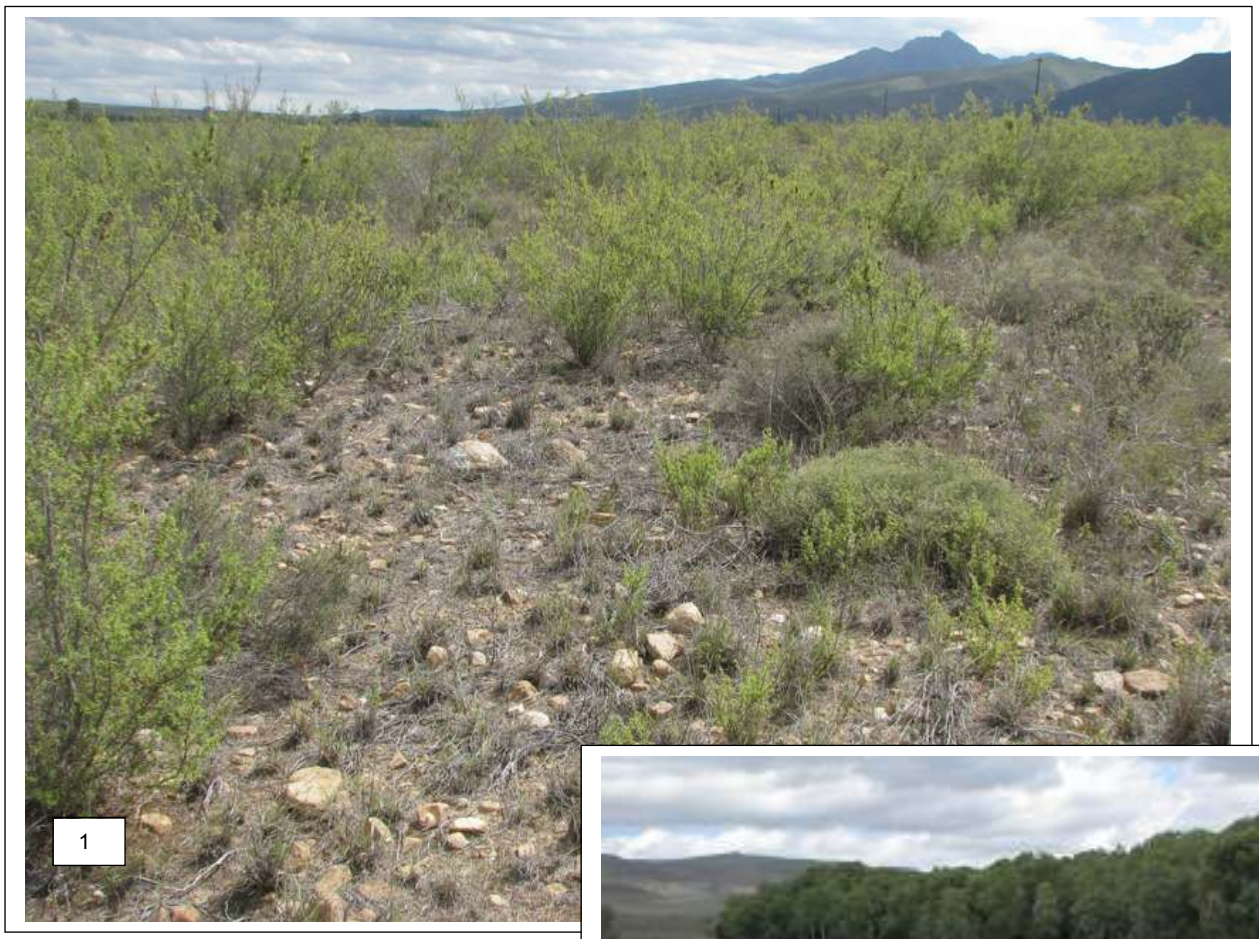

Photo 1: Section A has been heavily disturbed by grazing and significant removal of the rock cover.

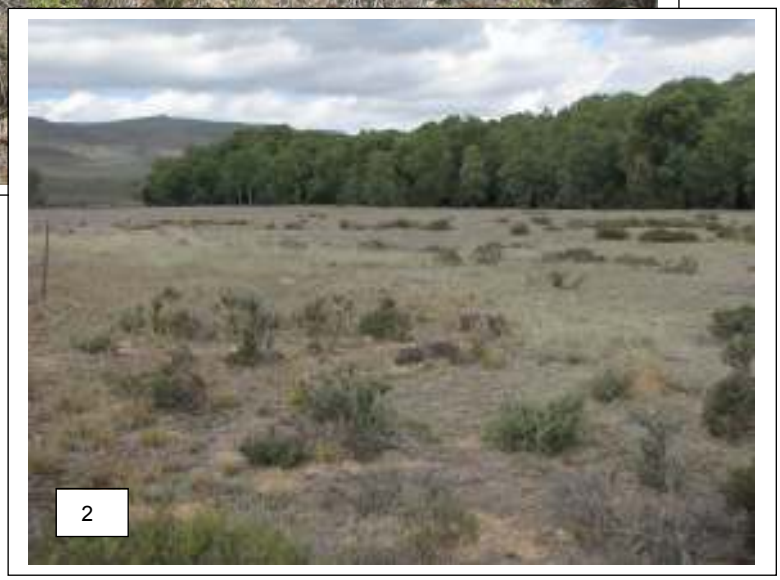

Photo 2: Section A floodplain area heavily disturbed and exists almost exclusive as a grazed grass cover. The Sonderend River banks infested with *Eucalyptus* and *Acacia mearnsii* trees.

The **eastern section** referred to as **section B** of some 126.65 Hectares (excl floodplain) supports a well intact and diverse vegetation. The loamy soils are well covered by small rocks and stones. The vegetation communities change in species composition and dominant species on a south to north gradient. Dominant species include *Cliffortia ruscifolia*, the Asteraceae: *Oedera squarrosa; Macledium spinosum; Metalasia acuta; Disparago ericoides, Eriocephalus sp*., as well as legumes of *Aspalathus* species and *Gnidia laxa* and *Freylinia undulata.* The Aizoaceae/Mesemb family succulents of *Lampranthus* and *Drosanthemum* are also conspicuous. Emergent shrubs of *Dodonaea, Rhus* and *Carissa* are found as well as patches of *Aloe ferox*. The Proteaceae *Serruria acrocarpa* and senescent *Protea repens* occur. The vegetation has not been burnt for an extended period with the *Protea repens* aged at 25-30 years. There is a large amount of dry dead plant material with well established lichens. Burning will significantly improve the quality and conservation worthiness of the vegetation here.

The central area of this section has a more succulent community dominated by Asteraceae the Red listed ***Stoebe rugulosa*** **(RDL = Endangered)** coming into flower and *Elytropappus rhinocerotis* with succulents *Senecio radicans, Haworthia pumila, Chironia baccifera, Glottiphyllum depressum Adromischus filicaulis, Cotyledon* and *Euphorbia* species. Exposed gravel patches occur within the community with *Cheiridopsis sp.* (GPS 34^{o} 04' 36.5" S ; 20^{o} 06' 38.8" E).This area also has an approximately 35% coverage of the Rooikrans, *Acacia cyclops*. There is some biological control of these aliens evident on the plants. The drainage line through this section has also been invaded by alien *Acacia* species.

Northwards within this section towards the mountain the vegetation is in very good condition and has transitional element to the sandstone fynbos.

Throughout this eastern section are clear signs of use by indigenous buck fauna and various burrowing animals. Ants are particularly active. No cattle grazing is evident at present except for parts of the floodplain area of this section. The Sonderend River banks and part of the floodplain are heavily (100%) infested with *Eucalyptus* and *Acacia mearnsii* trees.

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Photo 3. Southern extent of section B with *Aloe ferox* present. Much of the veld exists with significant dead material with lichen growth and is in need of a burn.

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Photo 4. A large senescent 25-30 year old *Protea repens*.

Photo 5. Exposed gravel patches occur within the central area of section B with a specific plant species community.

Photo 6. *Cheiridopsis sp.* on the gravel terraces of section B

Given the significant limitation of seasonality only one flowering Red Listed species was recorded from the entire study area and occurs in the east section B of the property site. *Stoebe rugulosa* is a RDL Endangered and is on the decline with only five populations known. It has not previously been recorded from this locality. (Raimondo, D et al, 2009). The number of red listed species is expected to be significantly higher if assessed in season and given the ecotonal nature of the vegetation type on site.

The mature veld age also highlights the possibility of fire enhanced geophytes occurring on the clay based soils of the site.

Photo 7. The Red Listed as Endangered *Stoebe rugulosa* of the Asteraceae or daisy family.

6. CONSERVATION VALUE AND BOTANICAL SENSITIVITY

The conservation value and botanical sensitivity of the study site is described for the two habitat condition sections A & A1 and B.

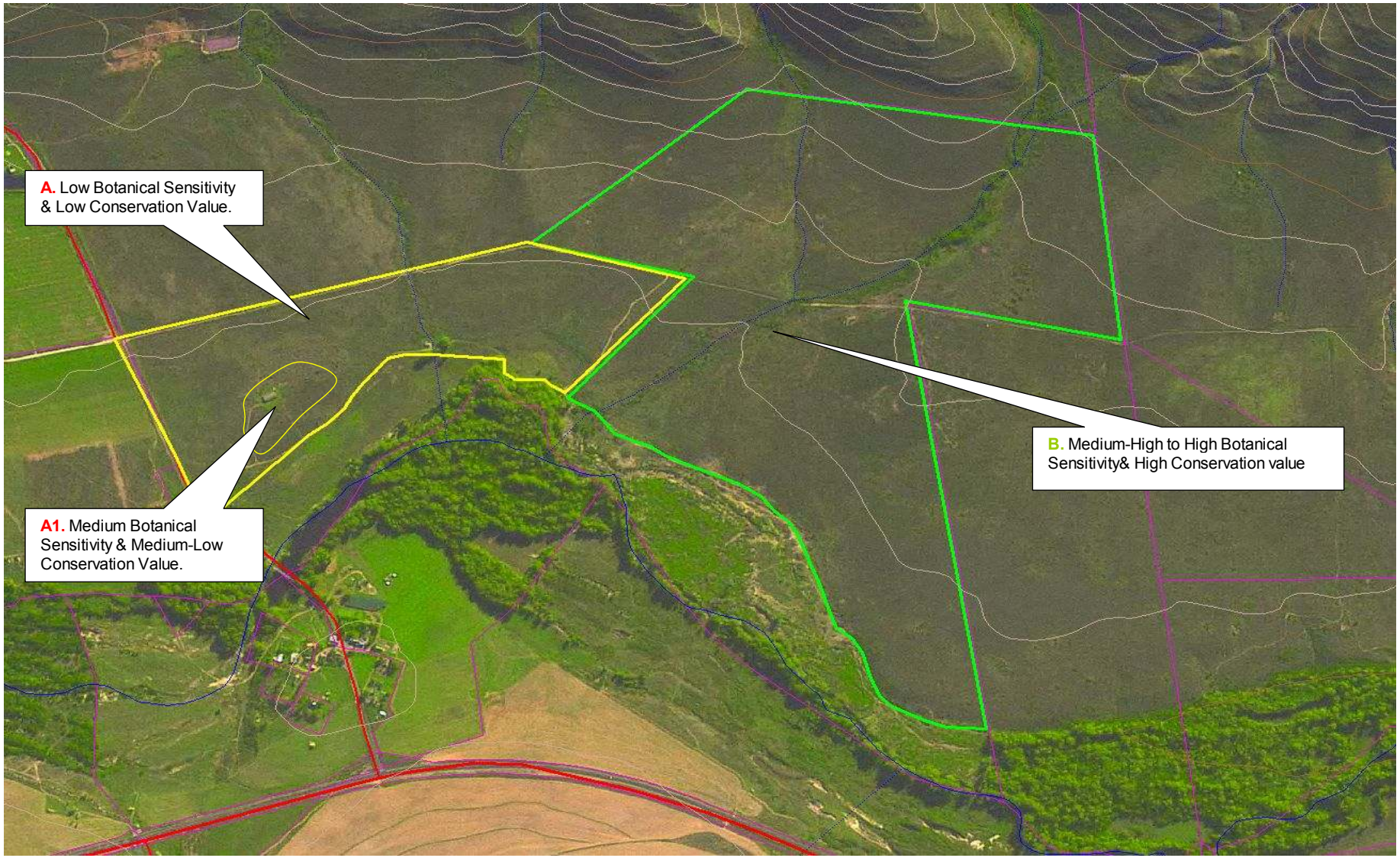
The highly degraded **section A** comprising the eastern portion of the study site on the south – north fence line (GPS 34° 04' 36.1" S : 20° 06' 08.2" E to 34° 04' 25.3" S : 20° 06' 18.4" E) is comprised of a few disturbance resistant plant species. This low species diversity and high habitat disturbance make the vegetation here of Low botanical sensitivity and Low conservation value. Given that very little of the indigenous vegetation remains and that rehabilitation of this area would be extremely difficult, the conservation value of this area of the site is rated as being Low.

Within this section the patch A1of medium diversity of species and habitat condition has a reduced conservation value due to the lack of connectivity to ant adjacent intact natural vegetation. The conservation value of the patch is rated as being Medium-Low.

To the west of the given GPS line and referred to as **section B**, the vegetation has a range of Medium-High to High species diversity and habitat condition. The moderation in habitat condition comes almost exclusively from the exclusion of fire from the area. The area also has connectivity to surrounding intact vegetation. Botanical sensitivity and conservation value are therefore rated as High.

The confidence level of the botanical sensitivity and conservation values are regarded as high.

Figure 1: (Following page) This aerial photo of the study site demarcates the two sections, section A and A1 from section B as discussed in the text. A plant species community composition gradient exist on the altitudinal gradient from south to north.


A. Low Botanical Sensitivity & Low Conservation Value.
A1. Medium Botanical Sensitivity & Medium-Low Conservation Value.
B. Medium-High to High Botanical Sensitivity& High Conservation value
N
Scale 1:15000

7. IMPACT ASSESSMENT

It is assumed that the chicken rearing houses will permanently disturb an area of 12 000m^2 occurring as individual and isolated segments and that there will be access roads to these houses.

Direct negative botanical impacts of the proposed development are expected to involve the loss of the on site vegetation and probable loss of some ecological process. Indirect impacts are those that may possibly be encountered with the operational phase of the development.

The **direct negative impact on section A** is the loss of a heavily degraded vegetation type and habitat. Despite being within a Critically Endangered vegetation type the area has very low rehabilitation potential and the proposed development impact here is regarded as Low.
Area A1 within this section, although of medium diversity has little long term viability due to the disconnected nature of the remnant. Development of this area will have a Medium-Low Impact.

The only **recommended mitigation** to development within this area would be to place the chicken pens no less than 5 meters away from the intact vegetation of section B. This would be to allow for a buffer area for the disturbance impact of “edge effect” and to serve as a fire break belt. Other than this there would no botanical restrictions on alternatives to the placement arrangement of the chicken houses/pens within this area.

The **direct negative impacts on section B** would be the permanent loss of vegetation with a Medium-High to High habitat condition and plant diversity. Development may involve Red Listed plant species. As such any development in this area will have a High impact.

No mitigation measures are offered with the development of section B.

As such a very significant difference in the direct botanical impacts are expected with the proposed development of the two identified sections.

Indirect negative impacts are envisaged only with the **development of section B**. The scattered placement of chicken pens with connective corridors within this area opens the vegetation to a significant long- term “edge effect” degradation. The loss of important ecological drivers such fire may be expected due to the difficulty of implementing a fire regime with embedded development sites. Both of these effectively will diminish the habitat condition of the intact areas.

An **indirect positive impact** of the **development of only section A** may be the recommended alien clearing and a burning schedule in Section B. The condition of the vegetation can be considerably improved with the implementation of the key ecosystem driver, fire, to stimulate the bulbous, indigenous grass and proteoid components. This can be seen as a mitigation measure.

There are no real cumulative botanical impacts of the development of section A or A1. Cumulative impacts of the development of section B however is the regional loss of habitat and conservation value of the Central Reuns Shale Renosterveld.

The alternative no-go option allows for the continuation of the status quo and is possibly temporary condition with a neutral impact.

Summary Table 1:Botanical Impact assessment for direct impacts from the development of Section A &A1

Impact	**Extent**	**Duration**	**Intensity**	**Status**	**Significance**	**Confidence**
A. Loss of Vegetation	Local	Permanent	Low	-ve	Low	High
A1 Loss of Vegetation	Local	Permanent	Low	-ve	Medium-Low	High

Summary Table 2: Botanical Impact assessment for indirect impacts from the development of Section A &A1.

Impact	**Extent**	**Duration**	**Intensity**	**Status**	**Significance**	**Confidence**
Alien clearing & fire in Section B	Local & regional	Permanent	High	+ve	High	High

Summary Table 3: Botanical Impact assessment for direct impacts from the development of Section B

Impact	**Extent**	**Duration**	**Intensity**	**Status**	**Significance**	**Confidence**
Loss of Vegetation	Local & regional	Permanent	High	-ve	High	High

Summary Table 4: Botanical Impact assessment for indirect impacts from the development of Section B

Impact	Extent	Duration	Intensity	Status	Significance	Confidence
Edge effect	Local	Permanent	High	-ve	High	High
Loss of process	Local & regional	Permanent	High	-ve	High	High

The total on site floodplain area of approximately 44 Hectares is the most heavily disturbed by present grazing and alien plant infestation. Development here is subject to the 1 in 100 year flooding.

All impacts are considered to be irreversible with irreplaceable loss of existing vegetation cover both over a medium to long term.

8. RECOMMENDATIONS

- Development activities are to be confined to the area of Low botanical sensitivity and Low conservation value (Section A). This includes the patch A1 with Medium diversity and Medium-Low conservation value.

- No development on the adjacent High botanical and conservation value area (Section B) should be considered. No real and effective mitigations measures can be offered to facilitate the conservation of the flora with the development of this section.

- The recommended mitigation to development within Section A is to place the chicken pens no less than 5 meters away from the intact vegetation of section B.

- The high conservation value of Section B should be maintained with an appropriate management plan for alien plant clearing and burning. This is recommended as a mitigation and as part of the operational environmental management programme development agreement for Section A. Provision should be made for monitoring and auditing.

10. REFERENCES

Greesse, P. 1997. Geological Series 1:250 000 3319 Worcester. Council for Geoscience. Bellville.

Government Gazette No 32689. November 2009. GN. 1477 of 2009. Draft National List of Threatened Ecosystems.

Mucina, L and Rutherford C. R.(eds). 2006. The Vegetation of South Africa, Lesotho and Swaziland.Strelitzia 19. . SANBI

Raimondo, D. et. al. 2009. Red List of South African Plants. Strelitzia 25. SANBI.