



BOTANICAL SCAN

OWK RAISIN PROCESSING FACILITY

BLAAUWSKOP SETTLEMENT ERF 151, KENHARDT (NORTHERN CAPE)

A Botanical scan of the area that will be impacted by the proposed facility and associated infrastructure.

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DECLARATION

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RELEVANT QUALIFICATIONS & EXPERIENCE

Mr. Peet Botes holds a BSc. (Hons.) degree in Plant Ecology from the University of Stellenbosch (Nature Conservation III & IV as extra subjects). Since qualifying with his degree, he has been employed for more than 15 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTB and being responsible for developing and implementing an ISO14001 environmental management system, ensuring environmental compliance, performing environmental risk assessments with regards to missile tests and planning the management of the 26 000 ha of natural veld, working closely with CapeNature (De Hoop Nature Reserve). In 2005 he joined Enviroscientific, an independent environmental consultancy specializing in wastewater management, botanical assessments and developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits. He was also responsible for helping develop the biodiversity part of the "Farming for the Future" audit system implemented by Woolworths. During his time with Enviroscientific he performed more than 400 biodiversity and environmental legal compliance audits. During 2010 he joined PB Consult in order to move back to the biodiversity aspects of environmental management. Experience with PB Consult includes EIA applications, biodiversity and botanical assessments, environmental compliance audits and environmental control work.

Mr. Botes is also a registered Professional Environmental and Ecological Scientists at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003, since 2005.

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1. INTRODUCTION

Orange River Cellars (OWK) proposes to establish and operate a new raisin processing facility on Erf 151, Kenhardt (near Keimoes) in the Northern Cape. OWK (owners of the property) already operates a winery on a portion of the property. One of the OWK's wineries is already located on the property. The proposed expansion of its activities on the site will include the establishment of concrete drying beds, drying sheds and associated infrastructure which is likely to have a physical footprint of more than 5 ha.

The property, Erf 151, is 29.8729 ha in extent, located near the Blaauwskop Settlement (Kanoneiland), about 18 km east of Keimoes. Since the proposed development will likely result in the clearance of an area of larger than 1 ha of indigenous vegetation, NEMA EIA authorization must be obtained.

EnviroAfrica was appointed by OWK to perform the NEMA EIA application. Since there are still natural veld on the property, EnviroAfrica appointed PB Consult to perform a botanical scan of the area that may be impacted.

The site visit showed that large portions of the property are already impacted by the existing land use practices (winery and its associated activities).

2. TERMS OF REFERENCE

PB Consult was appointed by EnviroAfrica to conduct a botanical scan of the proposed site with the following terms of reference:

- Evaluate the extent and significance of the existing natural vegetation on site.
- A desktop assessment of all available information, environmental protections and context.
- Review proposed development *i.t.o.* relationship with the neighbouring properties and land uses.
- Site assessment of vegetation condition and context in terms of connectivity environments and any identified concerns of constraints associated therewith.
- Produce a constraints map indicating areas of development (no issues), possible development (botanical issues which can be worked to some extent) and No-Go areas.
- Produce a report detailing the findings and mitigation measures.

3. APPLICABLE LEGISLATION

Constitution of the Republic of South Africa (1996): of special relevance in terms of environment is section 24

Conservation of Agricultural Resources Act 43 of 1983 (CARA): supports conservation of natural agricultural resources (soil, water, plant biodiversity) by maintaining the production potential of the land and combating/preventing erosion; for example, by controlling or eradicating declared weeds and invader plants.

Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947), to control the sell, purchase, use and disposal of agricultural or stock remedies.

Hazardous Substances Act 15 of 1973: to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitizing or flammable nature, or by the generation of pressure

National Environmental Management Act 107 of 1998 (as amended): replaces the Environmental Conservation Act (ECA) and establishes principles for decision-making on matters affecting the environment, and for matters connected therewith.

- **Environmental Impact Assessment Regulations (R543 of 2010):** procedures to be followed for application to conduct a listed activity.

National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA): replaces the Atmospheric Pollution Prevention Act (No. 45 of 1965).

National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA): supports conservation of plant and animal biodiversity, including the soil and water upon which it depends.

- **National list of ecosystems that are threatened and in need of protection** (GN 1002 of 9 December 2011).
- **Alien and invasive species regulations 2014** (GN R.598 of 1 August 2014)

National Environmental Management: Protected Areas Act 57 of 2003 (as amended Act 31 of 2004) (NEMPAA): To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes.

National Environmental Management: Waste Act 59 of 2008 (NEMWA): To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

- **List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment** (GN 718 of 3 July 2009): Identifies activities in respect of which a waste management license is required.

National Forests Act 84 of 1998 (as amended): supports sustainable forest management and the restructuring of the forestry sector.

- **List of protected tree species** (GN 908 of 21 November 2014)

National Heritage Resources Act 25 of 1999: supports an integrated and interactive system for the management of national heritage resources, including supports soil, water and animal and plant biodiversity.

National Veld and Forest Fire Act 101 of 1998 (NVFFA): protects soil, water and plant life through the prevention and combating of veld, forest, and mountain fires

National Water Act 36 of 1998 (NWA): promotes the protection, use, development, conservation, management, and control of water resources in a sustainable and equitable manner.

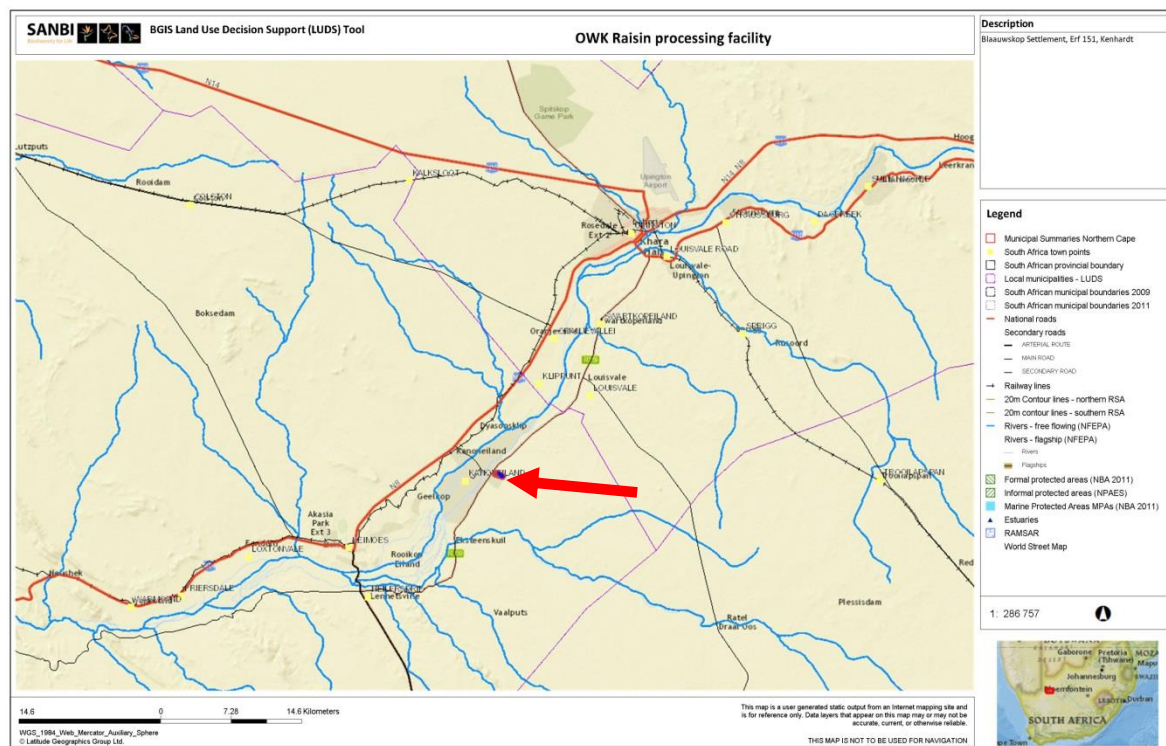
Northern Cape Nature Conservation Act 9 of 2009 (NCNCA): which provides for the sustainable utilization of wild animals, aquatic biota and plants.

4. STUDY AREA

4.1 LOCATION & LAYOUT

The property is located just off the R359, which runs to the south and parallel with the Orange River, between Keimoes and Upington. Erf 151 is about 4 km from the Kanoneiland settlement and about 20 km east of Keimoes, within the //Khara Hais local Municipality (ZF Mgcawu District Municipality) in the Northern Cape. Access to the site is gained from a small road, directly off the R359 (Refer to Figure 1).

Figure 1: Location of the site in relation to Keimoes and Upington (Northern Cape)



The purpose of this study is to evaluate the remainder of the property and to advise on possible impact minimisation in terms of botanical significance. As such the whole of the remainder of the site was scanned in terms of botanical significance.

The proposed raisin processing facilities is expected to cover approximately 5-6 ha. Figure 2 shows the preferred area in which the proposed facilities will be located (just to the south and west of the existing facilities, utilising the same access roads and also staying away from the existing water courses on the property. Figure 1 show that the property is not located near to any significant river or stream, but Figure 2 shows that two minor seasonal water ways crosses the property. Figure 3 shows the proposed facility layout within the preferred site option (yellow area in Figure 2).

Figure 2: Shows the boundaries of the Erf 151 (Red), the proposed development area (Yellow) and the two seasonal streams (Blue)

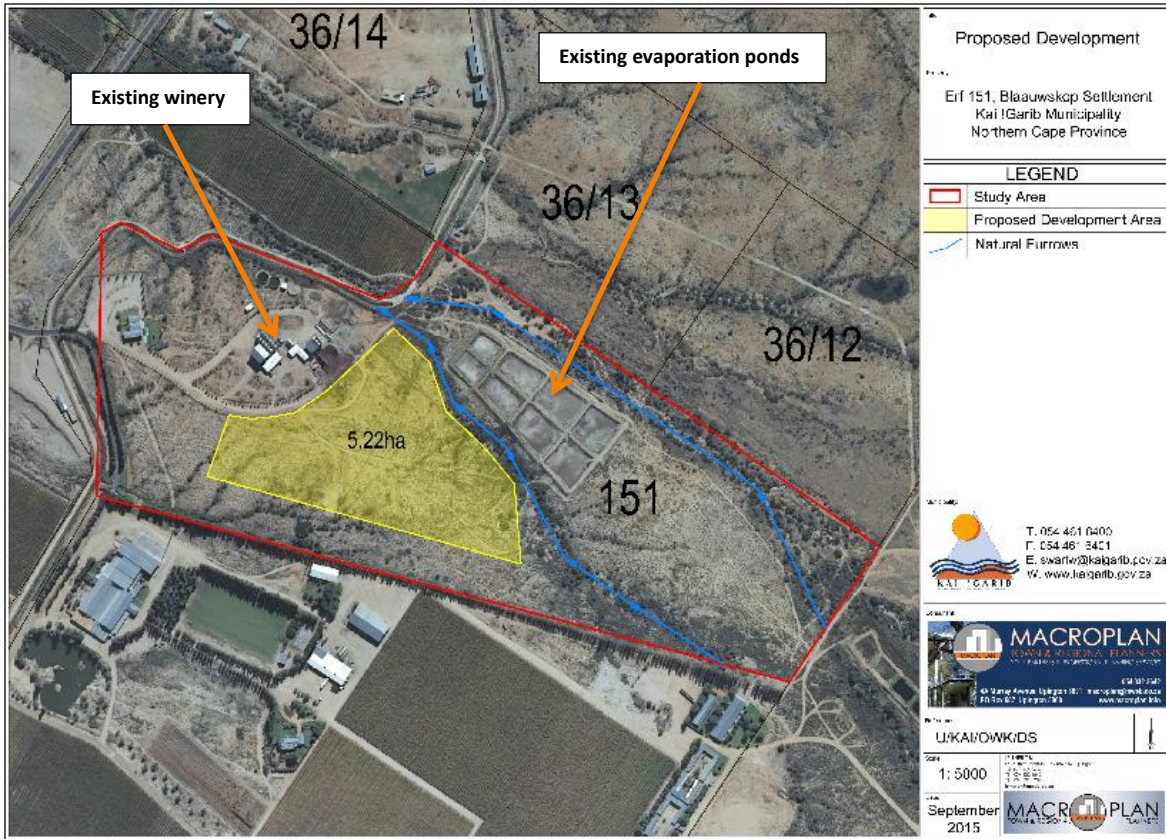
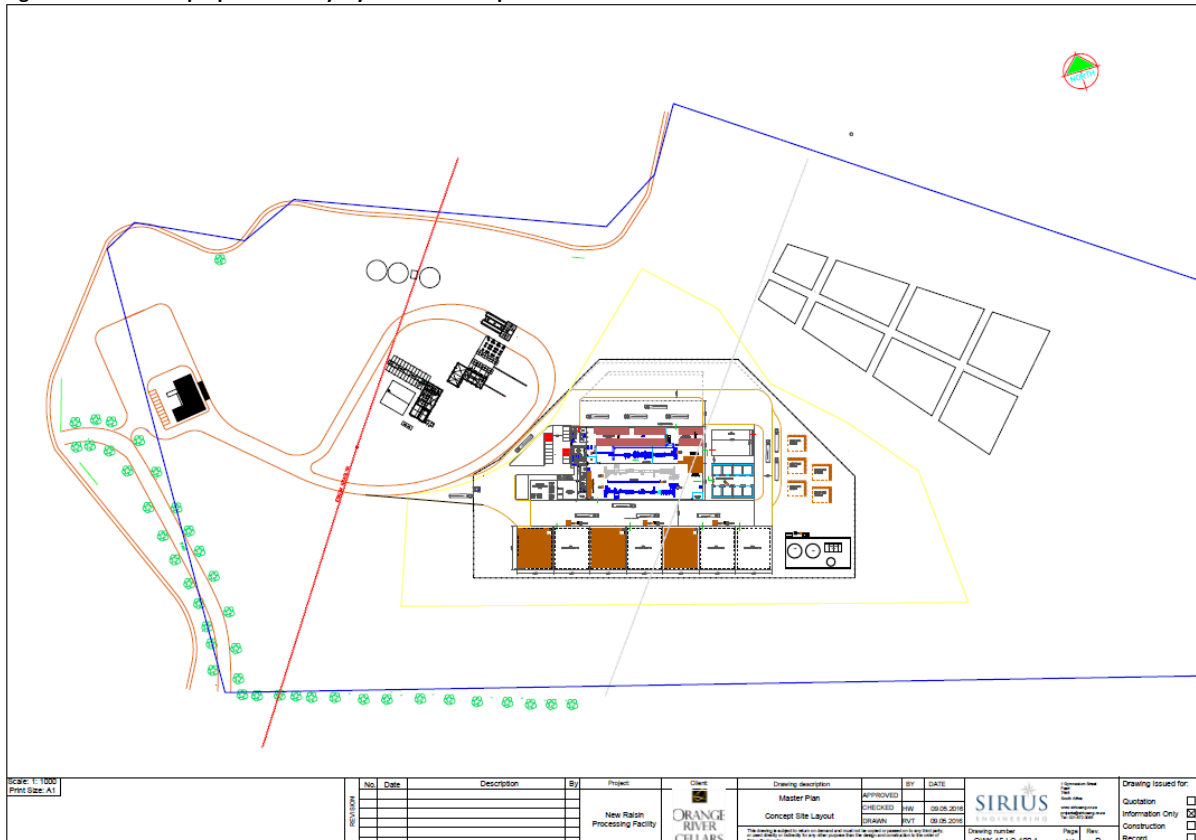


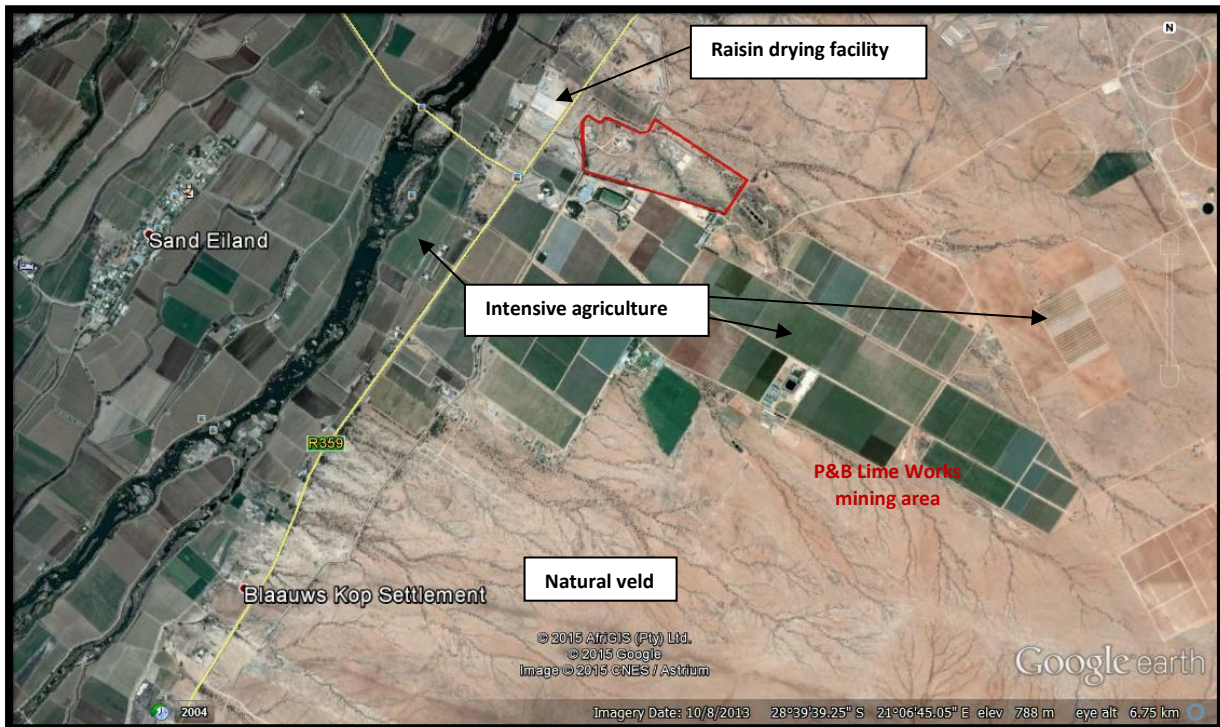
Figure 3: Shows the proposed facility layout within the preferred site location



4.2 SURROUNDING LAND USE

Erf 151 is located just outside the main irrigation floodplain next to the Orange River. However, it still borders on areas of intense cultivation to its west, south and southeast. The northwest it borders on the R359, with an existing raisin drying facility located just across from the R359. Agricultural land is also found adjacent and to the north west of the property, while the north, northeast is mostly natural veld Figure 4.

Figure 4: Google image showing the surrounding land use in relation to the property



4.3 TOPOGRAPHY

The property is approximately 30 ha in size and is located just off the (to the east) Orange River flood plain. The property is almost flat, but with a slight slope towards the Orange River (southeast to northwest), following the route of the small seasonal streams on the property. The elevation of the property varies between 789m (southeast) to 777m (northwest) with an average slope of approximately 0.4% (thus basically flat). Within the property the two seasonal streams are located within slight depressions.

Photo 1: The view over the preferred site from northwest to southeast



4.4 CLIMATE

All regions with a rainfall of less than 400 mm per year are regarded as arid. This area normally receives about 106 mm of rain per year (the climate is therefore regarded as arid to very arid). Keimoes normally receives about 84mm of rain per year, with most rainfall occurring during autumn. It receives the lowest rainfall (0 mm) in June and the highest (27 mm) in March. The monthly average daily maximum temperatures range from 19.8°C in June to 33°C in January. The region is the coldest during July when temperatures drop to 3°C on average during the night (www.saexplorer.co.za).

4.5 GEOLOGY AND SOILS

According to Mucina & Rutherford (2004) the Geology is dominated by mudstones and shales of the Ecca Group (Prince Albert and Volksrust Formations) and Dwyka tillites, both of the early Karoo age. About 20% of rock outcrops are formed by Jurassic intrusive dolerite sheets and dykes. Soils are described as soils with minimal development, usually shallow on hard or weathering rock, Glenrosa and Mispah forms, with lime generally present in the entire landscape (Fc land type) and, to a lesser extent, red-yellow apedal, freely drained soils with a high base status and usually <15% clay (Ah and Ai land types) are also found. The salt content in these soils is very high (Mucina & Rutherford, 2004).

Figure 5: An overview of the property showing the location of the two seasonal streams on the property.



4.6 RIVERS & WETLANDS

Figure 1 shows clearly that there is no major streams or wetlands expected on the property, with the Orange River the nearest watercourse (>600m away). However, Figure 5 (above) also shows that two smaller seasonal drainage lines were encountered during the site visit. Unfortunately, both these seasonal drainage lines are heavily impacted (even reduced to channels in places) up and down stream of Erf 151. On Erf 151, both drainage lines are still in good condition. The proposed location of the new facilities is likely to be within 32m of the southern stream, but will not impact directly on these features. However, impact minimisation during construction should be a high priority (e.g. demarcation of these streams as “no-go” zones).

5. EVALUATION METHOD

Desktop studies were conducted, coupled with a two day site visit (13th of October and the 4th of November 2015). Standard methods for botanical surveys were used, using a hand-held GPS to record the route and waypoints for any feature of special significance. Photographs were taken to support the general observations made during the site visit.

5.1 SITE VISIT

The survey was conducted by walking the site, examining, marking and photographing any area of interest. Confidence in the findings is high. During the site visit the author endeavoured to identify and locate all significant environmental features such as rivers, streams or wetlands, special plant species and or specific soil conditions which may indicate special botanical features (e.g. salt marsh areas, rocky outcrops or silcrete patches).

5.2 LIMITATIONS AND ASSUMPTIONS

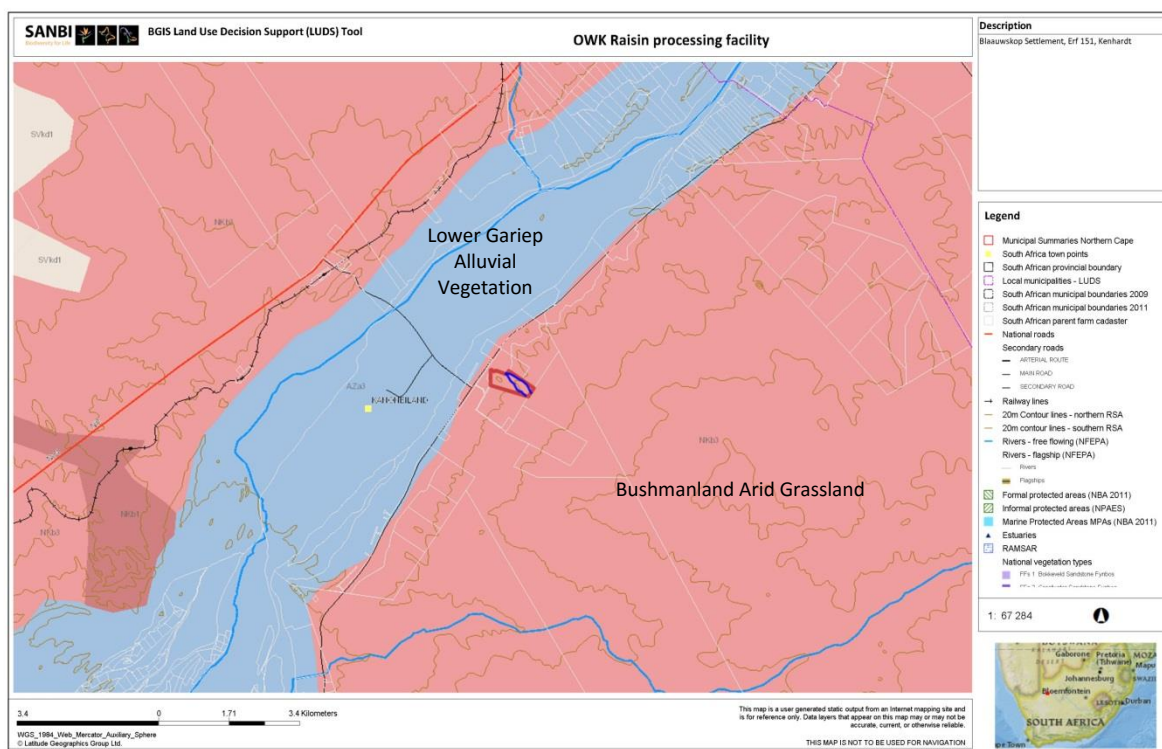
The site visit was performed during October, which is normally a good time of the year to evaluate most vegetation types. At that stage the site was quite dry which could be seen in the vegetation (only hardy species observed). However, the author is familiar with this vegetation type and could make a fair assumption of the status of the veld and its flora. Most of the property was previously subject to various forms of disturbance, which is more and more evident nearer to the existing winery infrastructure. Although it is likely that a number of species may have been missed, the author is confident that a fairly good understanding of the vegetation status in the area was obtained.

6. DESKTOP ANALYSIS

6.1 BROAD SCALE VEGETATION PATTERNS

The Vegetation map of SA (Mucina & Rutherford, 2006) indicates that only one vegetation type is expected on the property (Refer to Figure 6). This vegetation type was classified as “Least Threatened” during the 2004 National Spatial Biodiversity Assessment (NSBA). More than 99% of this vegetation still remains in its natural state, but at present only 4% is formally protected (Augrabies Falls National Park) throughout South Africa. Recently the *National list of ecosystems that are threatened and in need of protection* (GN 1002, December 2011), was promulgated in terms of the National Environmental Management Biodiversity Act (NEM: BA), Act 10 of 2004. According to this National list, **Bushmanland Arid Grassland, remains classified as Least Threatened.**

Figure 6: Vegetation map of South Africa, indicating the property and vegetation types expected



6.2 BUSHMANLAND ARID GRASSLAND

Bushmanland Arid Grassland is described as extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semi-desert “steppe”. Sometimes low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected (Mucina & Rutherford, 2006). Acocks (1953) described this vegetation as Arid Karoo and Desert False Grassland or Orange River Broken Veld while Low & Rebelo (1996) described this vegetation as Orange River Nama Karoo.

According to Mucina & Rutherford (2006) important taxa includes the following:

Graminoids: *Aristida adensionis*, *A. congesta*, *Enneapogon desvauxii*, *Eragrostis nindensis*, *Schmidtia kalahariensis*, *Stipagrostis ciliate*, *S. Obtuse*, *Cenchrus ciliaris*, *Enneapogon scaber*, *Eragrostis annulata*, *E. porosa*, *E. procumbens*, *Panicum lanipes*, *Setaria verticillata*, *Sporobolus nervosus*, *Stipagrostis brevifolia*, *S uniplumis*, *Tragus berteronianus* and *T racemosus*.

Small trees: *Acacia mellifera*, *Boscia foetida* subsp. *foetida*.

Tall shrubs: *Lycium cinereum*, *Rhigozum trichotomum*, *Aptosimum spinescens*, *Hermannia spinosa*, *Pentzia spinescens*, *Aizoon asbestinum*, *Aizoon schellenbergii*, *Aptosimum elongatum*, *Aptosimum lineare*, *A marlothii*, *Barleria rigida*, *Berkheya annectens*, *Eriocephalus ambiguous*, *Eriocephalus spinescens*, *Limeum aethiopicum*, *Polygala seminuda*, *Pteronia leuococlada*, *Tetragonia arbuscula*, *Zygophyllum microphyllum*

Succulent Shrubs: *Kleinia longiflora*, *Lycium bosciifolium*, *Salsola tuberculata*, *S gabrescens*.

Herbs: *Acanthopsis hoffmannseggiana*, *Aizoon canariense*, *Amaranthus praetermissus*, *Dicoma capensis*, *Lotononis platycarpa*, *Sesamum capense*, *Tribulus pterophorus* etc.

7. FINE SCALE MAPPING (CBA'S)

Although a draft version of the Siyanda District Municipal, Environmental Management Framework (EMF) is available it has not been approved or published. No fine-scale mapping is as yet available for this area and as a result no critical biodiversity areas or biodiversity support areas has been promulgated for this area.

However, the proposed priorities for conservation in the Siyanda District is depicted on Maps 12a and 12b of the EMF, based on local occurrence, the national conservation target, the national ecosystem status and the national protection level of the vegetation types. A proposal is made for the prioritisation of vegetation types in the Siyanda District. The land cover of the Siyanda district reflects the results of the 2000 national land cover determination and is depicted on Map 13 from which it is evident that most of the area is in a natural state and the most significant spatial impact on the environment has come from mining which occupies an area of almost 7% of the total area. A sensitivity index is shown on Map 14 of the Draft EMF. The main factors that were used to compile the index include the following:

- The erosion potential of soil where soils with a high erosion potential were awarded a sensitivity of 1;
- The conservation priority of veld types for veld types with a medium conservation priority were awarded a sensitivity count of 1 those with a high conservation priority were awarded a count of 2 and those with a very high conservation priority were awarded a count of 3;
- Topographical areas with a high variance in shape and form were awarded a sensitivity count of 1;
- All watercourses, drainage lines and pans (including a 32 m buffer on either side) were awarded a sensitivity count of 2; and
- All transformed areas were awarded a sensitivity count of -1.

Environmental control zones are depicted on Map 15 of the EMF. The purpose of environmental control zones is to indicate areas that require a specific type or regime of control due to unique environmental elements that occur in these areas. It may or may not be linked to the application of EIA legislation and should be dealt with at a more strategic level where it should serve as a guide for decision-making and planning.

7.1 SUMMARY OF FINDINGS ACCORDING TO THE EMF

According to the Draft Siyanda Environmental Management Framework the proposed site falls within the following categories according to the various maps.

Conservation priority areas: According to Map 12a the site falls within an area regarded as having a Medium (2) conservation priority. According to Map 12b, the site does not fall within a proposed conservation area.

Land cover: According to Map 13 of the Draft EMF, it would seem as if the proposed site falls within the area marked as shrubland.

Sensitivity Index: According to Map 14 of the Draft EMF, the proposed site falls within an area identified as of very low environmental sensitivity (1) in an index which starts at Transformed and then are given values of 0-8 (8 being of high environmental sensitivity).

Control Zones: According to Map 15, the proposed site location falls within a control zone 7 area, which is regarded as a low control zone.

8. VEGETATION ENCOUNTERED

Erf 151 is approximately 30 ha in size. Of this the existing infrastructure has resulted in the transformation of approximately 5-6ha (marked as Transformed in Figure 7) with another approximately 2ha also severely impacted as a result of associated activities (marked as in Poor condition – Orange in Figure 7). The vegetation encountered on the remainder of the property was in relative good condition and included two seasonal drainage lines and a small number of protected tree species. The preferred footprint for the new development (marked by the yellow line in Figure 7) includes the disturbed area, but also some natural veld and is also very near to the one of the drainage lines (probably within 32m).

Figure 7: Google image showing the status of the Erf 151



Bushmanland Arid Grassland is normally described as a sparsely vegetated, grassland dominated vegetation type, sometimes structurally transformed into a low shrubs vegetation layer. In this case the grassy layer was indeed sparse while the vegetation was rather dominated by a low hardy shrub layer, as is often associated with shallow calcrete (which was also evident in many cases).

Photo 2: One of the protected *Aloe claviflora* individuals



As mentioned above about 15 – 20% of the property can be described as transformed as a result of existing activities (including roads, parking areas and open storage sites), while another 5 – 6% can be described as impacted as a result of associated activities (waste material disposal and open storage areas).

The remainder, however, is in fairly good condition and the vegetation encountered can be described mostly as an open low shrubland (Photo 3) with grassland patches

(Photo 4) in between. The average canopy height was approximately 0.4 m, with larger bush sometimes forming a sparse second layer of up to 0.8 m. However, a much higher and mostly very prominent riparian vegetation zone was encountered next to the seasonal drainage lines (including a number of tree species). In arid and semi-arid regions, there typically is a strong visual contrast between the riparian and surrounding vegetation zones (as was encountered on site).

Photo 3: Typical shrub dominated vegetation encountered



Photo 4: Grass dominated patches sometimes encountered



The open shrubland vegetation was typically dominated by *Tetraena decumbens* (*Zygophyllum decumbens*) in combination with *Rhigozum trichotomum*, *Monechma genistifolium*, *Kali* species and *Aptosimum spinescens*. The following species were also observed: *Aloe claviflora* (patches), *Aloe hereroensis*, *Atriplex semibaccata*, *Boscia foetida*, *Euphorbia braunsii*, *Kleinia longiflora*, *Lycium hirsutum*, *Mesembryanthemum guerichianum*, *Monsonia* cf. *crassicaulis*, *Pteronia* cf. *pallens* *Roepera cordifolia* and *Senegalia mellifera* (= *Acacia mellifera*). The grassy patches were dominated by white grasses with the shrub layer much reduced.

Photo 5: Typical riparian vegetation to the northeast of the site



Photo 6: Riparian vegetation, Camel thorn tree in background



The riparian vegetation associated with the small seasonal drainage lines was dominated by a combination of small to medium trees, with *Senegalia mellifera* (= *Acacia mellifera*) prominent in combination with *Boscia foetida*, *Parkinsonia africana* and *Searsia pendulina* sometimes present. The shrub *Lycium cinereum* and grass *Stipagrostis namaquensis* was also frequently found and the parasite *Tapinanthus oleifolius* often associated

with *Senegalia mellifera*. A number of the protected tree *Vachellia erioloba* (= *Acacia erioloba*) was observed, but mostly outside the boundaries of the property. None will be impacted by the proposed development.



To the south west of one of the small streams a patch of what is presumed to be *Stoeberia arborea* was encountered. Unfortunately, no flowers or fruit were present, which made positive identification impossible.

A number of the alien tree, *Prosopis glandulosa*, was also observed in association with the northern drainage line.

8.1 FLORA ENCOUNTERED

Please note that this study never intended to be full botanical assessment. However, a scan of significant species was done during the site visit, and even though the author does not claim that all species encountered were identified, all efforts were made to do just that. Table 1 gives a list of the species encountered on the two sites, and also indicates status in terms of:

- Tree species protected in terms of the National Forest Act, Act 84 of 1998;
- Plant species protected in terms of the Northern Cape Nature Conservation Act, Act 9 of 2009;
- The Red list of South African Plants (www.redlist.sanbi.org).

Table 1: List of flora encountered on the property

No.	Species name	FAMILY	Status NFA, NCNCA	SA Red list status (V 2015/1)	Alien & invader species (AIS)
1.	<i>Aloe claviflora</i>	ASPHODELACEAE	Protected in terms of schedule 2 of the NCNCA	LC	
2.	<i>Aloe hereroensis</i>	ASPHODELACEAE	Protected in terms of schedule 2 of the NCNCA	LC	
3.	<i>Atriplex semibaccata</i>	AMARANTHACEAE		LC	Introduced in SA as a drought and salt tolerant forage
4.	<i>Boscia foetida</i>	CAPPARACEAE	Protected in terms of schedule 2 of the NCNCA	LC	
5.	<i>Euphorbia braunsii</i>	EUPHORBIACEAE	Protected in terms of schedule 2 of the NCNCA	LC	
6.	<i>Kali species (=Salsola kali)</i>	AMARANTHACEAE	-	-	Introduced weed NEMBA Cat. 1b AIP
7.	<i>Kleinia longiflora</i>	ASTERACEAE		LC	
8.	<i>Lycium cinereum</i>	SOLANACEAE		LC	
9.	<i>Lycium hirsutum</i>	SOLANACEAE		LC	
10.	<i>Mesembryanthemum guerichianum</i>	AIZOACEAE	Protected in terms of schedule 2 of the NCNCA	LC	

No.	Species name	FAMILY	Status NFA, NCNCA	SA Red list status (V 2015/1)	Alien & invader species (AIS)
11.	<i>Monechma genistifolium</i>	ACANTHACEAE		LC	
12.	<i>Monsonia cf. crassicaulis</i>	GERANIACEAE		LC	
13.	<i>Parkinsonia africana</i>	FABACEAE		LC	
14.	<i>Pteronia cf. pallens</i>	ASTERACEAE		LC	
15.	<i>Prosopis glandulosa</i>	FABACEAE			CARA Cat. 2 invader NEMBA Cat. 3 AIP (in Northern Cape)
16.	<i>Rhigozum trichotomum</i>	BIGNONIACEAE		LC	
17.	<i>Roepera cordifolia</i> (= <i>Zygophyllum cordifolium</i>)	ZYGOPHYLLACEAE		LC	
18.	<i>Searsia pendulina</i>	ANACARDIACEAE		LC	
19.	<i>Senegalia mellifera</i> (=Acacia mellifera).	FABACEAE		LC	
20.	Cf. <i>Stoeberia arborea</i> (no flowers or fruit)	AIZOACEAE	Protected in terms of schedule 2 of the NCNCA	LC	
21.	<i>Tapinanthus oleifolius</i>	LORANTHACEAE		LC	
22.	<i>Tetraena decumbens</i> (= <i>Zygophyllum decumbens</i>)	ZYGOPHYLLACEAE		LC	
23.	<i>Vachellia erioloba</i> (=Acacia erioloba)	FABACEAE	Protected in terms of the NFA	LC	

8.2 ALIEN AND INVASIVE PLANT (AIP) SPECIES

Alien and invasive plant (AIP) species were introduced into South Africa more than 1 000 years ago *via* trading routes from other countries in southern Africa (Alberts & Moolman, 2013). Since the arrival of settlers from Europe these numbers have increased dramatically. At present, AIPs are encountered on large portions of land in South Africa (10 million hectares) and it is reportedly consuming nearly 330 million cubic meters of water annually, or 7% of the annual run-off. But what is really scary is that this water consumption levels are increasing rapidly and could reach 50% of the mean annual run-off in the not too distant future (Alberts & Moolman, 2013). The aggressive behaviour of the AIPs in their unnatural habitat is a direct threat to the vast wealth of biodiversity in South Africa. South Africa is a relatively small country that comprises only 2% of the total surface of the Earth, but it contains 10% of the plant species, 7% of the vertebrates, and is home to three biodiversity hotspots.

In South Africa, there are currently three pieces of national legislation that relate to the control of Alien and Invasive Species (AIS) namely:

- Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947), administered by the Department of Agriculture, forestry and Fisheries.
- List of weeds and invader plants declared in terms of Regulations 15 and 16 (as Amended, March 2001) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) administered by the Department of Agriculture, Forestry and Fisheries (DAFF);

- Alien and invasive species regulations 2014 (GN R.598 of 1 August 2014) promulgated in terms of the National Environmental Management, Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), administered by the Department of Environmental Affairs (DEA).

8.2.1 Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to “acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container”. Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947).

8.2.2 CARA: National legislation controlling AIP's

The **CARA** sets out the regulations (amended March 2001) regarding the control of weeds and invasive plants and provides a list of declared plants. The amended regulations make provision for four groups of invader plants. The first three groups consist of undesirable alien plants and are covered by Regulation 15, namely:

- **Category 1** declared weeds (Section 15A of the amended act) are prohibited plants that will no longer be tolerated on land or on water surfaces, neither in rural or urban areas. These plants may no longer be planted or propagated, and all trade in their seeds, cuttings or other propagative material is prohibited. Plants included in this category because their harmfulness outweighs any useful properties or purpose they may have.
- **Category 2** declared plant invaders (Section 15B of the amended act) are plants with a proven potential of becoming invasive, but which nevertheless have certain beneficial properties that warrant their continued presence in certain circumstances. May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- **Category 3** declared plant invaders (Section 15C of the amended act) are undesirable because they have the proven potential of becoming invasive, but most of them are nevertheless popular ornamentals or shade trees that will take a long time to replace. May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, provided they are not within 30 metres of the 1:50 year flood line of a river, stream, lake or other type of inland water body.
- **Bush encroachers**, which are indigenous plants that require sound management practices to prevent them from becoming problematic, are covered separately by Regulation 16.

Refer to Error! Reference source not found. for listed weeds and invader species encountered in terms of CARA.

8.2.3 NEM: BA: National legislation controlling AIP's

NEMBA aims to provide the framework, norms, and standards for the conservation, sustainable use, and equitable benefit-sharing of South Africa's biological resources. The purpose of NEMBA as it relates to Alien and Invasive Species (AIS) is to prevent the unauthorised introduction and spread of such species to ecosystems and habitats where they do not naturally occur; manage and control such species to prevent or minimise harm to the environment and to biodiversity in particular; and to eradicate alien invasive species from ecosystems and habitats where they may harm such ecosystems or habitats. In 2014, DEA published Regulations on Alien and Invasive Species (AIS) in terms of the NEMBA, for implementation. The new **AIS Regulations** (Effective as from 1 October 2014) combine invasive species already listed in the CARA, with two new lists relating to invasive species and prohibited species. A total of 559 alien species are listed as invasive, while a further 560 species are listed as prohibited, and may not be introduced into the country.

The AIS Regulations list 4 different categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa, namely:

- **Category 1a:** invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. These species need to be controlled on your property, and officials from the Department of Environmental Affairs must be allowed access to monitor or assist with control.
- **Category 1b:** invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1b species are major invaders that may need government assistance to remove. All Category 1b species must be contained, and in many cases they already fall under a government sponsored management programme.
- **Category 2:** These are invasive species that can remain in your garden, but only with a permit, which is granted under very few circumstances.
- **Category 3:** These are invasive species that can remain in your garden. However, you cannot propagate or sell these species and must control them in your garden. In riparian zones or wetlands all Category 3 plants become Category 1b plants.

Refer to Table 1 for listed alien and invasive species encountered in terms of NEM: BA.

8.2.4 NCNCA: Provincial Legislation controlling AIP's

Although provinces have a mandate to implement and enforce national legislation (such as CARA or NEM:BA), provincial authorities can also add further to legislation in the form of provincial ordinances, whereby each province can further prohibit certain species should the authorities feel that a species poses a potential risk or threat to the province's ecosystems or biodiversity.

In the Northern Cape Schedule 6 of the Northern Cape Nature Conservation Act, Act 9 of 2009 list additional invasive species that must be controlled. Schedule 6 list includes all species listed as weeds in CARA as well as an additional 36 species (none of which has been observed during this study).

Refer to Table 1 for listed invasive species encountered in terms of NCNCA. Please note that all species categorized as Category 1 plants in terms of CARA are automatically listed in terms of the NCNCA (Refer to Table 1)

8.2.5 Alien and invasive plants encountered

A total of 2 alien plant species was observed on the property (Refer to Table 1).

- **CARA Listed species:** Only one species listed namely **Prosopis granulosa**.
- **NEMBA Listed species:** In terms of the NEM: BA two listed alien invasive species, were encountered namely **Prosopis granulosa** Category 3 in Northern Cape and **Kali** species (= **Salsola kali**), a Category 1b alien and invasive plant species.
- **NCNCA Listed species:** Apart from those already listed in terms of Category 1 of CARA, no other invasive species are listed in terms of the NCNCA.

9. IMPACT ASSESSMENT METHOD

The concept of environmental impact assessment in terms of the National Environmental Management Act, Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) was developed to identify and evaluate the nature of potential impact in order to determine whether an activity is likely to cause significant environmental impact on the environment. The concept of significance is at the core of impact identification, evaluation and decision making, but despite this the concept of significance and the method used for determining significance remains largely undefined and open to interpretation (DEAT, 2002).

9.1 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.

$$\text{Significance} = \text{Conservation Value} \times (\text{Likelihood} + \text{Duration} + \text{Extent} + \text{Severity})$$

9.1.1 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 2 for categories used).

Table 2: Categories used for evaluating conservation status

CONSERVATION STATUS	
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.

9.1.2 Likelihood

Likelihood refers to the probability of the specific impact occurring as a result of the proposed activity (Refer to Table 3, for categories used).

Table 3: Categories used for evaluating likelihood

LIKELIHOOD	
Highly Unlikely (1)	Under normal circumstances it is almost certain that the impact will not occur.

LIKELIHOOD	
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.

9.1.3 Duration

Duration refers to the length in time during which the activity is expected to impact on the environment (Refer to Table 4 for categories used).

Table 4: 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.

9.1.4 Extent

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 5 for categories used).

Table 5: 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).

9.1.5 Severity

Severity refers to the direct physical or biophysical impact of the activity on the surrounding environment should it occur (Refer to Table 6).

Table 6: 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,

SEVERITY	
	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.

9.2 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.

Each identified potentially significant impact is described under Paragraph 10 (below). The evaluation method described above is used to determine the potential significance of each impact associated with the proposed activity (development). The potential significance is then described in terms of the categories given in Table 7. Mitigation options are evaluated and comparison is then made (using the same method) of potential significance before mitigation and potential significance after mitigation (to advise the EAP).

Table 7: 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 (67-79)	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.

10. ASSESSMENT OF THE IMPACT

Areas of protected natural habitat are the backbone of any strategy to maintain regional biological diversity, which means they should include examples of as many natural features (species, communities, landscapes) as possible. Municipal Conservation Plans or Environmental Management Frameworks aims to achieve this through the establishment of a network of ecological corridors, ecological support areas and critical biodiversity areas for the protection of remaining natural features. It should also focus on the conservation of areas that will make the best conservation sense and which will help to reach our national conservation targets per vegetation unit. No fine-scale mapping is as yet available for this area and as a result no critical biodiversity areas or biodiversity support areas has been promulgated for this area. However, a draft version of the Siyanda District Municipal, Environmental Management Framework (EMF) is available and was used as reference during the impact assessment process.

10.1 PHYSICAL FOOTPRINT

Erf 151 (the property) is 29.8729 ha in extent. Existing infrastructure cover or has transformed approximately 5-6ha (Figure 8) of the site, whilst another 2ha is also severely impacted as a result of associated activities (23-26% already impacted). The vegetation encountered on the remainder of the property was in relative good condition and included two seasonal drainage lines and a small number of protected tree species. The proposed raisin processing facility (and associated infrastructure) is expected to cover/transform approximately 5-6 ha permanently.

Figure 8: Google image showing the status of the Erf 151



However, the proposed footprint was chosen to overlap the 2 ha area that was already disturbed. As a result the proposed facility will have a direct impact on only an additional 3-4 ha of land (reducing the potential physical footprint on site).

For assessment purposes (Refer to Table 8) it was taken that an additional 4 ha of the property will be transformed, in order to establish the additional infrastructure. The proposed 4 ha is located within remaining natural veld and might impact on a small seasonal drainage line (within 32 m). Note that the presence of any water course will increase the conservation value of a site.

10.1.1 Mitigation

- Moving the proposed footprint towards the southwest, can slightly reduce the impact (moving it away from the seasonal drainage line) as indicated by the green arrow in Figure 8.

10.2 POTENTIAL IMPACT ON CONNECTIVITY

The site is almost encompassed by intensive agriculture, with no connectivity to other areas of natural veld to the northwest, the west, the south and the southeast. The northwest it borders on the R359, with an existing raisin drying facility located just across from the R359. The only remaining connectivity is to the north and northeast (Refer to Figure 4).

Unintentionally, the proposed footprint placement minimise the direct impact on connectivity (being to the northwest and west of the site – the most disturbed portion of the property). Even though the vegetation type found on the property needs further conservation it is unlikely that conservation of this specific property will be the most attractive option for conservation bodies, as it is almost confined by agriculture. Slight impact reduction can

10.2.1 Mitigation

- Moving the proposed footprint towards the southwest, can slightly reduce the impact (by moving it more within the already disturbed areas) as indicated by the green arrow in Figure 8.

10.3 POTENTIAL IMPACT ON VEGETATION

Only one vegetation type (SA Vegetation map) was encountered, namely Bushmanland Arid Grassland (Least Threatened). More than 99% of this vegetation still remains in its natural state, but at present only 4% is formally protected (Augrabies Falls National Park) throughout South Africa. In terms of regional and national conservation status, Bushmanland Arid Grassland is still well represented in its natural state, but poorly

protected. According to the Draft EMF for the district municipality, it has a medium conservation value (the need for formal conservation of more of this vegetation type exist), but this particular property and its surrounding area is not currently earmarked for conservation and is described as of low environmental sensitivity.

Bushmanland Arid Grassland is part of the Nama-Karoo Biome. The Nama-Karoo Biome is not particularly rich in species, does not contain any centre of endemism and local endemism is very low and vegetation type is fairly similar over extended areas. It is thus considered highly unlikely that small localised impacts will have any significant impact on any specific species or the vegetation type as a whole. Connectivity (see underneath) is also not very good, which further undermines this properties intrinsic conservation value. It is fair to deduct that although there is a need for further conservation of this vegetation type, this property is not ideally located.

10.3.1 Mitigation

- Search & rescue of *Aloe*- and *Euphorbia* species (Refer to rare & endangered species underneath).

10.4 POTENTIAL IMPACT ON PROTECTED PLANT SPECIES

Six species protected in terms of the NCNCA was encountered namely:

- *Aloe claviflora* – single individuals likely to be impacted by the proposed footprint (search & rescue individuals that will be impacted).
- *Aloe hereroensis* - single individuals likely to be impacted by the proposed footprint (search & rescue individuals that will be impacted).
- *Boscia foetida* – will not be impacted by the proposed footprint.
- *Euphorbia braunsii* - single individuals likely to be impacted by the proposed footprint (search & rescue individuals that will be impacted).
- *Mesembryanthemum guerichianum* – likely to be impacted, but it is a pioneer species of low value in terms of protection (should likely not be on the protected species list).
- *Stoeberia arborea* – will not be impacted by the proposed footprint.
- *Vachellia erioloba* (= *Acacia erioloba*) – will not be impacted by the proposed footprint.

10.4.1 Mitigation

- Search and rescue all *Aloe*- and *Euphorbia braunsii* individuals that might be impacted by the proposed development.

10.5 THE NO-GO OPTION

The “No-Go” alternative will ensure that none of the above negative environmental impacts will occur. However, the property is not pristine and it should be preferable to development on a site like this (not

pristine and with poor connectivity) before compromising pristine veld with good connectivity. The proposed development is also sure to have short and long term benefits with regards to job creation, which are likely to have a positive impact on the local and regional area.

10.6 SUMMARY OF POTENTIAL IMPACT EVALUATION

Table 2 gives a summary of the evaluation of the potential impacts in terms of the project description (Refer to Par. 8.1).

Table 8: Summary of potential impact evaluation

Aspect	CV	Lik	Dur	Ext	Sev	Sig. before Mit.	Sig. after Mit.
Physical footprint	3	5	5	1	2	39	26
Impact on connectivity	3	5	5	1	1	36	12
Impact on vegetation type	2	5	5	1	2	26	13
Impact on protected species	3	5	5	1	2	39	12

From the above it is clear that even without mitigation the proposed development (in its current location) is not considered to pose any significant threat on local or national conservation targets. It is likely to have some impact on protected species, but with mitigation this can be much reduced.

11. CONCLUSION

The proposed development is expected to result in a 4 ha footprint enlargement on the site. This footprint will overlap natural veld in relative good condition, but is unlikely to result in any significant impact on local or regional conservation targets or connectivity. It is also very unlikely that the property will be considered for inclusion in any conservation network (because of its “isolation” – being surrounded by agricultural land).

The evaluation of the potential environmental impacts indicates the most significant potential impacts identified where:

- The potential impact on NCNCA protected plant species, especially *Aloe* species.
- The potential impact on a small portion of one of the seasonal drainage lines.

However (with appropriate mitigation), it is considered highly unlikely that the proposed project will contribute significantly to any of the following:

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

12. MITIGATION

- The development should remain within the proposed footprint (Figure 2), or more westwards (towards the existing buildings) as this will minimise impact on the remaining natural veld and fragmentation. Moving the proposed footprint towards the southwest, can further reduce the impact (moving it away from the seasonal drainage line) as indicated by the green arrow in Figure 8.
- All viable *Aloe-* and *Euphorbia braunsii* individuals within the footprint must be search & rescued and transplanted in the same soil conditions on the same property. Aftercare must include watering of these plants throughout the construction period.
- The development should aim at minimising the impact on the seasonal drainage lines and should stay at least 10 m away from these features.
- **The seasonal stream must be marked on site layout plans and demarcated as No-Go zones, before construction commence. This is likely to mean that access must be from the west.**
- All invasive alien plant species encountered on the property should be removed responsibly and follow-up work must be done during the construction period.

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