Botanical Impact Assessment for the proposed Project 4 Solar PV farm (West) at Visserspan 40 near Dealesville, Free State Province

Dr David J. McDonald
Bergwind Botanical Surveys & Tours CC.
14A Thomson Road, Claremont, 7708
Tel: 021-671-4056
Fax: 086-517-3806

EnviroAfrica CC

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National Legislation and Regulations governing this report

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

Appointment of Specialist

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by EnviroAfrica CC to provide specialist botanical consulting services for the assessment of the area for the proposed development of a solar farm on the farm Visserspan 40, near Dealesville, Free State Province.

Details of Specialist

Dr David J. McDonald Pr. Sci. Nat.
Bergwind Botanical Surveys & Tours CC
14A Thomson Road
Claremont
7708
Telephone: 021-671-4056
Mobile: 082-876-4051
Fax: 086-517-3806
e-mail: dave@bergwind.co.za
Professional registration: South African Council for Natural Scientific Professions No. 400094/06

Expertise

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 35 years' experience in the field of Vegetation Science.
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 400 specialist botanical / ecological studies.
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

Curriculum Vitae – Appendix 3

Independence

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

Conditions relating to this report

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

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

Declaration of independence:

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

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

Signature of the specialist:

Bergwind Botanical Surveys & Tours CC

Name of company:

8 February 2019

Date:

CONTENTS

1. Background and Brief

Bergwind Botanical Surveys & Tours CC was appointed by EnviroAfrica CC on behalf of Ventura Renewable Energy (the 'Applicant') to undertake a botanical assessment to determine the botanical sensitivity of the area proposed for development of a solar farm on the farm Visserspan 40, near Dealesville, Free State Province.

2. Terms of Reference

- Take cognizance of, and comply with, the substantive content requirements outlined within Appendix 6 of GN R982, as amended (i.e. GN 326), which outlines the legal minimum requirements for specialist studies in terms of the 2014 NEMA EIA Regulations, as amended;
- Investigate the areas proposed for the solar farm and determine their botanical sensitivity and possible constraints that would prevent solar farm development.
- Described the local and regional context of the vegetation communities and plant species within the affected areas.
- The ecosystem status and conservation value of the vegetation communities, including the whether the potentially affected areas comprise critically endangered or endangered ecosystem(s) listed in terms of Section 52 of the NEMBA;
- Any rare or endangered species encountered or likely to be or have been present;
- The presence of and proximity of the proposed site to protected area(s) identified in terms of NEMPAA and proximity to a Biosphere Reserve (where relevant) (within, at least, a 20km radius of the site).

3. Project Area

3.1 Locality and Extent

Farm Visserspan 40, is approximately 10 km north the small town of Dealesville, which in turn is 68 km west of Bloemfontein in the Free State Province. The entire farm is 1190 ha in extent (Figures 1--3). Importantly, this farm is near the Eskom Perseus Substation, one of the largest power substations in South Africa, and a suitable connection point for any solar PV plant that may be built in the area.

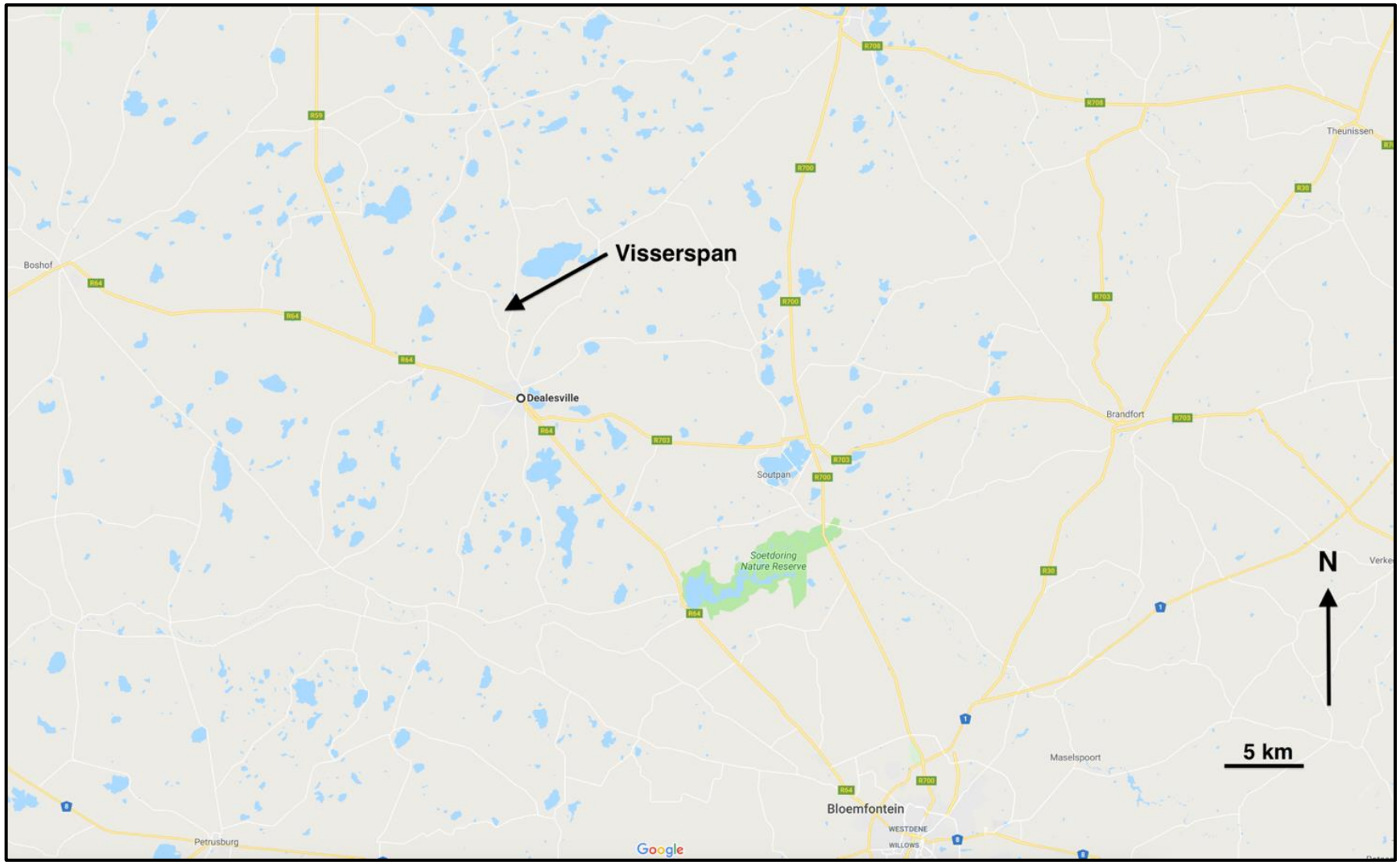

Figure 1. General location of Visserspan north of Dealesville in the Free State Province.

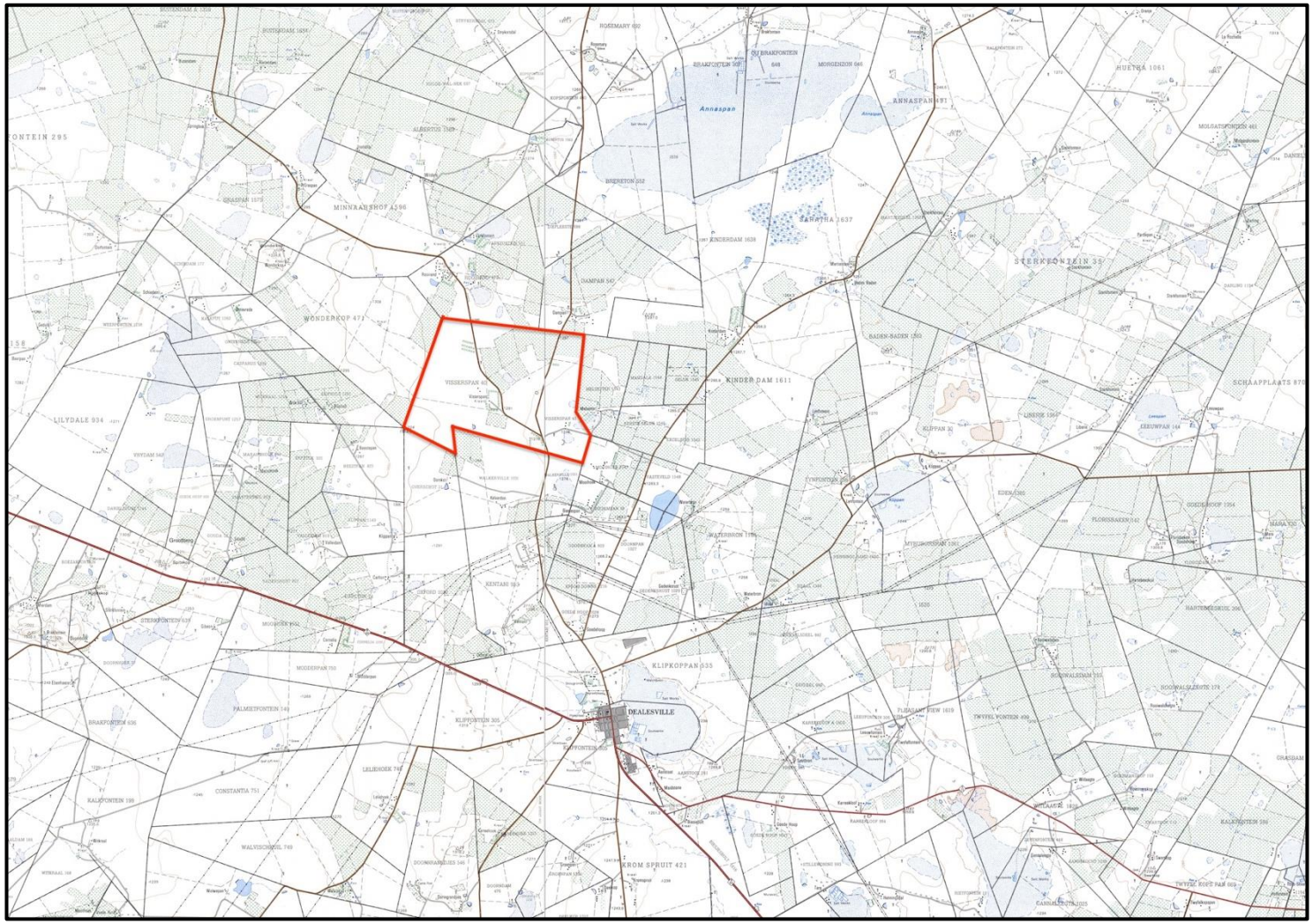

Figure 2. Topographic map showing the location and extent of Visserspan 40. The topography is relatively flat (Map source: 1: 50 000 2825 DA Elandsfontein and 2825 DB Dealesville, Chief Directorate: National Geo-spatial Information).

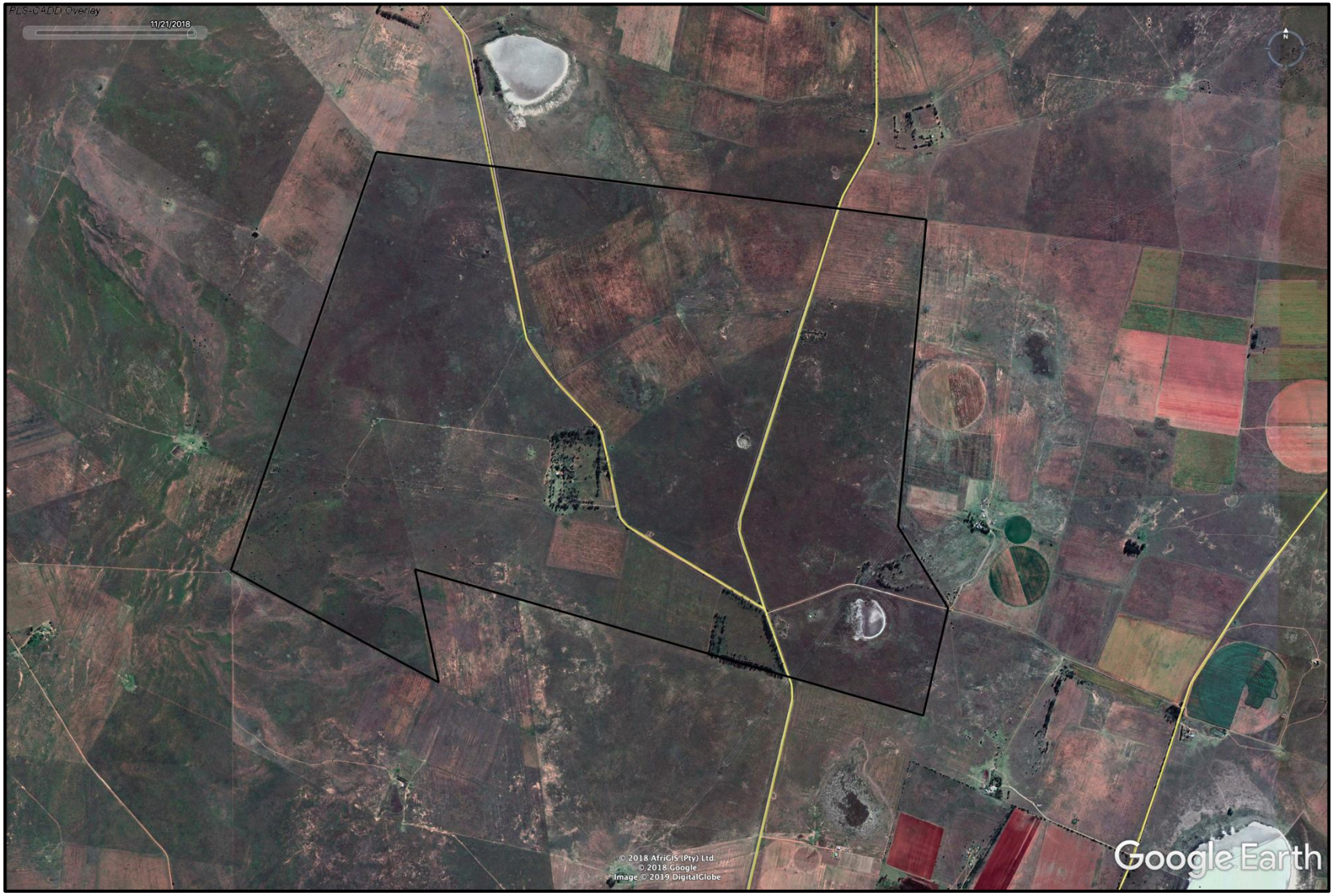

Figure 3. Aerial image (Google Earth ™) of Visserspan 40, black boundary, dissected by two main gravel roads.

3.2 Topography, Geology and Soils

The topography of Visserspan 40 is relatively flat with a slight rise to the southwest corner of the farm. A few depressions are found, and they form seasonal pans.

The geology consists of aeolian and colluvial sand that has been laid down over sandstone, shale and mudstone of the Karoo Supergroup, mostly Ecca Group. The soil forms are mostly Avalon, Westleigh and Clovelly. Dolerite has intruded the landscape where Vaal-Vet Sandy Grassland occurs (Figure 4) but it does not occur at Visserspan 40 except for a small outcrop in the southwest corner of the farm that is not prominent enough to be mapped.

Figure 4. Geological map of Visserspan 40. The farm lies on sand over shale and mudstone (unshaded). The orange areas represent dolerite intrusions of which there are none significant at Visserspan 40.

3.3 Climate

Visserspan 40 is located in the summer rainfall region and the climate is classified as warm-temperate. Overall mean annual precipitation (MAP) is 530 mm and temperatures are high in summer and low in winter with severe frosts on average for 37 days of the year. The climate diagram (Figure 5) shows the complete lack of rainfall in winter and rain mainly occurring from November to March.

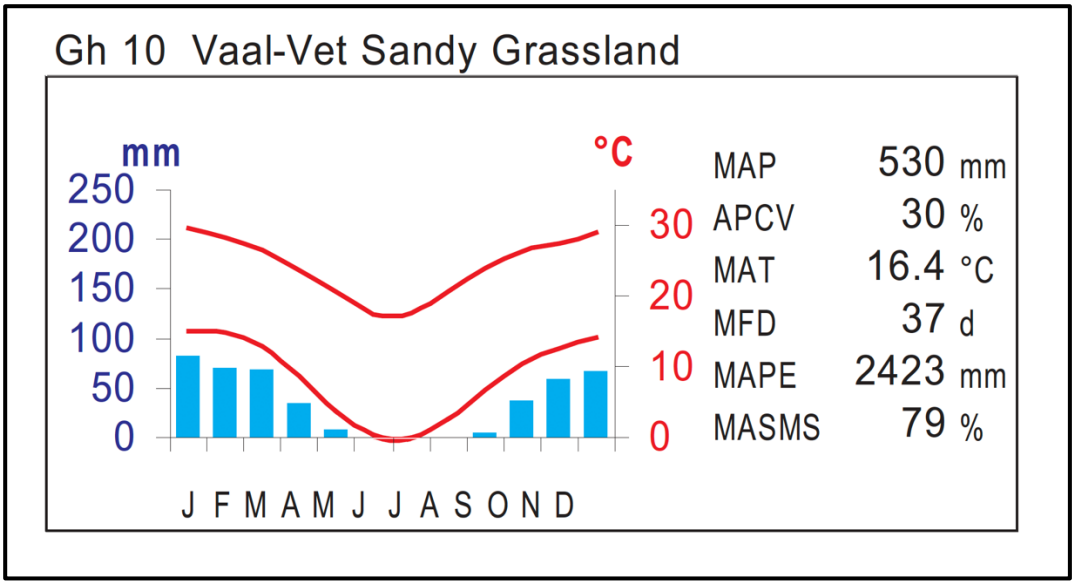

Figure 5. Climate diagram for Vaal-Vet Sandy Grassland the vegetation in the study area (Mucina *et al.* 2006 in Mucina & Rutherford, 2006) showing MAP – Mean Annual Precipitation; ACPV = Annual Precipitation Coefficient of Variance; MAT = Mean Annual Temperature; MFD = Mean Frost Days; MAPE = Mean Annual Potential Evaporation; MASMA = Mean Annual Soil Moisture Stress.

4. Methods

4.1 Desk-top analysis and reporting

The recorded waypoints were transferred to Google Earth ™ satellite aerial-photographs and together with the photographs obtained in the field as well as and available literature, were used for description of the vegetation and compiling the maps presented in this report. The National Vegetation Map (SANBI, 2012) (referred to as VEGMAP) was used as the base-map for vegetation mapping.

As part of the desktop study an initial appraisal of the Visserspan 40 study area was done using Google Earth ™ imagery to determine where the proposed solar photovoltaic (PV) installations could be placed. This exercise revealed that Visserspan 40 had areas that were cultivated in the past and these areas were targeted as the possible 'PV build' areas. The first map produced is shown in Figure 6 with four areas were determined as possibilities. However, it was still recognized that this was not the final word on where solar PV installations could or should be built. It was further recognized that a field assessment would be necessary to 'test' this preliminary desk-top analysis and to determine which areas of the farm are in fact botanically sensitive or not hence the field survey undertaken in November 2018 as described in Section 4.2

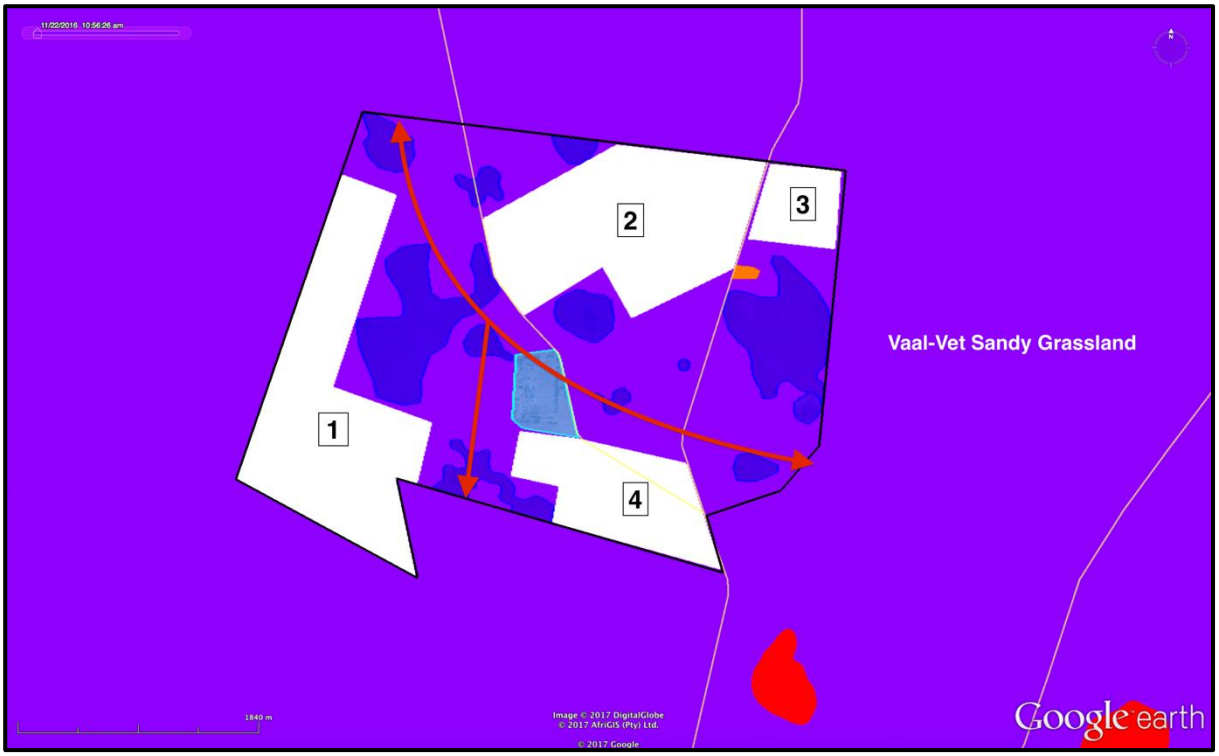

Figure 6. Preliminary map (from desktop analysis) showing possible build areas for solar PV.

4.2 Field Sampling

The fieldwork for the assessment of Visserspan was carried out over two days, 20 and 21 November 2018. It was anticipated that this would be an acceptable time of the year (season) in which to carry out this study . As it happened, 2018 was a very dry year which made planning the survey very difficult. The vegetation was still dry since the summer rains had not yet started to fall. The first meaningful thunderstorm rain occurred at the time of the survey. Season of survey was therefore a **moderate limitation** since the majority of species could not be identified and the summer-growing herbs and forbs were not yet in evidence. However, the natural vegetation was satisfactorily characterized on the basis of dominant grasses that were positively identified.

The study area was accessed using a 4x4 vehicle and on foot. The method used was a 'rapid-assessment technique' in which site observations and numerous photographs were taken at randomly distributed waypoints. The survey tracks and waypoints are shown in Figure 7.

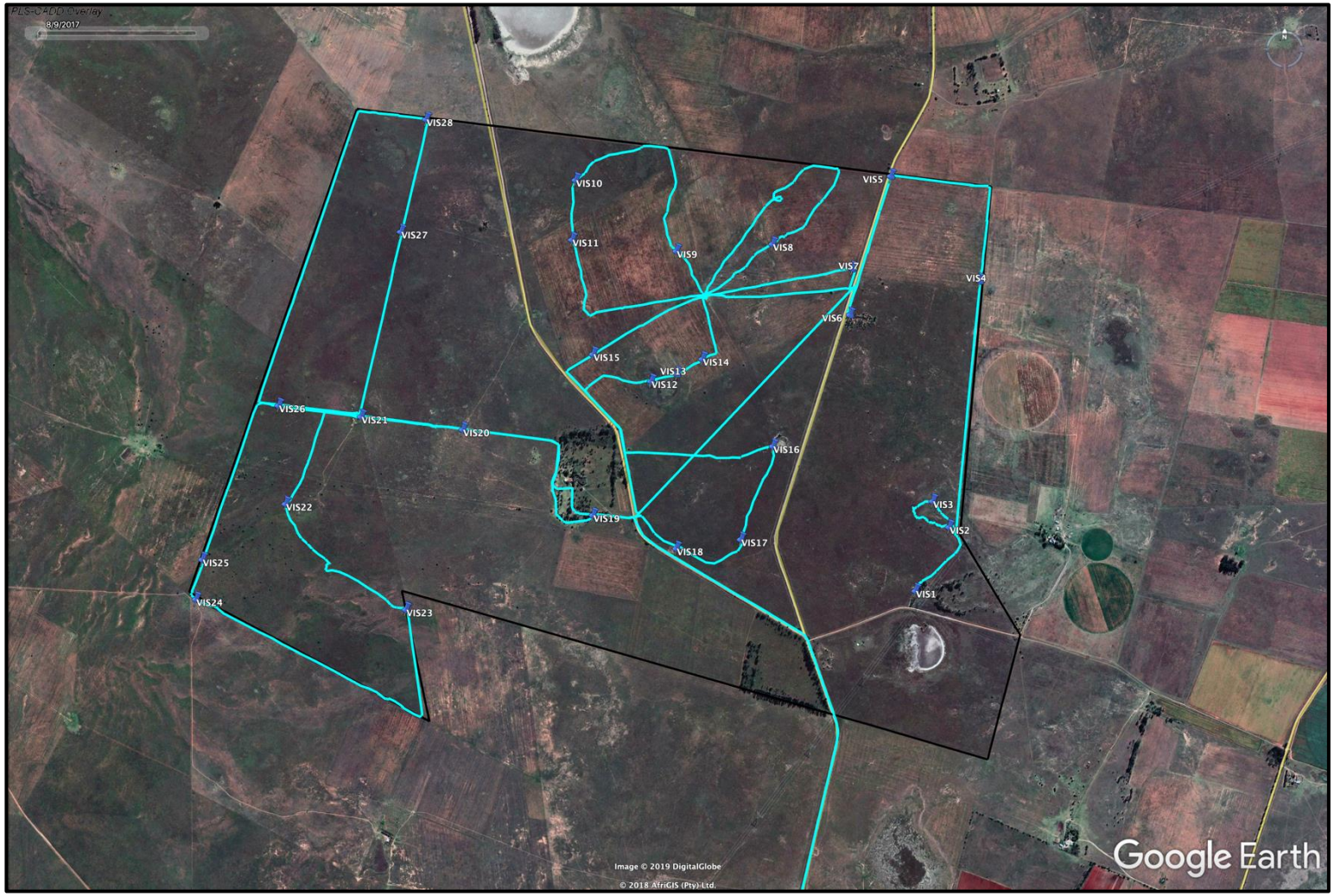

Figure 7. Survey track and waypoints recorded during the botanical survey at Visserspan 40.

5. Botanical evaluation of the study area

5.1 General description

The vegetation of Visserspan falls firmly within the area mapped as Vaal-Vet Sandy Grassland (SANBI, 2012) (Figure8) and this was confirmed during the field-survey.

Vaal-Vet Sandy Grassland, as the name indicates, is a low grassland formation, dominated by C4 grasses. These are grasses adapted to warm-temperate to sub-tropical conditions. A low diversity of shrubs and forbs is found.

Species listed for this vegetation type by Mucina *et al.* (2006) include the following:

Grasses:

Anthephora pubescens, Aristida congesta, Brachiaria serrata, Chloris virgata, Cymbopogon caesius, Cymbopogon pospischilii, Cynodon dactylon, Digitaria argyrograpta, Digitaria eriantha, Eragrostis chloromelas, E. curvula, E. lehmanniana, E. obtusa, E. plana, E. superba, E. trichophora, Elionurus muticus, Heteropogon contortus, Panicum coloratum, Panicum gilvum, Pogonarthria squarrosa, Setaria sphacelata, Themeda triandra, Tragus berteronianus, Trichoneura grandiglumis, Triraphis andropogonoides.

Herbs:

Barleria macrostegia, Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Geigeria aspera var. aspera, Helichrysum caespititum, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Rhynchosia adenodes, Selago densiflora, Stachys spathulata, Vernonia oligocephala.

Geophytic herbs:

Bulbine narcissifolia, Ledebouria marginata

Succulent herbs:

Tripteris aghillana var. integrifolia

Low shrubs:

Anthospermum rigidum subsp. pumilum, Felicia muricata, Helichrysum dregeanum, H. paronychioides, Pentzia globosa, Ziziphus zeyheriana

Herb:
Lessertia philipsiana (endemic)

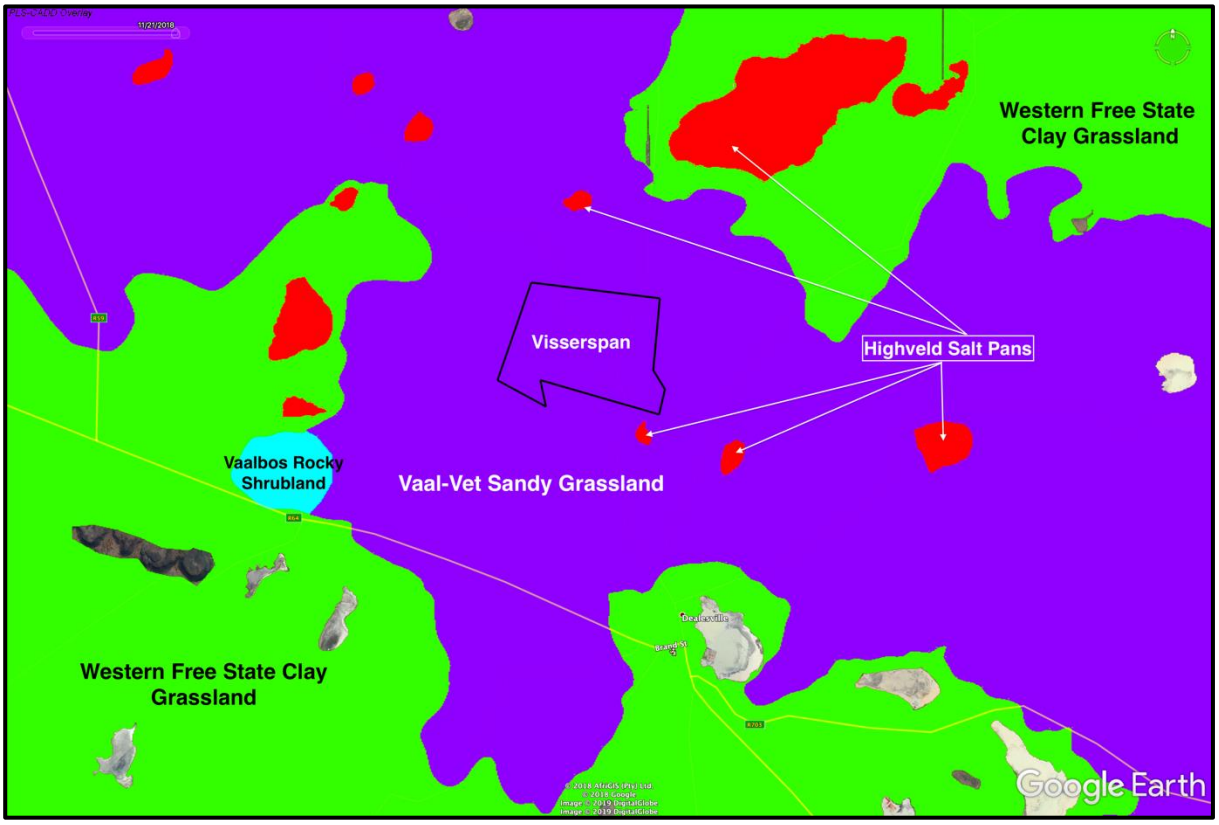

Figure 8. Extract from the Vegetation Map of South Africa, Lesotho & Swaziland (Mucina *et al.* 2005; SANBI, 2012) (VEGMAP) indicating the location of Visserspan 40 in Vaal-Vet Sandy Grassland.

5.2 Vegetation recorded at sample waypoints

Reference should be made to Figure 6 for the location of the respective waypoints. The co-ordinates of the waypoints with photographic illustrations to represent the vegetation found are presented in Table 1.

Table 1. The vegetation and habitat found at the sample waypoints

Waypoint	Co-ordinates	Illustration
VIS1	S 28° 36’ 22.5” E 25° 45’ 20.1”	
VIS2	S 28° 36’ 10.5” E 25° 45’ 27.3”	
VIS3	S 28° 36 ‘05.7” E 25° 45’ 23.8”	

VIS4	S 28° 35’22.5 “ E 25° 45’ 20.1”	
VIS5	S 28° 35’04.6“ E 25° 45’ 14.8”	
VIS6	S 28° 35’30.6“ E 25° 45’ 06.1”	
VIS7	S 28° 35’21.9 “ E 25° 45’ 06.6”	

VIS8	S 28° 35’17.3 “ E 25° 44’ 49.5”	
VIS9	S 28° 35’18.6“ E 25° 44’ 28.9”	
VIS10	S 28° 35’05.3“ E 25° 44’ 07.4”	
VIS11	S 28° 35’16.5 “ E 25° 44’ 06.6”	

VIS12	S 28° 35’43.1“ E 25° 44’ 23.5”	
VIS13	S 28° 35’41.7“ E 25° 44’ 29.0”	
VIS14	S 28° 35’38.9“ E 25° 44’ 34.5”	
VIS15	S 28° 35’38.0“ E 25° 44’ 11.1”	

VIS16	S 28° 35’55.3“ E 25° 44’ 49.6”	
VIS17	S 28° 36’12.8“ E 25° 44’ 42.6”	
VIS18	S 28° 36’14.5“ E 25° 44’ 28.9”	
VIS19	S 28° 36’08.2“ E 25° 44’ 11.0”	

VIS20	S 28° 35’52.1“ E 25° 43’ 43.2”	
VIS21	S 28° 35’49.7“ E 25° 43’ 21.6”	
VIS22	S 28° 36’06.0“ E 25° 43’ 05.5”	
VIS23	S 28° 36’25.8“ E 25° 43’ 31.1”	

VIS24	S 28° 36’23.8“ E 25° 42’ 46.5”	
VIS25	S 28° 36’16.4“ E 25° 42’ 47.8”	
VIS26	S 28° 35’47.6“ E 25° 43’ 04.0”	

VIS27	S 28° 35'15.0" E 25° 43' 30.1"	
VIS28	S 28° 34'53.9" E 25° 43' 35.5"	

It is readily noted from examination of the photos in Table 1 that there is a high degree of uniformity in the structure of the vegetation at Visserspan 40, with good-condition grassland covering the greater part of the area investigated. Species composition of the vegetation is also highly uniform with only variation in dominance of grass species related to the soils and most noticeably in the depressions that collect water in the rainy season. The preliminary desktop assessment of aerial images (Google Earth ™) described above suggested that variation in the vegetation would be detected during the field-survey due to presence of old (fallow) lands. This was found not to be the case except for the presence of alien invasive shrubs (trees) of mesquite (*Prosopis glandulosa* var. *torreyana*) that have mostly invaded old lands but are also present as scattered individuals throughout the study area. In general, the areas that were ploughed in the distant past have reverted to grassland and these area are now almost indistinguishable from the area that have never been ploughed.

The vegetation type and condition is summarised as follows (refer to Table 1):

Waypoints VIS1, 2, 4, 5, 7, 8, 9, 10, 14, 15, 17, 20, 21, 22, 23, 26, 27, 28 represent typical Vaal-Vet Sandy Grassland (with no trees) and this type is widespread and in good condition.

Waypoints VIS3, 11 & 12 represent a low-lying depressions that are vegetated by grasses and may be described as a **seasonal pans**.

Waypoint VIS6 represents a strong stand of alien invasive *Prosopis glandulosa* var. *torreyana.*

Waypoint VIS13 represents overgrazed veld on the neighbouring property to the north.

Waypoint VIS16 represents a dam that has been created by excavating a large depression. A number of invasive mesquite trees occur here.

Waypoint VIS18 represents a depression that was probably created as a borrow pit for road-building material

Waypoint VIS19 represents the farmstead with many Australian *Eucalyptus* sp. (gum) trees.

Waypoints VIS24 & 25 represent the area in the southwest of the farm that is underlain by dolerite that crops out at the surface. The vegetation is Vaal-Vet Sandy Grassland but it has an open woodland of *Vachellia (Acacia) karoo* trees (sweet-thorn). This area is regarded as sensitive and No Go for PV development.

5.3 Alien invasive plants

The main alien invasive plant is honey mesquite (*Prosopis glandulosa* var. *torreyana*) (Figure 9) (Henderson, 2001). This species tends to proliferate where there is disturbance. It occurs more commonly in areas of old lands at Visserspan 40 but is not restricted to these site. It is strongly advised that an eradication programme should be instituted to remove all the mesquite from Visserspan 40 before any further disturbance (construction-related) takes place, to curb the spread of this species.

Figure 9. Honey mesquite (*Prosopis glandulosus* var. *torreyana*)

6. Conservation Status and Vegetation Sensitivity

The vegetation, Vaal-Vet Sandy Grassland, is listed as Endangered A1 in the National List of Threatened Ecosystems (Government Gazette, 2011). The critical biodiversity areas (CBA) map for the Visserspan 40 study area from the Department of Economic Development and Environmental Affairs, Free State Province was overlaid on a Google Earth ™ image and examined to compare what was observed in the field with the aerial image with the overlaid CBA map (Figure 10). The presence of CBAs and ESAs (Ecological Support Areas) suggest that areas where they have been mapped are ecologically sensitive. However, that is not always the case.

The map in Figure 9 shows that the Critical Biodiversity Areas (CBA1) cover most of the western part and most of the eastern part of Visserspan 40, with the central and northeast areas classified as degraded. Ecological Support Areas (ESA) occur in the north and southeast of the site and in the southwest, a small area of “Other” is mapped.

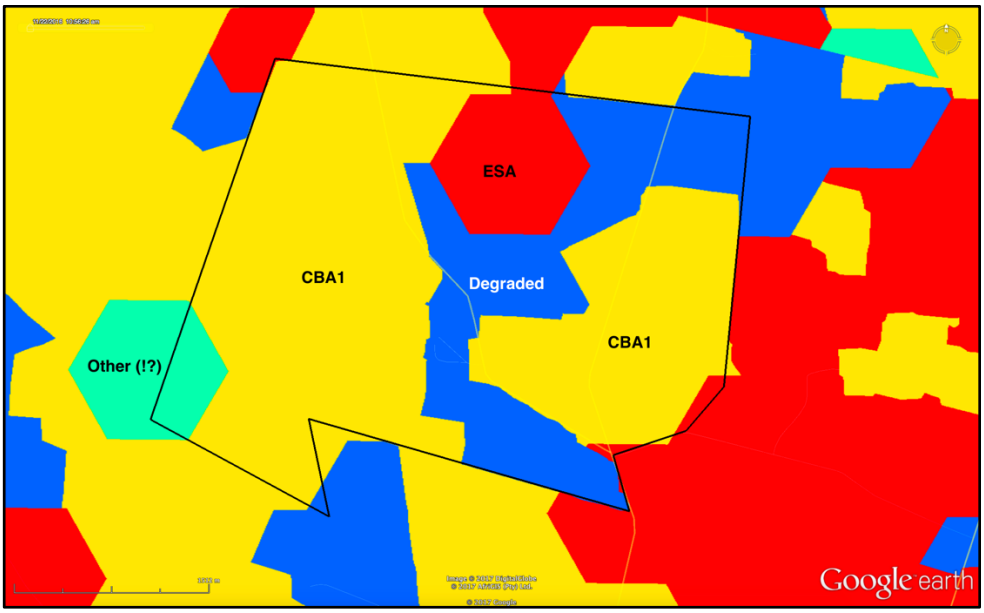

Figure 10. Critical Biodiversity Map (Department of Economic Development and Environmental Affairs, Free State Province as applied to Visserspan 40.

From the field-survey a map has been compiled that represents the *status quo* as determined from 'on-the-ground' observations (Figure 11). This map indicates areas of low sensitivity that can be considered for building PV installations, pans that are areas of high sensitivity that should be buffered (32 m minimum) and a No-Go area in the southwest. The areas that are mapped as 'degraded' in Figure 9 are, in my opinion, no longer degraded since they have successfully reverted to Vaal-Vet Sandy Grassland (good condition). This is true for the area mapped as an ESA as well. It is my view, therefore, that the CBA map (Figure 10), requires rigorous testing and revision. In its current form it does not represent what is found in reality.

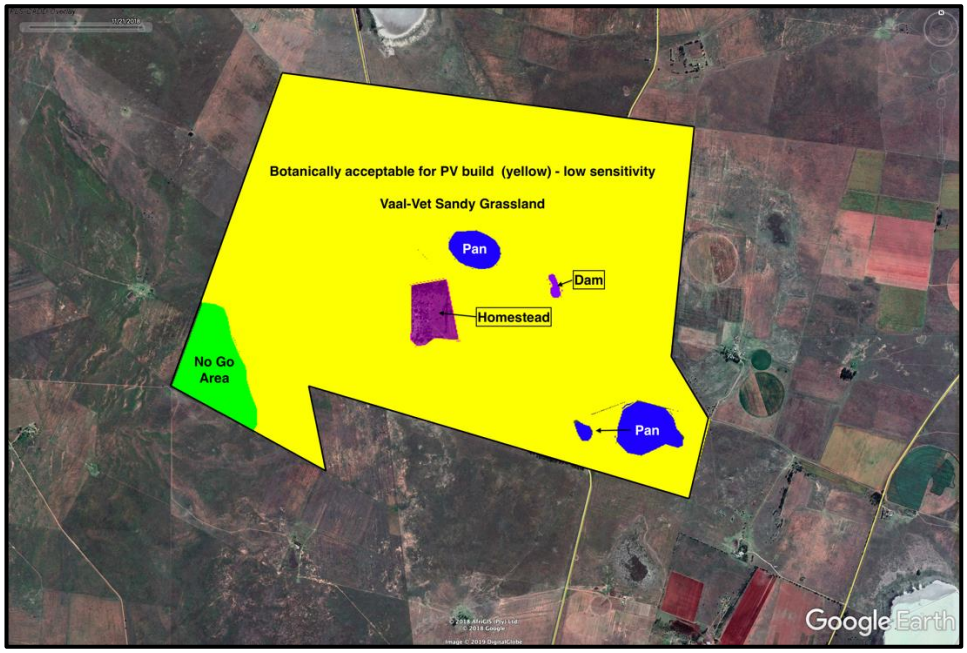

Figure 11. Botanical sensitivity map (*status quo* map) of Visserspan 40. The area shaded yellow is acceptable for construction of solar PV.

The botanical survey of Visserspan 40 in November 2018 (McDonald, 2019) was aimed at determining (i) the vegetation type(s) and condition; (ii) the veracity of the existing CBA (conservation status) map; (ii) the sensitivity of the vegetation and (iv) areas that could be considered for the construction of a PV facility.

As described, only one vegetation type, Vaal-Vet Sandy Grassland, occurs on Visserspan 40. Owing to the widespread occurrence of the principal vegetation type, Vaal-Vet Sandy Grassland, I hold the view that this vegetation is not sensitive at Visserspan. I therefore question the CBA1 classification imposed on parts of the farm. I also contend that the ESA areas and degraded areas are incorrectly mapped.

In view of the above, it is my professional view that the areas shaded yellow in Figure 11 could all be considered for construction of solar PV infrastructure. It was on this basis that the area for the Visserspan Solar PV Project 4 (East) was determined.

The Vaal-Vet Sandy Grassland at Visserspan 40 is Endangered A1 (Government Gazette, 2011) and there would be high local loss of this vegetation type (habitat) and loss of ecological

functionality. Mitigation options are minimal to zero and the impact at a local scale is thus **High Negative**, which cannot be avoided.

9. Conclusions

An initial study was carried out by the author in November 2018 and reported in February 2019 (McDonald, 2019). This study was primarily a survey of the vegetation and habitat at Visserspan 40 to determine the sensitivity and constraints on building the proposed solar PV infrastructure.

The areas now determined for solar PV development were informed by the above study and an impact assessment carried out (this report).

The conclusion is that even though the area of Visserspan Solar PV Project 4 (West) is acceptable for building renewable energy infrastructure, the impact of clearing of the vegetation would still be **High Negative**. No meaningful mitigation measures would be possible. The only thing that can be hoped for is that the solar PV installations are constructed as sensitively as possible.

Since the Vaal-Vet Sandy Grassland is an extensive system and not confined to Visserspan, the cumulative impact would be **Low Negative** and the loss of resources would be low. Consequently, the development of the Solar PV Project 4 (West) at Visserspan is supported from a botanical (vegetation) perspective.

9. References

Government Gazette No. 34809. 2011. Threatened Terrestrial Ecosystems in South Africa.

Henderson, L. *Alien Weeds and Invasive Plants*. Plant Protection Research Institute Handbook No. 12, Agricultural research Council, Pretoria.

Mucina, L., Rutherford, M.C., & Powrie, L.W. (Eds.). 2005. Vegetation map of South Africa, Lesotho, and Swaziland 1:1 000 000 scale sheet maps. South African National Biodiversity Institute, Pretoria. ISBN 1-919976-22-1.

Mucina, L., Hoare, D.B., Lötter, M.C., du Preez, P.J., Rutherford, M.C., Scott-Shaw, R., Bredenkamp, G.J., Powrie, L.W., Scott, L., Camp, K.G.T, Cilliers, S.S., Bezuidenhout, H. Mostert, T.H., Siebert, S.J., Winter, P.J.D., Burrows, J.E., Dobson, L., Ward, R.A., Stalmans, M., Oliver, E.G.H., Siebert, F., Schmidt, E., Kobisi, K. & Kose, L. Chapter 8: Grassland Biome, In: Mucina, L. & Rutherford, M.C. 2006. (eds.) The Vegetation of South Africa. Lesotho & Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria. pp.349—436.

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Report submitted: 8 February 2019

Appendix 1: Botanical Assessment Content Requirements of Specialist Reports, as prescribed by Appendix 6 of GN 982, as amended.

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (a)	Details of- (i) The specialist who prepared the report; and	Cover page and Page 2
	(ii) The expertise of that specialist to compile a specialist report, including a CV.	Page 2 and Appendix 2 (Page 32)
1 (1) (b)	A declaration that the specialist is independent in a form as may be specified by the competent authority.	Page 4
1 (1) (c)	An indication of the scope of, and purpose for which, the report is prepared.	Page 6
1 (1)(cA)	An indication of the quality and age of base data used for the specialist report.	Pages 11--12
1 (1)(cB)	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change.	Pages 11, 24
1 (1) (d)	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment.	Page 12
1 (1) (e)	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used.	Pages 11 & 12

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (f)	Details of an assessment of the specifically identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	Not applicable
1 (1) (g)	An identification of any areas to be avoided, including buffers.	Pages 26 & 27
1 (1) (h)	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers.	Pages 25 & 26
1 (1) (i)	A description of any assumptions made and any uncertainties or gaps in knowledge.	None
1 (1) (j)	A description of the findings and potential implications of such findings on the impact of the proposed activity or activities.	Pages 14—26
1 (1) (k)	Any mitigation measures for inclusion in the EMPr.	Not Applicable
1 (1) (l)	Any conditions for inclusion in the environmental authorisation.	Not Applicable
1 (1) (m)	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Not Applicable
1 (1) (n)	A reasoned opinion- (i) whether the proposed activity, activities or portions thereof should be authorised; and	Page 27
	(iA) regarding the acceptability of the proposed activity or activities; and	Page 27
	(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Not applicable at this stage

Regulation	Content as required by NEMA	Specialist Report Section/Annexure Reference
1 (1) (o)	A description of any consultation process that was undertaken during the course of preparing the specialist report	Not applicable
1 (1) (p)	A summary and copies of any comments received during any consultation process and where applicable, all responses thereto	Not applicable
1 (1) (q)	Any other information requested by the competent authority	Not requested

Appendix 2: Curriculum Vitae

Dr David Jury McDonald Pr.Sci.Nat.

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

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

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

E-mail: dave@bergwind.co.za

Website: www.bergwind.co.za

Profession: Botanist / Vegetation Ecologist / Consultant / Tour Guide

Date of Birth: 7 August 1956

Employment history:

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

Nationality: South African (ID No. 560807 5018 080)
Languages: English (home language) – speak, read and write
Afrikaans – speak, read and write

Membership in Professional Societies:

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

Key Qualifications:

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute).

- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.
- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.
- Further tasks involved the day-to-day management of a large non-profit environmental organisation.
- **Independent botanical consultant** (2005 – to present) over 300 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

Higher Education

Degrees obtained
and major subjects passed:

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

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

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

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

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

Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own company: **Bergwind Botanical Surveys & Tours CC**
August 2000 - 2005 : Deputy Director, later Director Botanical & Communication Programmes, Botanical Society of South Africa
January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National Botanical Institute
January 1979—Dec 1980 : National Military Service

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