PB CONSULT
ENVIRONMENTAL MANAGEMENT SERVICES

BOTANICAL STATEMENT

NEW WAVE DAM - TRAWAL

THE PROPOSED CONSTRUCTION OF A NEW IRRIGATION DAM ON PORTIONS 101 & 168 OF FARM MELKBOOM 384, VANRHYNSDORP, MATZIKAMA LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE.

16 November 2021

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SUMMARY - MAIN CONCLUSIONS

The activity entails the development of the proposed New Wave Dam, an off-stream storage dam on Portions 101 and 168 of the Farm Melkboom 384, near Trawal (Vanrhynsdorp District). Various options were evaluated in the feasibility study by Sarel Bester Engineers (Refer to Report 2114DDR-S1, 2021). Although the proposed alternative will extent the footprint within 32m of the Olifants River it will optimize land use. Three dam options are discussed of which the largest option will have a maximum storage capacity of 180 000m^3, with a dam wall that will not exceed 12m in height.

According to the 2018 version of the Vegetation map of SA (Mucina & Rutherford, 2006) the site is located within an area that historically would have been covered by Vanrhynsdorp Gannabosveld with Namaqualand Riviere vegetation associated with the riparian zone of the Olifants River (Figure 4). Both these vegetation types are classified as of "Least Threatened" in terms of "*List of ecosystems that are threatened and in need of protection*" (GN 1002, December 2011), promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004. More recently the 2018 National Biodiversity Assessment (NBA) was published (Skowno et al., 2019a & Skowno et al, 2019b). Although the findings of the 2018 NBA it is not yet formally adopted by NEM: BA both vegetation types remain classified as "Least Threatened" in terms of the 2018 NBA.

According to the WCBSP, the northern western portion of the dam will overlap an aquatic ecological support areas (Class 2) associated with the Olifants River and a terrestrial ESA2 (Refer to the yellow areas shown in Figure 5). However, the proposed footprint will remain within areas already disturbed, and although it might encroach on the 32m zone of the Olifants River, construction and operation of the dam will not impact any area not already transformed. As a result, it is not expected to have any impact on the ESA.

The site visit was conducted on the 8th of September 2021. The timing of the site visit was good, falling within the spring period (after recent rains), which overlaps the main flowering season. The site visit confirmed that the entire footprint will be located within existing agricultural land. The agricultural landscape had been reshaped into a terraced landscape, which mean that it has been subject to significant physical disturbance. The physical soil disturbances and fertilization practices have changed the soil conditions significantly, and as a result no natural veld remains. The only areas that are not intensively cultivated are small areas on the banks of the terraced areas. Today these areas support a mixture of weedy- and weedy alien species with the occasional hardy indigenous plant scattered in between. No remaining natural vegetation of any significance was observed. The few remaining indigenous plants was mostly hardy species often regarded as disturbance indicators (Refer to Heading 4).

In conclusion, the proposed footprint and its immediate surroundings had been transformed by agriculture and does not support any remaining natural vegetation of conservation importance. It is the opinion of the author that a full botanical assessment will not produce any significant additional information.

It is considered highly unlikely that the development will contribute significantly to any of the following:

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

WITH THE AVAILABLE INFORMATION IT IS RECOMMENDED THAT PROJECT BE APPROVED, TAKING THE RECOMMENDATIONS INTO ACCOUNT

INDEPENDENCE & CONDITIONS

PB Consult is an independent consultant and has no interest in the activity other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and PB Consult have no interest in secondary or downstream development because of the authorization of this proposed project. There are no circumstances that compromise the objectivity of this report. The findings, results, observations, and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. PB Consult reserve the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

RELEVANT QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

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 had worked for more than 20 years in the environmental management field, first at the Overberg Test Range (a Division of Denel) managing the environmental department of OTR 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 and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and 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 en environmental legal compliance audits.

During 2010 he joined EnviroAfrica to move back to the biodiversity aspects of environmental management. Experience with EnviroAfrica includes NEMA EIA applications, environmental management plans for various industries, environmental compliance audits, environmental control work as well as more than 70 biodiversity & botanical specialist studies.

Towards the end of 2017, Mr. Botes started his own small environmental consulting business focusing on biodiversity & botanical assessments, biodiversity management plans and environmental compliance audits.

Mr. Botes is a registered Professional Botanical, 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.

DECLARATION OF INDEPENDENCE

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Petrus, Jacobus, Johannes Botes, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014, as amended, and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 13 of GN No. R. 326.

Note: The terms of reference must be attached.

Signature of the specialist:

PB Consult (Sole Proprietor)

Name of company:

16 November 2021

Date:

COMPLIANCE WITH APPENDIX 6 OF GN. 982 (4 DECEMBER 2014)

Specialist reports

1. A specialist report prepared in terms of these regulations must contain -	
a) Details of –	**Refer to:**
(i) The specialist who prepared the report; and	Refer to Page ii, iii & Appendix 1
(ii) The expertise of the specialist to compile a specialist report including a curriculum vitae;	Refer to Appendix 1
b) A declaration that the specialist is independent in a form as may be specified by the competent authority;	Refer to Page iii
c) An indication of the scope of, and the purpose for which the report was prepared;	Refer to Heading 1.1
d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Refer to Heading 1.3
e) A description of the methodology adopted in preparing the report or carrying out the specialist process inclusive of equipment and modeling used;	Refer to Heading 1.3
f) Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructures, inclusive of a site plan identifying site alternatives;	Refer to Headings 4 & 4.1
g) An identification of any areas to be avoided, including buffers;	Refer to Heading 4.1
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;	Refer to Heading 4.1**Error! Reference source not found.**
i) A description of any assumptions made and any uncertainties or gaps of knowledge;	Refer to Heading 1.3
j) A description of the findings and potential implications of such findings on the impact of the proposed activity, [including identified alternatives on the environment] or activities;	Refer to Heading 4
k) Any mitigation measures for inclusion in the EMPr;	Refer to Heading 5
l) Any conditions for inclusion in the environmental authorization;	Refer to Heading 5
m) Any monitoring requirements for inclusion in the EMPr or environmental authorization;	Refer to Heading 5
n) A reasoned opinion -	
(i) [as to] whether the proposed activity, activities or portions thereof should be authorized;	Refer to the "*Main conclusion*" within the executive summary (Page i)
(iA) regarding the acceptability of the proposed activity or activities; and	
(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorized, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable the closure plan;	Refer to Heading 5
o) A description of any consultation process that was undertaken during the course of preparing the specialist report;	N/a
p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/a
q) Any information requested by the competent authority.	N/a
2. Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

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1. INTRODUCTION

Cederberg Farming (Pty) Ltd would like to construct a new off-stream dam on their property (Portions 101 and 168 of Farm Melkboom No. 384) near Klawer (Refer to Figure 1 & 2). The company focuses on the production of export grapes and vegetables. The proposed dam (the "New Wave Dam") will have a maximum storage capacity of approximately 180 000m^3, with a dam wall that will not exceed 12m in height. Sarel Bester Engineers was appointed to do a scoping and feasibility study (including the evaluation of various alternatives) in terms of engineering viability and cost feasibility (Refer to Report 2114DDR-S1 of 2021). The adjoining farm portions (Portions 101 & 168 of Melkboom) are in the intensively developed agricultural landscape next to the Olifants River in the Trawal area.

The proposed construction of the dam will trigger listed activities in terms of the NEMA EIA regulations. As a result, EnviroAfrica was appointed to facilitate the NEMA EIA application process. Because its location, right next to the Olifants River and overlapping potential ecological support areas, PB Consult was appointed to perform a botanical scan of the proposed footprint and its immediate surroundings to determine potential impacts on botanical features of significance.

Historically the proposed footprint would have been covered by Vanrhynsdorp Gannabosveld, with Namaqualand Riviere vegetation associated with the Olifants River riparian zone. Both of these vegetation types is considered of "Least Threatened" in terms of the "*List of ecosystems that are threatened and in need of protection*", GN 1002, December 2011 (meaning that they are not presently under treat). However, the proposed footprint overlaps small areas of the proposed ecological support area (ESA) associated with the riparian corridor next to the Olifants River. Desktop studies, on the other hand, suggested that the proposed footprint will only impact on areas already transformed into agricultural land because of past and present agricultural practices. This view was supported by historical Google images, Landcover maps as well as Crop census data. The earliest Google images (2004) in which the site is clearly visible, shows that the proposed footprint was already developed at that time.

The site visit confirmed that the entire footprint will be located within existing agricultural land. The agricultural landscape had been reshaped into a terraced landscape, which mean that it has been subject to significant physical disturbance. The physical soil disturbances and fertilization practices have changed the soil conditions significantly, and as a result no natural veld remains. The only areas that are not intensively cultivated are small areas on the banks of the terraced areas. Today these areas support a mixture of weedy- and weedy alien species with the occasional hardy indigenous plant scattered in between. No remaining natural vegetation of any significance was observed. The few remaining indigenous plants was mostly hardy species often regarded as disturbance indicators.

Note that this report was not intended as a full botanical assessment, but rather a botanical scan to evaluate the remaining natural veld to make recommendations on whether further studies might be required. It is the opinion of the author that a full botanical assessment will not produce any significant additional information.

1.1. TERMS OF REFERENCE

The terms of reference for this appointment were to:

- Give a short statement on the vegetation and its conditions encountered at the site and its immediate surroundings.
- Determine and record the position of any plant species of special significance (e.g., protected tree species, or rare or endangered plant species) that should be avoided or that may require "search & rescue" intervention.
- Make recommendations on impact minimization and further studies, should it be required

1.2. LOCATION & LAYOUT

Trawal is a grape growing agricultural area located Olifants River valley between Clanwilliam and Klawer, just off the N7 (Figure 1). The name Trawal is said to have been derived from the word "trouble" on account of the difficulties encountered by the early explores (Jan van Riebeeck's time), in the area where they had "trouble" crossing the Olifants River. Portions 101 (15.1ha) and 168 (13.2ha) of the Farm Melkboom 384 is located on the banks of the Olifants River to the north of Trawal (Figure 2). The dam will cover an area of approximately 4 ha.

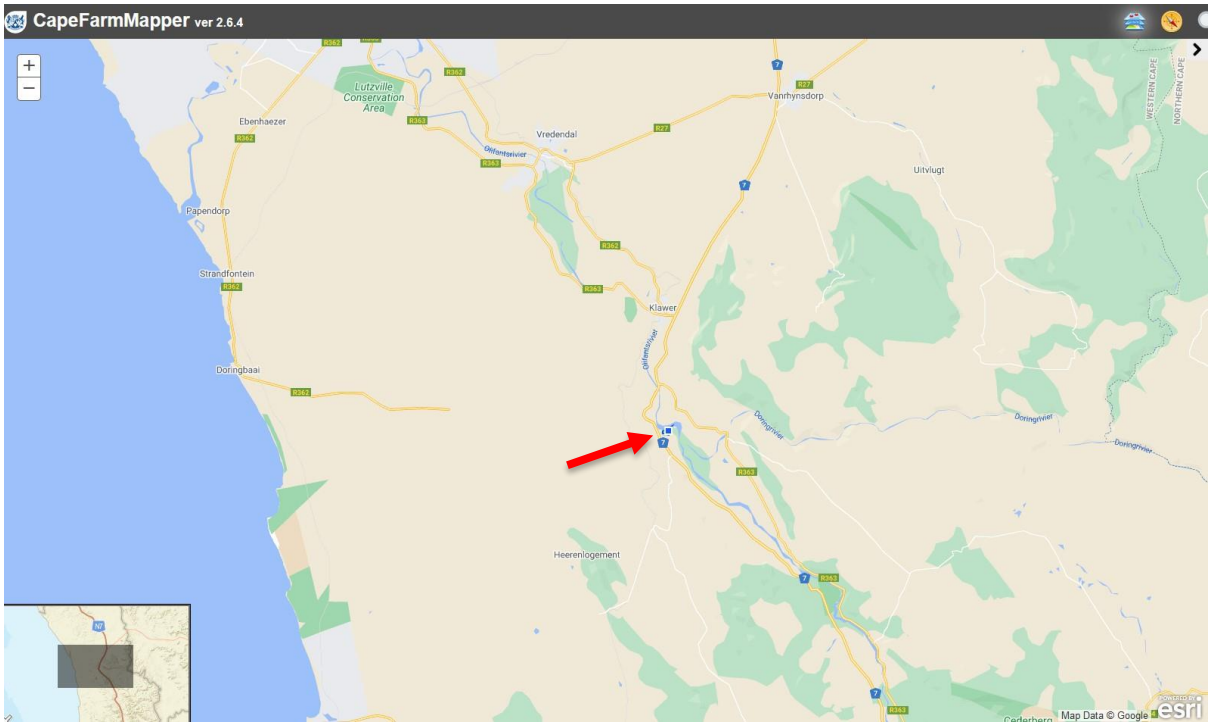

Figure 1: The location of the two farm portions in relation to Klawer, Vredendal and Vanrhynsdorp.

Figure 2: The location of the two farm portions (Blue) and the proposed dam (Red), next to the Olifants River

1.3. EVALUATION METHOD

Desktop studies together with a site visit was performed to evaluate the proposed site in terms of potential impacts on botanical features of significance and to make recommendations on mitigation measures (should it be required). As part of the desktop study spatial information from online databases such as SANBI BGIS, CapeFarmMapper and Google Earth were used to evaluate the site in terms of vegetation type(s) expected, potential significant features that might be encountered (e.g., variations in soil type, rocky outcrops etc.) and obvious differences in landscape or vegetation densities, which might indicate differences in plant community or species composition. Expected plant species lists were prepared and species of special significance were flagged (to be used as reference during the site visit).

The following general conclusions were drawn on completion of the desktop assessment:

- The footprint and its immediate surroundings are unlikely to support remaining natural veld of any significance. The veld is expected to be degraded or transformed agricultural land;
- Originally, the footprint would have been covered by Vanrhynsdorp Gannabosveld, with Namaqualand Riviere vegetation next to the Olifants River (Figure 4), both vegetation types are classified as of "Least Threatened" in terms of the "*List of ecosystems that are threatened and in need of protection*" (GN 1002, December 2011), Refer to Heading 2).
- According to the 2017 Western Cape Biodiversity Spatial Plan (WCBSP) (Refer to Heading 3): The proposed footprint may impact on an ESA's (Refer to Figure 5).

The site visit was conducted on the 8th of September 2021. The survey was conducted by walking and driving the site while examining, marking, and photographing any area of interest. A hand-held Garmin GPSMAP 62s was used to track the sampling route and record waypoints of locations of specific importance. During the survey notes, together with a photographic record, were compiled for the vegetation and landscape. The author endeavoured to identify and locate all significant biodiversity features, special plant species and or specific soil conditions which might indicate special botanical features (e.g., rocky outcrops or heuweltjies). The timing of the site visit was good, falling within the spring period (after recent rains), which overlaps the main flowering season.

The site visit confirmed that the proposed footprint (and its surroundings) had been transformed because of agricultural development. No natural veld remains, and only weedy species or single hardy (disturbance indicator) indigenous species was observed in the narrow strips between the various fields (mostly on the banks of the terraced areas).

1.4. ACTIVITY DESCRIPTION

The proposed activity entails the development of the proposed New Wave Dam, an off-stream storage dam on Portions 101 and 168 of the Farm Melkboom 384, near Trawal (Vanrhynsdorp District). These are two of nine neighboring properties owned by Cederberg Farming (managed as one farming unit). Various options were evaluated in the feasibility study by Sarel Bester Engineers (Refer to Report 2114DDR-S1, 2021). Although the proposed alternative will extent the footprint within 32m of the Olifants River it will optimize land use. Three dam options are discussed of which the largest option will have a maximum storage capacity of 180 000m^3, with a dam wall that will not exceed 12m in height.

Figure 3 shows a recent Google Image of the two properties that will be impacted (with the proposed development footprint in red) in which the transformed status of the veld is easily discernable.

Figure 3: Portions 101 & 168 of Farm 384 (Blue) showing the proposed development footprint (Red) – disturbed agricultural land

2. THE VEGETATION MAP OF SA

According to the 2018 version of the Vegetation map of SA (Mucina & Rutherford, 2006) the site is located within an area that historically would have been covered by Vanrhynsdorp Gannabosveld with Namaqualand Riviere vegetation associated with the riparian zone of the Olifants River (Figure 4). Both these vegetation types are classified as of "Least Threatened" in terms of "*List of ecosystems that are threatened and in need of protection*" (GN 1002, December 2011), promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004. More recently the 2018 National Biodiversity Assessment (NBA) was published (Skowno et al., 2019a & Skowno et al, 2019b). Although the findings of the 2018 NBA it is not yet formally adopted by NEM: BA both vegetation types remain classified as "Least Threatened" in terms of the 2018 NBA.

Mucina & Rutherford (2006) describe Vanrhynsdorp Gannabosveld as a succulent shrubland dominated by *Salsola* (over larger stretches), *Drosanthemum*, *Ruschia* and some disturbance indicators such as (mainly) short-lived Aizoaceae, including representatives of the genera *Galenia*, *Psilocaulon*, *Caulipsolon* and *Mesembryanthemum*. In the south, the shale plains can acquire a grassland appearance through seasonal dominance of *Bromus pectinatus* and *Stipa capensis*. Spectacular annual and geophyte flora can appear in spring after good winter rains.

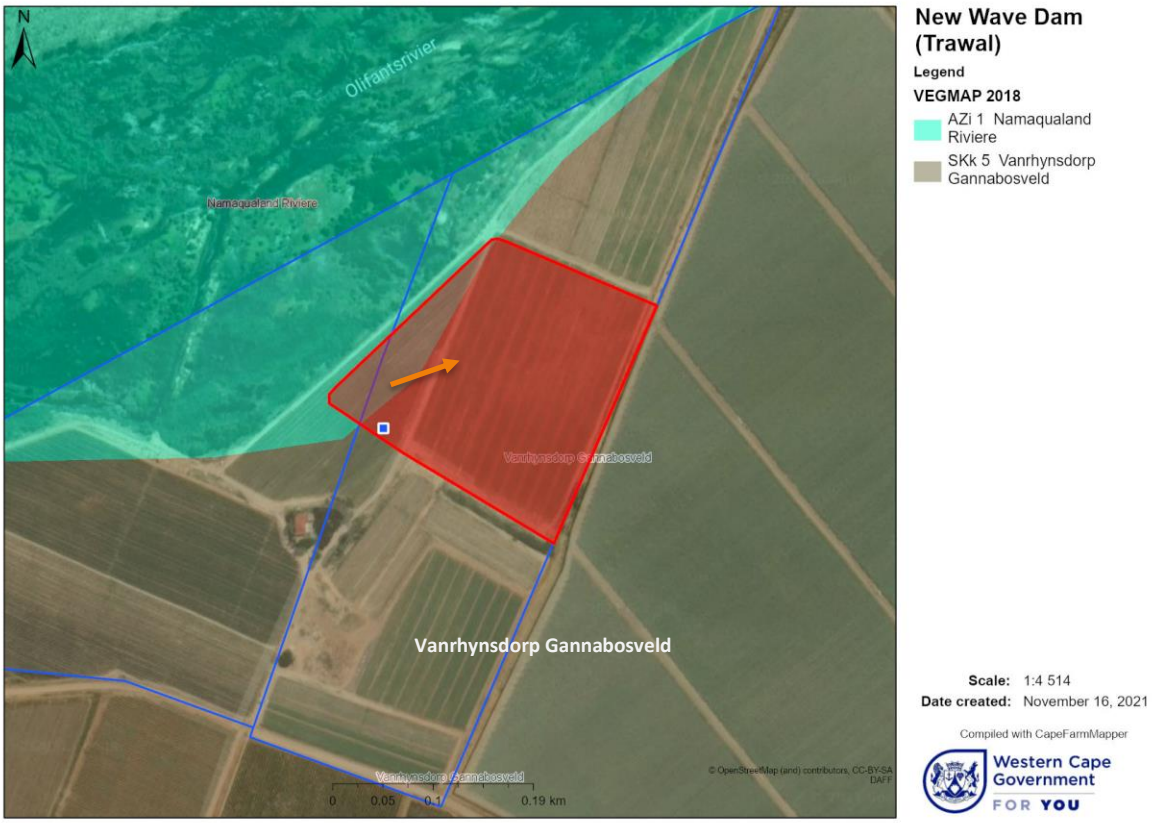

Figure 4: Vegetation map of South Africa (2018 version) showing the property (Green) and the proposed development footprint (Blue)

2.1. THE VEGETATION IN CONTEXT

Vanrhynsdorp Gannabosveld is part of the Succulent Karoo Biome (Mucina & Rutherford, 2006). The Succulent Biome vegetation is strongly influenced by winter rainfall and fog and has been compared to a desert rich in succulents. According to the 2004 National Spatial Biodiversity Assessment (NSBA), approximately 79% of the Vanrhynsdorp Gannabosveld vegetation remains, with the main reasons for the transformation of the remainder being cultivation and open-cast gypsum mining. A conservation target of 28% has been set for this vegetation type (none of which was formally conserved during 2004), but with the recent proclamation of the Knersvlakte Nature Reserve, at least some of this vegetation type should now be formally conserved. The 2004 NSBA originally classified this vegetation type as vulnerable. However, with more information now available, it was declassified to "**Least Threatened**" in the *National list of ecosystems that are threatened and in need of protection* (GN 1002, December 2011).

3. WESTERN CAPE BIODIVERISTY SPATIAL PLAN

The 2017 Western Cape Biodiversity Spatial Plan (WCBSP) includes a map of biodiversity importance for the entire province, covering both the terrestrial and freshwater realms, as well as major coastal and estuarine habitats (Pool-Stanvliet, 2017). The WCBSP is the product of a systematic biodiversity plan that delineates, on a map, Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which require safeguarding to

ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services.

According to the WCBSP, the northern western portion of the dam will overlap an aquatic ecological support areas (Class 2) associated with the Olifants River and a terrestrial ESA2 (Refer to the yellow areas shown in Figure 5). However, the proposed footprint will remain within areas already disturbed, and although it might encroach on the 32m zone of the Olifants River, construction and operation of the dam will not impact any area not already transformed. As a result, it is not expected to have any impact on the ESA.

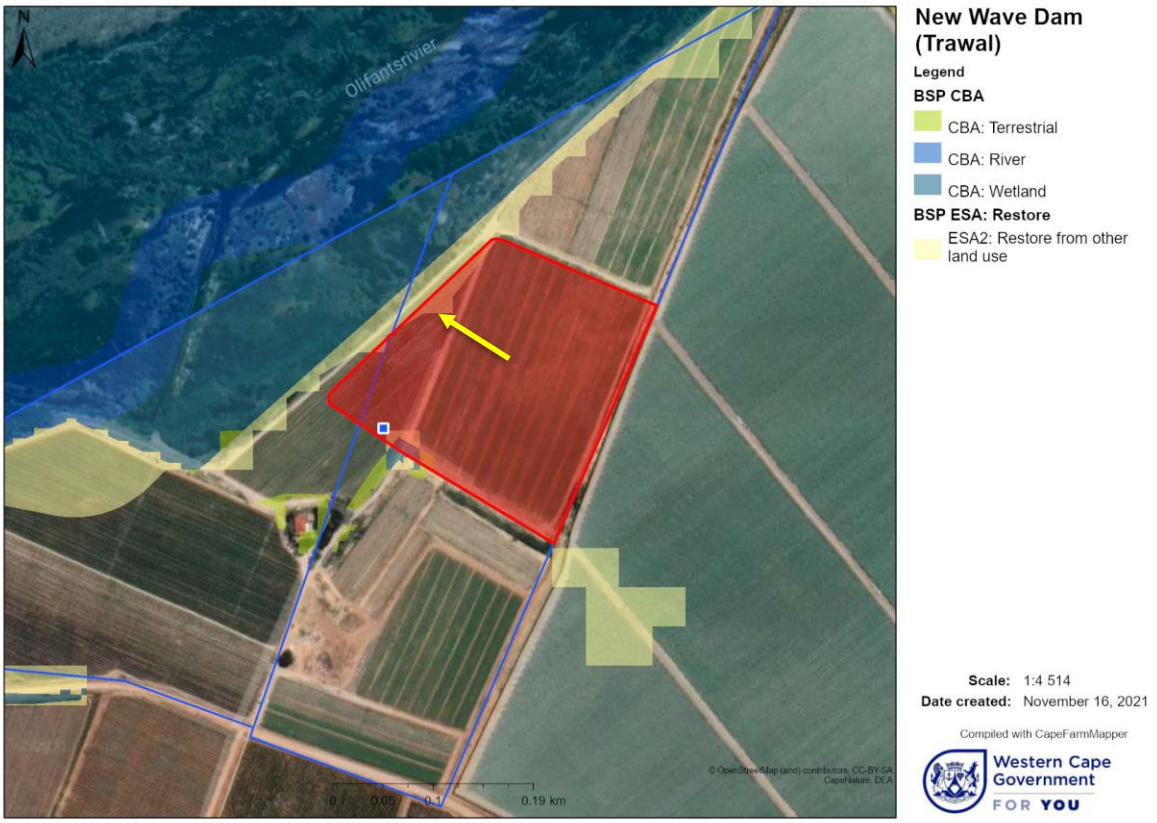

Figure 5: Western Cape Biodiversity Spatial Plan (2017) indicting the proposed dam location and surroundings

4. VEGETATION ENCOUNTERED

The site visit confirmed that the site was totally degraded/transformed because of agricultural practices. No natural veld remains as the total footprint and the soils had been changed over time. The agricultural landscape had been subject to significant soil disturbances over time as the area had been landscaped into terraced areas to accommodate agriculture. Coupled with fertilization programs the soils and soil chemical content were changed significantly over time.

Weedy species and a few single hardy indigenous species were only encountered in the thin strips between the fields (mostly on the embankments of the terraced areas. These weedy species included: *Amaranthus* species (Pigweed), *Atriplex* species, *Chenopodium album* ("misbredie"), *Conyza bonariensis* ("Skraalhans"), *Echium plantagineum* (purple echium), *Erodium moschatum* (musk heron's bill), *Lupinus luteus* (blue lupin), *Raphanus raphanistrum* (ramenas), *Ricinus communis* (Kasterolieboom) and *Salsola* species (naturalized weed), amongst others.

Only a few indigenous species were observed, and they were mostly hardy pioneer species which included small patches of the reed *Phragmites australis* (within the drainage lines next to the fields) (Photo 2), the occasional *Oxalis* cf. *pes-caprae* (yellow sorrel) and a small patch of *Albuca* cf. *canadensis* (slymstok) in the south-western corner of the site.

The absolute lack of any representative natural veld or species confirms that the site can only be described as transformed.

	**Photo 1:** Standing halfway up on the western boundary of the dam - Looking over the proposed dam site from southwest to northeast. Note the Berg River in the background
	**Photo 2:** Looking southeast over the southern section of the dam from the same location as in Photo 1..
	**Photo 3:** Looking from southwestern corner of the dam to northeast. Note the patch of *Phragmites australis* in the drainage lines between the fields.

	**Photo 4:** Standing on the eastern boundary of the proposed dam - looking from east to west over the middle part of the proposed footprint area. Note the lack of any remaining natural veld of significance (apart from the few weedy species).
	**Photo 5**: Looking in a southwestern direction over the dam site from the same location as Photo 4.
	**Photo 6:** Looking from east to west over the proposed dam site. Note the physical fence to the right. Construction will not impact on this fence or the river corridor.
	**Photo 7:** Typical weedy vegetation found in between the fields. Note the physical disturbance footprint and the terraces used for agriculture.

4.1. SENSITIVITY MAP

Normally a sensitivity map would have been included in the report. In this case there remains no sensitive areas, apart from the Berg River riparian corridor, which is already demarcated by a physical fence. The information received consistently stated that the construction footprint for the proposed dam will not impact in any way beyond this physical fence.

As a result, no sensitivity map is deemed necessary.

5. RECOMMENDATIONS

It is considered highly unlikely that the proposed development will lead to any significant impact on any remaining vegetation or plant species of significant conservation value. In fact, the terrain and its immediate surroundings are considered transformed by agricultural practices.

Recommendations on impact minimization are thus limited to good environmental control:

- The **river and wetland areas** to the north of the site must be regarded as **no-go areas**.
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase and ensure the riparian zone is not impacted in any way by the construction of the proposed dam.
- Lay-down areas or construction sites must be located within already disturbed areas or areas of low ecological value and must be pre-approved by the ECO.
- An integrated waste management approach must be implemented during construction.

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APPENDIX 1: CURRICULUM VITAE – P.J.J. BOTES

Curriculum Vitae: Peet JJ Botes

Address: 22 Buitekant Street, Bredasdorp, 7280; **Cell**: 082 - 921 5949

Nationality:	South African
ID No.:	670329 5028 081
Language:	Afrikaans / English
Profession:	Environmental Consultant & Auditing
Specializations:	Botanical & Biodiversity Impact Assessments
	Environmental Compliance Audits
	Environmental Impact Assessment
	Environmental Management Systems
Qualifications:	**BSc** (Botany & Zoology), with Nature Conservation III & IV as extra subjects; Dept. of Natural Sciences, Stellenbosch University 1989.
	Hons. BSc (Plant Ecology), Stellenbosch University, 1989
	More than 20 years of experience in the Environmental Management Field (Since 1997 to present).
Professional affiliation:	Registered Professional Botanical, Environmental and Ecological Scientist at SACNASP (South African Council for Natural Scientific Professions) since 2005.
SACNAP Reg. No.:	400184/05

BRIEF RESUME OF RELEVANT EXPERIENCE

1997-2005: Employed by the Overberg Test Range (a Division of Denel), responsible for managing the environmental department of OTB, 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).

2005-2010: Joined Enviroscientific, as an independent environmental consultant specializing in wastewater management, botanical and biodiversity assessments, developing environmental management plans and strategies, environmental control work as well as doing environmental compliance audits and 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.

2010-2017: Joined EnviroAfrica, as an independent Environmental Assessment Practitioner and Biodiversity Specialist, responsible for Environmental Impact Assessments, Biodiversity & Botanical specialist reports and Environmental Compliance Audits. During this time Mr Botes compiled more than 70 specialist Biodiversity & Botanical impact assessment reports ranging from agricultural-, infrastructure pipelines- and solar developments.

2017-Present: Establish a small independent consultancy (PB Consult) specialising in Environmental Audits, Biodiversity and Botanical specialist studies as well as Environmental Impact Assessment.

LIST OF MOST RELEVANT BOTANICAL & BIODIVERSITY STUDIES

Botes. P. 2007: Botanical assessment. Schaapkraal, Erf 644, Mitchell's Plain. A preliminary assessment of the vegetation in terms of the Fynbos Forum: Ecosystem guidelines. 13 November 2007.

Botes. P. 2008: Botanical assessment. Schaapkraal Erf 1129, Cape Town. A preliminary assessment of the vegetation using the Fynbos Forum Terms of Reference: Ecosystem guidelines for environmental Assessment in the Northern Cape. 20 July 2008.

Botes, P. 2010(a): Botanical assessment. Proposed subdivision of Erf 902, 34 Eskom Street, Napier. A Botanical scan and an assessment of the natural vegetation of the site to assess to what degree the site contributes towards conservation targets for the ecosystem. 15 September 2010.

Botes, P. 2010(b): Botanical assessment. Proposed Loeriesfontein low-cost housing project. A preliminary Botanical Assessment of the natural veld with regards to the proposed low cost housing project in/adjacent to Loeriesfontein, taking into consideration the National Spatial Biodiversity Assessment of South Africa. 10 August 2010.

Botes, P. 2010(c): Botanical assessment: Proposed Sparrenberg dam, on Sparrenberg Farm, Ceres. . A Botanical scan and an assessment of the natural vegetation of the site. 15 September 2010.

Botes, P. 2011: Botanical scan. Proposed Cathbert development on the Farm Wolfe Kloof, Paarl (Revised). A botanical scan of Portion 2 of the Farm Wolfe Kloof No. 966 (Cathbert) with regards to the proposed Cathbert Development, taking into consideration the National Spatial Biodiversity Assessment of South Africa. 28 September 2011.

Botes, P. 2012(a): Proposed Danielskuil Keren Energy Holdings Solar Facility on Erf 753, Danielskuil. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 17 March 2012.

Botes, P. 2012(b): Proposed Disselfontein Keren Energy Holdings Solar Facility on Farm Disselfontein no. 77, Hopetown. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 28 March 2012.

Botes, P. 2012(c): Proposed Kakamas Keren Energy Holdings Solar Facility on Remainder of the Farm 666, Kakamas. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 13 March 2012.

Botes, P. 2012(d): Proposed Keimoes Keren Energy Holdings Solar Facility at Keimoes. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 9 March 2012.

Botes, P. 2012(e): Proposed Leeu-Gamka Keren Energy Holdings Solar Facility on Portion 40 of the Farm Kruidfontein no. 33, Prince Albert. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 27 March 2012.

Botes, P. 2012(f): Proposed Mount Roper Keren Energy Holdings Solar Facility on Farm 321, Kuruman. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 28 March 2012.

Botes, P. 2012(g): Proposed Whitebank Keren Energy Holdings Solar Facility on Farm no. 379, Kuruman. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 27 March 2012.

Botes, P. 2012(h): Proposed Vanrhynsdorp Keren Energy Holdings Solar Facility on Farm Duinen Farm no. 258, Vanrhynsdorp. A Biodiversity Assessment (with botanical input) taking into consideration the findings of the National Spatial Biodiversity Assessment of South Africa. 13 April 2012.

Botes, P. 2012(i): Askham (Kameelduin) proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant

environmental features (and to identify the need for additional studies if required. 1 November 2012.

Botes, P. 2013(a): Groot Mier proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

Botes, P. 2013(b): Loubos proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

Botes, P. 2013(c): Noenieput proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

Botes, P. 2013(d): Rietfontein proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

Botes, P. 2013(e): Welkom proposed low cost housing, Mier Municipality Residential Project, Northern Cape. A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required. January 2013.

Botes, P. 2013(f): Zypherfontein Dam Biodiversity & Botanical Scan. Proposed construction of a new irrigation dam on Portions 1, 3, 5 & 6 of the Farm Zypherfontein No. 66, Vanrhynsdorp (Northern Cape) and a scan of the proposed associated agricultural enlargement. September 2013.

Botes, P. 2013(g): Onseepkans Canal: Repair and upgrade of the Onseepkans Water Supply and Flood Protection Infrastructure, Northern Cape. A Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required). August 2013.

Botes, P. 2013(h): Biodiversity scoping assessment with regards to a Jetty Construction On Erf 327, Malagas (Matjiespoort). 24 October 2013.

Botes, P. 2013(i): Jacobsbaai pump station and rising main (Saldanha Bay Municipality). A Botanical Scan of the area that will be impacted by the proposed Jacobsbaai pump station and rising main. 30 October 2013.

Botes, P. 2014(a): Brandvlei Bulk Water Supply: Proposed construction of a 51 km new bulk water supply pipeline (replacing the existing pipeline) from Romanskolk Reservoir to the Brandvlei Reservoir, Brandvlei (Northern Cape Province). A preliminary Biodiversity & Botanical scan in order to identify significant environmental features (and to identify the need for additional studies if required). 24 February 2014.

Botes, P. & McDonald Dr. D. 2014: Loeriesfontein Bulk Water Supply: Proposed construction of a new bulk water supply pipeline and associated infrastructure from the farm Rheeboksfontein to Loeriesfontein Reservoir, Loeriesfontein. Botanical scan of the proposed route to determine the possible impact on vegetation and plant species. 30 May 2014.

Botes, P. 2014(b): Kalahari-East Water Supply Scheme Extension: Phase 1. Proposed extension of the Kalahari-East Water Supply Scheme and associated infrastructure to the Mier Municipality, ZF Mgcawu District Municipality, Mier Local Municipality (Northern Cape Province). Biodiversity & Botanical scan of the proposed route to determine the possible impact on biodiversity with emphasis on vegetation and plant species. 1 July 2014.

Botes, P. 2014(c): The proposed Freudenberg Farm Homestead, Farm no. 419/0, Tulbagh (Wolseley Area). A Botanical scan of possible remaining natural veld on the property. 26 August 2014.

Botes, P. 2014(d): Postmasburg WWTW: Proposed relocation of the Postmasburg wastewater treatment works and associated infrastructure, ZF Mgcawu District Municipality, Tsantsabane Local Municipality (Northern Cape Province). Biodiversity and botanical scan of the proposed pipeline route and WWTW site. 30 October 2014.

Botes, P. 2015(a): Jacobsbaai pump station and rising main (Saldanha Bay Municipality) (Revision). A Botanical Scan of the area that will be impacted by the proposed Jacobsbaai pump station and rising main. 21 January 2015.

Botes, P. 2015(b): Steenkampspan proving ground. Proposed establishment of a high speed proving (& associated infrastructure) on the farm Steenkampspan (No. 419/6), Upington, ZF Mgcawu (Siyanda) District Municipality, Northern Cape Province. Biodiversity and Botanical Scan of the proposed footprint. 20 February 2015.

Botes, P 2015(c): Proposed Bredasdorp Feedlot, Portion 10 of Farm 159, Bredasdorp, Cape Agulhas Municipality, Northern Cape Province. A Botanical scan of the area that will be impacted. 28 July 2015.

Botes, P. 2016(a): OWK Raisin processing facility, Kuruman, Erf 151, Kenhardt, Northern Cape Province. A Botanical scan of the proposed footprint. 26 May 2016.

Botes, P. 2016(b): Onseepkans Agricultural development. The proposed development of ±250 ha of new agricultural land at Onseepkans, Northern Cape Province. Biodiversity and Botanical Scan. January 2016.

Botes, P. 2016(c): Henkries Mega-Agripark development. The proposed development of ±150 ha of high potential agricultural land at Henkries, Northern Cape Province. Biodiversity and Botanical Scan of the proposed footprint. 28 February 2016.

Botes, P. 2016(d): Proposed Namaqualand Regional Water Supply Scheme high priority bulk water supply infrastructure upgrades from Okiep to Concordia and Corolusberg. Biodiversity Assessment of the proposed footprint. March 2016.

Botes, P. 2017: The proposed new Namaqua N7 Truck Stop on Portion 62 of the Farm Biesjesfontein No. 218, Springbok, Northern Cape Province. Botanical scan of the proposed footprint. 10 July 2017.

Botes, P. 2018(a): Kuruman Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Kamiesberg, Northern Cape Province. Botanical scan of the proposed footprint. 20 February 2018

Botes, P. 2018(b): Rooifontein Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Rooifontein, Northern Cape Province. Botanical scan of the proposed footprint. 23 February 2018

Botes, P. 2018(c): Paulshoek Bulk Water Supply – Ground water desalination, borehole- and reservoir development, Paulshoek, Northern Cape Province. Botanical scan of the proposed footprint. 27 March 2018.

Botes, P. 2018(d): Kakamas Waste Water Treatment Works Upgrade – Construction of a new WWTW and rising main, Khai !Garib Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 1 August 2018.

Botes, P. 2018(e): Kakamas Bulk Water Supply – New bulk water supply line for Kakamas, Lutzburg & Cillie, Khai !Garib Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 4 August 2018.

Botes, P. 2018(f): Wagenboom Weir & Pipeline – Construction of a new pipeline and weir with the Snel River, Breede River Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint. 7 August 2018.

Botes, P. 2018(g): Steynville (Hopetown) outfall sewer pipeline – Proposed development of a new sewer outfall pipeline, Hopetown, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.

Botes, P. 2018(h): Tripple D farm agricultural development – Development of a further 60 ha of vineyards, Erf 1178, Kakamas, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.

Botes, P. 2018(i): Steynville (Hopetown) outfall sewer pipeline – Proposed development of a new sewer outfall pipeline, Hopetown, Northern Cape Province. Botanical assessment of the proposed footprint. 8 October 2018.

Botes, P. 2019(a): Lethabo Park Extension – Proposed extension of Lethabo Park (Housing Development) on the remainder of the Farm Roodepan No. 70, Erf 17725 and Erf 15089, Roodepan Kimberley. Sol Plaaitje Local Municipality, Northern Cape Province. Botanical assessment of the proposed footprint (with biodiversity inputs). 15 May 2019.

Botes, P. 2019(b): Verneujkpan Trust agricultural development – The proposed development of an additional ±250 ha of agricultural land on Farms 1763, 2372 & 2363, Kakamas, Northern Cape Province. 27 June 2019.

Botes, P. 2020(a): Gamakor & Noodkamp Low cost housing – Botanical Assessment of the proposed formalization of the Gamakor and Noodkamp housing development on the remainder and portion 128 of the Farm Kousas No. 459 and Ervin 1470, 1474 and 1480, Gordonia road, Keimoes. Kai !Gariep Local Municipality, Northern Cape Province. 6 February 2020.

Botes, P. 2020(b): Feldspar Prospecting & Mining, Farm Rozynen Bosch 104, Kakamas. Botanical assessment of the proposed prospecting and mining activities on Portion 5 of The Farm Rozynen Bosch No. 104, Kakamas, Khai !Garib Local Municipality, Northern Cape Province. 12 February 2020.

Botes, P. 2020(c): Boegoeberg housing project – Botanical assessment of the proposed formalization and development of 550 new erven on the remainders of farms 142 & 144 and Plot 1890, Boegoeberg settlement, !Kheis Local Municipality, Northern Cape Province. 1 July 2020.

Botes, P. 2020(d): Komaggas Bulk Water supply upgrade – Botanical assessment of the proposed upgrade of the existing Buffelsrivier to Komaggas BWS system, Rem. of Farm 200, Nama Khoi Local Municipality, Northern Cape Province. 8 July 2020.

Botes, P. 2020(e): Grootdrink housing project – Botanical assessment of the proposed formalization and development of 370 new erven on Erf 131, Grootdrink and Plot 2627, Boegoeberg Settlement, next to Grootdrink, !Kheis Local Municipality, Northern Cape Province. 14 July 2020.

Botes, P. 2020(f): Opwag housing project – Botanical assessment of the proposed formalization and development of 730 new erven on Plot 2642, Boegoeberg Settlement and Farm Boegoeberg Settlement NO.48/16, Opwag, !Kheis Local Municipality, Northern Cape Province. 16 July 2020.

Botes, P. 2020(g): Wegdraai housing project – Botanical assessment of the Proposed formalization and development of 360 new erven on Erven 1, 45 & 47, Wegdraai, !Kheis Local Municipality, Northern Cape Province. 17 July 2020.

Botes, P. 2020(h): Topline (Saalskop) housing project – Botanical assessment of the pproposed formalization and development of 248 new erven on Erven 1, 16, 87, Saalskop & Plot 2777, Boegoeberg Settlement, Topline, !Kheis Local Municipality, Northern Cape Province. 18 July 2020.

Botes, P. 2020(i): Gariep housing project – Botanical assessment of the proposed formalization and development of 135 new erven on Plot 113, Gariep Settlement, !Kheis Local Municipality, Northern Cape Province. 20 July 2020.