

**PROPOSED CASTLE WIND ENERGY FACILITY,
NORTHERN CAPE PROVINCE**

**AMENDMENT:
COMPARATIVE VIEWSHED ANALYSIS AND VISUAL ASSESSMENT**

Produced for:

Castle Wind Farm (Pty) Ltd

On behalf of:



Savannah Environmental (Pty) Ltd
1st Floor, Block 2, 5 Woodlands Drive Office Park,
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Produced by:



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- June 2019 -

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MAPS

Map 1: Comparative Viewshed Analysis – Castle Wind Energy Facility.

Lourens du Plessis (t/a LOGIS), a specialist in visual assessments and Geographical Information Systems (GIS), undertook the comparative viewshed analysis and visual assessment for the proposed amendment to the turbine specifications for the Castle Wind Energy Facility (WEF). Lourens, then director of MetroGIS (Pty) Ltd, did the Visual Impact Assessment for the original Castle WEF (submission date 2014) and the Visual Assessment for the second amendment submitted in 2016.

Lourens has been involved in the application of GIS in Environmental Planning and Management since 1990. He has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping, and applies this knowledge in various scientific fields and disciplines. His expertise is often utilised in Environmental Impact Assessments, State of the Environment Reports and Environmental Management Plans.

Lourens is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments.

Savannah Environmental (Pty) Ltd appointed Lourens du Plessis as an independent specialist consultant to undertake the visual assessment for the proposed amendment to the Castle WEF. He will not benefit from the outcome of the project decision-making.



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

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Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

<p>Postal address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Private Bag X447 Pretoria 0001</p> <p>Physical address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Environment House 473 Steve Biko Road Arcadia</p> <p>Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at: Email: EIAAdmin@environment.gov.za</p>

1. SPECIALIST INFORMATION

Specialist Company Name:	Lourens du Plessis t/a LOGIS		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Exempt	Percentage Procurement recognition
			0
Specialist name:	Lourens du Plessis		
Specialist Qualifications:	BA		
Professional affiliation/registration:	Professional Geo-Information Science (GISc) Practitioner registered with the SA Geomatics Council (SAGC) Reg. No. GPr GISc 0147		
Physical address:	531A Witogje Street Die Wilgers Pretoria		
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E-mail:	lourens@logis.co.za		

2. DECLARATION BY THE SPECIALIST

I, Lourens du Plessis, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

t/a LOGIS

Name of Company:

2019/5/31

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Lourens du Plessis, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



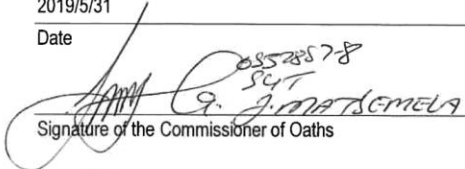
Signature of the Specialist

t/a LOGIS

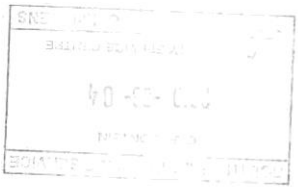
Name of Company


2019/5/31

Date

05528578
SGT

 Signature of the Commissioner of Oaths

2019-06-04
 Date



to	<i>Pretoria</i>	op	<i>2019-06-04</i>	om	<i>08:30</i>
at		on		at	
 (HANDTEKENING) KOMMISSARIS VAN EDE (SIGNATURE) COMMISSIONER OF OATHS VOLE VOORNAME EN VAN IN DRUKSKRIEF FULL FIRST NAMES AND SURNAME IN BLOCK LETTERS <i>277 Johannes Laas Street</i> (BUSINESS ADDRESS) (STRAATADRES) BUSINESS ADDRESS (STREET ADDRESS) <i>PRETORIA</i> (CITY) (STAD)					
SA POLISIEDIENS SA POLICE DEPARTMENT					

1. INTRODUCTION

Castle Wind Farm (Pty) Ltd wishes to amend the specifications of their wind turbine generators (WTG) for the proposed Castle WEF located near De Aar in the Northern Cape Province.

The intended amendment includes:

- The increase of the hub height from 130m (authorised in 2016) to between 90m to 150m (a potential maximum increase of 20m).
- Increase of the maximum turbine rotor diameter from 150m (authorised in 2016) to between 110m to 200m (a potential maximum increase of 50m diameter).
- Increase the individual turbine generating capacity from up to 4.5MW to up to 7.9MW.

The overall generating capacity of the facility will remain 118MW and the wind turbine layout is not expected to change.

The primary relevance of this proposed increase in dimensions, from a visual impact perspective, is that the potential total maximum vertical dimension (height) of the wind turbine may increase from approximately **205m** (130m hub-height + 75m blade length) to **250m** (150m hub-height + 100m blade length) above ground level. This translates to a total **45m** maximum increase in blade tip height per WTG (considered as a worst case scenario).

Should the minimum turbine dimensions be selected (i.e. 90m hub-height and 110m rotor diameter) the turbine blade tip height will be reduced by 60m to 145m above ground level. This is considered to be the best case scenario.

For the purposes of this study, the worst case scenario will be addressed in order to determine if it may aggravate the potential visual impact.

2. SCOPE OF WORK

The scope of work includes a comparative viewshed analysis and identification of potential sensitive visual receptors that may be influenced by the potential (worst case scenario) increase in dimensions of the WTGs. This is done in order to determine:

- If there are any additional visual receptors that may be negatively influenced by the amendment;
- Whether the increase in dimensions would significantly aggravate the potential visual impact on identified receptors (identified during the EIA phase (2014) and subsequent amendment undertaken in 2016);
- If additional impact mitigation measures are relevant; and
- To suggest amendments or additions to the Environmental Management Programme (EMPr) (if applicable).

3. METHODOLOGY

The visual assessment includes a comparative viewshed analysis in order to determine the visual exposure (visibility) of the original (authorised) turbine dimensions compared to the potential (additional) exposure of the increased (proposed) turbine dimensions. The viewshed analysis focuses on a radius of 5km from the proposed turbine layout (development footprint) and potential visual receptors located within this zone. The original VIA report determined that

receptors, where visible, within this zone may experience a **high** visual impact of the proposed infrastructure. Should this review of the change in dimensions of the wind turbine structures indicate that there may be a significant increase in the visual impact within this zone, as determined during the VIA, the study area may need to be increased to accommodate areas that were rated as **moderate** as well (i.e. beyond a 5km radius and up to a 20km radius from the structures).

Potential sensitive visual receptors include observers residing at homesteads (farm residences and dwellings) within the study area, and observers travelling along the secondary roads traversing near or over the proposed development site.

4. RESULTS OF THE COMPARATIVE VIEWSHED ANALYSIS

A visibility analysis was undertaken from each of the wind turbine positions (31 in total) at an offset of 205m (maximum blade tip height) above ground level. The result of this analysis represents the potential total visual exposure of the original turbine dimensions (indicated in green). The viewshed analysis was repeated at an offset of 250m to indicate the visual exposure (shown in red) of the increased turbine dimensions. The results of the visibility analyses are displayed on **Map 1** below.

It is clear that the approximately **18%** increase in turbine dimensions, would have a relatively small influence on the overall visual exposure, due to the already tall turbine structures previously approved and the elevated positions of the turbines within the landscape. The surface area (within the study area) of the original turbine exposure is **325km²**, compared to the **336km²** of the increased dimensions of the wind turbine exposure. This is an increase of **11km²**, or alternatively, an increase of only **3%** in potential visual exposure.

There are no additional sensitive visual receptors located within the area of increased visual exposure.

Potential sensitive visual receptors within an approximately 5km radius (identified during the EIA phase) include:

- Klipfontein
- Disselskuil
- Garrenboom
- Vendusiekraal¹
- Kranskop¹
- Rooiwal²
- Meyersfontein²
- Witput²
- Slingershoek³
- Pienaarskloof³
- Tweefontein³
- Enkeldebult³
- Die Dam³
- Observers travelling along the secondary roads traversing near or over the proposed development site

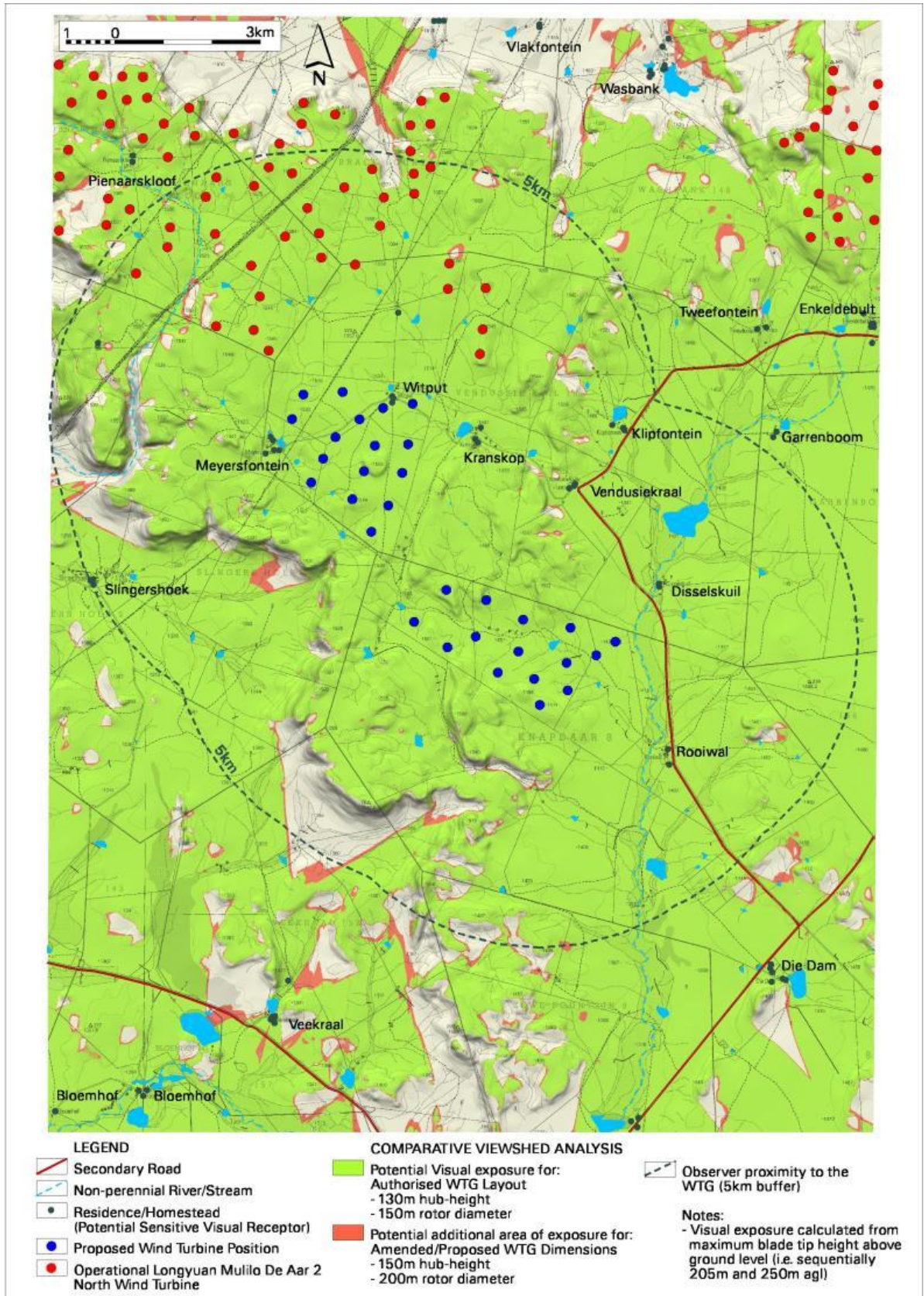
Note:

- *The homesteads marked ¹ are believed to be derelict or uninhabited.*

- *The homesteads marked ² are located on the farm earmarked for the Castle WEF development, assuming their approval of the WEF development.*
- *The homesteads marked ³ are located on the farms earmarked for the Longyuan Mulilo De Aar 2 North (operational) and South (approved) WEF developments, assuming their approval of the WEF development.*

The increased area of visual exposure does not include a significant portion of additional exposure to the secondary roads within the study area.

It is expected that the wind turbine structures, both the original dimensions and the proposed increased dimensions would be equally visible and noticeable from both the roads and homesteads identified above, therefore signifying a negligible change to the potential visual impact.



Map 1: Comparative Viewshed Analysis – Castle Wind Energy Facility.

5. COMPARATIVE VISUAL ASSESSMENT STATEMENT

In consideration of the proposed amendments, there is no (zero) change to the significance rating compared with the original EIA visual impact assessment report.

6. CONCLUSION/RECOMMENDATIONS

The proposed increase in the dimensions of the wind turbine structures is **not expected to significantly alter** the influence of the WEF on *areas of higher viewer incidence* (observers traveling along the secondary roads within the region) or *potential sensitive visual receptors* (residents of homesteads in close proximity to the WEF).

The proposed increase in dimensions are consequently **not expected to significantly influence** the anticipated visual impact, as stated in the original VIA report (i.e. the visual impact is expected to occur regardless of the amendment). This statement relates specifically to the assessment of the visual impact within a 5km radius of the wind turbine structures (potentially **high** significance), but also generally apply to potentially **moderate** to **low** visual impacts at distances of up to 20km from the structures.

From a visual perspective, the proposed changes will therefore require no (zero) changes to the significance rating within the original visual impact assessment report that was used to inform the approved EIA. In addition to this, no new mitigation measures are required.

It is suggested that the proposed amendment to the turbine dimensions and layout be supported, subject to the conditions and recommendations as stipulated in the original Environmental Authorisation, and according to the Environmental Management Programme and suggested mitigation measures, as provided in the original Visual Impact Assessment report.

7. REFERENCES

MetroGIS (Pty) Ltd, 2014. *Proposed Castle Wind Energy Facility Project, Northern Cape Province - Visual Impact Assessment Report.*

SMEC South Africa, 2016. *Proposed Castle Wind Energy Facility Project, Northern Cape Province. Amendment: Comparative Viewshed Analysis and Visual Assessment.*