PROPOSED KORANA WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE

AMENDMENT: COMPARATIVE VIEWSHED ANALYSIS AND VISUAL ASSESSMENT

Produced for:

Mainstream Renewable Power South Africa

On behalf of:

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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 Korana Wind Energy Facility (WEF). Lourens, then director of MetroGIS (Pty) Ltd, did the Visual Impact Assessment for the original Korana WEF (submission date 2015).

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 Korana WEF. He will not benefit from the outcome of the project decision-making.

1. INTRODUCTION

Mainstream Renewable Power South Africa wishes to amend the specifications of their wind turbine generators (WTG) for the proposed Korana WEF located near Pofadder in the Northern Cape Province.

The intended amendment includes:

- The increase of the hub height from up to 140m (authorised in 2015) to a potential maximum of 200m (an increase of 60m).
- Increase of the maximum turbine rotor diameter from up to 150m (authorised in 2015) to a potential maximum of 200m (an increase of 60m).
- Increase of the individual turbine capacity from 1,5MW - 4MW to 2MW - 7MW.

The overall generating capacity of the facility will not increase and the proposed wind turbine layout will remain unchanged.

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 **210m** (140m hub-height + 70m blade length) to **300m** (200m hub-height + 100m blade length) above ground level. This translates to a total **90m** maximum increase in blade tip height per WTG (considered as a worst case scenario).

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 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);
- 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 within a 5km radius of the proposed development site.

4. RESULTS OF THE COMPARATIVE VIEWSHED ANALYSIS

A visibility analysis was undertaken from each of the wind turbine positions (70 in total) at an offset of 210m (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 300m 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 **30%** 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 low visual absorption capacity of the landscape. The surface area (within the study area) of the original turbine exposure is **448km^2**, compared to the **457km^2** of the increased dimensions of the wind turbine exposure. This is an increase of **9km^2**, or alternatively, an increase of only **2%** 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:

- Onder Namies
- Poortjie 1 and 2
- Samoep
- De Rust

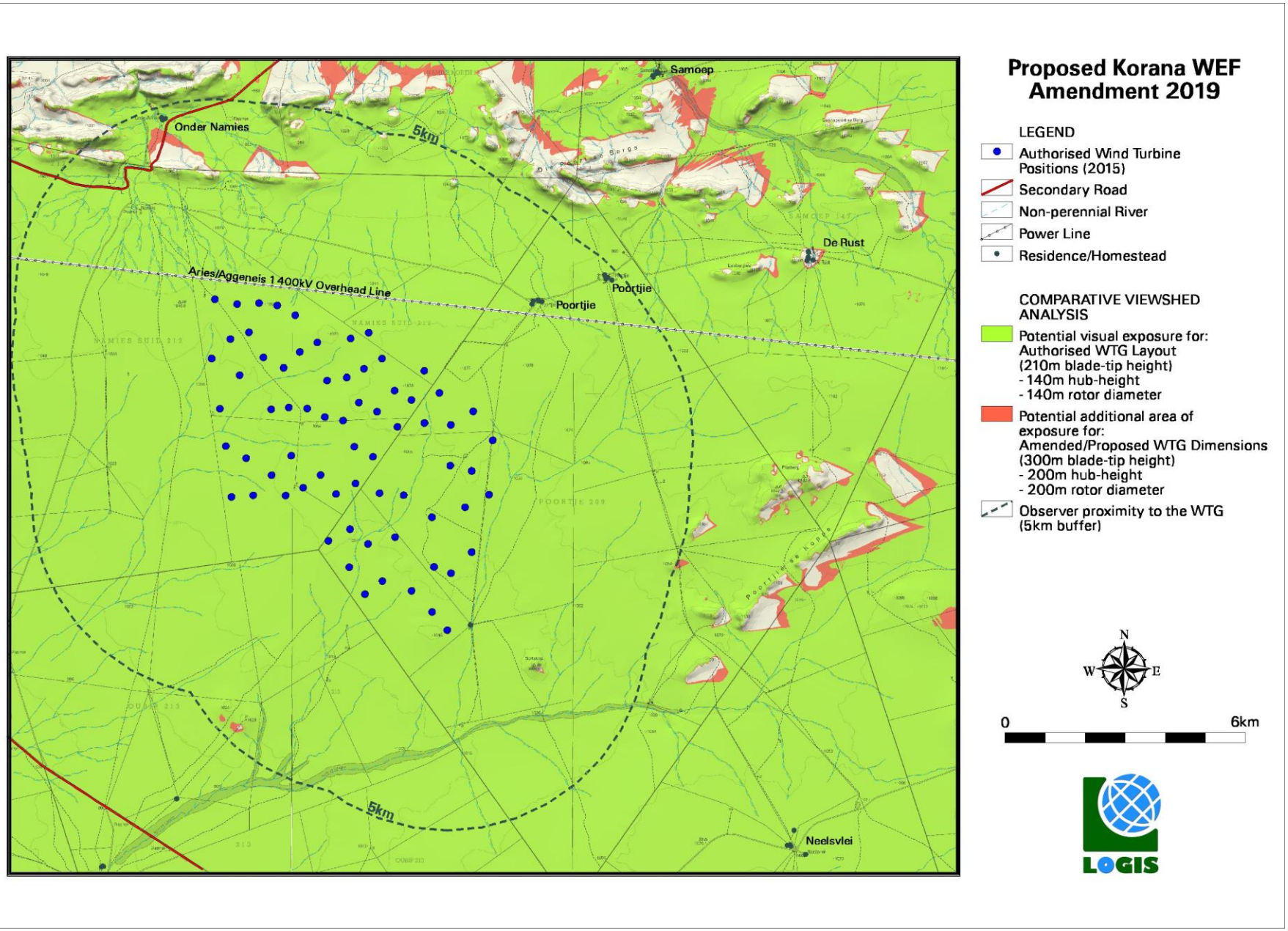
- Neelsvlei
- Observers travelling along the secondary roads traversing within a 5km radius of the turbine structures.

Note:

- *Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time as it is inhabited again.*

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 – Korana 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 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, 2015. *Proposed Korana Wind Energy Facility, Northern Cape Province - Visual Impact Assessment Report.*