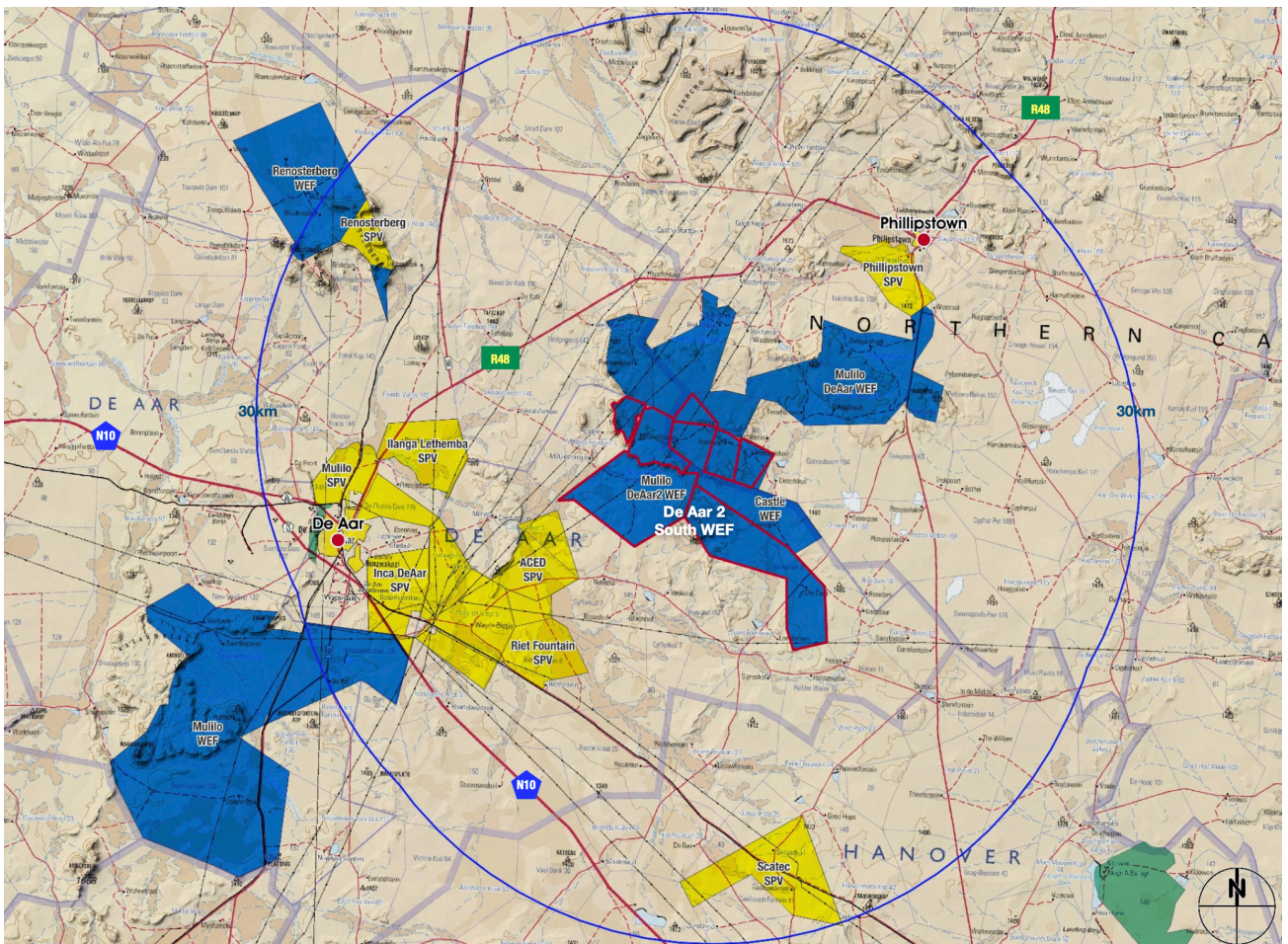


Proposed Mulilo De Aar 2 South Wind Energy Facility
near De Aar, Northern Cape Province
for Mulilo De Aar 2 South (Pty) Ltd

Visual Assessment Amendment

FINAL

28 November 2022



Prepared for
Holland & Associates Environmental Consultants

Prepared by
Quinton Lawson, Architect
and
Bernard Oberholzer, Landscape Architect

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List of Abbreviations

DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EMPR	Environmental Management Programme
O&M	Operations and maintenance
OHPL	Overhead powerline
REDZ	Renewable Energy Development Zone
VIA	Visual Impact Assessment
WEF	Wind energy facility
WTG	Wind turbine generator

1. Background

The Applicant is proposing to amend the Environmental Authorisation for the proposed Mulilo De Aar 2 South Wind Energy Facility (WEF) located near De Aar in the Northern Cape Province. This visual amendment report addresses the potential changes in visual impact significance relating to the proposed amendments, as well as the finalisation of the Layout Plan and Environmental Management Programme (EMPr) process.

The original Visual Impact Assessment (VIA) Report was prepared by Karen Hansen Landscape Architect (2011), along with a number of amendments from 2013 to 2019. Ms. Hansen has subsequently retired and the Authors of this Report have been requested to prepare the visual assessment of the current amendment.

2. Terms of Reference

The visual specialist input is for a Part 1 Environmental Authorisation (EA) amendment process, and for the finalisation of the EMPr and Final Layout Plan process. The Terms of Reference include the preparation of a specialist comment / statement addressing the following:

- *The implications of the proposed amendments, if any, in terms of the potential impacts within your area of expertise.*
- *A statement as to whether or not the proposed amendments will result in an increased level or change in the nature of the impact (which was initially assessed and considered when application was made for the environmental authorization and subsequent Part 2 EA amendment process in 2015 – 2016).*
- *Describe the status (baseline) of the environment that was assessed during the initial assessment.*
- *Confirm the current status of the assessed environment – also refer to studies recently conducted (i.e. EMPr/Layout update, BAR for Grid connection, other projects if applicable)*
- *A description and assessment of any changes to the environment that has occurred since the initial EA was issued, if any;*
- *Site sensitivity verification – Undertake and report on site sensitivity verification, and refer to your recent site visits and/or assessments undertaken within the project area/ knowledge of the area if a site investigation is not required (or has recently been undertaken).*
- *Indicate if the impact rating as provided in the initial assessment remains valid; if the mitigation measures provided in the initial assessment are still applicable; or if there are any new mitigation measures which need to be included into the EA, should the request to extend the commencement period be granted by the Department;*
- *An indication if there are any new assessments and/or guidelines which are now relevant to the authorised development which were not undertaken as part of the initial assessment, must be taken into consideration and addressed in the report (or indicate if such new assessments/ guidelines were already addressed during your recent studies for the EMPr and Layout Plan finalisation process in 2022);*
- *A description and an assessment of the surrounding environment, in relation to new developments or changes in land use which might impact on the authorised project, the assessment must consider the following:*
 - *Similar developments within a 30km radius*
 - *Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land.*

- Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
- The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
- A cumulative impact environmental statement on whether the proposed development must proceed.
- The study must conclude the following:
 - Has the baseline status of the receiving environment changed since the original EIA in 2012?
 - Is the initial impact rating undertaken during the initial assessment still valid?
 - Are the mitigation measures provided in the initial assessment (or subsequent updated assessments) still applicable?
 - Are there any new mitigation measures that should be added to the EA/ EMPr if the DFFE decides to approve the amendments?
 - Describe any update/new mitigations (or refer to them in the appropriate walkthrough/EMPr update report), where relevant.
 - Are the proposed amendments, including proposed extension of the validity period, acceptable (relative to your area of expertise)?

The purpose of this Amendment Report therefore is to determine if there would be any changes in the potential visual impacts, when compared to those of the authorised project description and layout, and the possible significance of the changes.

A field trip was not considered necessary for the amendment as the authors are familiar with the surroundings, having been involved in other renewable energy projects in the area.

3. Original VIA

The original VIA of 2011 for the Mulilo De Aar 2 South Wind Energy Facility consisted of a total of 103 wind turbines, which were authorised. However, a number of amendments resulted in the currently authorised project consisting of 25 to 61 wind turbines and associated infrastructure.

The visual impact significance rating in the original VIA at that time was recorded as high given the relative visibility of wind turbines to surrounding farmsteads. It was further recommended that from a visual perspective the development could proceed and that the agreed mitigation measures be undertaken. It was considered that the various amendments at the time would not result in any change to the visual impact significance ratings, (Hansen, 2019).

4. Proposed Amendments

The proposed amendments to the project description require an amendment to the text of the DFFE EA for the project, and accordingly a Part 1 Application for Amendment of the Environmental Authorisation is being submitted to DFFE.

The changes that could have potential visual implications include the following (see Table 1):

- Changes to the siting of proposed turbines as indicated in the latest layout (Map 3);
- A change from the 25-61 authorised turbines to a max. of 26 turbines, with no change to the maximum hub height and rotor diameter;
- Modifications to road widths, hardstands and internal grid reticulation.
- Extension of the validity period of the EA by 2 years.

- Addition of a Listed Activity into the EA, i.e. Activity 15 of GN R. 545 (Listing Notice 2) (the physical alteration and transformation of 20ha or more), was assessed in detail as part of the 2012 EIA process and subsequent Part 2 EA amendment process in 2015 for the project, however, this particular listed activity was erroneously omitted from the Application.
- Addition of Portion 7 of Farm Vendussie Kuil No. 165 into the EA (given that a section of a proposed road would cross the corner of Portion 7 of Farm No. 165, which is currently not included in the EA). This property was included and assessed in the combined EIA process and reporting for the De Aar 2 South WEF and De Aar 2 North WEF in 2012-2013, and was included in the Final Layout that was recently assessed (2022) by all specialists for the update of the EMP and Final Layout Plan process that is currently in progress).

Table 1: Proposed Amendments to the Wind Energy Facility

Component	Authorised Layout (2015)	Proposed Amendment (2022)
Number of turbines	25-61 turbines	Up to 26 turbines
Generation capacity per turbine	2.3MW – 6.0MW	Remove MW designation per turbine
Hub height	120 m	<u>Up to</u> 120 m
Rotor diameter	165 m	<u>Up to</u> 165 m
Hardstand area	50 x 40m per WTG	Approximately 0,47ha per WTG
Width of internal roads	4m	6m (10m working width during construction)
Foundations	18.4m in diameter that narrows up to 10.6m at the surface (the visible portion) with a depth of 3.5 once completed	Maximum 24 m diameter at lowest point and up to 12 m diameter at surface
Substation/ O&M buildings	2 ha	No change to footprint. Modification to coordinates.
Internal reticulation	22 kV	33 kV
Temporary laydown areas	Total 24 ha	No change to footprint.

5. Visual Assessment Methodology

A comparison of viewsheds between the authorised and currently proposed (final) layout are indicated on Maps 4 and 5 to determine the zone of visual influence of the two layouts. The currently proposed layout with fewer turbines would have a slightly reduced viewshed (zone of visual influence).

To facilitate a comparison between the previously authorised layout and the current (proposed final) layout, Landscape Features (Map 6), and Visual Sensitivity (Map 7) have been prepared on which the layouts can be overlaid. The maps were also made available to the EAP as shape files for inclusion in the Environmental Sensitivity Map for the Final Layout Plan. Landscape features and sensitive receptors, including recommended buffers are listed in Table 2 below, as a basis for the sensitivity mapping.

Table 2: Visual Sensitivity Mapping Categories for Wind Turbines

Scenic Resources	Very high visual sensitivity	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic feature: scarps, peaks and ridges	within 200m	within 400m	within 600m	-
Steep slopes	Slopes > 1:6	Slopes > 1:10	Slopes > 1:20	-
Water features	Feature	within 100m	-	-
Cultural landscapes ¹	Refer to HIA		-	-
Protected Landscapes / Sensitive Receptors				
Nature Reserves	n/a	-	-	-
Private reserves / game farms	within 2 km	within 4 km	within 6 km	-
Settlements/ towns	within 2 km	within 4 km	within 6 km	-
Farmsteads outside site	within 1 km	within 2 km	within 3 km	-
Farmsteads inside site	within 500m	within 1 km	within 2 km	-
Arterial routes R48 and R389	within 750m	within 1 km	within 1,5 km	-
Main district roads	within 250m	within 500m	within 1 km	-

6. Site Sensitivity Verification

A DFFE Screening Report for Environmental Authorisation was generated on 18 November 2022 (see Figure 1 below). The Landscape / Visual Theme map in the Screening Report is based on regional scale mapping, and is disputed based on more detailed mapping at the local project scale (see Maps 7 and 8), which were taken into account in the revised layout.

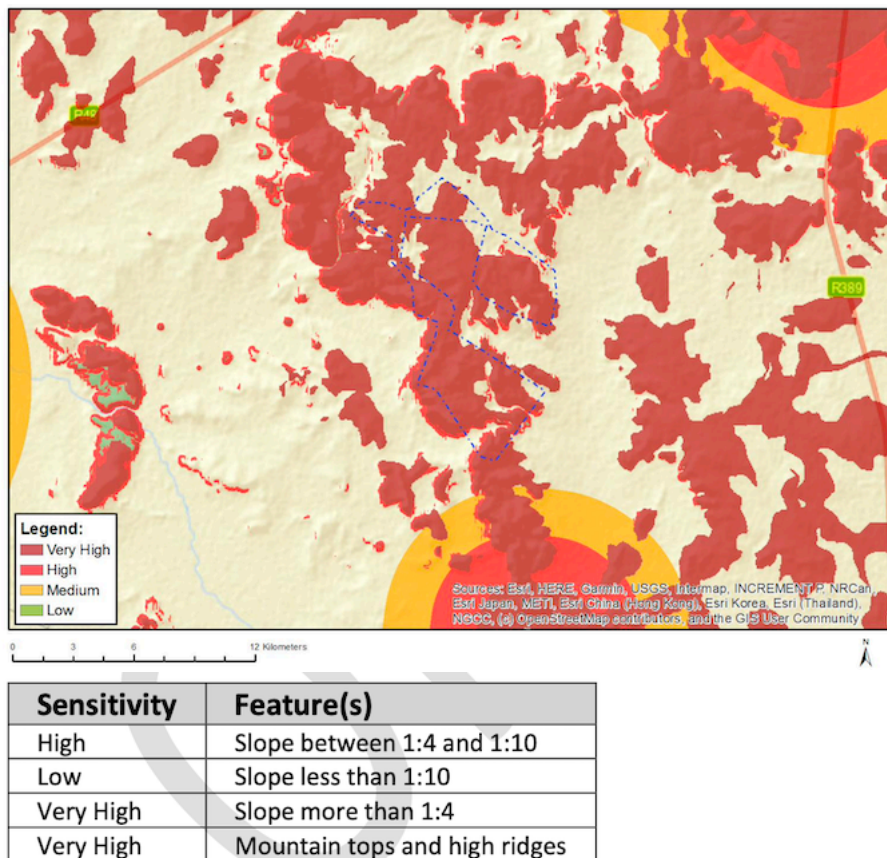


Figure 1: DFFE Screening Tool Map for the Landscape / Visual Theme

7. Re-assessment of Visual Impacts

Spatial layout:

The changes to the layout of the currently proposed project with fewer turbines results in an overall improvement in terms of potential visual impacts as can be seen in the comparison of wind turbine generator (WTG) positions (see Map 7).

Besides having fewer turbines, most of these have been moved back slightly from the steep escarpment edge, which is a visually sensitive landscape feature. In addition, the proposed turbines are now located further from surrounding farmsteads.

The only exceptions are WTG 19 and 24, close to the scarp edge, which is a visually prominent landform. If possible, taking engineering and other considerations into account, these WTGs should be micro-sited to minimise visual intrusion on the surrounding landscape, although they are acceptable in the current locations if micro-siting is not possible.

Changes to the internal road layout and internal overhead powerline (OHPL) layouts tend to not have any major visual implications. However, the internal OHPL between WTGs 21 and 24 crosses steep scarp slopes and a small kloof, and therefore consideration should be given to re-routing this powerline if possible.

There are no visual impact implications for extending the validity period of the EA for 2 years as the visual baseline environment has not changed since the original visual assessment and subsequent amendments.

There are also no visual impact implications for including the listed activity, being the physical alteration of more than 20ha of land, as this was previously assessed in detail as part of the 2012 EIA process, and subsequent Part 2 amendment processes.

Potential shadow flicker resulting from the proposed layout is indicated on Map 9. Shadow flicker effect tends to be limited to a 2-kilometre radius, and depends on a wide range of local conditions being aligned. Only the farmhouse at Vendusiekuil, which is inside the project site, could potentially be affected by shadow flicker, and therefore this is not considered to be a significant issue.

Advantages and Disadvantages

The reduction in the number of turbines means that the fewer turbines would result in less visual clutter in the landscape. Because there are fewer turbines, the distance between visually sensitive viewpoints and WTGs has slightly increased in most cases.

The viewshed analysis indicates that there would be a moderate decrease in the zone of visual exposure as well as extent of the viewshed. No disadvantages relating to the currently proposed layout were noted, in comparison to the previously authorised layout.

8. Cumulative Visual Impacts

The original VIA of 2011 indicated the following:

"The local landscape character would be changed and made more industrial, but the scale of the landscape can absorb both of these currently assessed developments, (De Aar 1 and 2 WEFs), and this cumulative impact is assessed as medium for both magnitude and significance".

A number of other renewable energy projects have been developed, or are proposed, in the De Aar area, as indicated on Map 1 and as per the Department of Forestry, Fisheries and the Environment's latest Renewable Energy EIA Application Database (REEA 2022, Q2). However, given that De Aar 2 North WEF has been developed, and that De Aar 2 South

WEF has been previously authorised, no change in the cumulative visual impact significance is anticipated.

The proposed De Aar 2 South WEF development forms part of an existing renewable energy node, and therefore the project could proceed in terms of cumulative visual impacts.

9. Mitigations

As indicated in the VIA of the previously authorised project, the layout of the wind farm has already been through a number of iterations based on the specialist studies and engineering considerations.

As the screening of wind turbines is not practical, only avoidance measures are possible. Where possible, the micro-siting of turbines could be considered, as in the case of WTG 19 and 24 as previously mentioned. The routing of the internal overhead powerline between WTG 21 and 24 should be re-considered, given the visual sensitivity of the steep slopes and small kloof.

The visual mitigations contained in the original VIA of 2011 are still relevant, and no other additional visual mitigations are proposed. (Note: The proposed painting of one of the blades of each turbine, as recommended by the avifaunal specialist during the current EMPr and layout plan finalisation process, is considered acceptable from a visual impact perspective. Accordingly, amendment of the mitigation measures in the original VIA (2011) that indicated that blades must be white (with no stripes, decals or logos) is considered acceptable, to allow for the proposed blade painting. The update of the visual mitigation measure to allow for the proposed blade painting will be addressed in the update of the Environmental Management Programme (EMPr) process).

10. Conclusion

Although the currently proposed layout consists of fewer wind turbines, the overall visual impact significance rating for the project is not expected to change from that of the authorised layout and would remain high before and after mitigation, because of the change in character of the site and surrounding area.

Amendments to the related infrastructure, such as internal access roads and overhead powerlines, would result in no change in the overall visual impact significance ratings in relation to those of the previously assessed proposals, and would remain low before and after mitigation.

The extension of the validity period of the EA, and the inclusion of Activity 15 of GN R. 545 (Listing Notice 2) and Portion 7 of Farm Vendussie Kuil No. 165 into the EA, would not result in any change to the visual impact significance.

There are no known new visual assessments and/or guidelines that are relevant to the authorised development.

Accordingly, the proposed amendments and proposed final layout will not result in an increased level or change in the nature of impacts, and the final layout is acceptable from a visual impact perspective.

11. Recommendation

Provided that the visual mitigations listed in the original visual impact study (including post-construction rehabilitation of the site) are adhered to¹, the findings of the original and

¹ and allowing amendment of the mitigation measures in the original VIA (2011) that indicated that blades must be white (with no stripes, decals or logos), to allow for the proposed blade painting recommended by the avifaunal specialist.

subsequent visual assessments for the Mulilo De Aar 2 South Wind Energy Facility project would still be valid for the currently proposed amendments.

Our opinion from a visual perspective therefore is that the proposed amendments to the project description and proposed final layout could be authorised. Further consideration could be given to the optional recommended mitigations mentioned in Section 9 above.

References

Hansen, K. 2011. Proposed Wind Energy Facilities (North and South) Situated on the Eastern Plateau near De Aar, Northern Cape: level 3 Visual Impact Assessment.

Hansen K. 2019. Proposed Application for Amendment of the Environmental Authorisation for the Proposed Wind Energy Facility Situated on the Plateau (South) near De Aar, Northern Cape Province. Specialist Visual Impact Assessment.

Holland and Associates, July 2022. Establishment of a Wind Energy Facility Situated on the Eastern Plateau (South) near De Aar, Northern Cape Province: Application for Amendment of the Environmental Authorisation, and Finalisation of the Environmental Management Programme and Site Layout Process: Visual Specialist Input TOR.

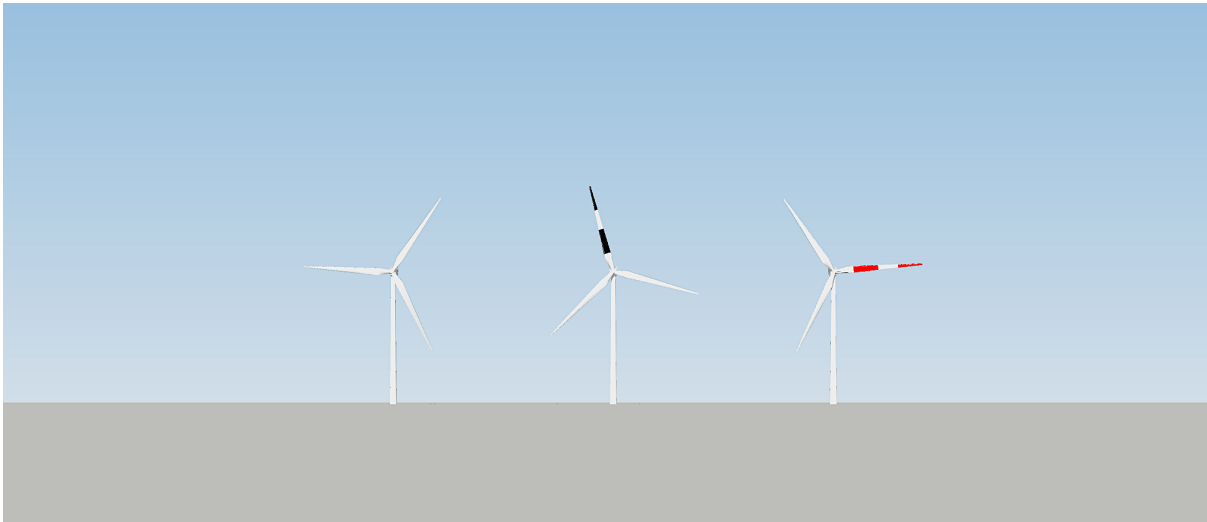


Figure 1: Scale of proposed turbines and painted blades at 2km

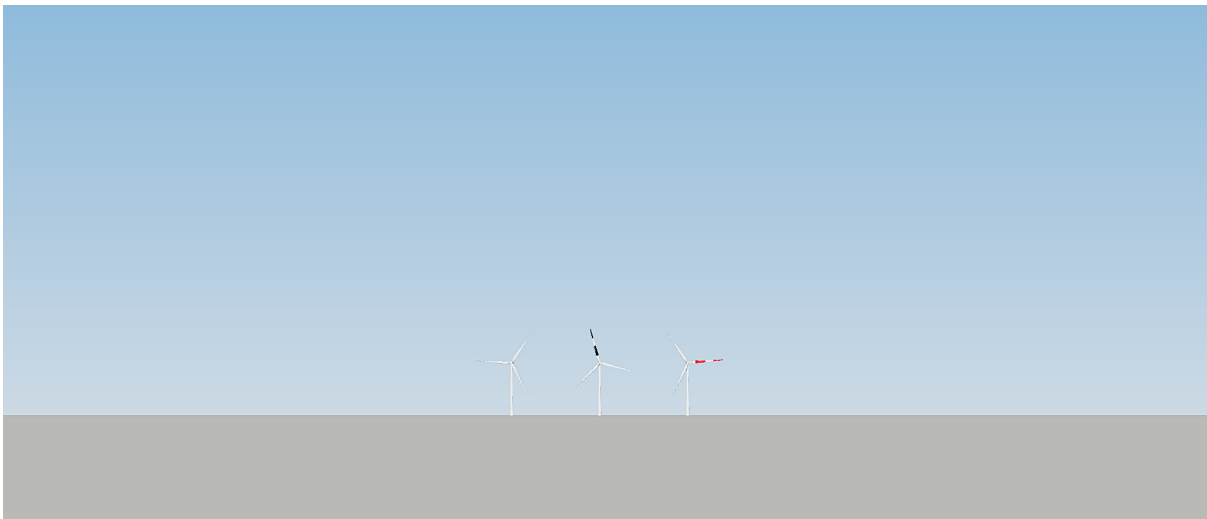


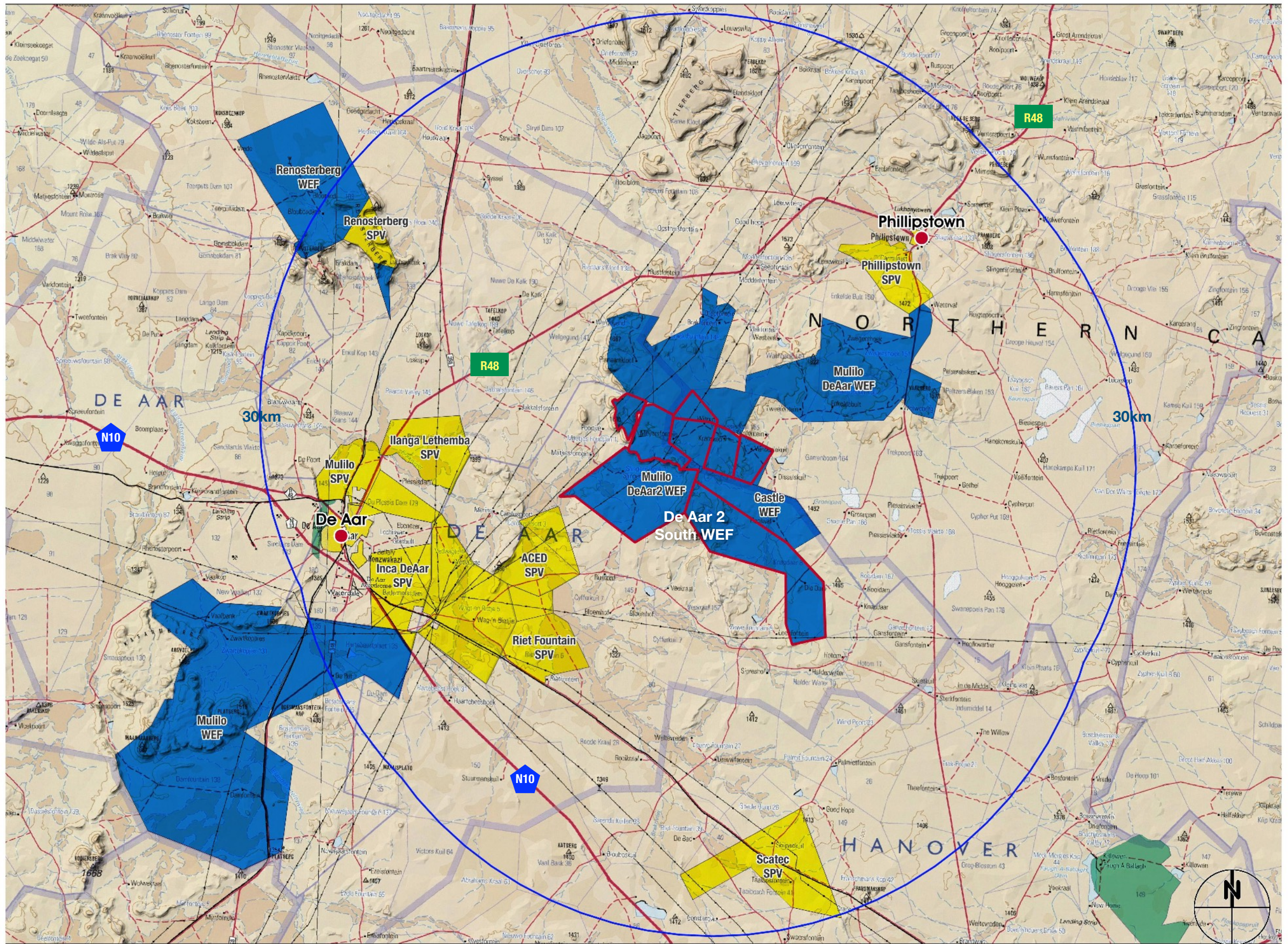
Figure 2: Scale of proposed turbines and painted blades at 5km



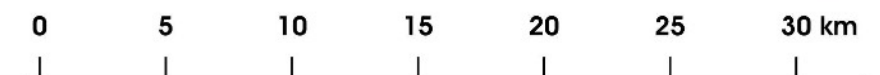
Figure 3: Example of existing De Aar 2 North turbines at about 3km (source : Google Earth - 'Earthview')

Legend :

-  Onshore Wind
-  Solar PV



Base map : CD NGI 250K Topo-Cadastral Series Current Mosaic 2022



map 1 : Regional Locality, REEA Q2 2022

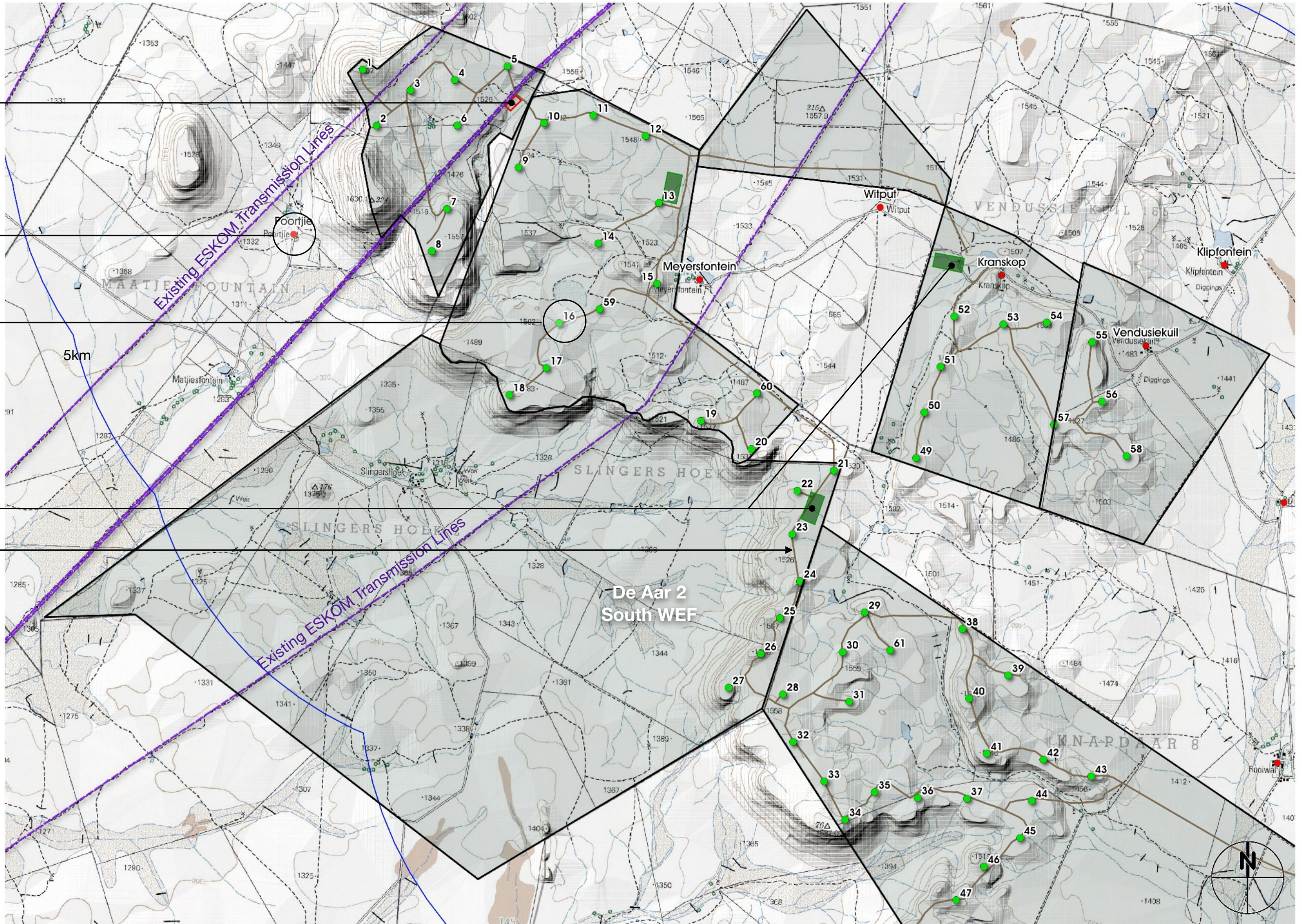
Substation Complex

Neighbouring Farmsteads

Numbered WTGs

Temporary Laydown Area

Internal Access Roads



Base map : CD NGI 50K Topographic Series Current Mosaic 2022



map 2 : De Aar 2 South WEF Authorised Layout • 61x WTGs

Neighbouring Farmsteads

Temporary Laydown Areas

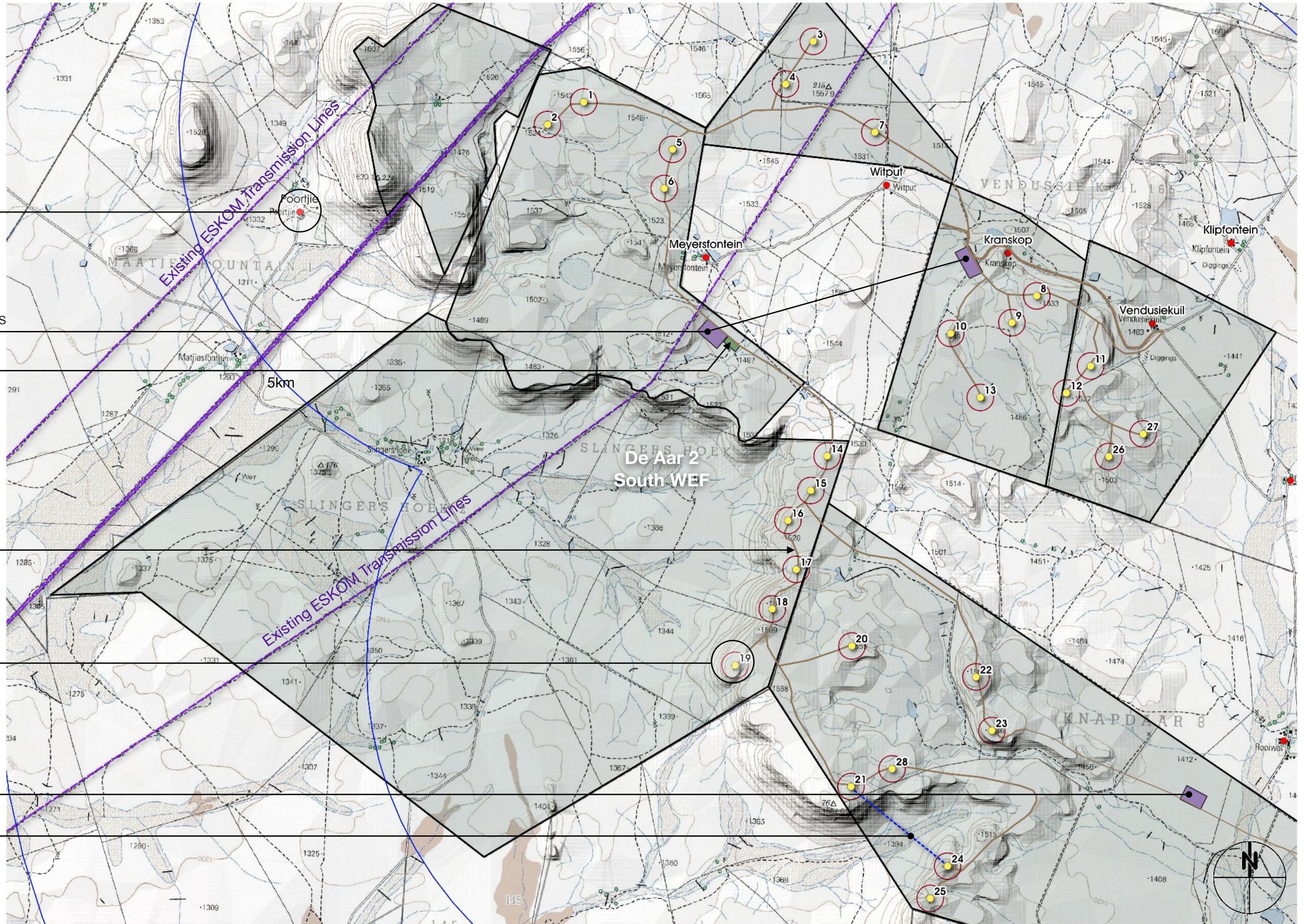
Substation Complex

Internal Access Roads

Numbered WTGs

Temporary Laydown Area

Additional 33kV OH Line

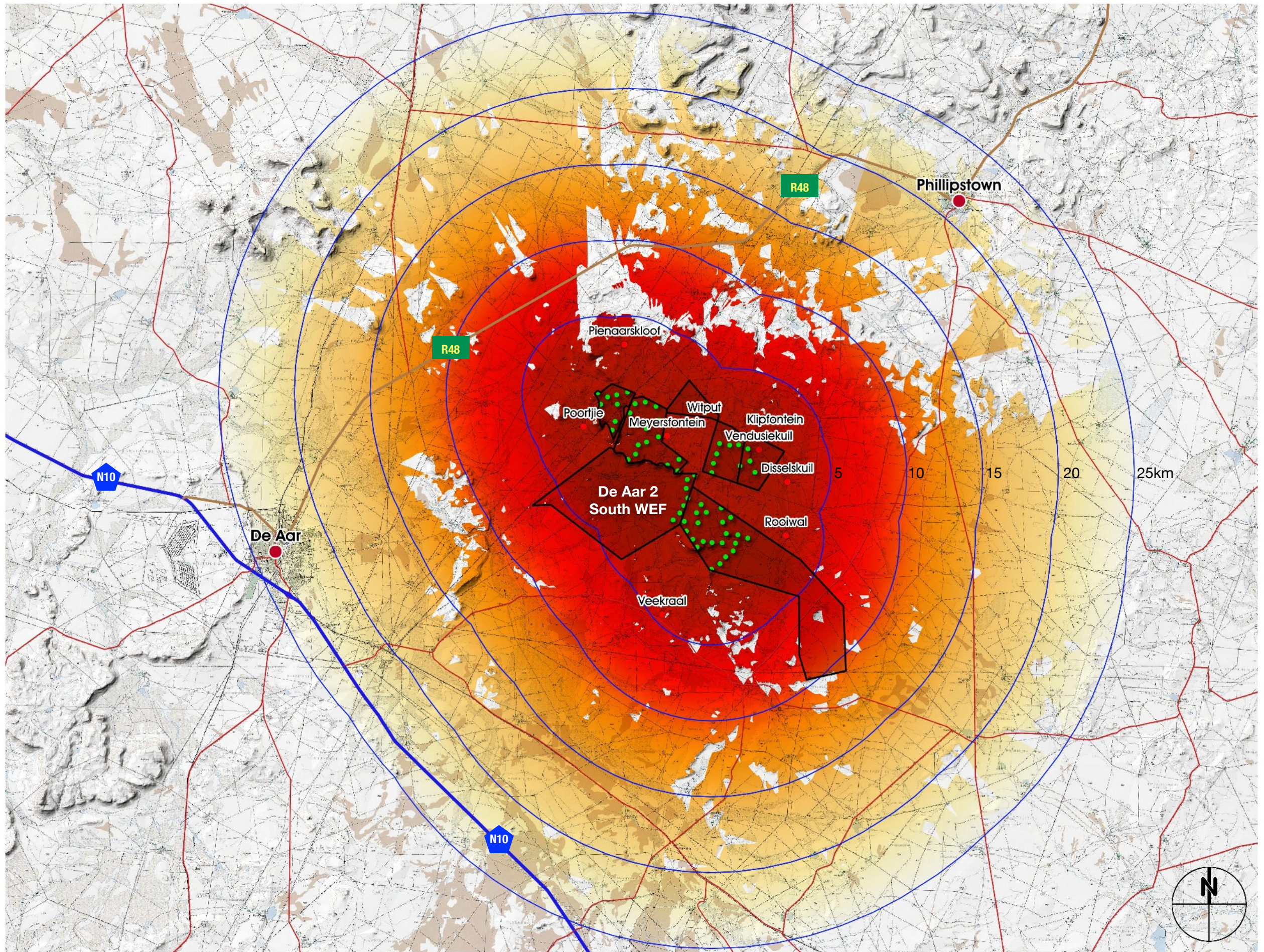
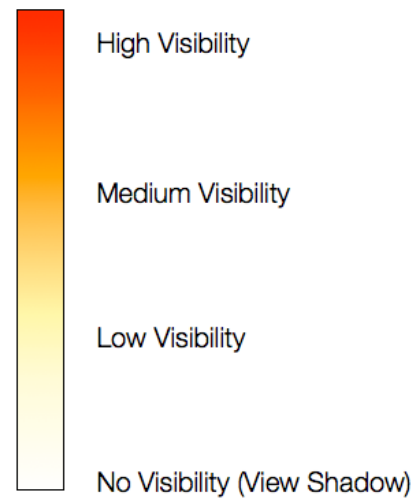


Base map : CD NGI 50K Topographic Series Current Mosaic 2022



map 3 : De Aar 2 South WEF Amended Layout • 28x WTGs (only 26x WTGs will be constructed)

Viewshed Legend :

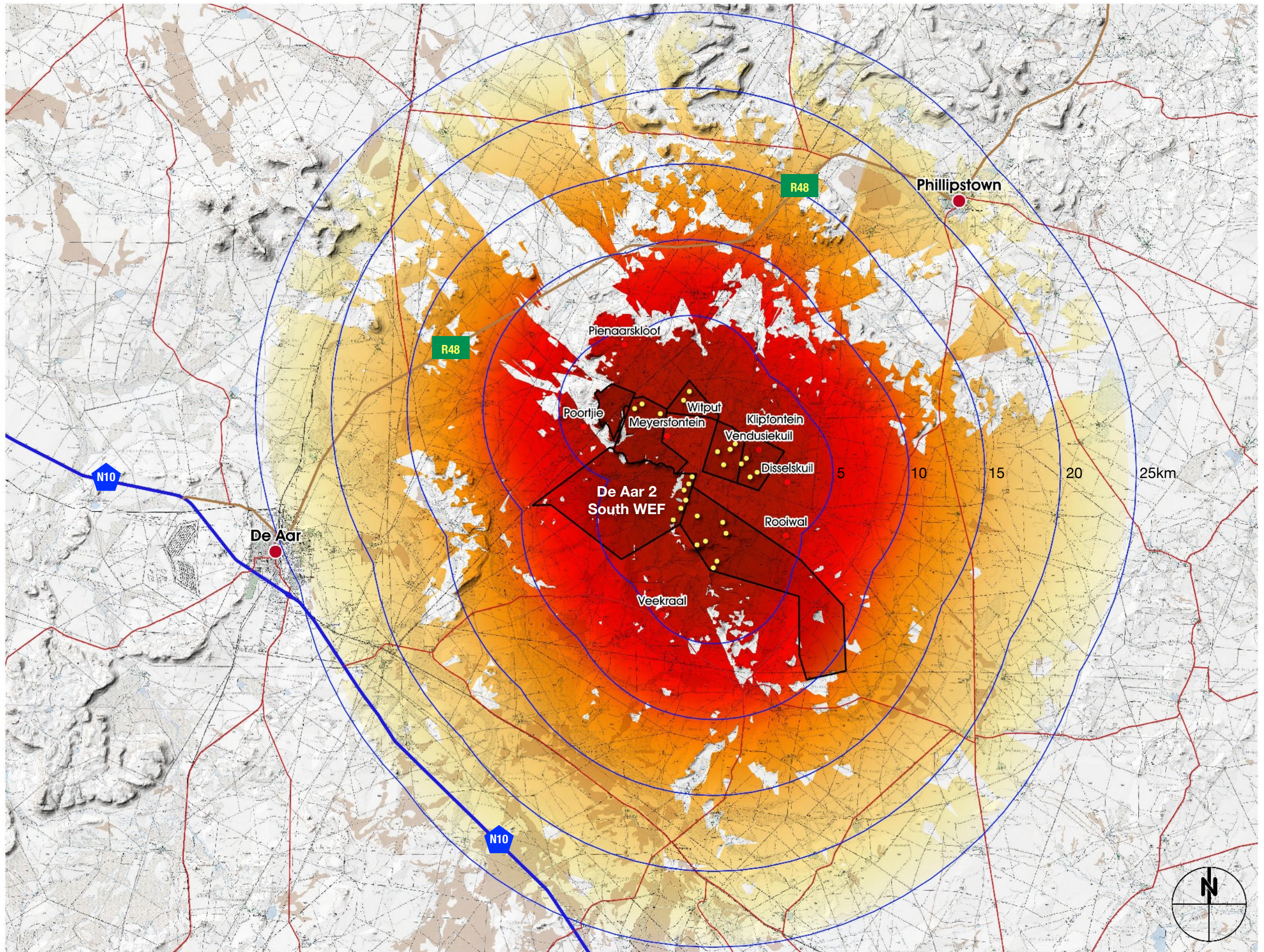
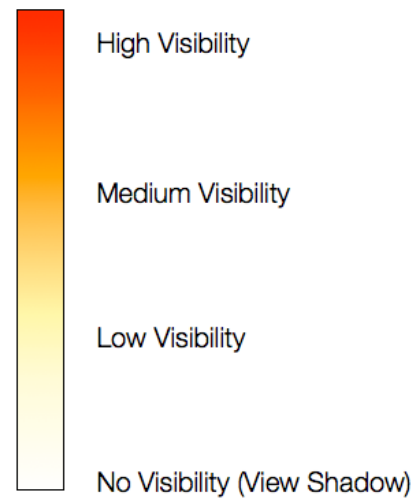


Base map : CD NGI 50K Topographic Series Current Mosaic 2022



map 4 : De Aar 2 South WEF Authorised Layout • VIEWSHED 61x WTGs

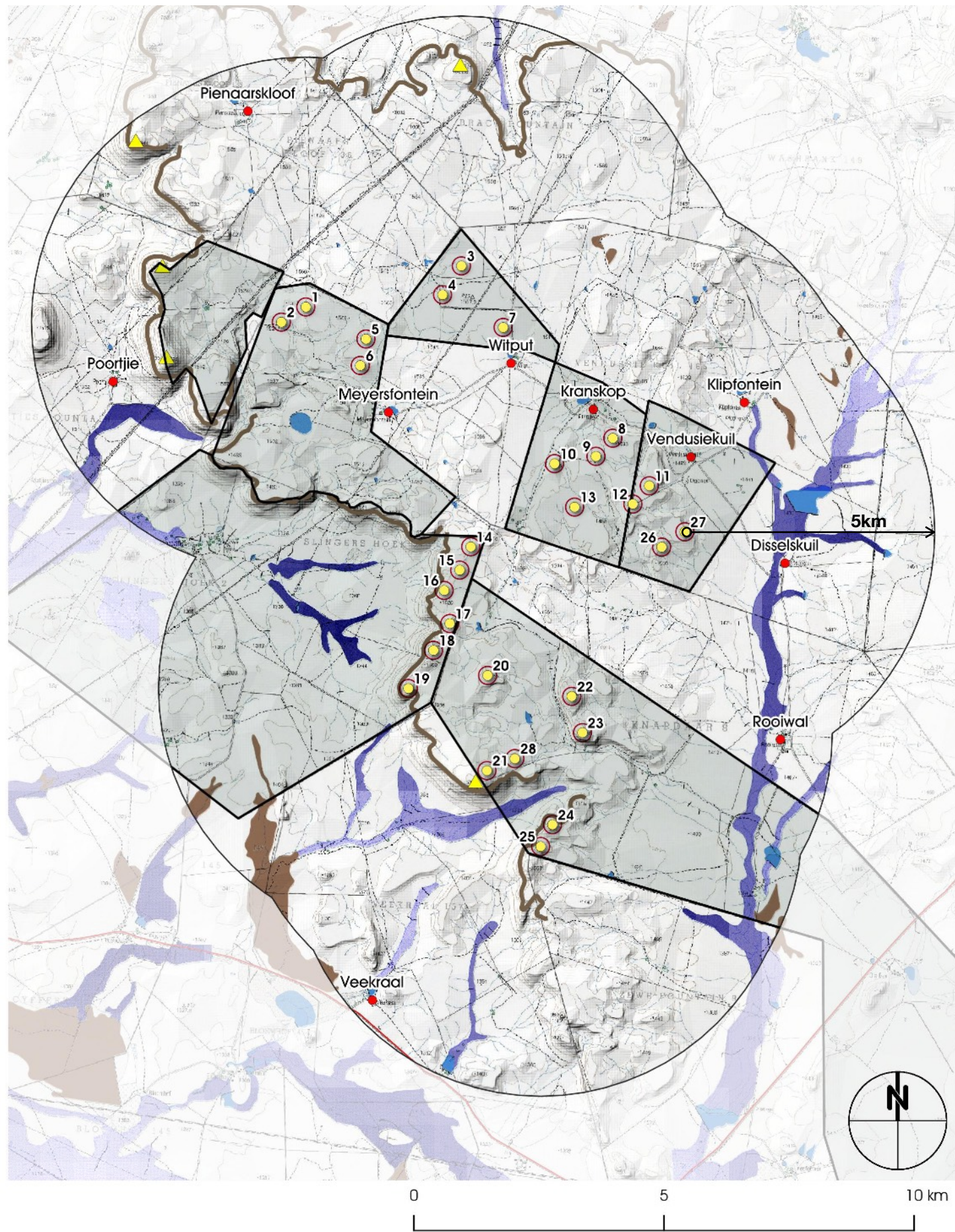
Viewshed Legend :



Base map : CD NGI 50K Topographic Series Current Mosaic 2022

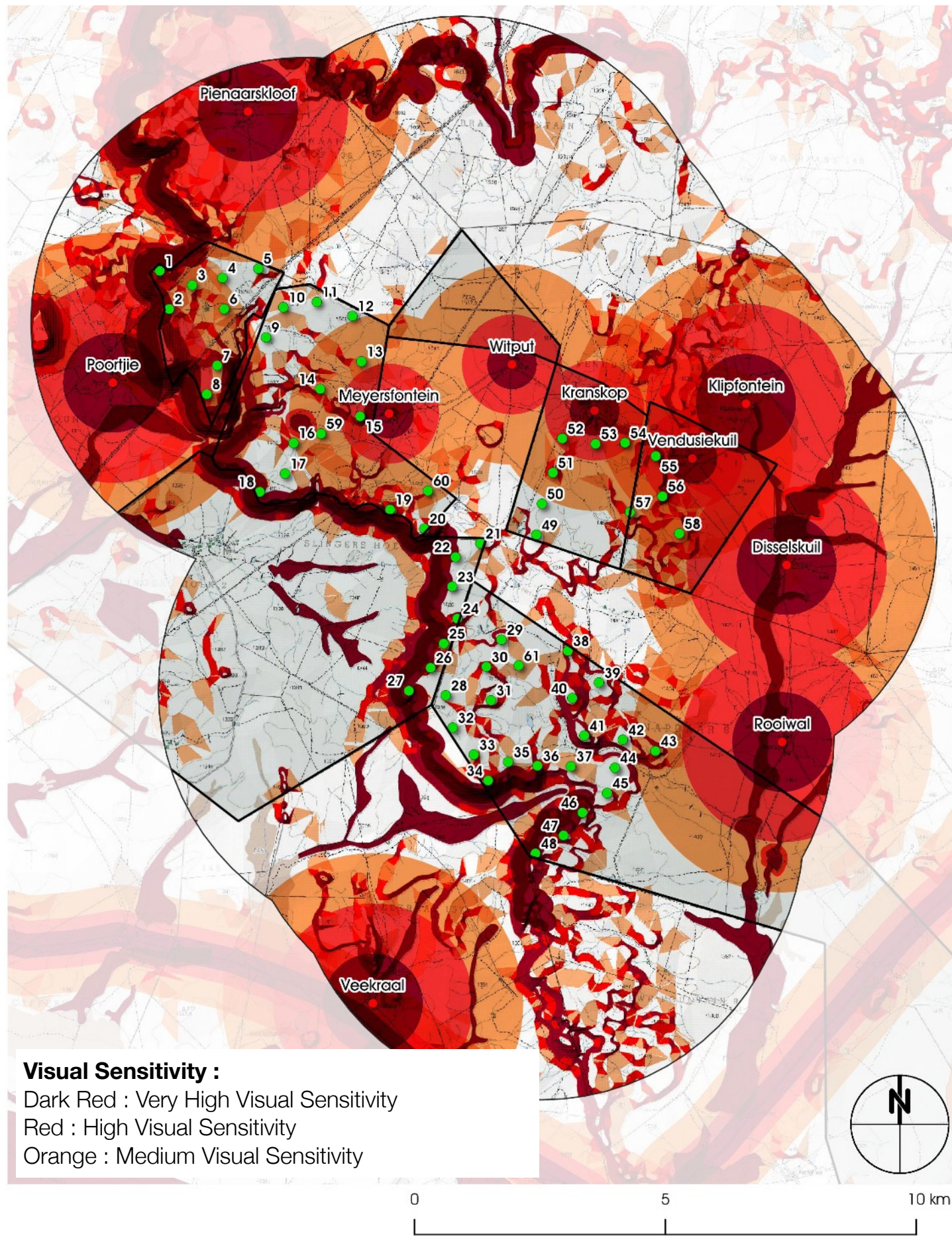


map 5 : De Aar 2 South WEF Amended Layout • VIEWSHED 28x WTGs (only 26x WTGs will be constructed)



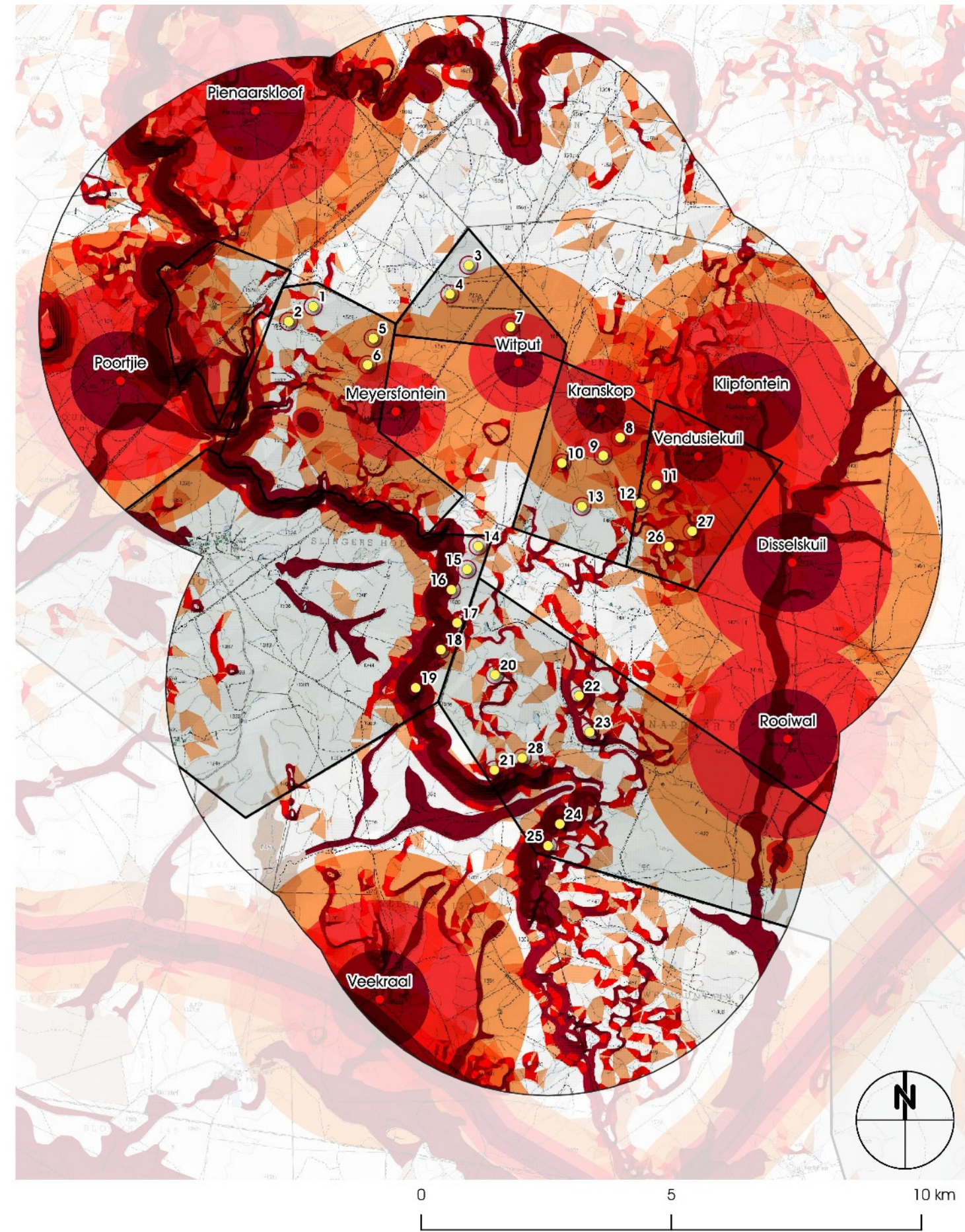
map 6 : Landscape Features (within 5km of WTGs)

base map : NGI 50K Topographic Series : 3024 CA De Aar



map 7 : Visual Sensitivity • Authorised Layout 2015 • 61x WTGs

base map : NGI 50K Topographic Series : 3024 CA De Aar



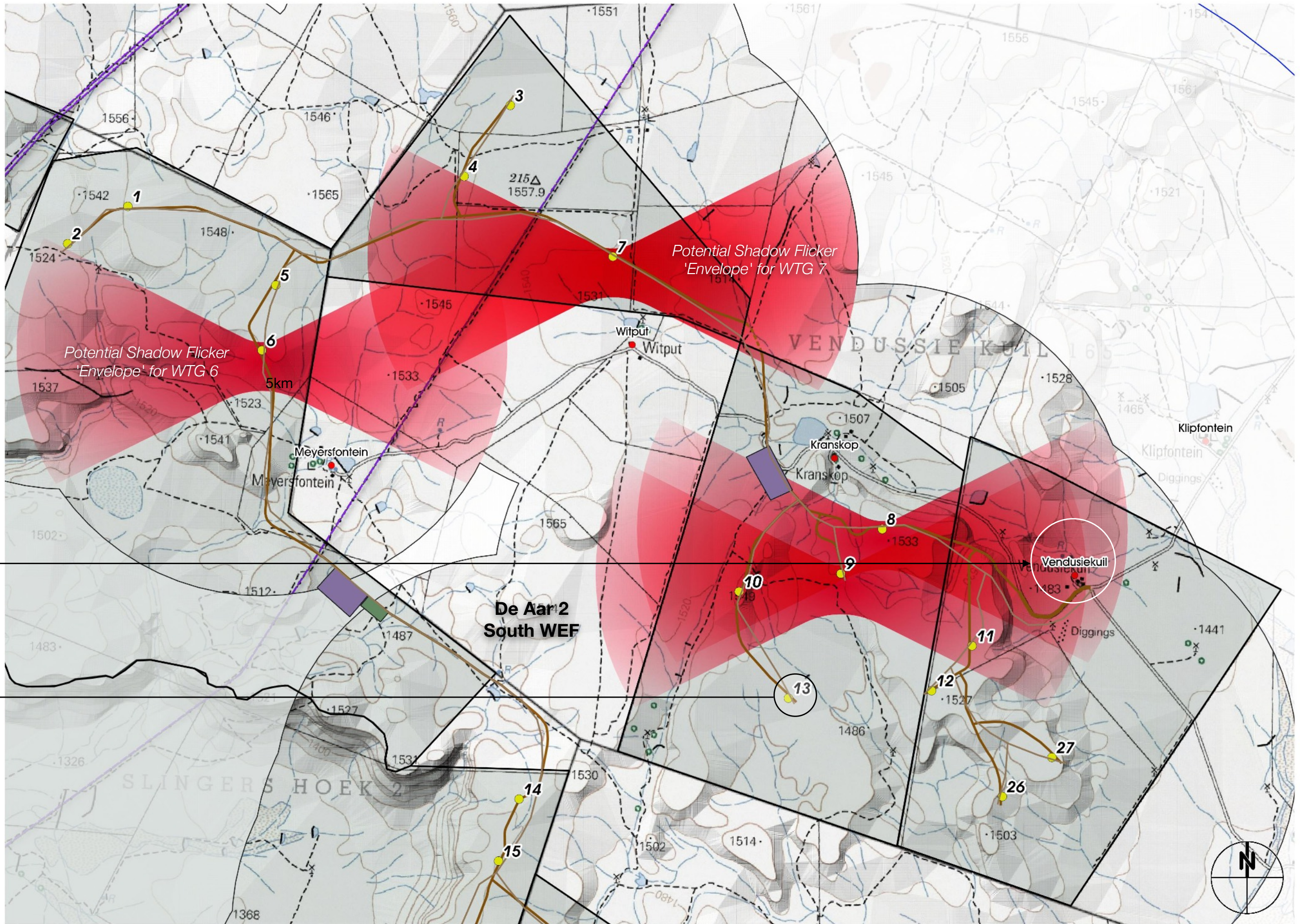
Amended Layout 2022 • 28x WTGs (only 26x WTGs will be constructed)



Green Symbol : Authorised Layout 2015
 Yellow Symbol : Amended Layout 2022

map 8 : ALL Very High Visual Sensitivity : Authorised vs Amended Layout

base map : NGI 50K Topographic Series : 3024 CA De Aar



Vendusiekuil Farmstead POTENTIALLY affected by Shadow Flicker from WTGs 8 and 9.

Numbered WTGs

Base map : CD NGI 50K Topographic Series Current Mosaic 2022

map 9 : De Aar 2 South WEF Amended Layout • POTENTIAL Shadow Flicker Effect

Addendum A: CV of Visual Specialists

The Visual Assessment Amendment was prepared by the following:

Quinton Lawson, Architect
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Expertise

Quinton Lawson has a Bachelor of Architecture Degree (Natal) and has more than 12 years' experience in visual assessments, specializing in 3D modeling and visual simulations. He has previously lectured on visual simulation techniques in the Master of Landscape Architecture Programme at UCT.

Bernard Oberholzer has a Bachelor of Architecture (UCT) and Master of Landscape Architecture (U. of Pennsylvania), and has more than 22 years' experience in undertaking visual impact assessments. He has presented papers on *Visual and Aesthetic Assessment Techniques*, and is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes*, prepared for the Dept. of Environmental Affairs and Development Planning, Provincial Government of the Western Cape, 2005.

The authors have been involved in visual assessments for a wide range of residential, industrial and renewable energy projects. They prepared the 'Landscape Assessment' report for the *National Wind and Solar PV Strategic Environmental Assessment (SEA)*, in association with the CSIR, for the Department of Environmental Affairs (now DFFE) in 2014.

Addendum B

Proposed Mulilo De Aar 2 South Wind Energy Facility
near De Aar, Northern Cape Province
for Mulilo De Aar 2 South (Pty) Ltd

**Visual Specialist Comment on Proposed Turbine Blade
Painting**

23 August 2022

Prepared for
Holland & Associates Environmental Consultants

Prepared by
Quinton Lawson, Architect
and
Bernard Oberholzer, Landscape Architect

1 Background

The avifaunal specialist, Chris van Rooyen, for the proposed Mulilo De Aar 2 South Wind Energy Facility (WEF), has recommended that one of the blades of each turbine be painted, as an avifaunal mitigation measure.

The Visual Specialists have accordingly been requested to compile a short separate specialist comment to address the acceptability of the proposed blade painting for the Mulilo De Aar 2 South WEF, including whether or not it will result in an increased level or change in the nature of visual impacts.

The original Visual Impact Assessment (VIA) prepared by Karen Hansen in 2011 included mitigation measures which indicated that blades must be white (with no stripes, decals or logos). However, Ms Hansen subsequently provided specialist comment relating to the blade painting for the existing De Aar 2 **North** WEF project before she retired, confirming that it would be acceptable.

Given that the proposed mitigation measure relating to the colour of the turbine blades is a change to the mitigations contained in the original VIA of 2011, this current statement addresses the change for the proposed Mulilo De Aar 2 **South** WEF.

The proposed blade painting will be addressed in the Environmental Management Programme (EMPr) update process.

2 Methodology

The Authors were not involved in the original VIA and therefore do not have any photo-montages to compare the visual effect of the painted blades painting with the original unpainted blades.

The Authors have instead prepared a series of images depicting the proposed turbines at a range of distances with an unpainted turbine blade, as well as black and red-painted blades, (see Figures 1 and 2).

The images are theoretical, and provide an over-simplification, as in reality there would be topographic variation and other terrain features to dilute the visibility of the turbines and their rotating blades, (see Figure 3).

3 Findings and Conclusion

Figures 1 and 2 indicate that the painted turbine blades would be clearly visible from 0 to 2km distance, and moderately to marginally visible from 2 to 5km distance. From 5km and beyond the visibility of the painted blades would be negligible to not visible. The red-painted blade would be slightly more visible than the black-painted one.

Given that nearby receptors, such as farmsteads, are generally 2km and much further in distance from the proposed Mulilo De Aar 2 South WEF, the overall visual significance would range from moderate to mostly negligible and not visible.

The following mitigation measure included in the original VIA: "*The colour finish of the turbines: paint treatment: white, matte, no stripes, decals, logos*" could be amended to "The colour finish of the turbines: Paint treatment: white, matte, no stripes, decals, logos preferable, however painting of one of the blades of each turbine (with red or black), as per avifaunal specialist recommendations, is acceptable".

The conclusion that can be drawn from this theoretical exercise is that the overall visual impact significance ratings for the proposed WEF would not change as a result of the painted turbine blades, and the proposed painting of the blades is considered acceptable from a visual impact perspective. The painting of turbine blades is likely to become more common as a bird mitigation measure for WEFs in the future, which needs to be taken into consideration.