

Proposed Highlands North, Highlands Central and Highlands South Wind Energy Facilities, Eastern Cape Province

for WKN Windcurrent South Africa (Pty) Ltd

Visual Impact Assessment Amendment

June 2021



Prepared for
Holland & Associates Environmental Consultants

Prepared by
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and
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Visual Specialists

The Visual Impact Assessment (VIA) was prepared by the following:

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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 in 2014.

1. Introduction

The Applicant is proposing to amend the Environmental Authorisations for the proposed Highlands North, Central and South Wind Energy facilities located between Somerset East and Pearston in the Eastern Cape Province. This amendment report addresses the potential changes in visual impact significance relating to the proposed amendments. This Amendment Report should be read in conjunction with the main Visual Impact Assessment (VIA) Report (2018).

2. Scope

The proposed changes would result in a Part 2 Amendment in terms of Regulation 31 of the NEMA EIA Regulations (GN R 982, as amended) which requires:

- *An assessment of all impacts (including cumulative impacts) related to the proposed changes;*
- *A description of advantages and disadvantages associated with the proposed changes; and*
- *Identification of additional measures to avoid, manage and mitigate impacts associated with the proposed changes for inclusion in the EMP.*

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 layout, and the possible significance of the changes.

3. Original VIA

The original Visual Impact Assessment (VIA) for the Highlands wind energy facilities (November 2018), consisted of a total of 49 wind turbines, with hub heights of up to 135m and a rotor diameter of up to 150m. Subsequently 41 turbines were authorised. The visual significance rating both before and after mitigation at that time was rated as **moderate (-)** given the relative visibility of wind turbines to surrounding farmsteads and game farms. The ranking of impacts was based on the methodology provided by the Environmental Assessment Practitioner.

The original VIA indicated that the layout of the proposed turbines in all three of the wind farm phases (North, Central and South), succeeded in largely avoiding all the major visual constraints for the study area, and would occupy the least visually sensitive parts of the site. The VIA also indicated that if all the turbines, as proposed, were not required, priority should be given to removing those closest to the R63 Route and Bruintjieshoogte Pass.

4. Proposed Amendments

The currently proposed amendments to the Highlands Wind Energy Facilities are indicated in Table 1 below. The changes that would have potential visual implications include the following:

- Changes to the siting of proposed turbines as indicated in the latest layouts (Maps 1 to 4);
- A decrease in the total number of 41 authorised turbines to 34 turbines, (all 3 phases);
- The increase in the proposed maximum hub height from 135m to 180m (Fig. 1);
- The increase in the proposed rotor diameter from a maximum of 150m to 175m, (and a smaller diameter in 2 cases). (Fig. 1).
- The proposed inclusion of a battery storage area, which would be located adjacent to the substation of each phase, on the temporary laydown area (Fig. 2).

The fewer proposed number of turbines would result in slightly lower lengths of access roads required for each of the 3 phases, which together with the fewer hardstand areas and internal powerlines, would have only marginal visual significance for receptors in the general area. The generation capacity and foundation size do not have any visual implications.

Table 1a: Proposed amendments to Wind Energy Facilities – Highlands North WEF

Component	Approved Layout	Proposed Amendment
Number of turbines	14 turbines	Up to 12 turbines
Generation capacity of WEF	Up to 84 MW	Up to 87 MW
Hub height	Up to 135 m	Up to 180 m
Rotor diameter	Up to 150 m	Max. 175 m (except T01: 160 m and T12: 150 m)
Tip height	Up to 200 m	Up to 267,5 m
Foundation size	Up to ± 25 x 25m and 5m deep per turbine.	Up to ± 35 x 35m and 7m deep per turbine.
Hardstand area / turbine	5000 m ²	6000 m ²
Battery storage	N/A	1 ha footprint, and approx. 8 m height
Length of internal roads	Approx. 50 km	Approx. 45 km

Table 2b: Proposed amendments to Wind Energy Facilities – Highlands Central WEF

Component	Approved Layout	Proposed Amendment
Number of turbines	Up to 12 turbines	Up to 10 turbines
Generation capacity of WEF	Up to 72 MW	No change
Hub height	Up to 135 m	Up to 180 m
Rotor diameter	Up to 150 m	Max. 175 m
Tip height	Up to 200 m	Up to 267,5 m
Foundation size	Up to ± 25 x 25m and 5m deep per turbine.	Up to ± 35 x 35m and 7m deep per turbine.
Hardstand area / turbine	5000 m ²	6000 m ²
Battery storage	N/A	1 ha footprint, and approx. 8 m height
Length of internal roads	Approx. 50 km	Approx. 45 km

Table 3c: Proposed amendments to Wind Energy Facilities – Highlands South WEF

Component	Approved Layout	Proposed Amendment
Number of turbines	Up to 15 turbines	Up to 12 turbines
Generation capacity of WEF	Up to 90 MW	No change
Hub height	Up to 135 m	Up to 180 m
Rotor diameter	Up to 150 m	Max. 175 m
Tip height	Up to 200 m	Up to 267,5 m
Foundation size	Up to ± 25 x 25m and 5m deep per turbine.	Up to ± 35 x 35m and 7m deep per turbine.
Hardstand area / turbine	5000 m ²	6000 m ²
Battery storage	N/A	1 ha footprint, and approx. 8 m height
Length of internal roads	Approx. 50 km	Approx. 45 km

5. Visual Assessment Methodology

The methodology for the visual assessment is based on that of the original VIA Report for consistency. In addition, the amendment involves making a comparison, on a number of levels, between the previously assessed layout and the current proposed amended layout. This involves comparing the site layouts in relation to the visual sensitivity mapping, as well as the viewsheds for each of the 3 phases. Based on experience, the differences in the photomontages of the turbines seen from a distance would hardly be noticeable, and these were therefore not re-rendered.

6. Re-assessment of Visual Impacts

6.1 Highlands North WEF

Physical layout:

The changes to the layout of the proposed Highlands North wind turbines (with fewer turbines) have avoided areas of visual sensitivity as indicated on Map 1. A detailed layout is indicated on Map 12. A benefit of the amended layout from a visual perspective is that the turbines are further away from the R63 and from a number of farmsteads (see Table 2a below). Minor changes to the internal road layout would not have any significant visual implications, while the addition of the battery storage adjacent to the substation would only have marginal visual implications.

Viewshed analysis (Maps 5 and 6):

The 45m increase in hub height has been taken into account in the comparison between the viewsheds of the previously assessed and amended layouts. The comparison indicates that because of the higher turbines, there would be some increase in the zone of visual exposure, and that the viewshed would extend for a slightly greater distance, although the visibility of the turbines becomes less significant with distance.

Field observations of other wind farms suggest that increased turbine height is mainly of visual significance within about 5km of the turbine, and less significant with greater distances. Also, it appears that farmsteads in a view shadow would generally not be affected by the increased height of the proposed turbines.

Photomontages from selected viewpoints (Figures 3 and 4):

Comparative photomontages of the proposed wind turbines from 2 additional viewpoints, Kamala 'Viewpoint x1' and Side by Side 'Viewpoint x2', indicate the potential effect on visual receptors. The distance from the Kamala Private Game Reserve to the nearest Highlands North turbine would be 5,9km. The visual effect of the increased height of the turbines is considered to be marginal at this distance.

The distance from the Side by Side Safaris Viewpoint to the nearest Highlands North turbine would be 14,6km. Based on the photomontage (Figure4), Highlands North WEF would only be marginally visible from this viewpoint.

Advantages and Disadvantages

The increase in height of the proposed wind turbines and the increase in rotor diameter is partly offset by the reduction in the number of turbines, as the fewer turbines could result in less visual clutter in the landscape. Because there are fewer turbines, the distance between viewpoints and turbines has slightly increased in some cases (see Table 2a).

The viewshed analysis indicates that there would be a moderate increase in the zone of visual exposure and a slight increase in the extent of the viewshed, but that farmsteads in a view shadow would generally not be affected.

Table 2a: Distances and Visibility: HIGHLANDS NORTH WEF

View-point	Location	Coordinates	Distance to WEF: Previously assessed layout	Distance to WEF: amended layout	Visibility of WEF
VP1	Goedehoop Road	32.706490S 25.445065E	5.3km	5.6km	Moderate-high visibility.
VP2	Opposite Lekkerwater on R63	32.700113S 25.412498E	2.3km	2.9km	High visibility.
VP3	Viewsite on Bruintjieshoogte Pass	32.681138S 25.340371E	1.9km	2.0km	High visibility.
VP3a	Crest of Bruintjieshoogte Pass	32.687757S 25.351308E	857m	1.1km	High visibility.
VP4	Allemanfontein Farm	32.667288S 25.265467E	7.7km	7.7km	Moderate visibility.
VP4a	Toekoms farm	32.696542S 25.270453E	5.5km	5.6km	Partly in view shadow, facing west away from proposed wind farms.
VP5	Boschfontein Farm	32.714650S 25.265360E	5.1km	5.1km	Moderate-high visibility.
VP5a	Woodcliffe farm	32.743777S 25.234579E	8.2km	8.2km	Derelict farmstead, surrounded by trees and facing south away from proposed wind farms.
VP6	Intersection with Pearston District Road	32.750674S 25.209773E	10.7km	10.6km	Marginal visibility.
VP6a	Blaaukrantz farm	32.775372S 25.213988E	11.1km	11.1km	Partly in view shadow, surrounded by trees, facing south away from proposed wind farms.
VP7	Vaalklip Farm Gate (game farm)	32.786705S 25.232462E	10.7km	10.7km	Partly in view shadow.
VP8	District road near Coetzenburg and Wentworth farms	32.750093S 25.510084E	Road: 12.5km Farms: ±11km	Road: 12.5km Farms: ±10km	Marginal visibility.
VP9	District road near Kaalplaas (East Cape Safaris Game Farm)	32.818506S 25.458107E	Road: 12.8km Farm: 11.5km	Road: 13.3km Farm: 11.6km	Marginal visibility.
VP10	District road near Uitkomst farm	32.838857S 25.430732E	Road: 13.9km Farm: 12.1km	Road: 14.1km Farm: 13km	Marginal visibility.
VPx1	Goedehoop (Kamala Private Game Reserve)	32.697722S 25.446527E	5.5km	5.9km	Moderate-high visibility.
VPx2	Side by Side Game Reserve	32.853317S 25.357474E	14.6km	14.6km	Marginal visibility.

6.2 Highlands Central WEF

Physical layout:

The changes to the layout of the proposed Highlands Central wind turbines (with fewer turbines) have avoided areas of visual sensitivity as indicated on Map 2. A detailed layout is indicated on Map 13. A benefit of the amended layout from a visual perspective is that the turbines are further away from a number of farmsteads in some cases (see Table 2b below). Minor changes to the internal road layout and orientation of the substation would not have any significant visual implications, while the addition of the battery storage would only have marginal visual implications.

Viewshed analysis (Maps 7 and 8):

The 45m increase in hub height has been taken into account in the comparison between the viewsheds of the previously assessed and amended layouts. As in the case of Highlands North WEF, there would be some increase in the zone of visual exposure, and the viewshed would extend for a slightly greater distance, although the visibility of the turbines becomes less significant with distance. Farmsteads in a view shadow would generally not be affected by the increased height of the proposed turbines.

Photomontages from additional viewpoints (Figures 3 and 4):

Comparative photomontages of the proposed wind turbines from 2 additional viewpoints, Kamala 'Viewpoint x1' and Side by Side 'Viewpoint x2', indicate the potential effect on visual receptors. The distance from the Kamala Private Game Reserve in the north to the nearest Highlands Central turbine would be 7,1km. The visual effect of the increased height of the turbines would be marginal at this distance.

The distance from the Side by Side Safaris Viewpoint to the nearest Highlands Central turbine would be 12,3km. Based on the photomontage (Figure 4), Highlands Central WEF would only be marginally visible from this viewpoint.

Advantages and Disadvantages

The increase in height of the proposed wind turbines and the increase in rotor diameter is partly offset by the reduction in the number of turbines, as the fewer turbines could result in less visual clutter in the landscape. Because there are fewer turbines, the distance between viewpoints and turbines has slightly increased in some cases (see Table 2b).

The viewshed analysis indicates that there would be a moderate increase in the zone of visual exposure and a slight increase in the extent of the viewshed, but that farmsteads in a view shadow would generally not be affected. On balance no change to the overall visual impact significance is expected.

Table 2b: Distances and Visibility: CENTRAL HIGHLANDS WEF

View-point	Location	Coordinates	Distance to WEF: Authorized layout	Distance to WEF: amended layout	Visibility of WEF
VP1	Goedehoop Road	32.706490S 25.445065E	6.5km	6.5km	Moderate-high visibility.
VP2	Opposite Lekkerwater on R63	32.700113S 25.412498E	4.5km	4.5km	High visibility.
VP3	Viewsite on Bruintjieshoogte Pass	32.681138S 25.340371E	4.1km	4.4km	High visibility.
VP3a	Crest of Bruintjieshoogte Pass	32.687757S 25.351308E	3.4km	3.6km	High visibility.
VP4	Allemansfontein Farm	32.667288S 25.265467E	8.5km	8.4km	Moderate visibility.
VP4a	Toekoms farm	32.696542S 25.270453E	6.5km	6.1km	Partly in view shadow, facing west away from proposed wind farms.
VP5	Boschfontein Farm	32.714650S 25.265360E	6.0km	5.9km	Moderate-high visibility.
VP5a	Woodcliffe farm	32.743777S 25.234579E	8.9km	8.9km	Derelict farmstead, surrounded by trees and facing south away from proposed wind farms.
VP6	Intersection with Pearston District Road	32.750674S 25.209773E	11.4km	11.3km	Marginal visibility.
VP6a	Blaaukrantz farm	32.775372S 25.213988E	11.3km	11.6km	Partly in view shadow, surrounded by trees, facing south away from proposed wind farms.
VP7	Vaalklip Farm Gate (game farm)	32.786705S 25.232462E	10.4km	11.1km	Partly in view shadow.
VP8	District road near Coetzenburg and Wentworth farms	32.750093S 25.510084E	Road: 12.1km Farms: ±10.7km	Road: 12.2km Farms: ±10km	Marginal visibility.
VP9	District road near Kaalplaas (East Cape Safaris Game Farm)	32.818506S 25.458107E	Road: 12.0km Farm: 10.3km	Road: 12.4km Farm: 10.3km	Marginal visibility.
VP10	District road near Uitkomst farm	32.838857S 25.430732E	Road: 12.5km Farm: 11.4km	Road: 12.5km Farm: 11.4km	Marginal visibility.
VPx1	Goedehoop (Kamala Private Game Reserve)	32.697722S 25.446527E	7.1km	7.1km	Moderate-high visibility.
VPx2	Side by Side Game Reserve	32.853317S 25.357474E	12.3km	12.3km	Marginal visibility.

6.3 Highlands South WEF

Physical layout:

The changes to the layout of the proposed Highlands South wind turbines (with fewer turbines) have avoided areas of visual sensitivity as indicated on Map 3. A detailed layout is indicated on Map 14. A benefit of the amended layout from a visual perspective is that the turbines are further away from a number of farmsteads in some cases (see Table 2c below). Minor changes to the internal road layout and orientation of the substation would not have any significant visual implications, while the addition of the battery storage facility would only have marginal visual implications.

Viewshed analysis (Maps 9 and 10):

The 45m increase in hub height has been taken into account in the comparison between the viewsheds of the previously assessed and amended layouts. As in the case of Highlands North and Central WEFs, there would be some increase in the zone of visual exposure, and the viewshed would extend for a slightly greater distance, although the visibility of the turbines becomes less significant with distance. Farmsteads in a view shadow would generally not be affected by the increased height of the proposed turbines.

Photomontages from additional viewpoints (Figures 3 and 4):

Comparative photomontages of the proposed wind turbines from 2 additional viewpoints, Kamala 'Viewpoint x1' and Side by Side 'Viewpoint x2', indicate the potential effect on visual receptors. The distance from the Kamala Private Game Reserve in the north to the nearest Highlands South turbine would be 10,3km. The visual effect of the increased height of the turbines would be negligible at this distance, as can be seen in the photomontage (Figure 3).

The distance from the Side by Side Safaris Viewpoint to the nearest Highlands South turbine would be 4,2km. Based on the photomontage (Figure 4), Highlands South WEF would be clearly noticeable because of their proximity, despite the fewer number of turbines.

Advantages and Disadvantages

The increase in height of the proposed wind turbines and the increase in rotor diameter is partly offset by the reduction in the number of turbines, as the fewer turbines could result in less visual clutter in the landscape. Because there are fewer turbines, the distance between viewpoints and turbines has slightly increased in some cases (see Table 2c).

The viewshed analysis indicates that there would be a moderate increase in the zone of visual exposure and a slight increase in the extent of the viewshed, but that farmsteads in a view shadow would generally not be affected. On balance no change to the overall visual impact significance is expected.

Table 2c: Distances and Visibility: HIGHLANDS SOUTH WEF

View-point	Location	Coordinates	Distance to WEF: Authorized layout	Distance to WEF: amended layout	Visibility of WEF
VP1	Goedehoop Road	32.706490S 25.445065E	9.6km	9.4km	Moderate-high visibility.
VP2	Opposite Lekkerwater on R63	32.700113S 25.412498E	7.7km	8.5km	Moderate-high visibility.
VP3	Viewsite on Bruintjieshoogte Pass	32.681138S 25.340371E	8.1km	10.2km	in view shadow.
VP3a	Crest of Bruintjieshoogte Pass	32.687757S 25.351308E	7.2km	8.8km	Moderate-high visibility.
VP4	Allemansfontein Farm	32.667288S 25.265467E	12.8km	15.1km	in view shadow.
VP4a	Toekoms farm	32.696542S 25.270453E	10.5km	12.7km	in view shadow.
VP5	Boschfontein Farm	32.714650S 25.265360E	9.6km	11.7km	in view shadow.
VP5a	Woodcliffe farm	32.743777S 25.234579E	11.5km	13.3km	Derelict farmstead, surrounded by trees and facing south away from proposed wind farms.
VP6	Intersection with Pearston District Road	32.750674S 25.209773E	13.6km	15.4km	Marginal visibility.
VP6a	Blaaukrantz farm	32.775372S 25.213988E	13.0km	13.0km	Partly in view shadow, surrounded by trees, facing south away from proposed wind farms.
VP7	Vaalklip Farm Gate (game farm)	32.786705S 25.232462E	10.9km	11.1km	in view shadow.
VP8	District road near Coetzenburg and Wentworth farms	32.750093S 25.510084E	Road: 12.5km Farms: ±11km	Road: 12.3km Farms: ±11km	Marginal visibility.
VP9	District road near Kaalplaas (East Cape Safaris Game Farm)	32.818506S 25.458107E	Road: 7.1km Farm: 4.7km	Road: 7.1km Farm: 4.7km	Moderate-high visibility.
VP10	District road near Uitkomst farm	32.838857S 25.430732E	Road: 5.6km Farm: 4.5km	Road: 5.6km Farm: 4.5km	High visibility.
VPx1	Goedehoop (Kamala Private Game Reserve)	32.697722S 25.446527E	10.3km	10.3km	Moderate-high visibility.
VPx2	Side by Side Game Reserve	32.853317S 25.357474E	4.2km	4.2km	High visibility.

7. Cumulative Visual Impacts (Map 11)

The combined viewshed of the 3 Highlands wind farm phases provides an indication of the cumulative zone of visual influence (Map 11). Lower lying areas to the west and east of the proposed wind farm have the greatest exposure, while areas to the north tend to fall within a view shadow being visually screened by the Bruintjieshoogte Mountain.

The fact that the 3 phases of the proposed Highlands wind farms fall within the gazetted Cookhouse REDZ means that these would form part of a renewable energy node.

Given that other renewable energy projects mentioned in the VIA are not within viewing distance of each other and that they form part of the REDZ, the cumulative visual impact significance is considered to be **low**.

8. Mitigations

As indicated in the VIA of the previous authorised wind farm, the layout of the wind farm has already been through a number of iterations based on the specialist studies and engineering considerations. The visual mitigations contained in the original VIA of 2018 are still relevant.

In particular, where the substations, battery storage and O&M buildings, or the construction camps are located close to existing roads or dwellings, these should be screened by means of earth berms and/or planting.

9. Conclusion

The increased hub height, rotor diameter and blade tip height would result in increased visibility of the 3 phases of the Highlands wind farm project (i.e. Highlands North, Central and South WEFs), particularly when viewed from the R63.

Given that the visual significance of the increased height is generally limited to within 5km of the turbines, and that there will be fewer turbines, the overall visual impact significance rating for the turbines is not expected to change from that of the originally assessed layout (comprising 49 turbines) or authorised layout (comprising 41 turbines), and would remain **moderate (-)** before and after mitigation for all 3 phases of the Highlands Wind Farm project, as contained within the visual impact Tables 9-15 and Table 20 of the original Visual Impact Assessment. The ratings therefore remain valid and applicable to the EA amendment application.

Amendments to the related infrastructure, such as internal access roads and 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. Minor changes to substations and internal roads would have marginal visual implications and therefore their visual impact significance rating also remains unchanged at **low (-)**. The addition of the battery storage facilities adjacent to the substations would not have any major visual significance, given their maximum height of 8m and distance from visual receptors.

10. Recommendation

Provided that the visual mitigations listed in the original visual impact study (including post-construction rehabilitation of the site) are adhered to, the findings of the original visual assessment for the 3 Phases of the Highlands Wind Farm project (Highlands North, Highlands Central and Highlands South wind energy facilities) would still be valid for the proposed amendments. Our opinion from a visual perspective therefore is that the proposed amendments could be approved.

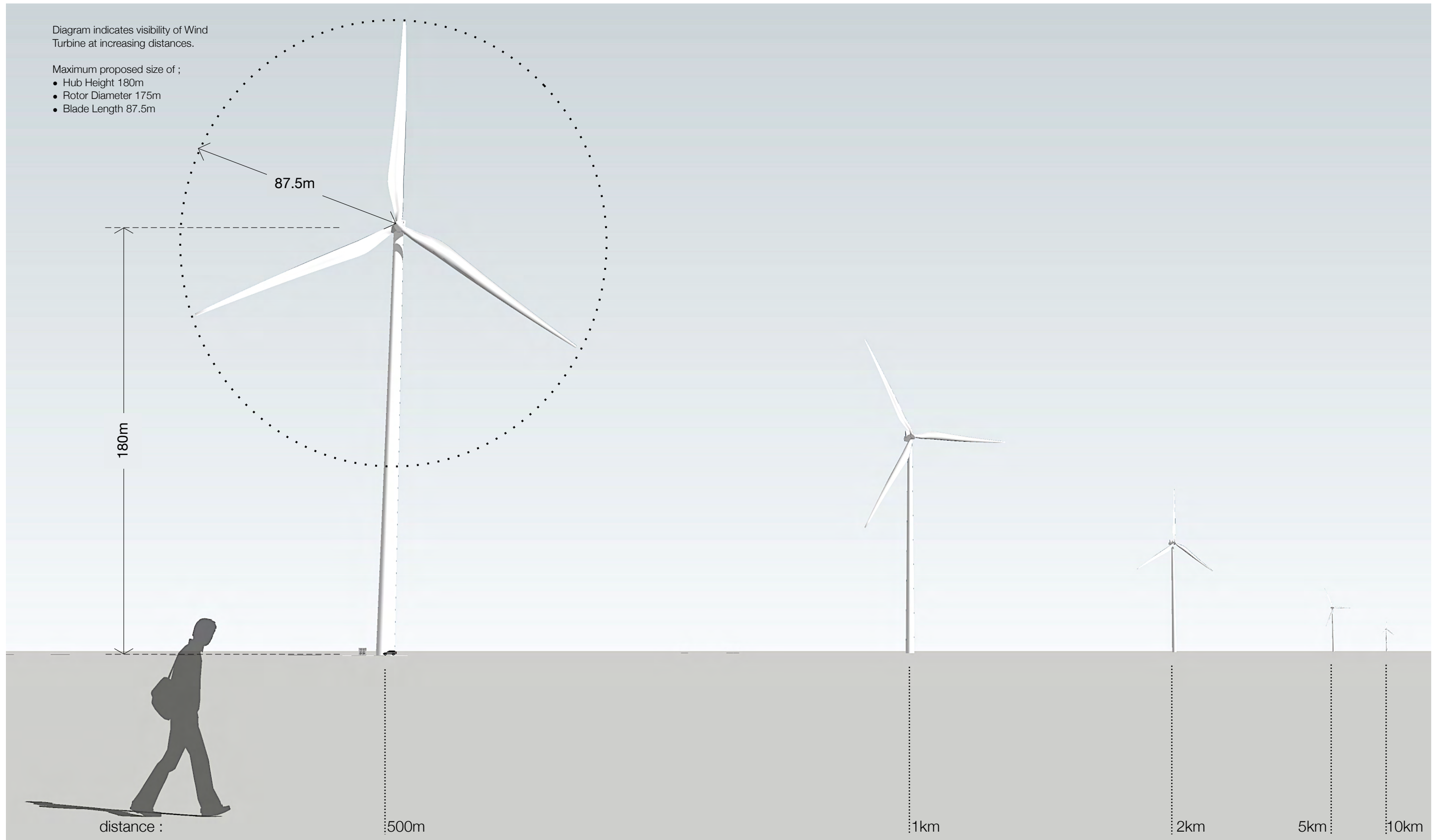
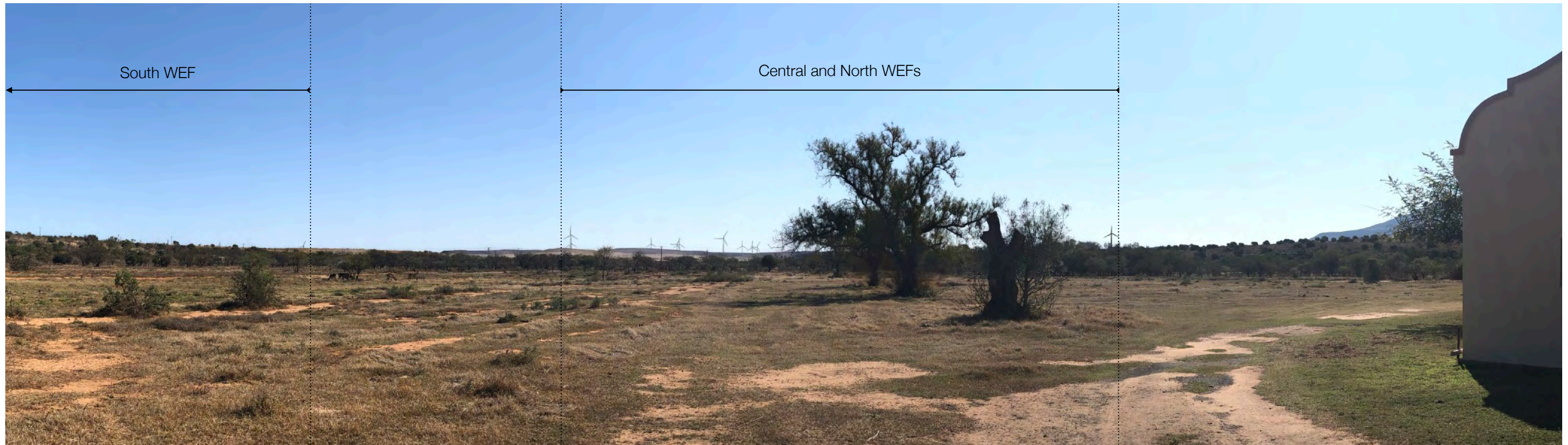


Figure 1 : WKN Highlands WEF : 3D Models : Wind Turbine Distances

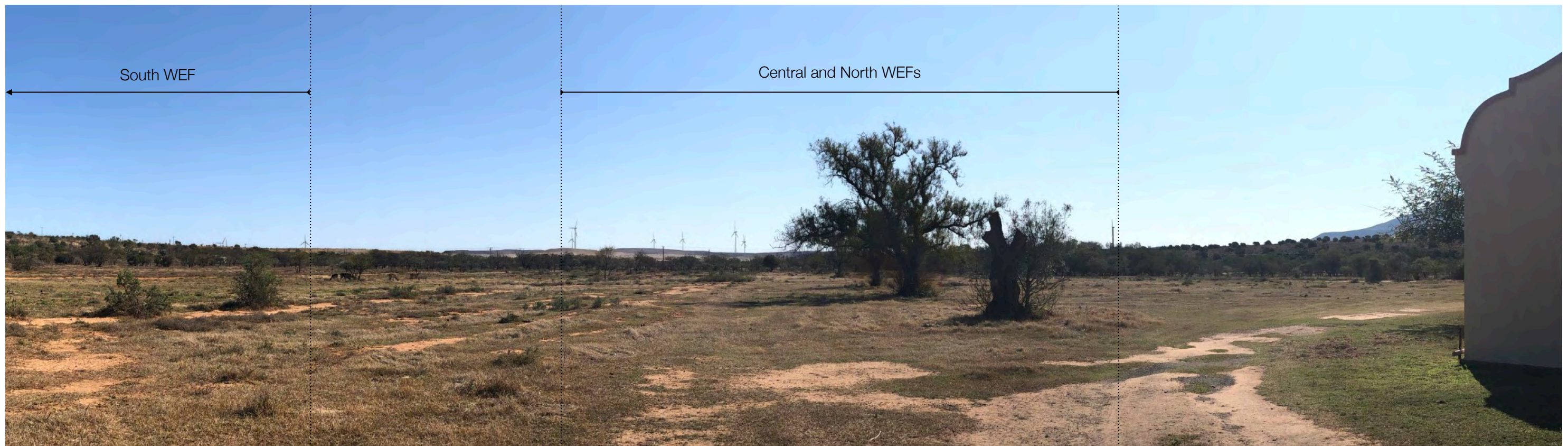


Figure 2 : WKN Highlands WEF : Typical Example of Substation, Switching Station and BESS



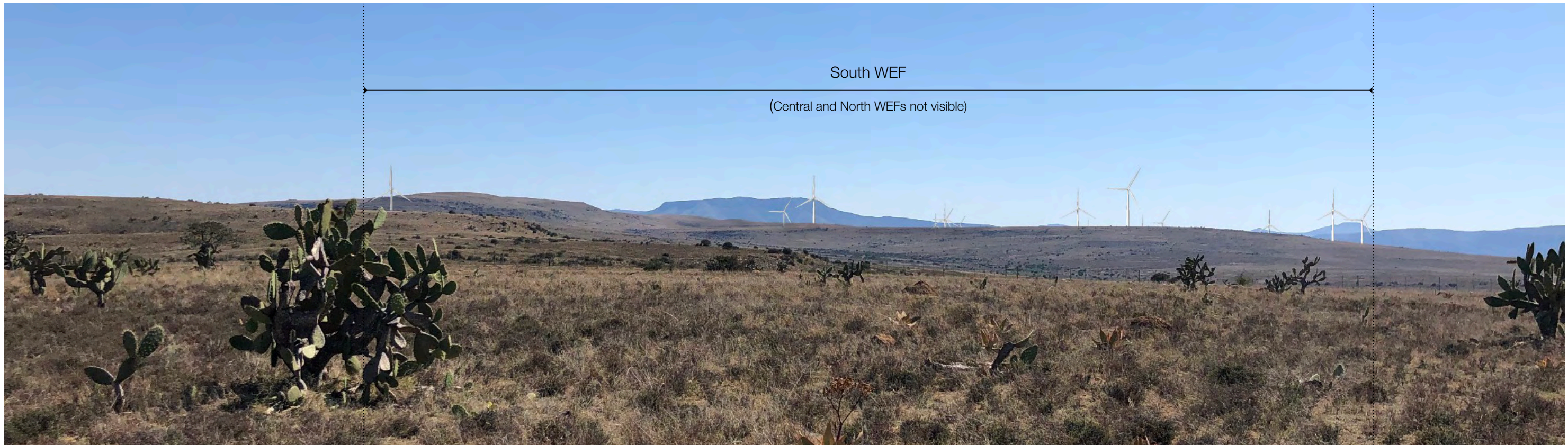
Kamala Viewpoint x1 : EA Authorised Layout : 41 WTGs, 125m Hub Height, 150m Rotor Diameter

32.697722S, 25.446527E, distance 6.01km



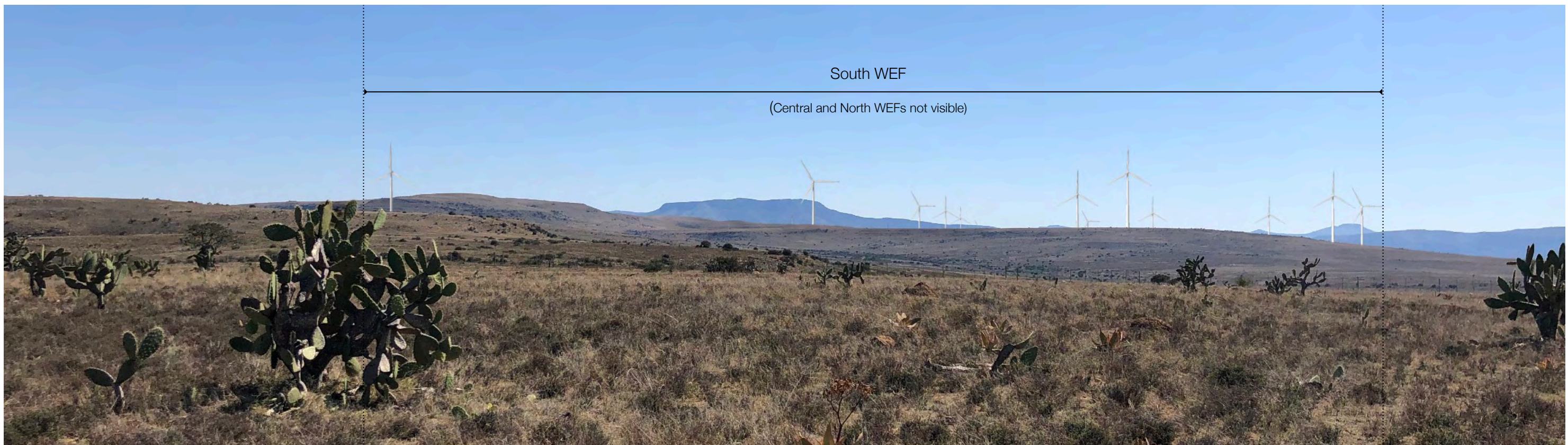
Kamala Viewpoint x1 : Amendment Layout : 34 WTGs, 180m Hub Height, 175m Rotor Diameter

32.697722S, 25.446527E, distance 6.01km



Side by Side Viewpoint x2 : EA Authorised Layout : 41 WTGs, 125m Hub Height, 150m Rotor Diameter

32.853317S, 25.357474E, distance 4.22km



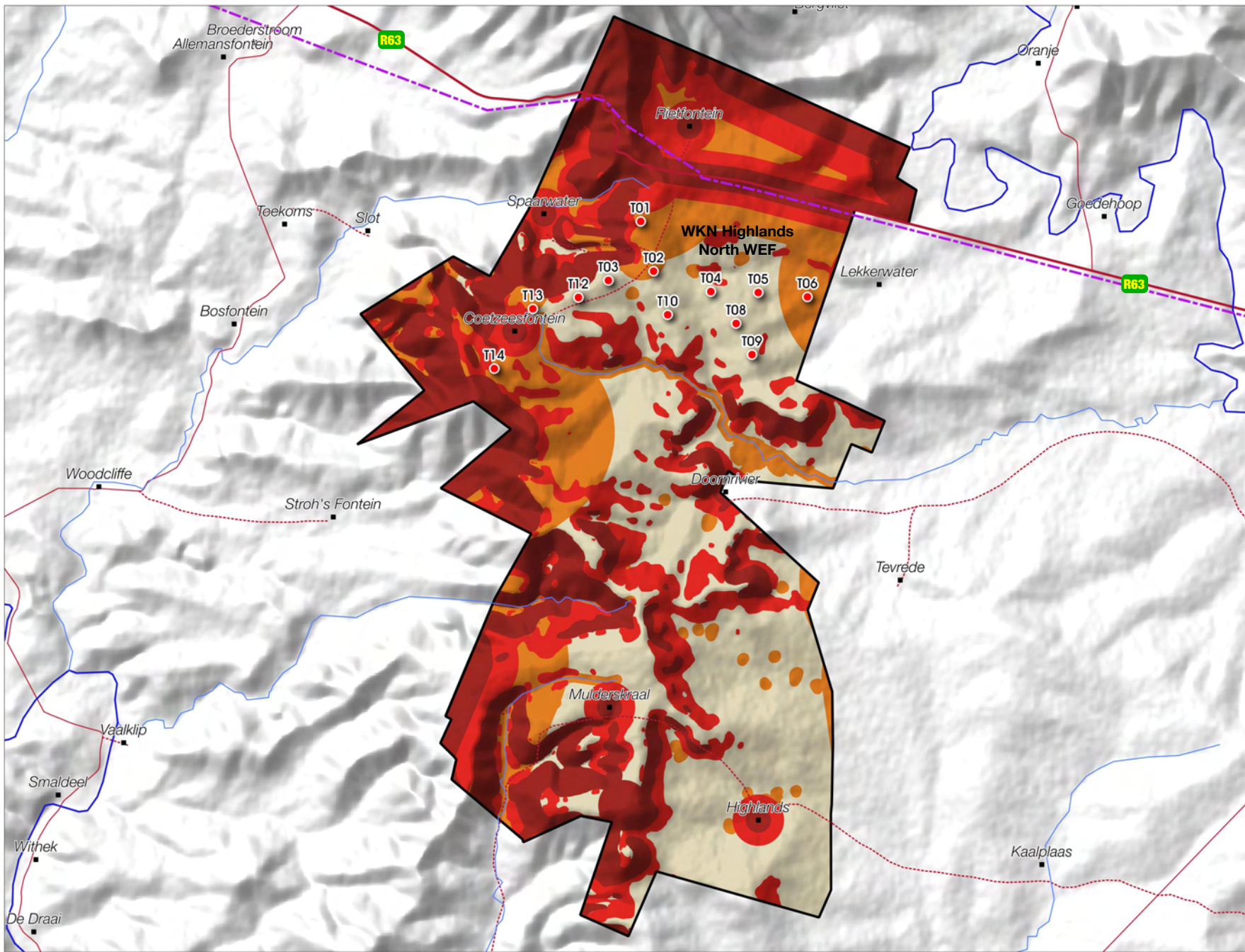
Side by Side Viewpoint x2 : Amendment Layout : 34 WTGs, 180m Hub Height, 175m Rotor Diameter

32.853317S, 25.357474E, distance 4.18km

Figure 4 : WKN Highlands WEF : Viewpoint Photomontages

Visual Sensitivity Legend :

- Very High
- High
- Medium
- Low

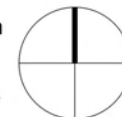


Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 1 • Visual Sensitivity : North WEF : Amended Layout

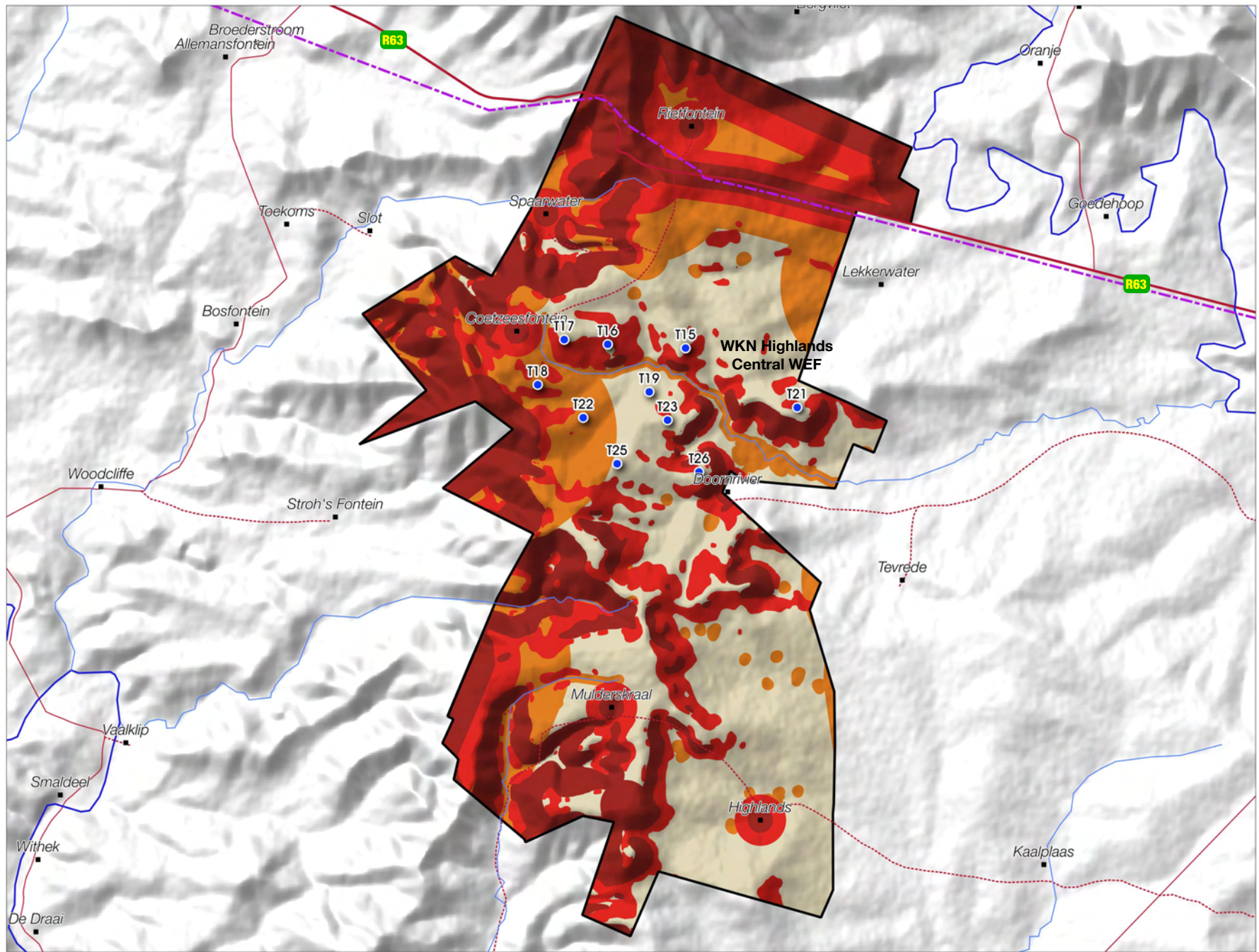
0 5 10 km

1:75 000 @ A3



Visual Sensitivity Legend :

- Very High
- High
- Medium
- Low



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 2 • Visual Sensitivity : Central WEF : Amended Layout

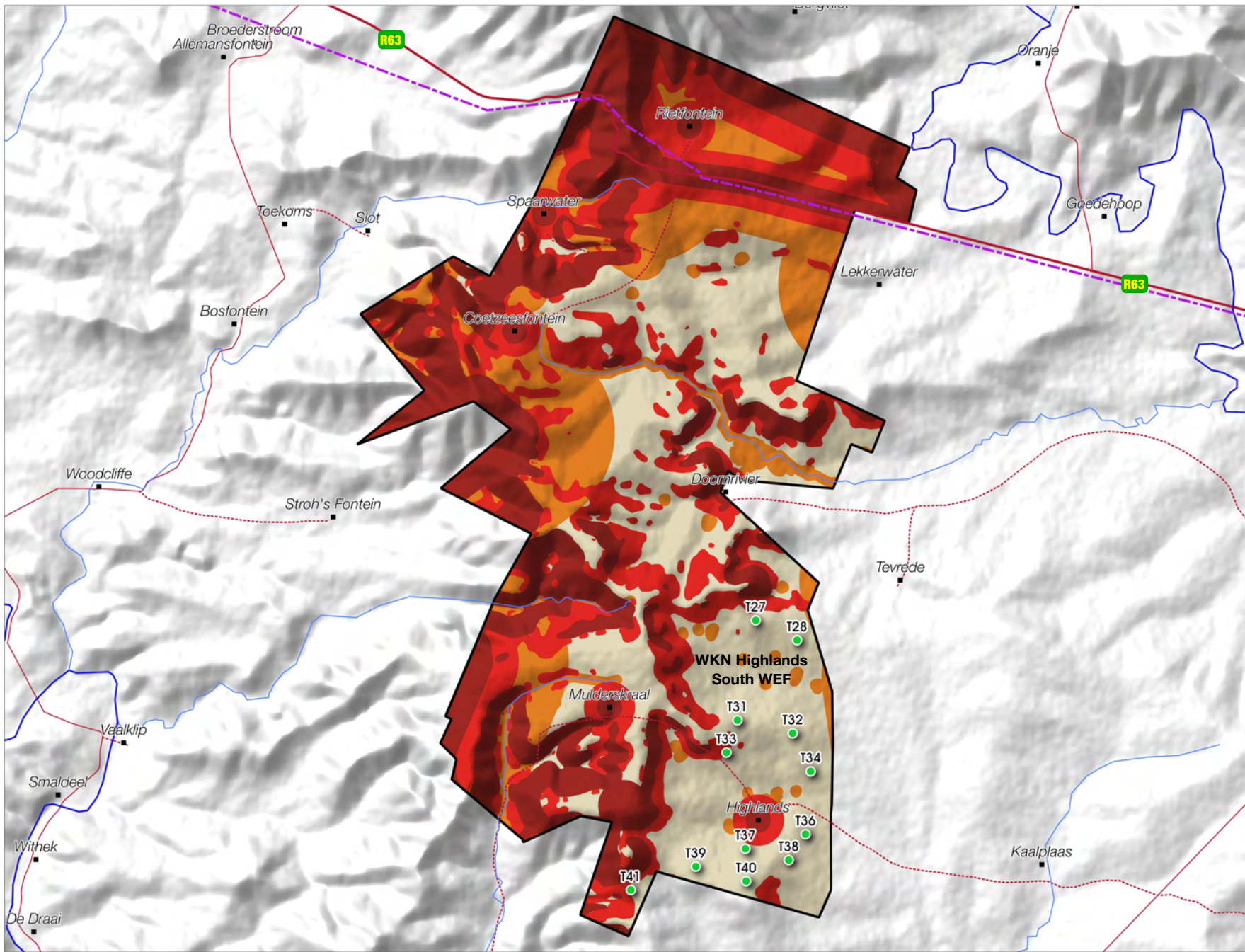
0 5 10 km

1:75 000 @ A3



Visual Sensitivity Legend :

- Very High
- High
- Medium
- Low



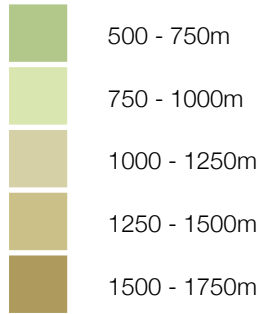
Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 3 • Visual Sensitivity : South WEF : Amended Layout

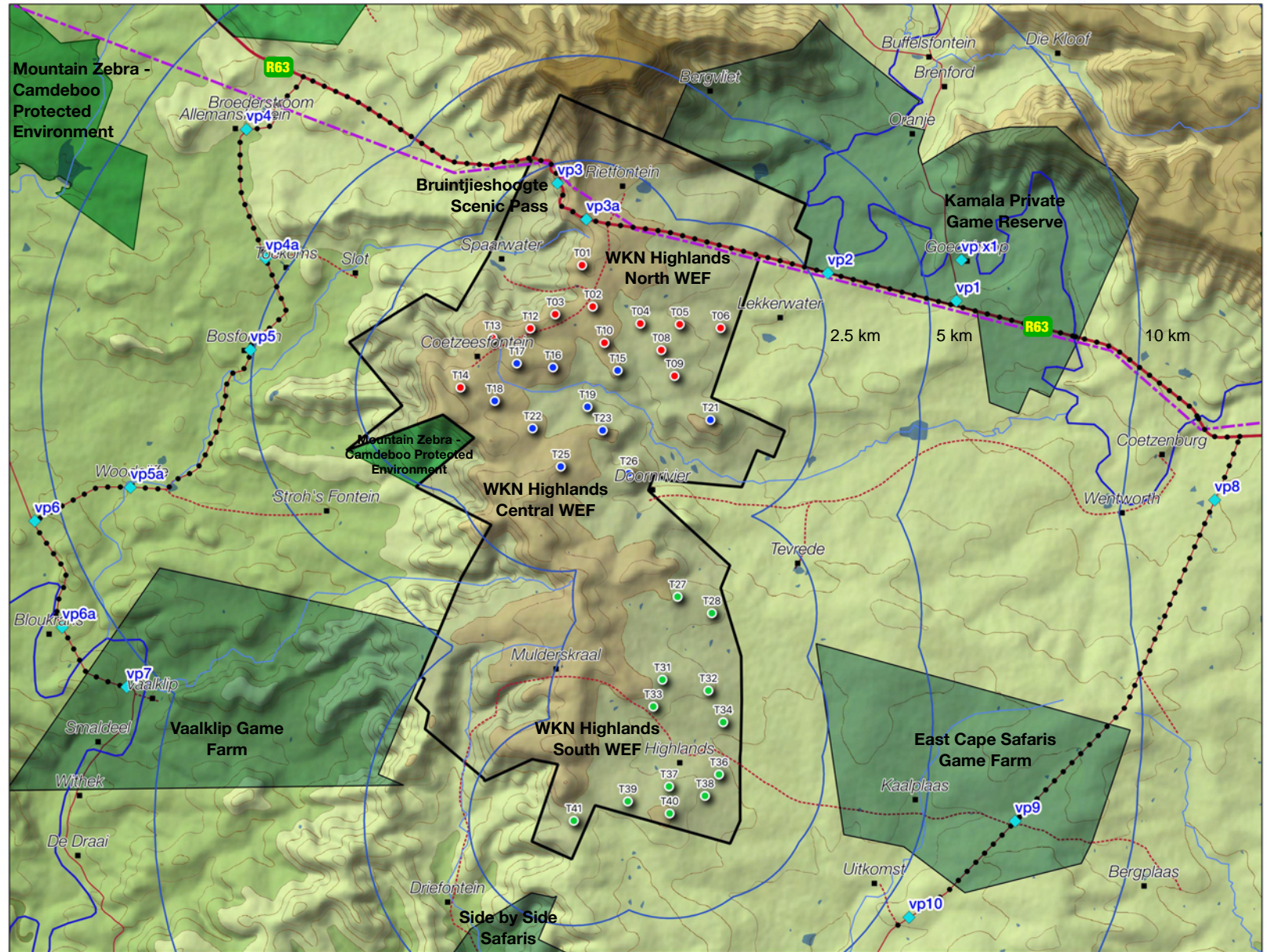
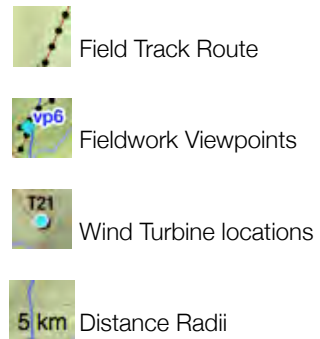
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Physiography :

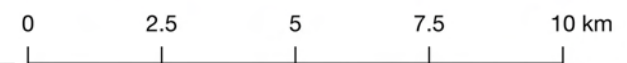


Legend :



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

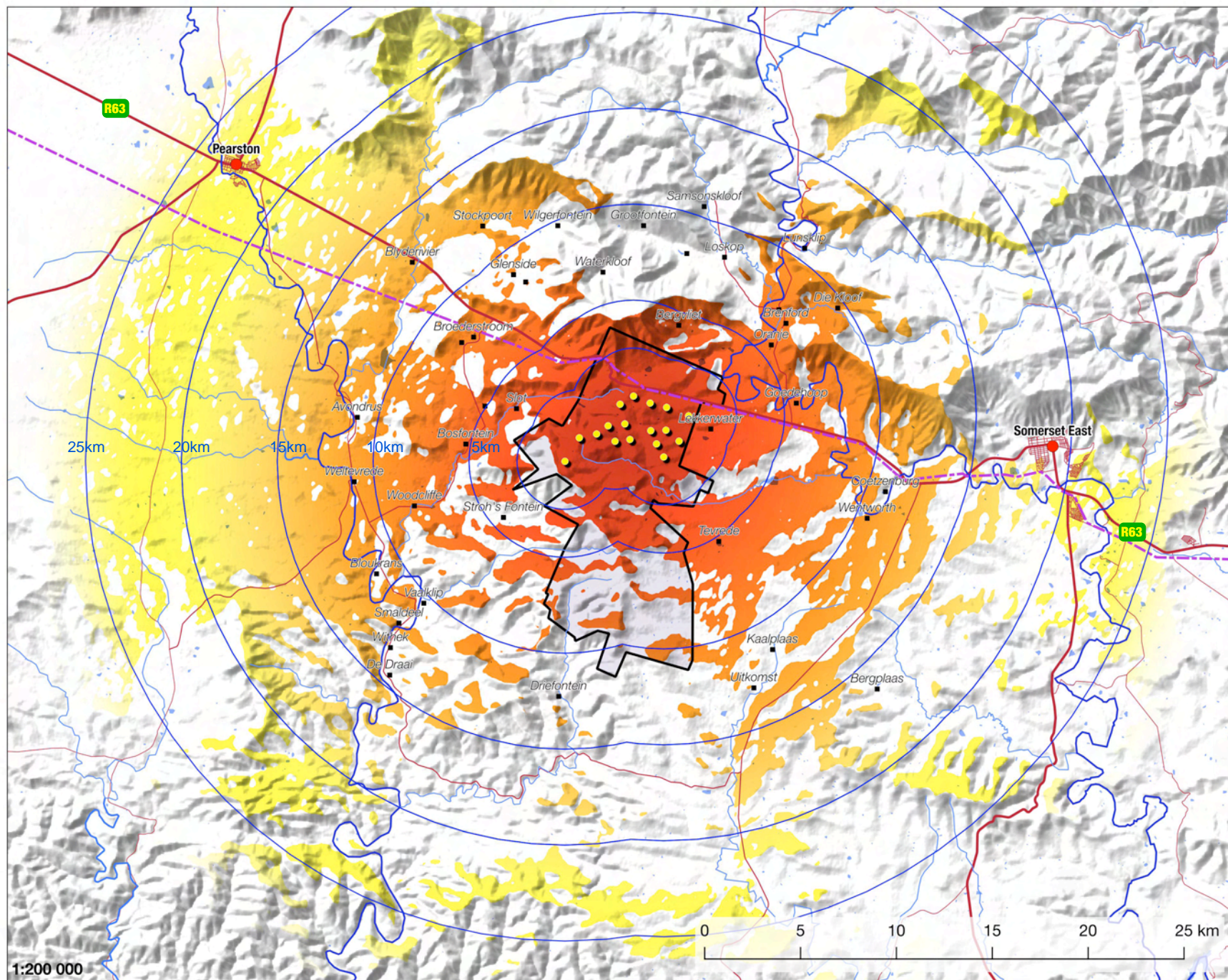
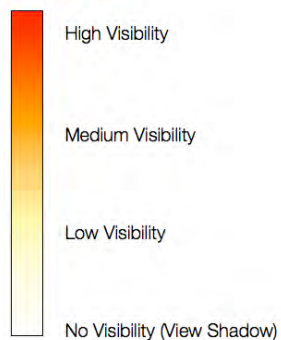
Map 4 • Physiography with 50m contours, Fieldwork and Viewpoints



1:100 000 @ A3



Viewshed Legend :

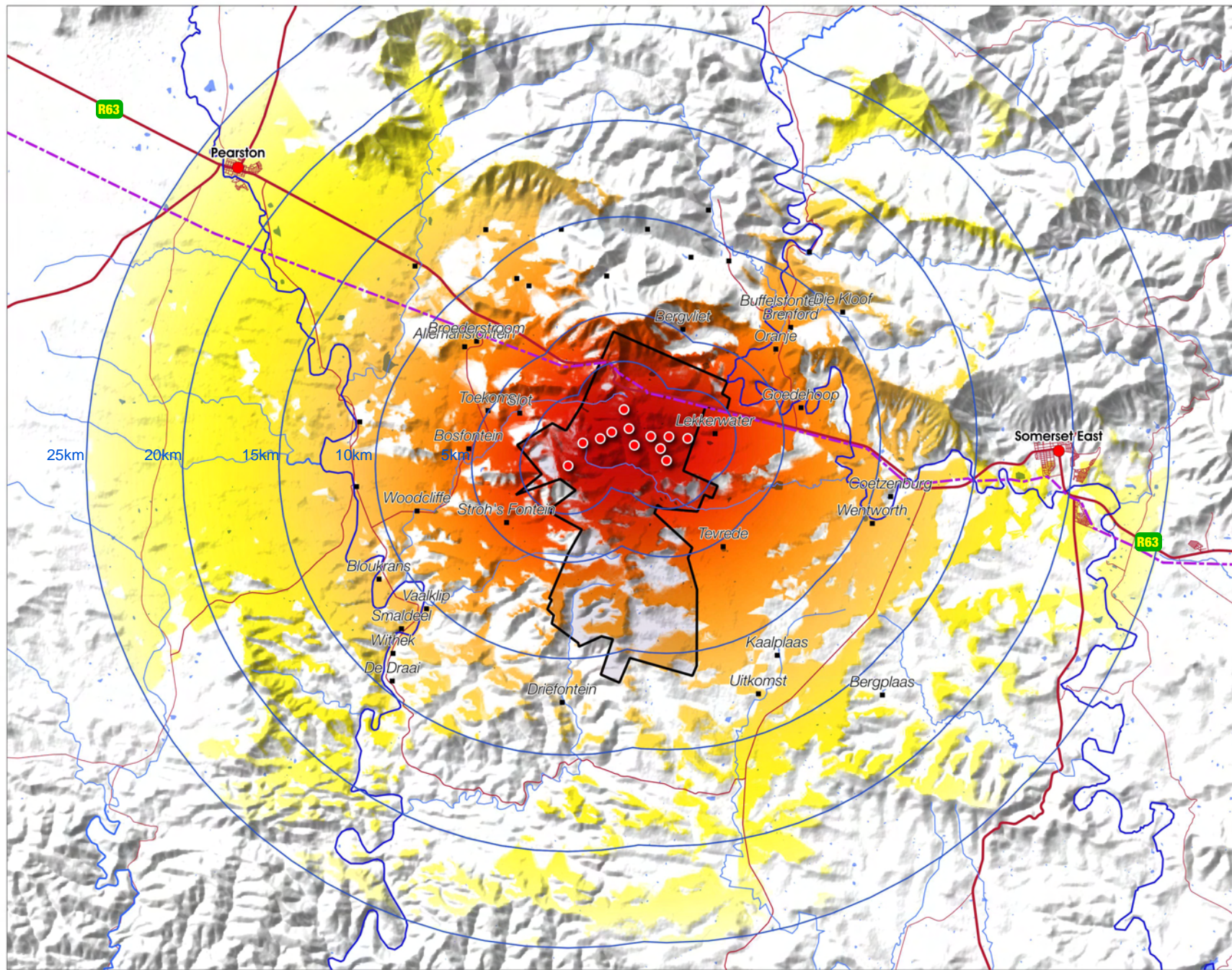
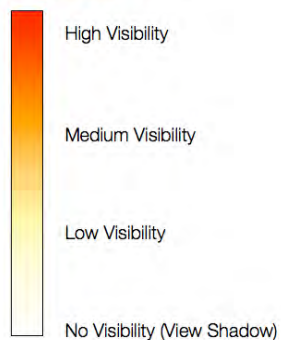


Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 5 • Viewshed North WEF : Previously Assessed Layout



Viewshed Legend :



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

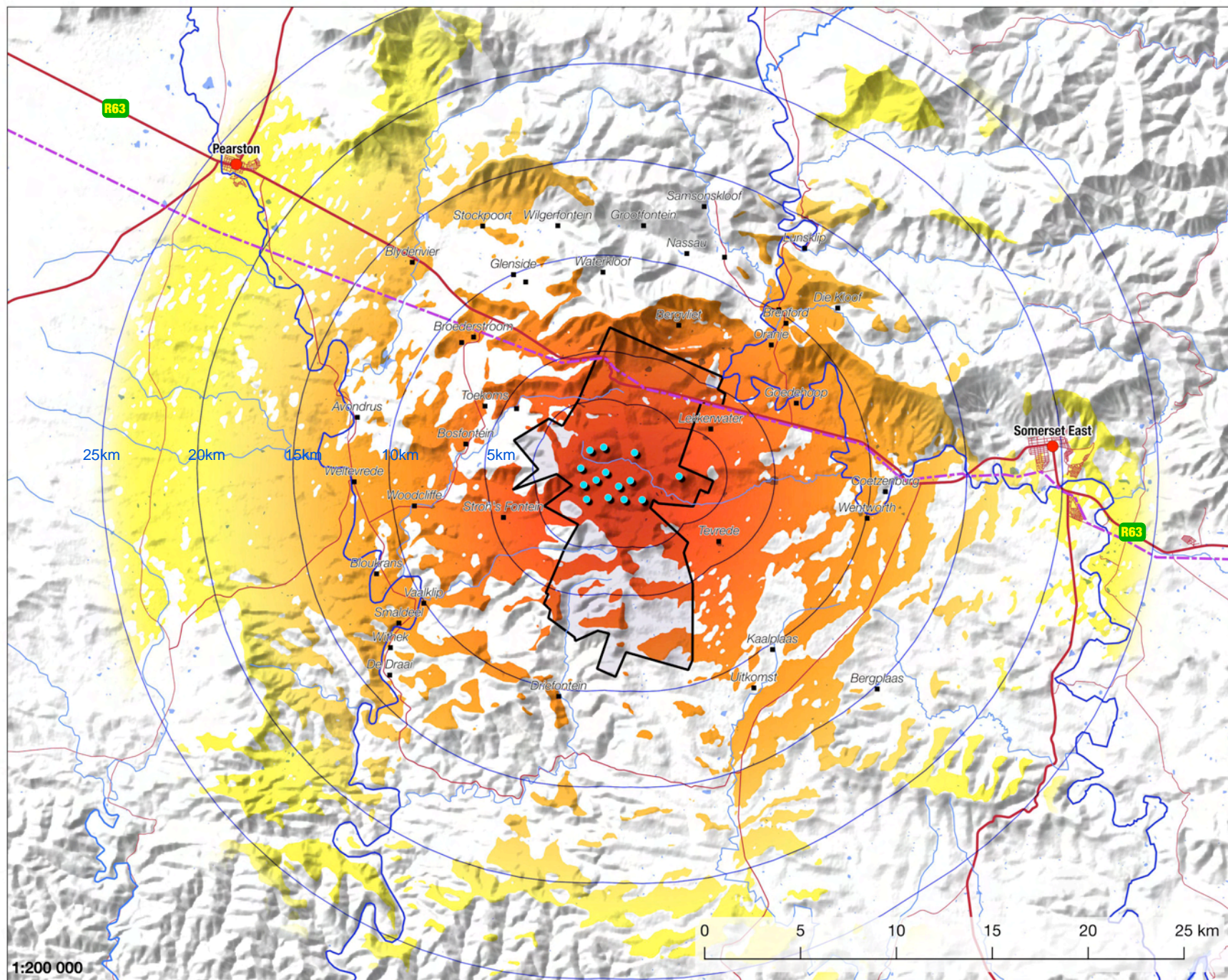
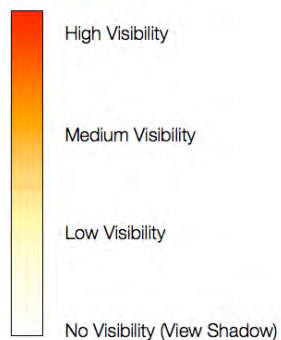
Map 6 • Viewshed North WEF : Amended Layout



1:200 000 @ A3



Viewshed Legend :

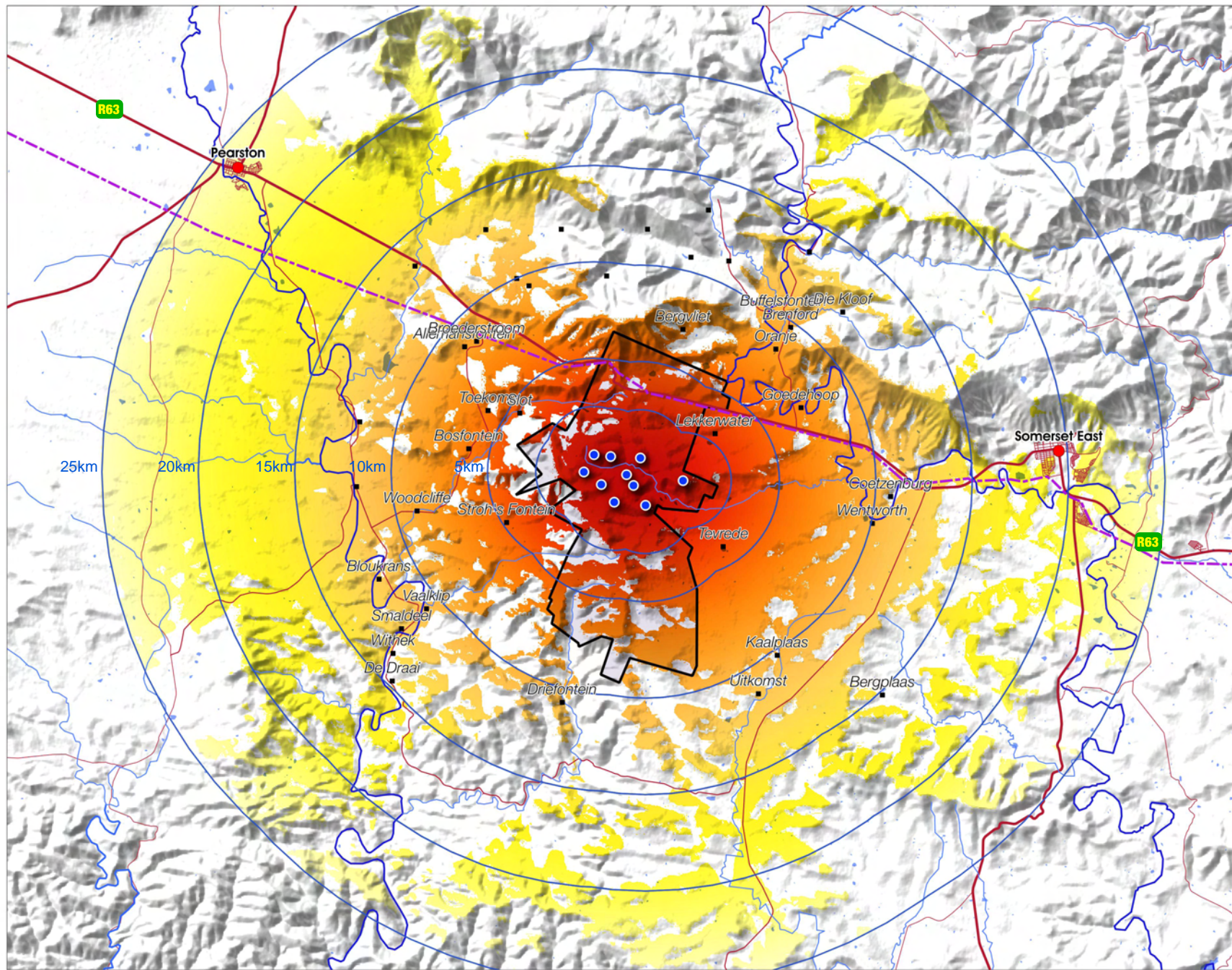
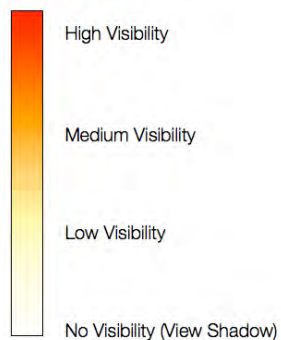


Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 7 • Viewshed Central WEF : Authorised Layout



Viewshed Legend :



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

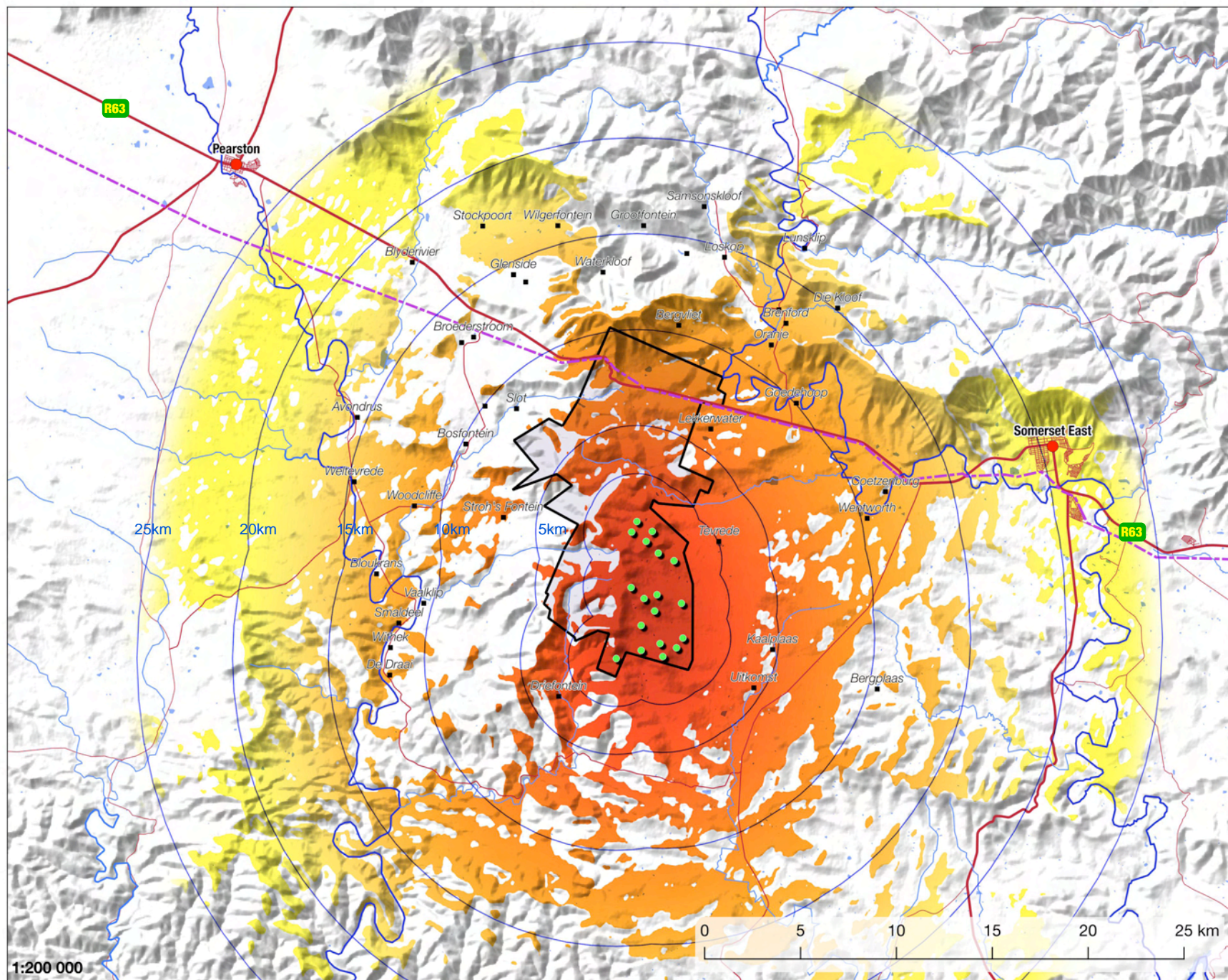
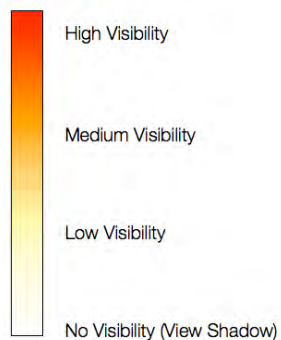
Map 8 • Viewshed Central WEF : Amended Layout



1:200 000 @ A3



Viewshed Legend :

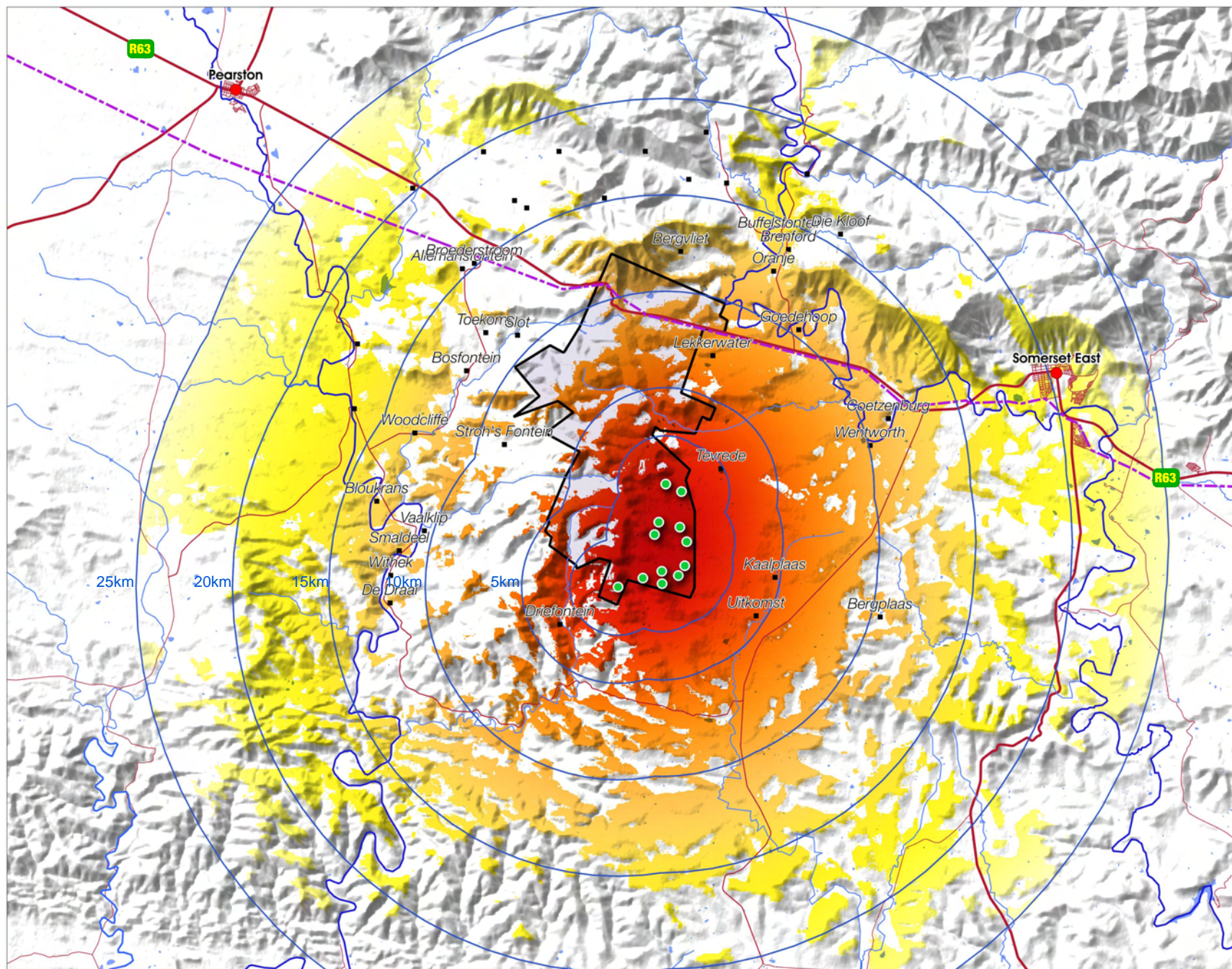
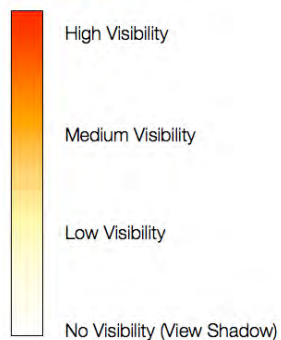


Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

Map 9 • Viewshed South WEF : Authorised Layout



Viewshed Legend :



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources

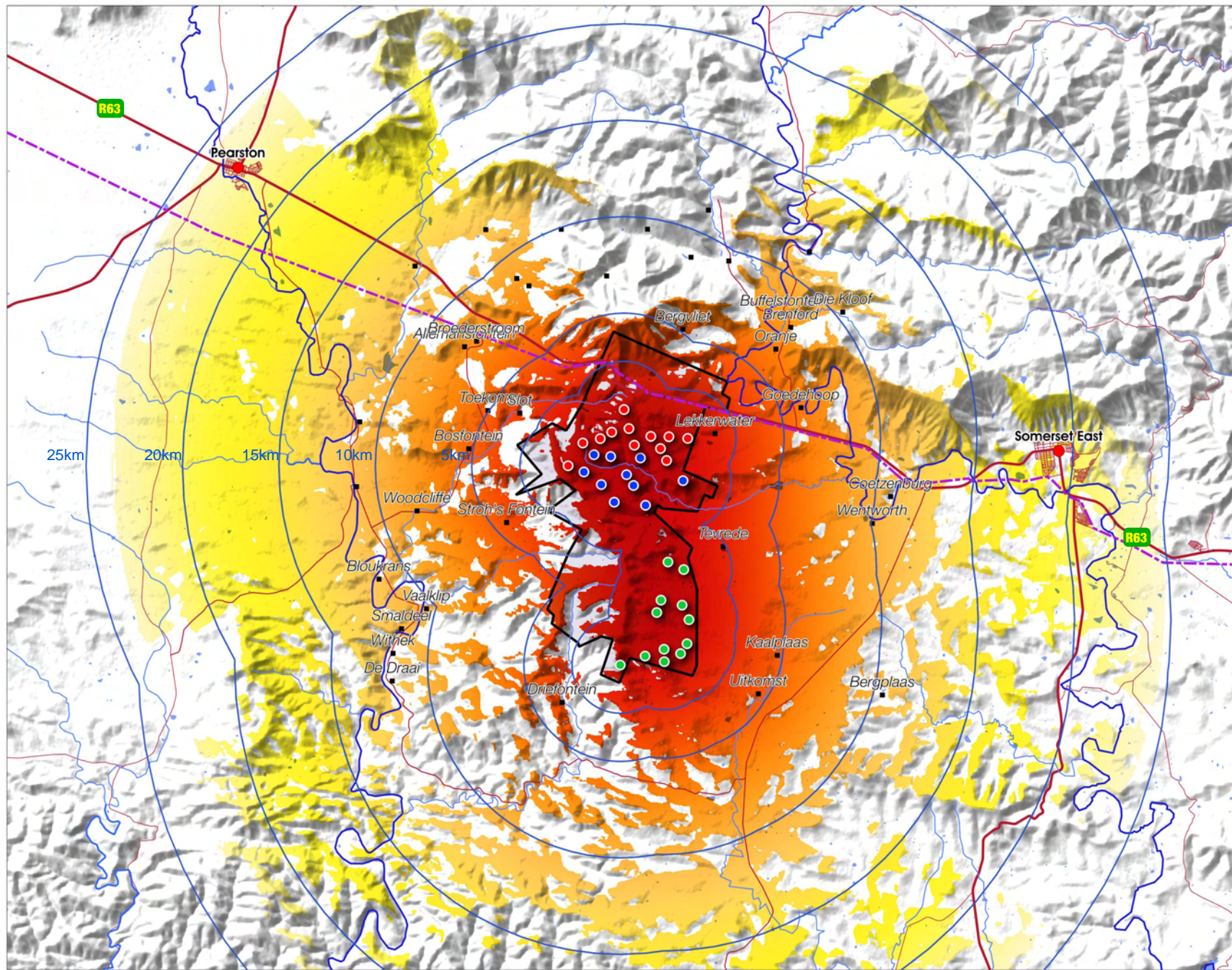
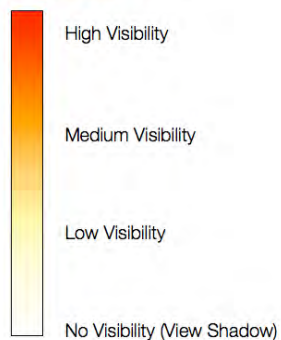
Map 10 • Viewshed South WEF : Amended Layout



1:200 000 @ A3



Viewshed Legend :



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources



Map 11 • Viewshed Combined North, Central, South WEFs : Amended Layout

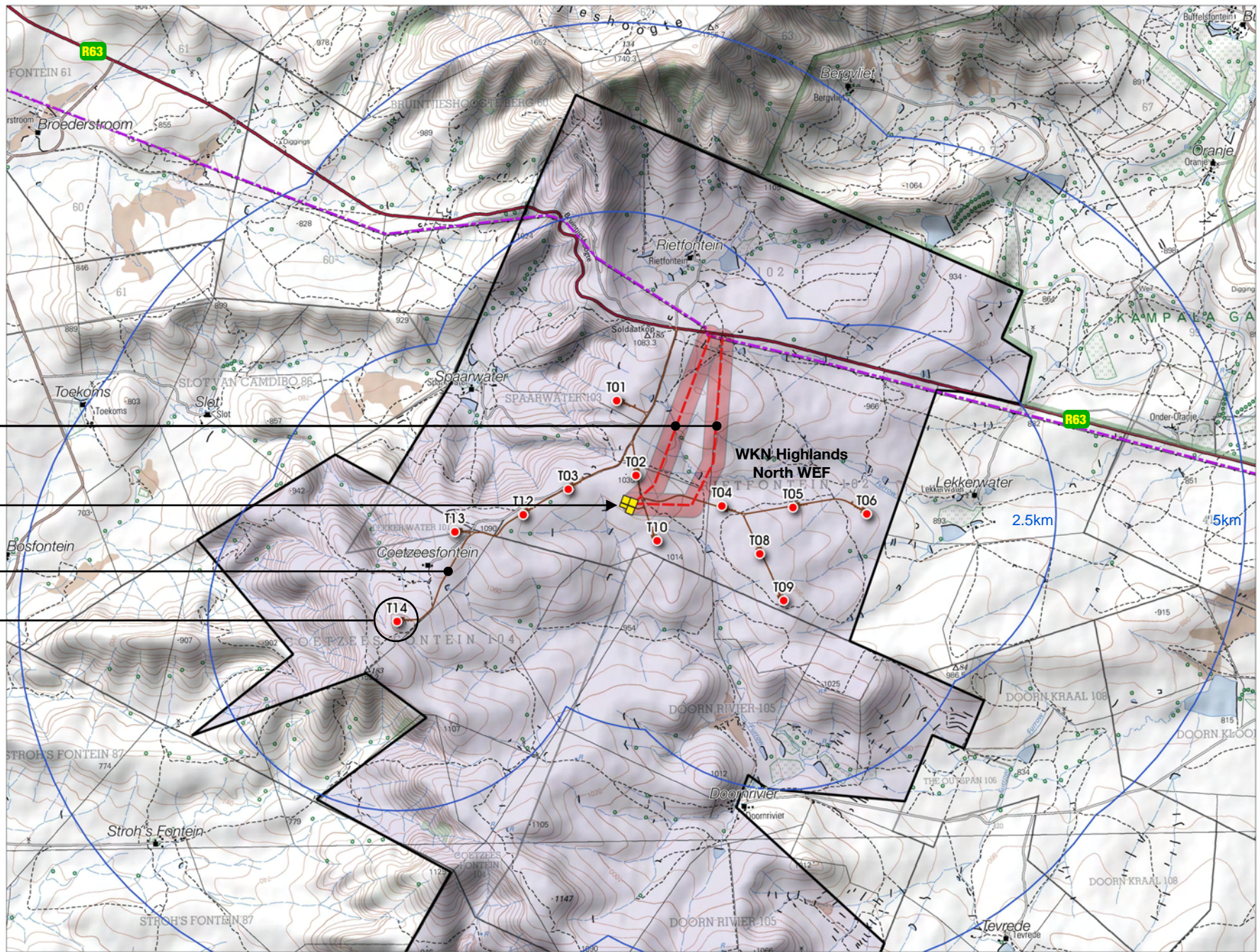
1:200 000 @ A3

Grid Connection
Alternative Routes

North WEF SubStation
Laydown & BESS

Internal Roads and
Cable Routes

Wind Turbine
Locations

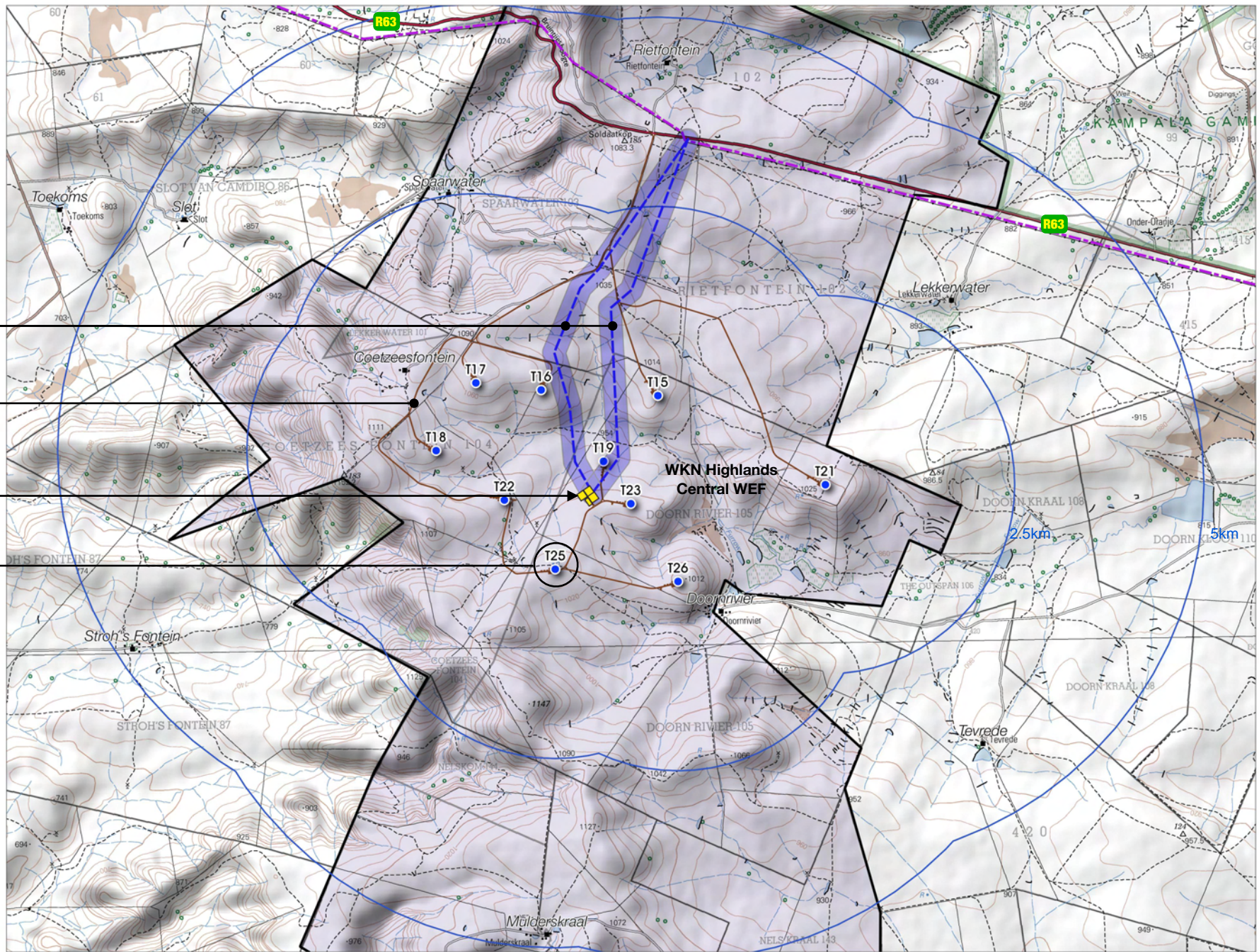


Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources, NGI 1:50 000 Topographic Series : 3225 CB Bruintjeshoogte, CD The Ridges

Map 12 • Highlands North WEF Amended Layout

1:50 000 @ A3





Grid Connection
Alternative Routes

Internal Roads and
Cable Routes

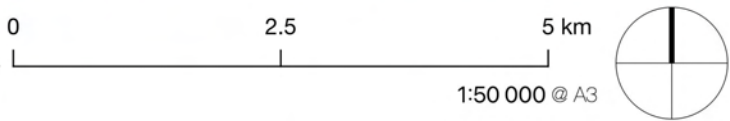
Central WEF SubStation
Laydown & BESS

Wind Turbine
Locations

Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources, NGI 1:50 000 Topographic Series : 3225 CB Bruintjeshoogte, CD The Ridges

Map 13 • Highlands Central WEF Amended Layout

1:50 000 @ A3

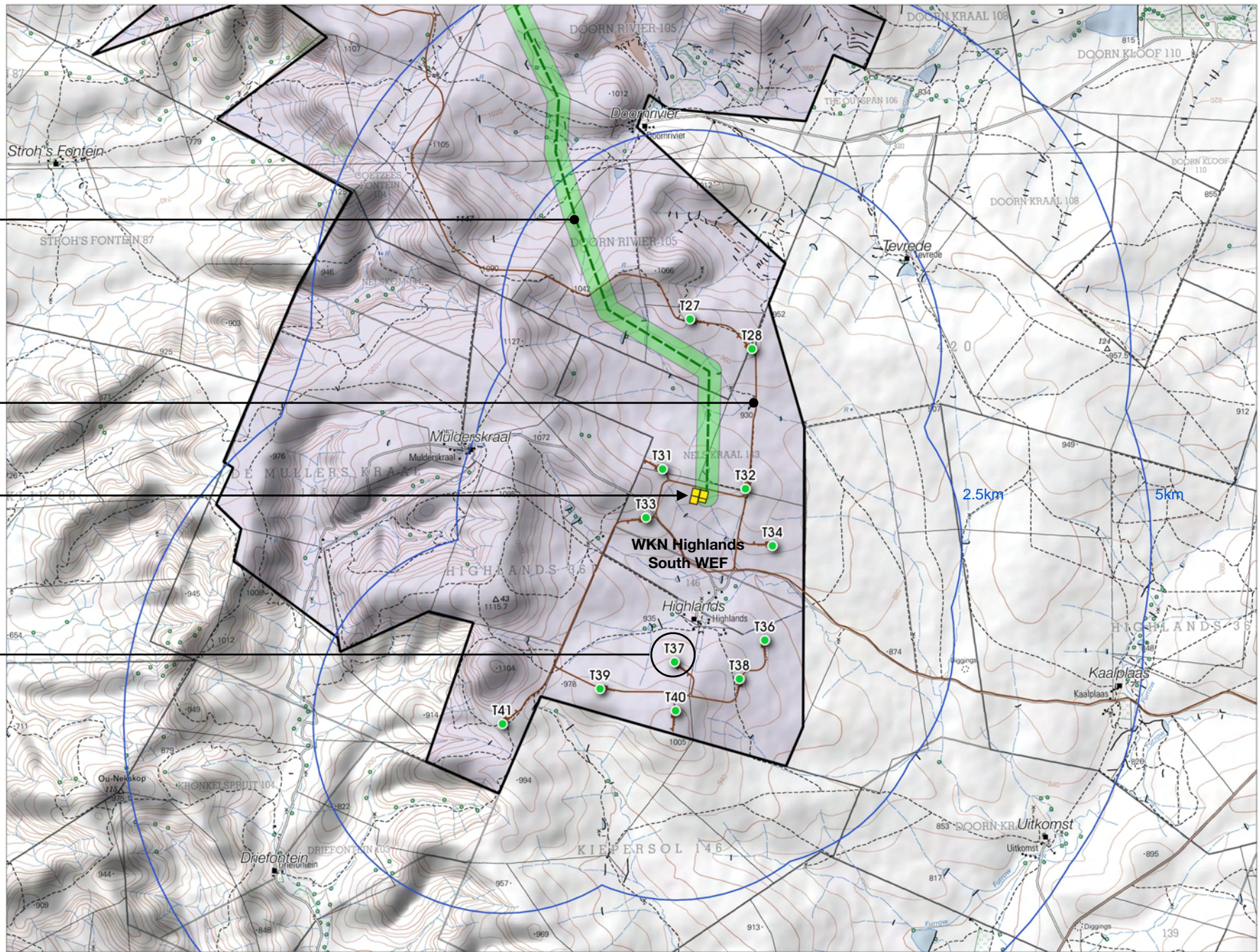


Grid Connection
Route

Internal Roads and
Cable Routes

South WEF SubStation
Laydown & BESS

Wind Turbine
Locations



Base Map Source : SRTM 1arcSEC DEM 2014, GIS Data ; Various Sources, NGI 1:50 000 Topographic Series : 3225 CB Brintjeshoogte, CD The Ridges

Map 14 • Highlands South WEF Amended Layout

1:50 000 @ A3

