

Note Concerning Kwandwe

Due to the significant size and varying views of the proposed WEF, the viewshed assessment for Kwandwe Private Game Reserve has been assessed under three components (see Figure 6.8 below), namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Kwandwe Private Game Reserve North - none Indalo Protected Environment

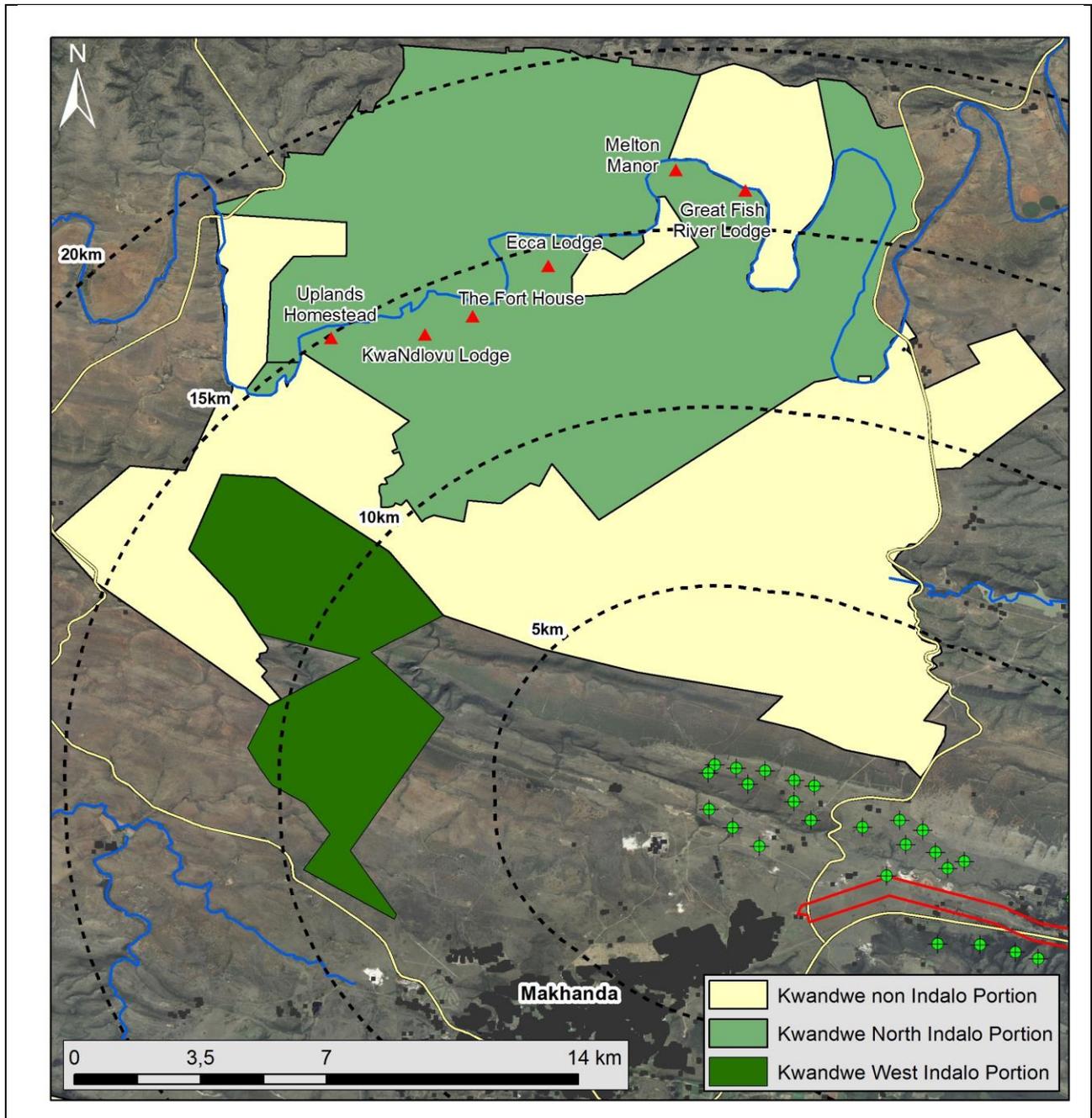


Figure 6.8: Three Kwandwe locations assessed separately in the current VIA.

6.1.2. Geology and Landforms

The geology has a primary influence on landforms, and the character of the landscape, or 'sense of place'. The proposed Albany WEF and grid infrastructure sites are underlain by lithologies of the Witteberg Group and the Grahamstown Formation. The surrounding lithologies include the Dwyka Group and the Eccca Group.

The main structural control in the area are the south-east trending Cape Fold Mountain rock formations. To the far east of this formation (current WEF project area), these formations are classified as hills rather than mountains.

The landscape within the wider study area is very varied within a 20 km radius of the project site with high hills to mountains and deep, steep river valleys. Most rivers tend to follow the main fabric of the landscape and form parallel drainage basins which empty out into the Indian Ocean to the south-east.

The proposed wind farm site is located on locally elevated land between Kowie and Great Fish river systems. The effect of these rivers and their tributaries is clearly visible in the topographic profiles (Figure 6.9).

The topography within about a 10 km radius of the project site will provide some visual screening, particularly from the lower lying land Fish River Valley to the north of the project site.

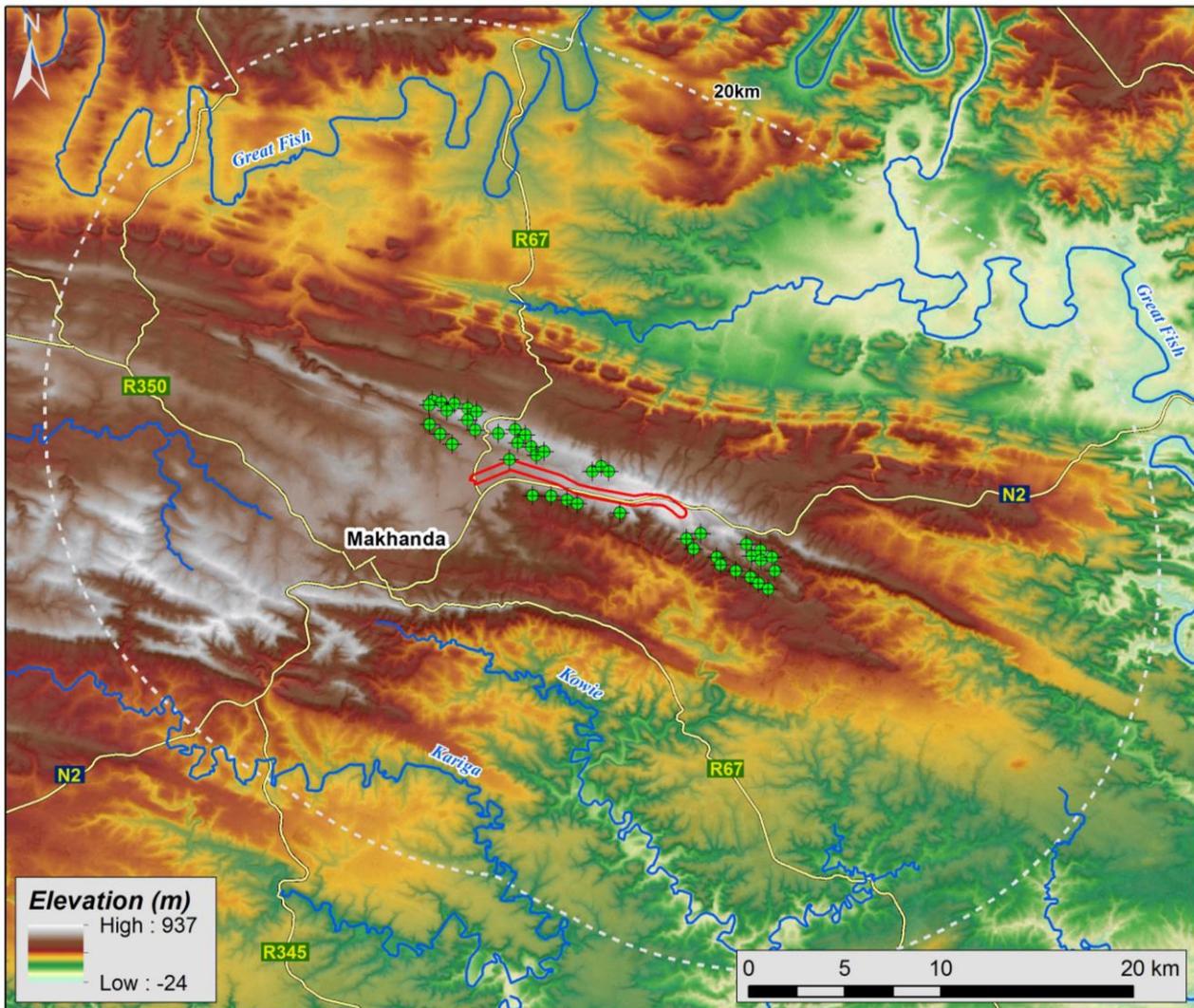


Figure 6.9: Topography of the study area.

The images in Figure 6.10 below show some of the typical topography of the study area along the R67 from the Great Fish River towards Makhanda and the project site.

The topography generally in the study area is, therefore, considered to have a LOW to MODERATE screening potential. However, topographical screening potential may be HIGH in the region of the Ecca Ridge.

Figure 6.10 a-j: Various images showing the topography along the R67 from the Great Fish River to the project site.

	
<p>View along R67 from Salvatore Farm looking south toward proposed WEF about 20 km away.</p>	<p>View along R67 from close to the Great Fish River looking south toward proposed WEF about 215 km away.</p>
	
<p>View of entrances to Kwandwe and Great Fish River Nature Reserve along the R67.</p>	<p>View along R67 from close to the Great Fish River looking south toward proposed WEF about 15 km away.</p>
	
<p>View of valley near the Glen Mellville Dam is located about 6km north of the project site.</p>	<p>View of variable topography along the R67 in the Ecca Pass area.</p>



6.1.3. Vegetation

Study area

According to National Vegetation Map (Mucina and Rutherford 2018), there are four Biomes, comprising of 16 vegetation types that occur within the broader study area (see Table 6.3 and Figure 6.11 below). From a VIA perspective, the most important features of the vegetation are its height and density as these determine its screening potential.

Table 6.3: Vegetation (Mucina & Rutherford 2018) within the study area.

BIOME	VEGETATION TYPE	DESCRIPTION OF VEGETATION HEIGHT
Albany Thicket Biome	Grahamstown Grassland Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of short (0.1 - 1 m) grassland vegetation.
	Albany Arid Thicket	A low thicket (2 m), with occasional trees and emergent succulent trees.
	Albany Bontveld	A mosaic of low thicket (2 m) consisting of bush clumps in a matrix of low shrubland.
	Albany Mesic Thicket	Tall (3-5 m) thickets dominated by trees and woody shrubs.
	Albany Valley Thicket	Medium-sized to tall (3-5 m) thicket dominated by small trees and woody shrubs.
	Crossroads Grassland Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of short (0.1 - 1), grassland.
	Fish Arid Thicket	Low to medium sized (2 - 3 m) succulent thicket intermixed with bush clumps comprising small trees and woody shrubs. The grass component is well developed.
	Fish Meseic Thicket	Tall (3 - 5 m), dense thickets dominated by trees and woody shrubs.

BIOME	VEGETATION TYPE	DESCRIPTION OF VEGETATION HEIGHT
	Fish Valley Thicket	Medium-sized (3 - 4 m) thicket comprising dense stands of <i>Portulacaria afra</i> , small trees and woody shrubs. Leaf- and stemsucculent shrubs are abundant, while the grass component is poorly developed.
	Nanaga Savanna Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of predominantly savanna vegetation.
	Saltire Karroid Thicket	A mosaic of low thicket (2 - 3 m) consisting of bush clumps in a matrix of karroid shrubland in which the grass component is well developed.
Savanna Biome	South Eastern Coastal Thornveld	Short grassland with scattered bush clumps, dominated by small trees and woody shrubs.
	Bhisho Thornveld	Open savannah characterised by small trees to <i>Acacia natalitia</i> with short to medium, dense, sour grassy understorey.
Afrotemperate, Subtropical and Azonal Forests	Southern Mistbelt Forest	On the great escarpment these forests are tall (15-20m) and multi-layered. The forests found on low-altitude scarps are low (in places having a character of a shrub forest).
Fynbos Biome	Suurberg Shale Fynbos	Low to medium high, closed, ericoid shrubland or grassland, with closed restioid and/or grassland understorey. Graminoid fynbos, with localised patches of dense proteoid fynbos, also occurs.
	Suurberg Quartzite Fynbos	Low to medium high, closed, ericoid shrubland or grassland, with closed restioid and/or grass understorey. Grassy fynbos is the most typical structural type, with localised patches of dense proteoid and ericaceous fynbos.

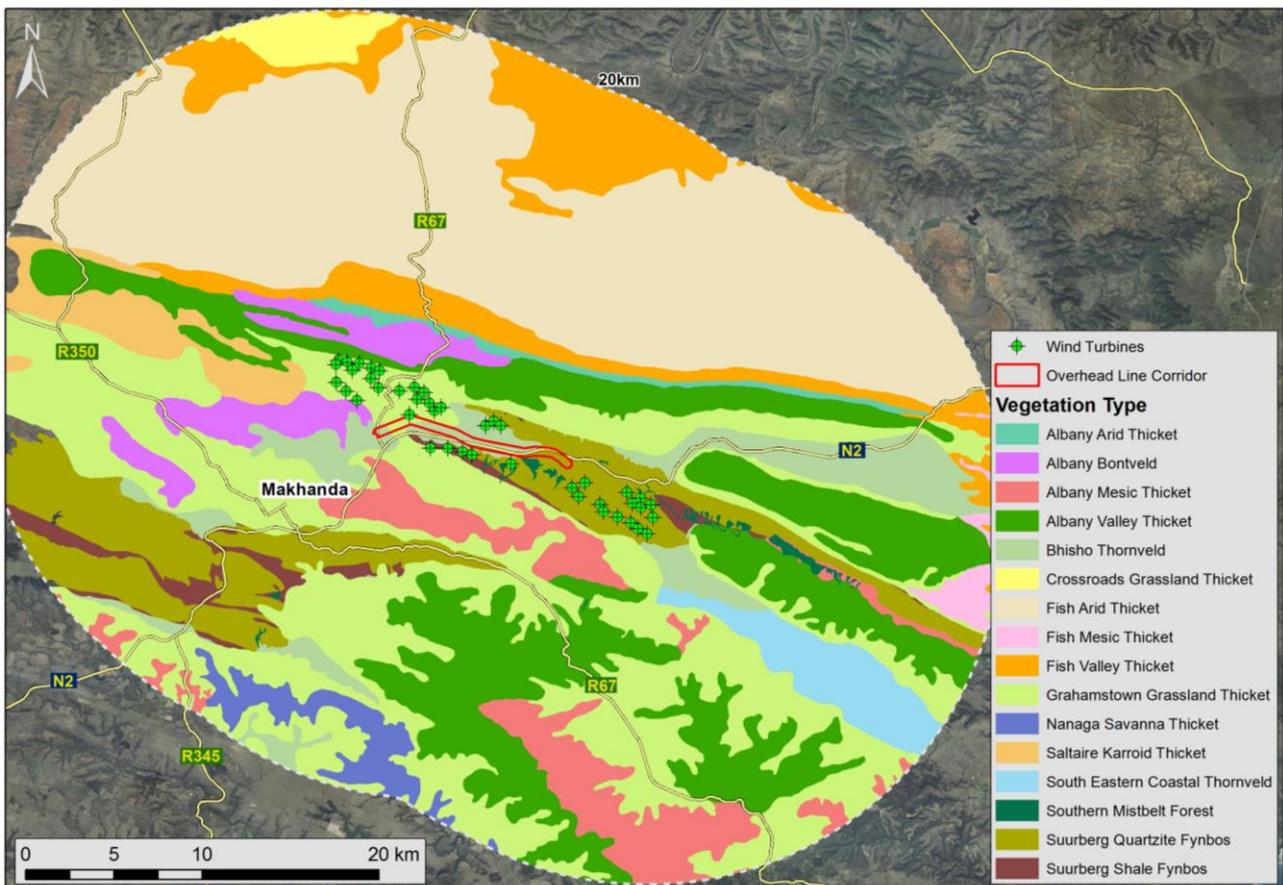


Figure 6.11: Vegetation (Mucina & Rutherford 2018) within the study area.

The height of the vegetation seldom exceeds three metres. Taller trees and thicket patches are generally restricted to valleys. Furthermore, large portions of the project area have been transformed and/or degraded by agricultural activities. The vegetation generally in the study area is, therefore, considered to have a LOW to MODERATE screening potential.

Project area

Figure 6.12 below shows the vegetation types located in the project area itself. The three broad WEF turbine clusters are generally associated with four vegetation types:

Turbine cluster	Vegetation type	Conservation Status
Western	Grahamstown Grassland Thicket	Least Concern
Central	Bhisho Thorveld and Southern Mistbelt Forest	Least Concern
Eastern	Suurberg Quartzite Fynboss	Least Concern

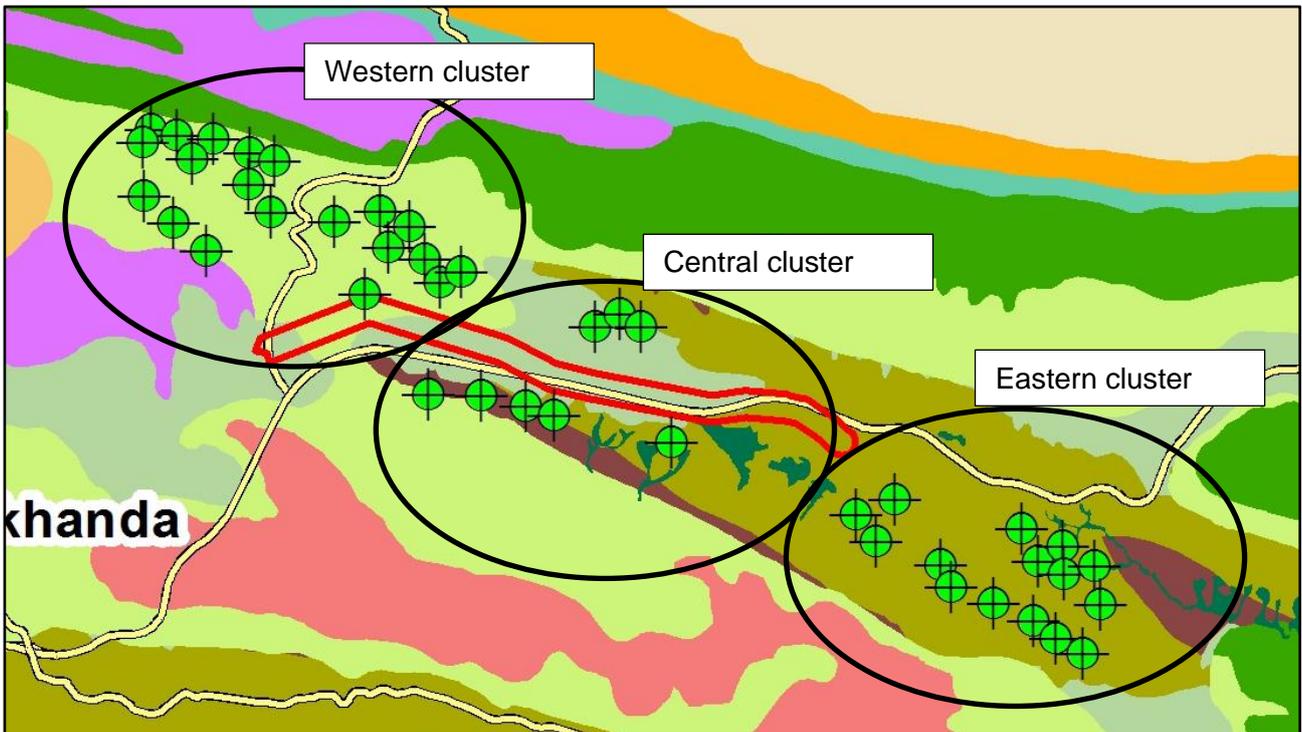


Figure 6.12: Vegetation (Mucina & Rutherford 2018) with in the project site.

It should be noted, however, that the Bhisho Thorveld and Southern Mistbelt Forest vegetation of the central cluster (Figure 6.13) and the Suurberg Quartzite Fynboss vegetation of the eastern cluster (Figure 6.14), has been significantly transformed on both sides of the N2 due to:

- Cultivation and historic and current commercial forestry; and
- Runaway infestation with Black Wattle trees and other alien tree species.

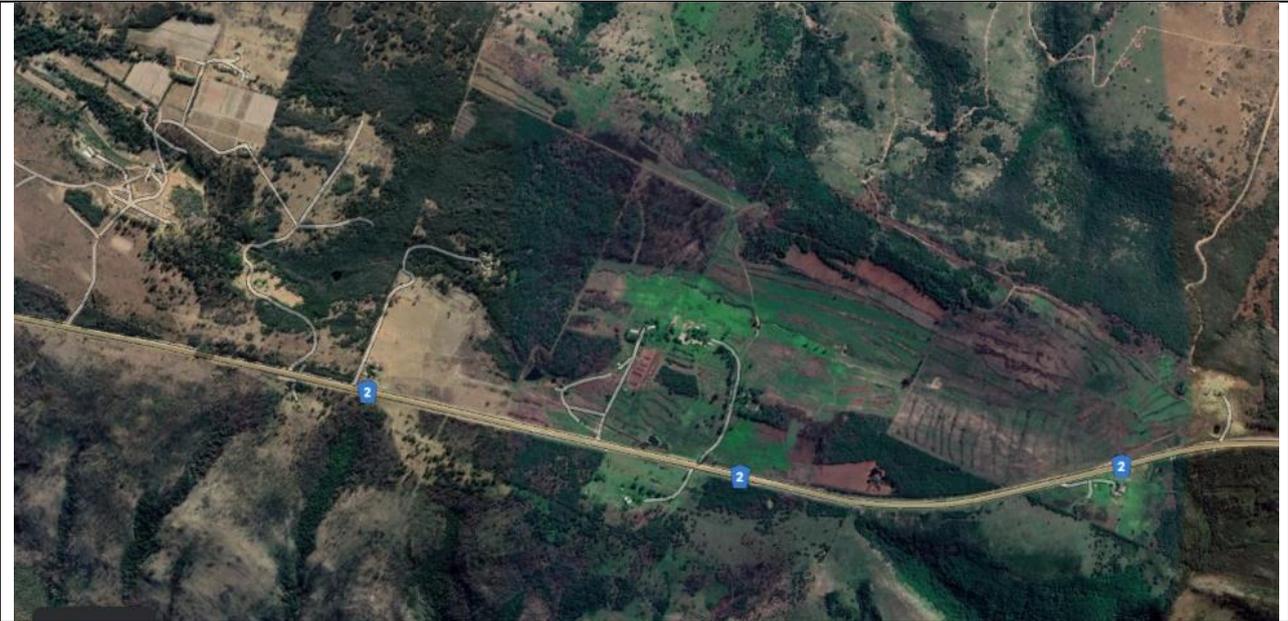


Figure 6.13: Central turbine area transformed by cultivation, forestry and alien species infestation.



Figure 6.14: Eastern turbine area transformed by cultivation, forestry and alien species infestation.

From a vegetation screening potential, the mixed alien tree species woodlots will provide some screening potential for commuters on the N2. However, the low Grahamstown Grassland Thicket of the western turbine cluster offers almost no screening potential.

6.1.4. Built environment

Within the study area, there are three main settlements. These include:

- Makhanda (previously known as Grahamstown) located approximately 5km south west;
- Bathurst located 15km south east; and
- KwaNdwanyana located 18km north east.

Apart from these settlements, the region is relatively sparsely populated with homesteads spread out according to the pattern of farms.

Major roads dissecting the study area are the N2 connecting Port Elizabeth with Makhanda and East London, the R67 north between Makhanda and Fort Beaufort, and the R67 south from Makhanda to Port Alfred.

The N2 is an important commuter route within the study area.

High-voltage Eskom power lines roughly follow the N2 between Makhanda and Peddie, and a new line is being built between Makhanda and Port Alfred with a large Eskom substation located south of the R67 near the WEF western cluster.

There are also a number of clay mining operations both within the study area and project site along Botha's Ridge.

6.2. Renewable Energy Development Zones (REDZ)

The National Development Plan (NDP) and the National Infrastructure Plan (NIP) are both part of the South African Government's long term strategy to address economic growth and broaden socio-economic transformation in the Country. DEFF initiated a Strategic Environmental Assessment (SEA) to identify processes that streamline the regulatory environmental requirements for certain Strategic Integrated Projects (SIPs) linked to the NDP and NIP, while also safeguarding the environment. The wind and solar photovoltaic (PV) SEA (2015) was commissioned in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. The SEA identified REDZ areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the natural environment, while yielding the highest possible socio-economic benefits to the Country.

The REDZs have been identified through an integrated spatial analysis and wide stakeholder engagement based on energy resource potentials, infrastructure availability, environmental suitability and socio-economic needs. The REDZ are identified as geographical areas in which large scale wind and solar PV development projects are considered most appropriate from a National strategic perspective.

The impact of renewable energy projects on the landscape was one of the aspects that was investigated as part of the SEA, in addition to other environmental criteria.

Landscape Sensitivity Mapping

Landscape sensitivity was determined as part of the REDZ SEA (2015) through the identification of natural, scenic and cultural resources which have aesthetic and economic value to the local community, the region, and society as a whole. The resources considered in the specialist landscape scoping report, included features of topographic, geological or cultural interest, together with landscape grain or complexity.

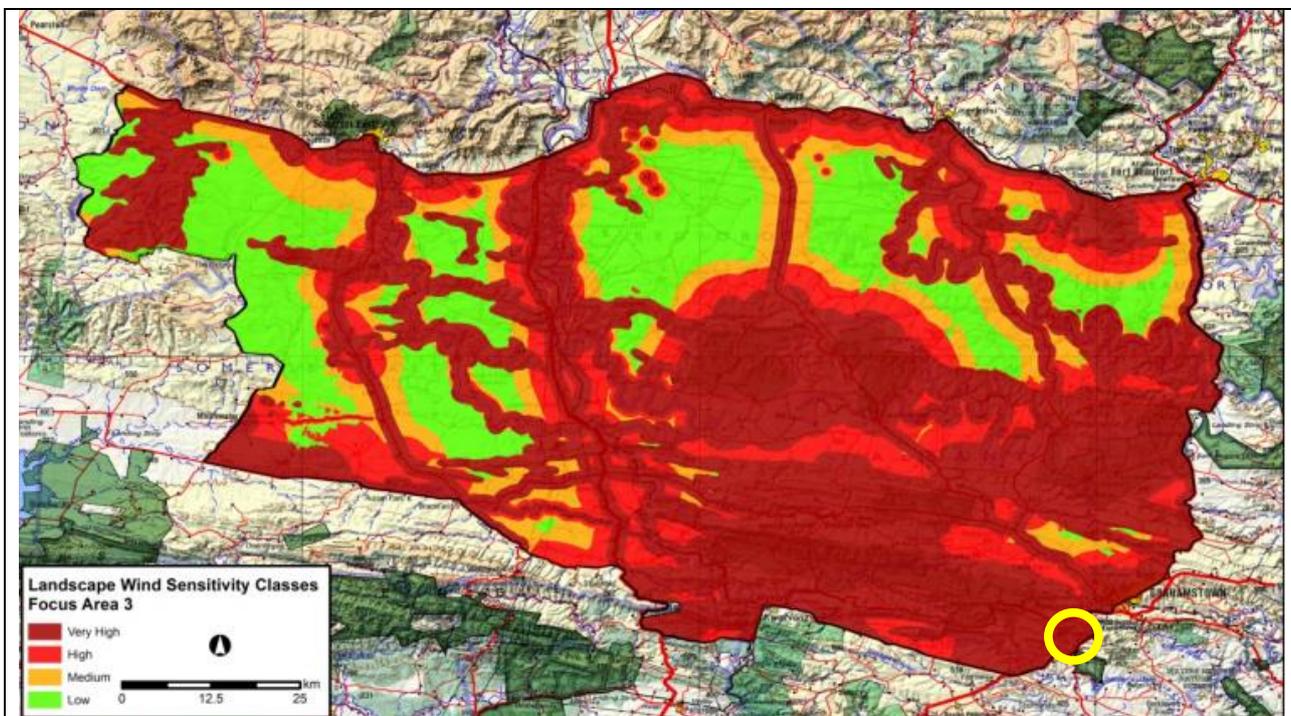


Figure 6.15: Cookhouse REDZ landscape sensitivity classes for wind energy (REDZ SEA, 2015) showing the location of 12 Albany WEF turbines in the south east (circled in yellow).

With respect to the Cookhouse REDZ, which is located to the north west of the Albany WEF (see Figure 6.15 above), the following overall suitability was concluded.

Site	Overall Suitability	Comment
Cookhouse focus area 3	Most of the landscape constraints are located in the southern and far eastern portions of the focus area, including the Swartwatersberg and Fish River Rand areas, and should generally be avoided. The northern and western portions on the other hand have fewer constraints, and therefore less visual sensitivity.	The southern and eastern portions should possibly be excluded from the focus area because of their visual and scenic sensitivity.

Twelve (12) turbines of the western cluster of proposed Albany WEF are located in a small south easterly portion of the Cookhouse Renewable Energy Development Zone (REDZ) which the Landscape Scoping Report suggests the possible exclusion of this area from the REDZ (although it still remains included in the REDZ per the SEA).

Table 6.4 below provides the landscape sensitivity features adopted by the SEA and the Landscape Scoping Report, that are potentially relevant to the current Albany WEF:

Table 6.4: Landscape sensitivity features adopted by the SEA and the Landscape Scoping Report.

Sensitivity feature	Potential sensitivity mapping application to wind farms
Ridgelines, scarps, prominent elevations and geological features.	Very high sensitivity – identified areas only.
Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.	Very high sensitivity – within 3 km viewshed.
	High sensitivity – between 3 and 5 km viewshed.
	Medium sensitivity – between 5 and 10 km viewshed.
Private reserves and game farms	Very high sensitivity – within 2 km viewshed.
	High sensitivity – between 2 and 5 km viewshed.
	Medium sensitivity – between 5 and 7 km viewshed.
Towns, villages and settlements	Very high sensitivity – within 2 km viewshed.
	High sensitivity – between 2 and 5 km viewshed.
	Medium sensitivity – between 5 and 7 km viewshed.
National roads	Very high sensitivity – within 1 km viewshed.
	High sensitivity – between 1 and 3 km viewshed.
	Medium sensitivity – between 3 and 5 km viewshed.
Scenic routes, passes and ports.	Very high sensitivity – within 1 km viewshed.
	High sensitivity – between 1 and 3 km viewshed.
	Medium sensitivity – between 3 and 5 km viewshed.
Provincial and arterial roads.	Very high sensitivity – within 1 km viewshed.
	Medium sensitivity – between 1 and 3 km viewshed.

6.3. Distance and visual impact

While developments such as a wind farms can have significant visual impacts on potential sensitive receptors, these impacts will decline with an increase of the distance of the receptor from the wind farm.

- According to the Scottish Natural Heritage Guideline (as referenced from the REDZ SEA, 2015), the visual impact of a wind farm depends on the distance from which it is viewed, weather conditions, turbine siting and the landscape context. Several guidance documents have provided generic categories for the degrees of visibility and visual impact related to distance. Table 6.5 below from the Scottish Planning Advice Note 45 provides some general guidance on the effect of distance on the perception of a wind farm in an open landscape. The distance is limited to 30km since beyond this, visual impacts of are generally considered to be of LOW impact.

Table 6.5: General perception of wind farm in an open landscape.

Distance from turbine	Perception
< 2 km	Likely to be a prominent feature
2-5 km	Relatively prominent
5-15 km	Only prominent in clear visibility – seen as part of the wider landscape
15-30 km	Only seen in very clear visibility – a minor element in the landscape

Source: Scottish Planning Advice Note 45 (revised 2002): Renewable Energy Technologies

According to the REDZ SEA, although the document does not clearly specify the turbine size the table refers to, the document mentions turbines with tower heights of more than 70 metres (m) and rotor diameters of more than 80 m. Turbines have since increased in size and can now reach hub heights of 120 m and rotor diameters of 130 m, resulting in a wind farm in some conditions being visible from a distance of up to 50 kilometres (km) away. Even though the table considers smaller turbines than is generally proposed in South Africa, it still places the potential visual impacts of wind farms into perspective.

The cumulative impacts of renewable energy development on the landscape are of specific concern. According to the Scottish Natural Heritage Guideline¹, cumulative impacts may be perceived when more than one facility is visible from one viewpoint, when several facilities are seen during a single journey, and when there is a gradual increase in the number or size of facilities over time. The same guidelines suggest that SEAs such as this one may show that some degree of development clustering in strategic areas (such as the Renewable Energy Development Zones) is preferable to a more widely distributed pattern.

A study by Sullivan et al (2012) on Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes, involved observations of five wind facilities in Wyoming and Colorado in the USA under various lighting and weather conditions. The following main observations were made:

- The wind facilities were visible to the unaided eye at >58 km under optimal viewing conditions, with turbine blade movement often visible at 39 km;
- Under favourable viewing conditions, the wind facilities were judged to be major foci of visual attention at up to 19 km and likely to be noticed by casual observers at >37 km;
- A conservative interpretation suggests that for such facilities, an appropriate radius for visual impact analyses would be 48 km;
- Facilities would be unlikely to be missed by casual observers at up to 32 km; and
- Facilities could be major sources of visual contrast at up to 16 km.

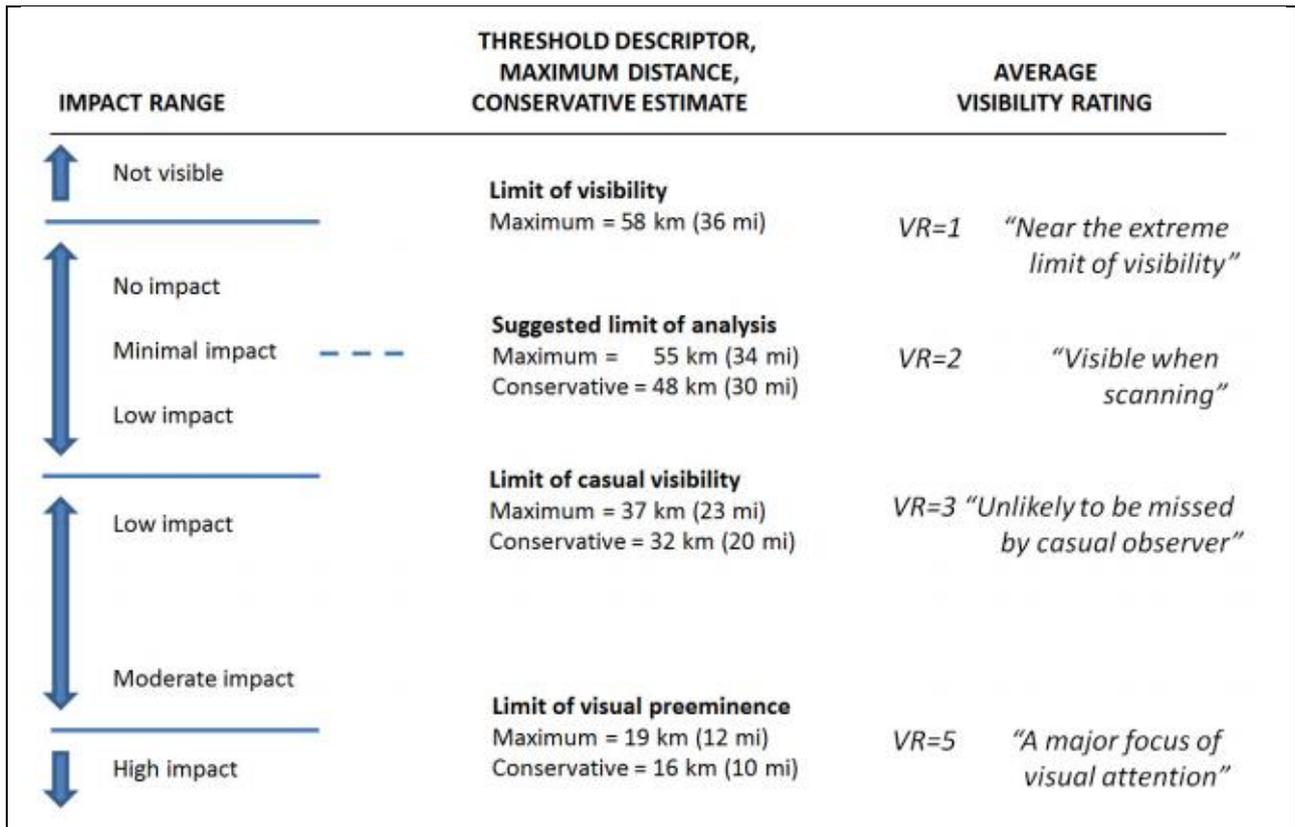


Figure 6.16: Proposed impact threshold distances for utility scale wind facilities (after Sullivan et al 2012).

Cautions on the use of the suggested impact thresholds

The following cautions are appropriate to consider in using the suggested impact thresholds for analytical purposes:

- The facilities studied had between 75 and 100 wind turbines visible in most views. For wind facilities with substantially fewer turbines in view, the appropriate threshold distances might be shorter. Viewshed analyses should be used to determine the number of turbines likely to be in view.
- The turbine models in the observed facilities ranged from ~90 to 120 m in height. For wind facilities with substantially larger or small turbine models, adjustments to the impact threshold distances may be required.
- Observations that form the bulk of the analysis in this study, are located on a low mesa (flat landscape) settings. This is a common siting situation in much of the western U.S., but may tend to focus views on the facility, and make it less subject to topographic, vegetative, or structural screening. Where facilities are sited on valley floors or subject to partial screening, threshold distances might be slightly smaller. In this study, partial screening of facilities depressed visibility ratings substantially.

A comprehensive study conducted by the University of Newcastle Study (2002) commissioned by Scottish Natural Heritage (based on their assessment of the eight wind farms) recommended a height/distance relationship for Zone of Visual Influence (ZVI) as shown in the Table 6.6 below.

Table 6.6: Recommendations for Zone of Visual Influence (ZVI) (University of Newcastle 2002).

Height of turbines (total including rotors) (m)	Recommended ZVI distance (km)
50	15
70	20
85	25
100	30

The study indicates that the figures in Table 6.6 above are approximate and suggests they should be adjusted either upwards or downwards to suit local circumstances and in the context of local or regional landscape character and landscape or visual sensitivity.

The study further indicates that despite the trend towards larger and taller structures, it is unclear what ultimate limits might exist, since optimum tower height depends on an integration of economic, meteorological, technological and environmental factors. The recommendations in Table 6.6 would need to increase for heights greater than 100m, although at distances much greater than 30 km, the limit of visibility to the human eye is being approached.

CES has also been involved during the construction of a number of wind farms over the past 10 years. Figures 6.16 and 6.17 below are based on our involvement in the recently constructed Nxuba Wind Farm near Bedford. Where the following is apparent:

Viewpoint	Observation
Figure 6.15: Nxuba WEF turbines looking east at 2 km and 4 km.	<ul style="list-style-type: none"> • Turbines diminish in size almost 6 fold at a distance of 2 km. • Turbines diminish in size more than 10 fold at a distance of 4 km.
Figure 6.16: Nxuba WEF turbines looking north west toward the Cookhouse WEF at 4 km and 8 km.	<ul style="list-style-type: none"> • The Nxuba turbines are clearly recognizable but diminished in size at a distance of 4 km. • The Cookhouse turbines in the distance, are significantly diminished in size and barely distinguishable at a distance of 8 km.

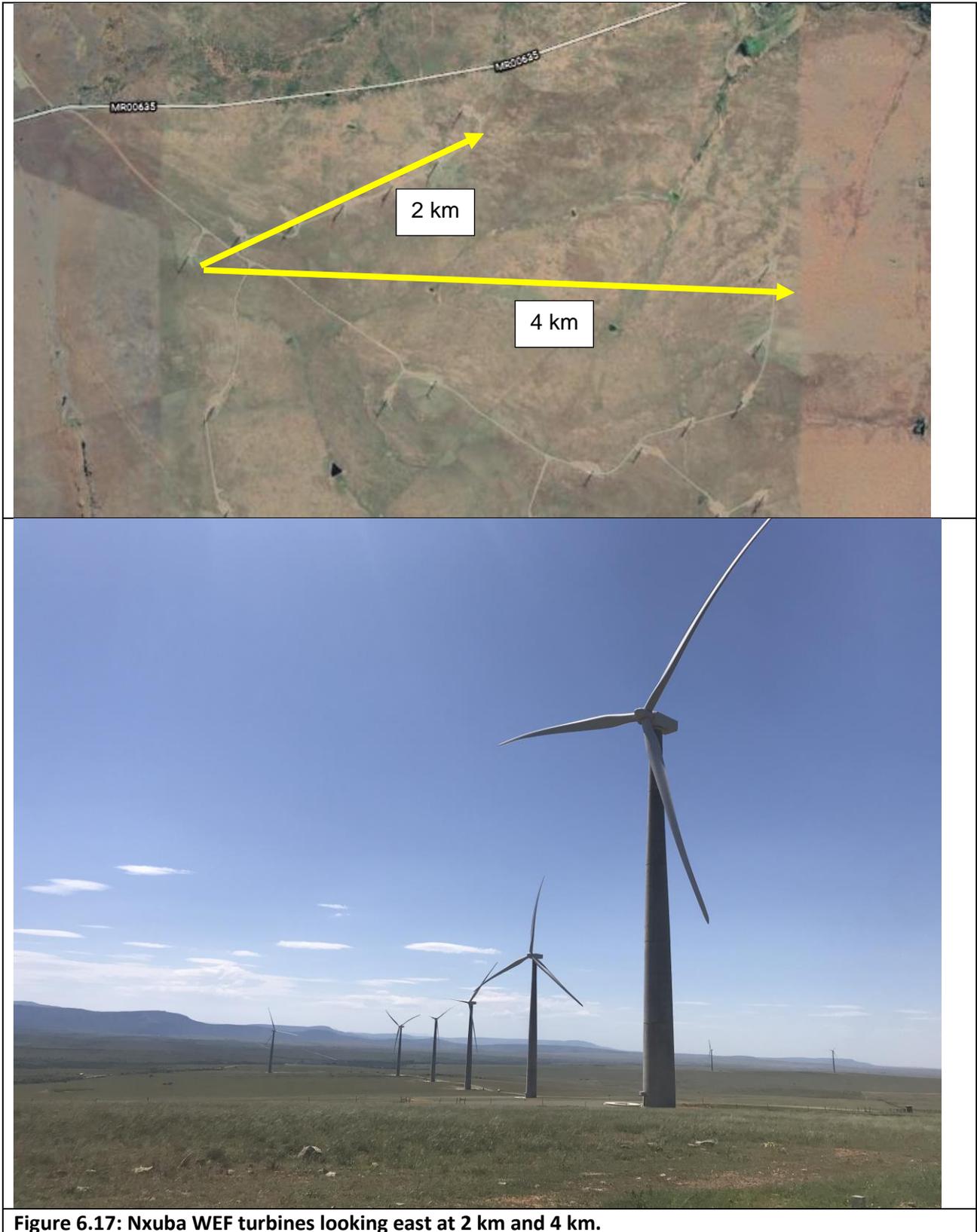


Figure 6.17: Nxuba WEF turbines looking east at 2 km and 4 km.

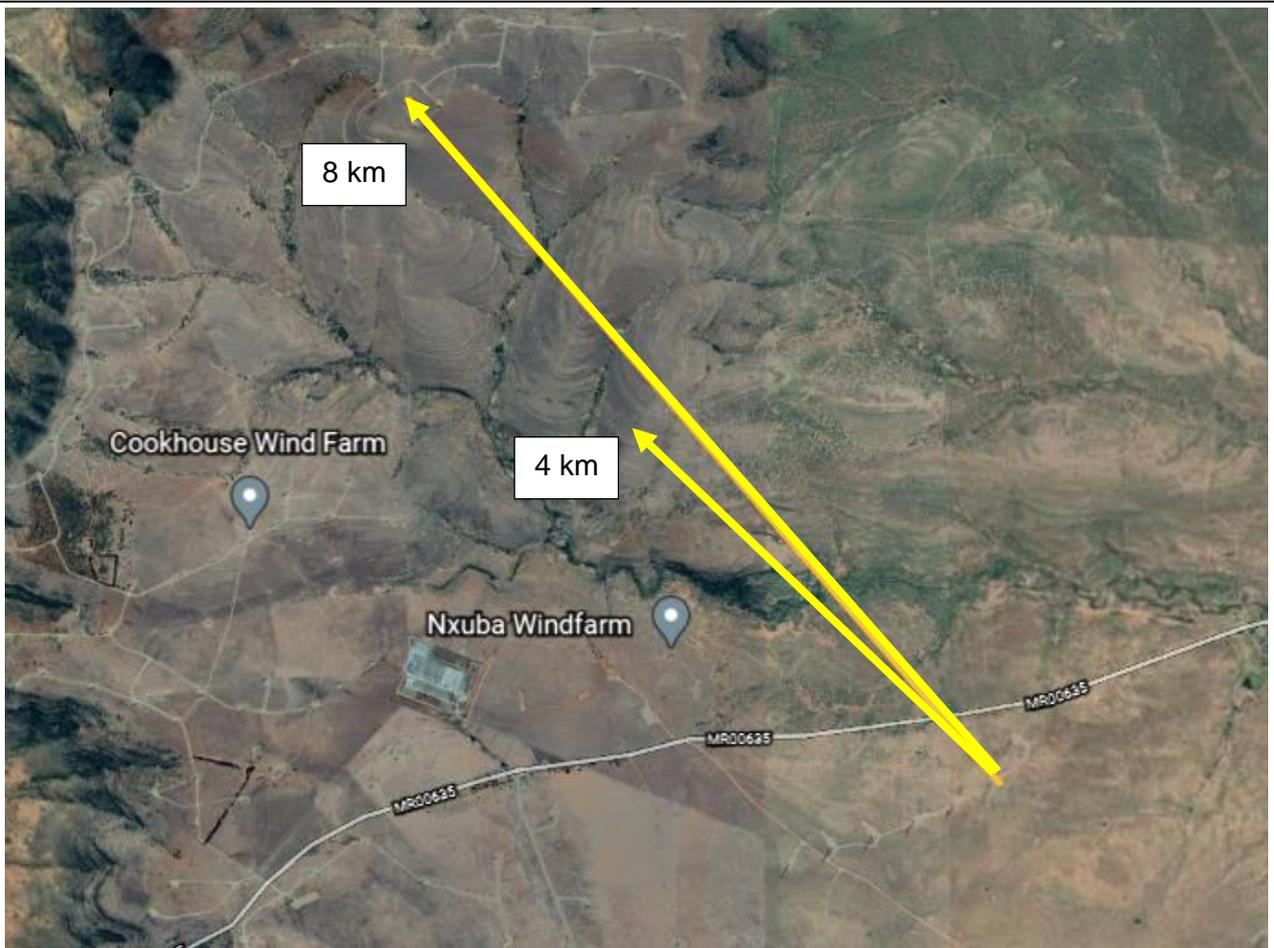


Figure 6.18: Nxuba WEF turbines looking north west toward the Cookhouse WEF at 4 km and 8 km.

7. IDENTIFICATION OF POTENTIAL SENSITIVE RECEPTORS

Visually sensitive receptors are locations or areas where people may have a significantly increased visual sensitivity or exposure to changes in the surrounding environment. Figure 7.1 below shows all the identified potential visual receptors within a 30 km radius of the proposed 43 Albany WEF turbines based on the sensitivity features used in the REDZ SEA Landscape Sensitivity Analysis Report (2015) described above.

Table 7.1 provides an assessment of the likely sensitivity of the identified receptors. Certain identified receptors were eliminated due to a combination of low sensitivity features such as:

- No or very low turbine visibility; and
- Long distance from the WEF.

Generally, all public nature and private game reserves within a 30 km radius of the WEF have been classified as sensitive.

Table 7.1: The main Albany WEF visual receptors based on the sensitivity features used in the REDZ SEA Landscape Sensitivity Analysis Report (2015).

SENSITIVITY FEATURE	VISUAL RECEPTORS	LOCATION	SENSITIVE RECEPTOR	ASSESSMENT METHOD
Ridgelines, scarps, prominent elevations and geological features.	Ecca Valley Pass (adjacent to the Ecca Nature Reserve)	R67 entering Makhanda from the north	YES	Observation
	Blaauwkrantz Pass	R67 entering Makhanda from the east	NO – valley with few turbines visible	NA
	Ridge north of Makhanda along N2 towards Peddie	Ridge along N2 near eastern turbine cluster	YES	Observation
Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.	Provincial Nature Reserves			
	Ecca Nature Reserve	Within 5 km north	YES	Viewshed
	Thomas Baines Nature Reserve	More than 20 km south west	NO – no turbine hubs and few blades visible and at over 15 km away, blades will not be readily noticeable.	NA
	Waters Meeting Nature Reserve	More than 20 km south east	YES	Viewshed
	Roundhill Oribi Local Authority Nature Reserve	15 km east	YES	Viewshed
	Blaauwkrantz Nature Reserve	More than 5 km south	NO – valley with few turbines visible	NA
	Kap River Nature Reserve	10 km east	YES	Viewshed
	Great Fish River Nature Reserve	More than 20 km north	YES	Viewshed and 3D simulation
	Beggars Bush State Forest	Immediately adjacent	YES	Viewshed
	Private Protected Environment			
	Kwandwe Private Game Reserve North (Indalo)	10 to 20 km north west	YES	Viewshed and 3D simulation
	Indalo Protected Environment West	More than 5 km west	YES	Viewshed and 3D simulation

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	Indalo Protected Environment South West	More than 15 km south west	NO – no turbine hubs or blades visible for the vast majority of the reserve (over 95%) and over 15 km away.	NA
	Buffalo Kloof Protected Environment	More than 10 km south	YES	Viewshed and 3D simulation
Private reserves and game farms	Kwandwe Private Game Reserve North (none Indalo)	Within 5 to 10 km north	YES	Viewshed and 3D simulation
	Kudu Ridge Private Game Reserve	More than 5 to 10 km north	YES	Viewshed and 3D simulation
	Bucklands Private Nature Reserve	More than 15 to 20 km north	YES	Viewshed
	Salvatore Farms	More than 15 km north	YES	Viewshed
	Coleridge Private Game Reserve	More than 5 km south	YES	Viewshed and 3D simulation
	Huntershoek Lodge	More than 15 to 20 km north east	YES	Viewshed
Towns, villages and settlements	Makhana	Within 5 km to the south	YES	Observation
	Bathurst	20 km to the south east	YES	Observation
	KwaNdwanyana	20 km to the north east	YES	Observation
National roads	N2 to Peddie	N2 running through the project area.	YES	3D simulation
Scenic routes, passes and ports.	Ecce Pass	R67 entering Makhanda from the north	YES	Observation
	N2	N2 along Botha Hill ridge	YES	3D simulation and observation
	Blaauwkrantz Pass	R67 towards Port Alfred	NO	NA
Provincial and arterial roads.	R67 to Fort Beaufort	Mobile receptor	YES	Observation

Visual Impact Assessment

	R67 to Port Alfred	Mobile receptor	YES	Observation
	Dirt road to Committees Drift about 3-4 km north	Mobile receptor	YES	Observation

It should be noted that with respect to the Kwandwe Private Game Reserve, due to the significant size, the visual impacts are assessed at three (3) distinct locations or areas, namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment;
- Kwandwe - West - Indalo Protected Environment; and
- Kwandwe Private Game Reserve North - none Indalo Protected Environment.

Refer to Figure 6.8 for layout of the three Kwandwe reserves.

8. DESCRIPTION OF ALTERNATIVES

Integral to the EIA process is the consideration and evaluation of alternatives to a proposed development plan. This is also applicable when conducting specialist studies including VIAs. A detailed description of the process involved in the identification and evaluation of reasonable and feasible alternatives associated with the Albany WEF proposal and the identification of the preferred alternative, is provided in the Environmental Impact Assessment Report (EIAR) for this project. For the purposes of this VIA, the following identified **preferred alternative** is assessed.

Type of Alternatives Considered	Description of the Preferred Alternative relating to the Albany Wind Farm
Location alternative	Only the project area described in this report has been considered. This proposed site has very good wind resources as indicated in the SA Wind Atlas. This is also based on the experiences of Waainek WEF to the south of Albany WEF. Wind resources have also been measured using 60 m and 120m masts. Proximity to the Eskom substation and existing overhead powerlines are also key factor on identifying the proposed site.
Technology alternatives	Only the development of a wind energy facility is considered since the proponent is a wind energy developer.
Turbine layout alternatives	One turbine layout of 43 positions has been assessed. This is a reduction of 23 turbines from the 66 turbines assessed in the draft VIA.
Powerline Alternatives	One powerline corridor has been assessed.
On-site substation location alternatives	One on-site IPP substation and two collector substations have been proposed. The viewshed of these substations has not been considered as they will be "swallowed" by the much more significant viewshed of the turbines.
No-go alternative	The "No-go" alternative entails maintaining the status quo. In other words, the proposed construction of the Albany WEF would not go ahead, and current land uses would continue as before.

9. VIEWSHED ANALYSIS OF SELECTED SENSITIVE RECEPTORS

The current section provides an analysis of viewsheds for selected potentially sensitive visual receptors.

9.1. Viewshed analysis of the study area

Figures 9.1 and 9.2 below provide the viewshed analyses with respect to visible turbine hubs and turbine tips, respectively within a 30 km radius of the project site (see more detailed maps at Appendix B).

Overall, the Albany WEF will have a HIGH degree of visibility within the study area. The visual sensitivity of the study area will vary according to distance and variability in topography. Generally, a greater number of turbines will be visible on elevated land located at greater distances and beyond 10 km from the WEF. Lower numbers of turbines will be visible within a 10 km radius of the WEF due to the more variable topography closer to the WEF.

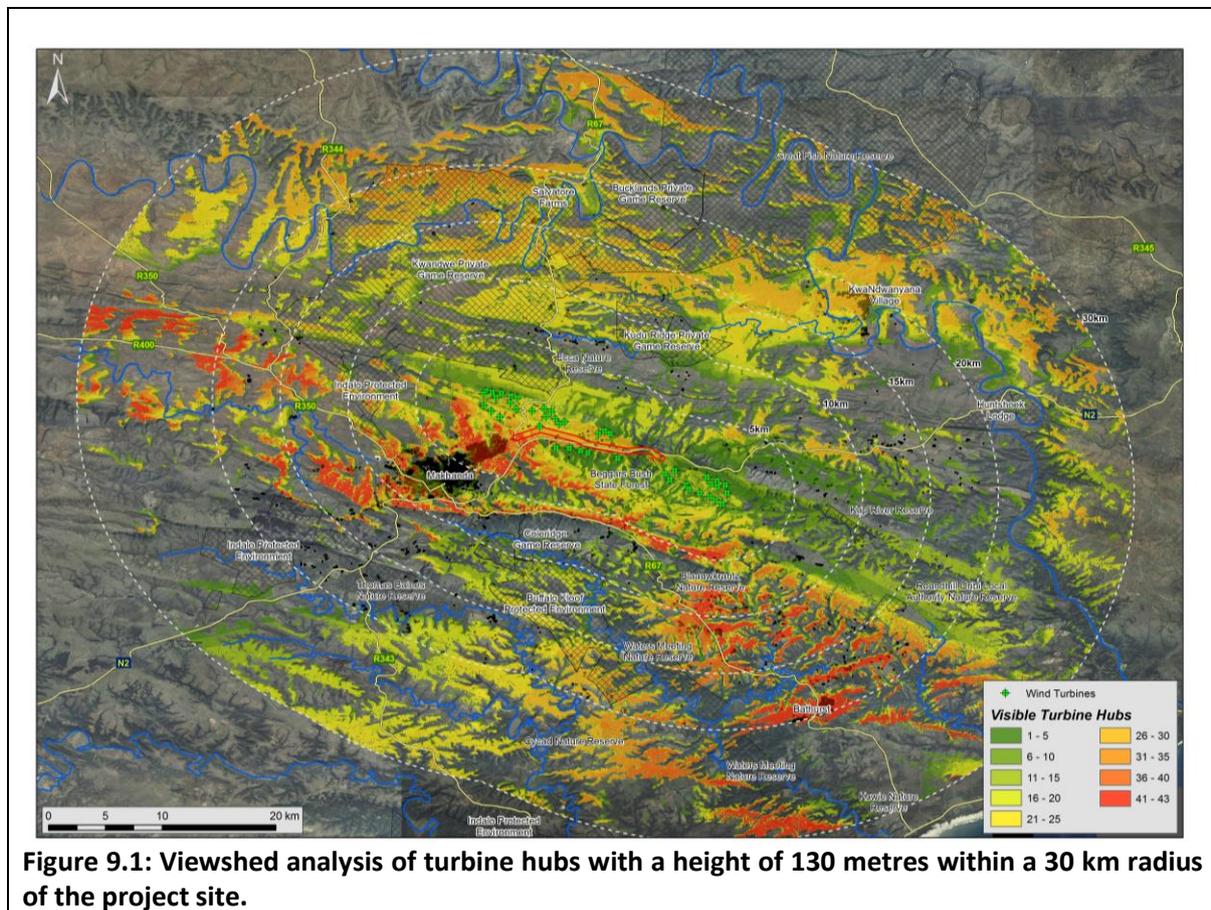


Figure 9.1: Viewshed analysis of turbine hubs with a height of 130 metres within a 30 km radius of the project site.

9.2. Viewshed analysis of selected sensitive receptor locations

The following provides a more detailed viewshed assessment of 15 selected public nature reserves and private game reserves determined to be potentially sensitive to the visual impacts from the proposed Albany WEF based on the analysis in Table 7.1.

Public proclaimed reserves
<ul style="list-style-type: none"> • Ecca Nature Reserve (Local Authority) • Waters Meeting Nature Reserve (EC Parks) • Roundhill Oribi Nature Reserve (Local Authority) • Kap River Reserve (Local Authority) • Great Fish Nature Reserve (EC Parks) • Beggar's Bush State Forest
Private Protected Environment
<ul style="list-style-type: none"> • Kwandwe Private Game Reserve North - Indalo Protected Environment • Kwandwe Private Game Reserve West - Indalo Protected Environment • Buffalo Kloof Protected Environment
Private un-protected reserves
<ul style="list-style-type: none"> • Kwandwe Private Game Reserve North - none Indalo Protected Environment • Kudu Ridge Private Game Reserve • Bucklands Private Nature Reserve • Salvatore Farms • Coleridge Private Game Reserve • Hunters Hoek Lodge

Note Concerning Kwandwe

As indicated in Section 6 of this VIA (Figure 6.8), due to the significant size and varying views of the proposed WEF, the viewshed assessment for Kwandwe Private Game Reserve has been assessed under three components, namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Kwandwe Private Game Reserve North - none Indalo Protected Environment

The detailed viewshed analyses for the 15 sensitive receptors, are provided below.

ECCA NATURE RESERVE

The proclaimed Ecca River Nature Reserve is a municipal nature reserve located north of the proposed WEF along the Ecca Pass and adjacent to the most south eastern extremity of the Non-Indalo portion of the Kwandwe Private Game Reserve.

Observations:

- The Ecca River Nature Reserve ranges in a distance of about 4-5 km north of the proposed WEF site.
- Up to 15 turbine hubs will be visible for approximately 50% of the Reserve (mostly the western cluster).
- Up to 35 turbine blades will be visible for approximately 50% of the Reserve (mostly the western cluster).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.3a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.3b).
- The exposure to the WEF is **HIGH** due to the 4-5 km distance from the WEF.
- The landscape sensitivity of the receptor is **HIGH** due to a proclaimed reserve being within 3-5 km away from the WEF.

Figure 9.3a: Viewshed for 130 metre turbine hubs – Eccca Nature Reserve.

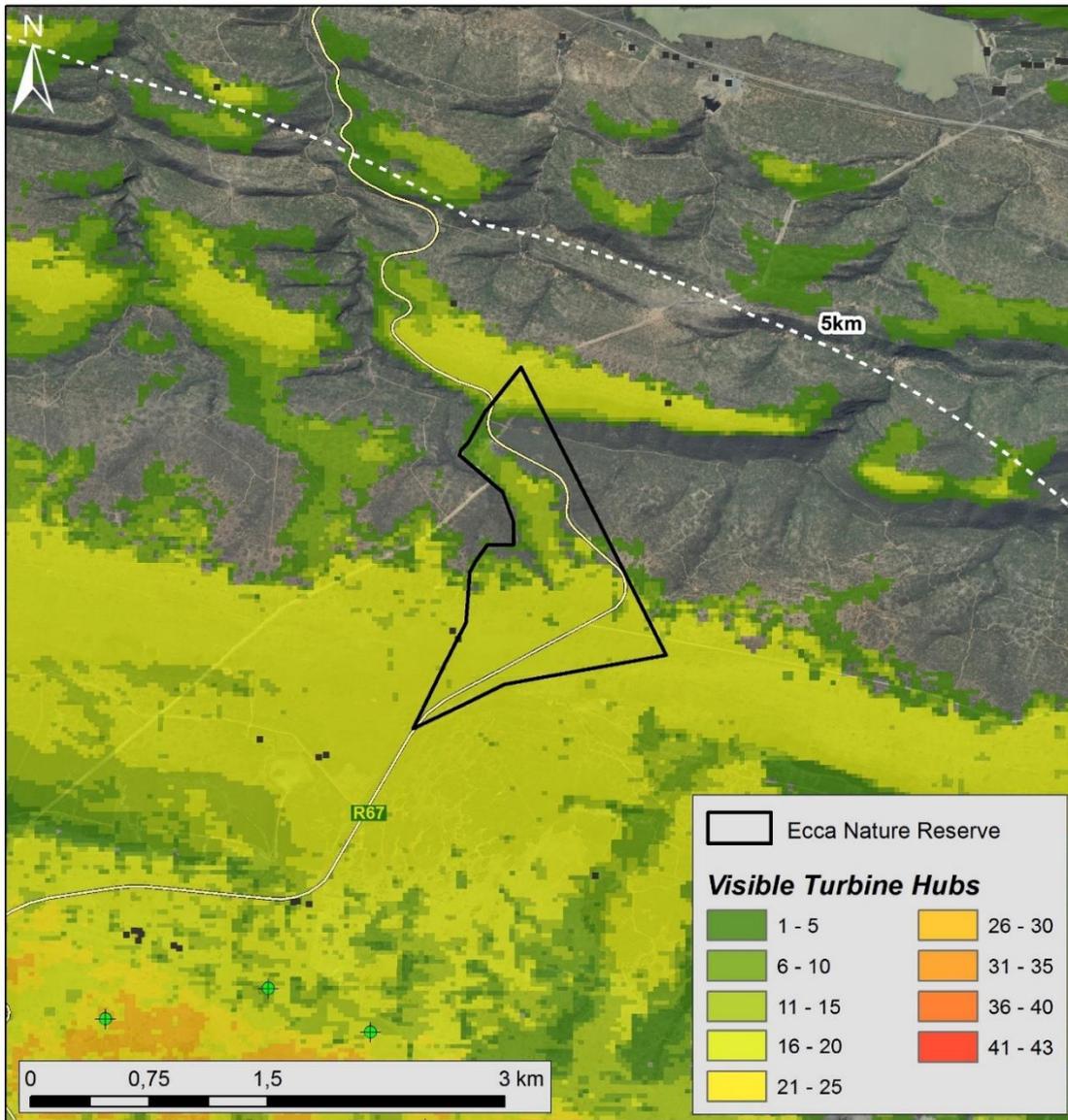
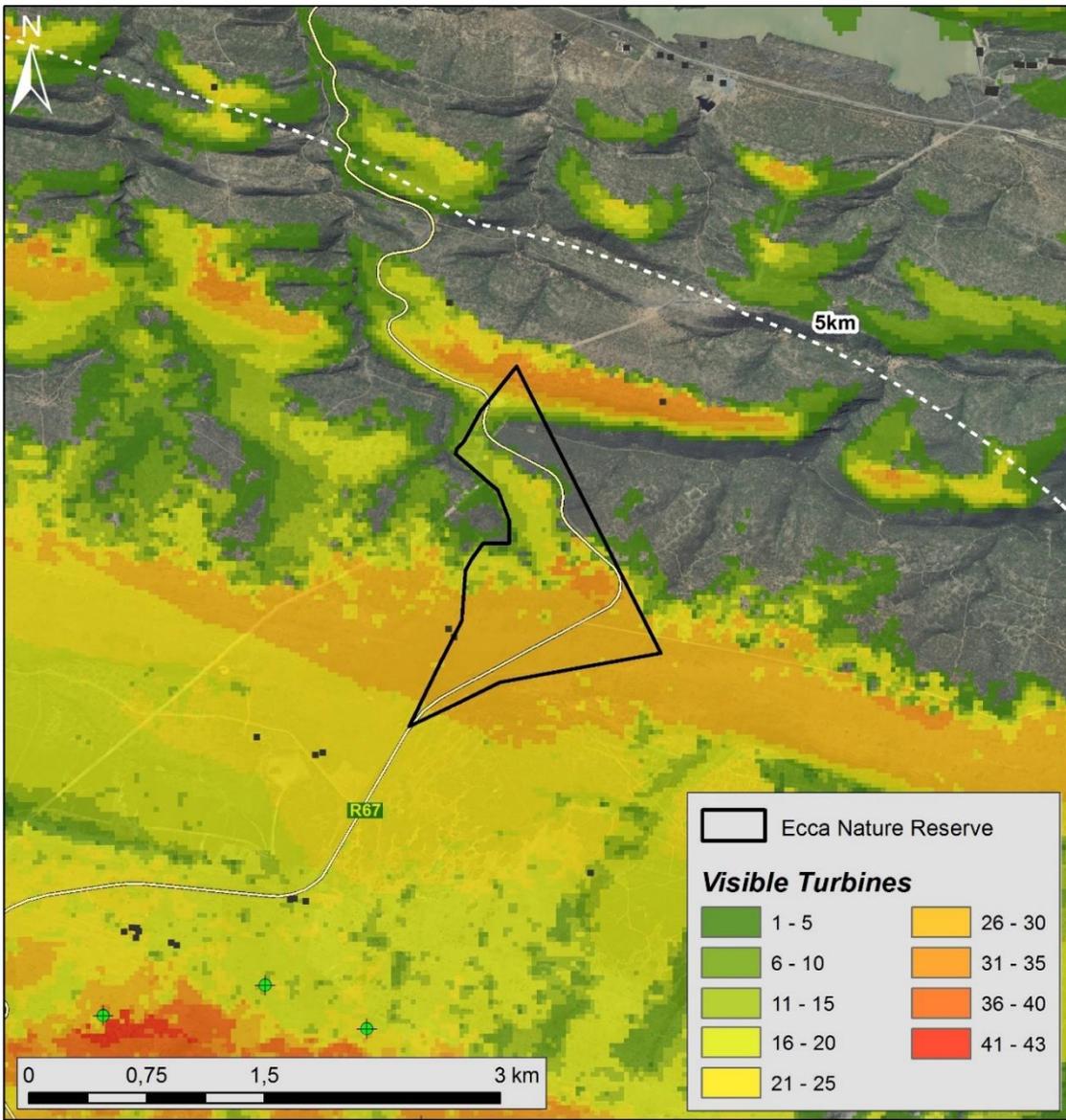


Figure 9.3b: Viewshed for 215 metre turbine blades – Ecca Nature Reserve.



WATERS MEETING NATURE RESERVE

Waters Meeting Nature Reserve is a proclaimed reserve that is operated by the ECPTA. The reserve was originally established as a forest reserve in 1897 and was declared a nature reserve in 1952 and 1985. It consists of two discontinuous reserves situated on the Kowie River in the vicinity of Bathurst namely Waters Meeting I (198ha) and Waters Meeting II (3 261ha). The reserve offers various accommodation and hiking trails.

Observations:

- The Waters Meeting Nature Reserve ranges in a distance of about 12-25 km south east of the proposed WEF site.
- Turbine hubs and blades will not be visible for the vast majority of the reserve (probably over 90% of the reserve).
- A large number of turbines (up to 40) will only be visible from limited elevated locations within the 12-20 km distance from the proposed WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.4a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.4b).
- The exposure to the WEF is **MODERATE to LOW** due to the 12-25 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve being > 10km away from the WEF.

Figure 9.4a: Viewshed for 130 metre turbine hubs – Waters Meeting Nature Reserve.

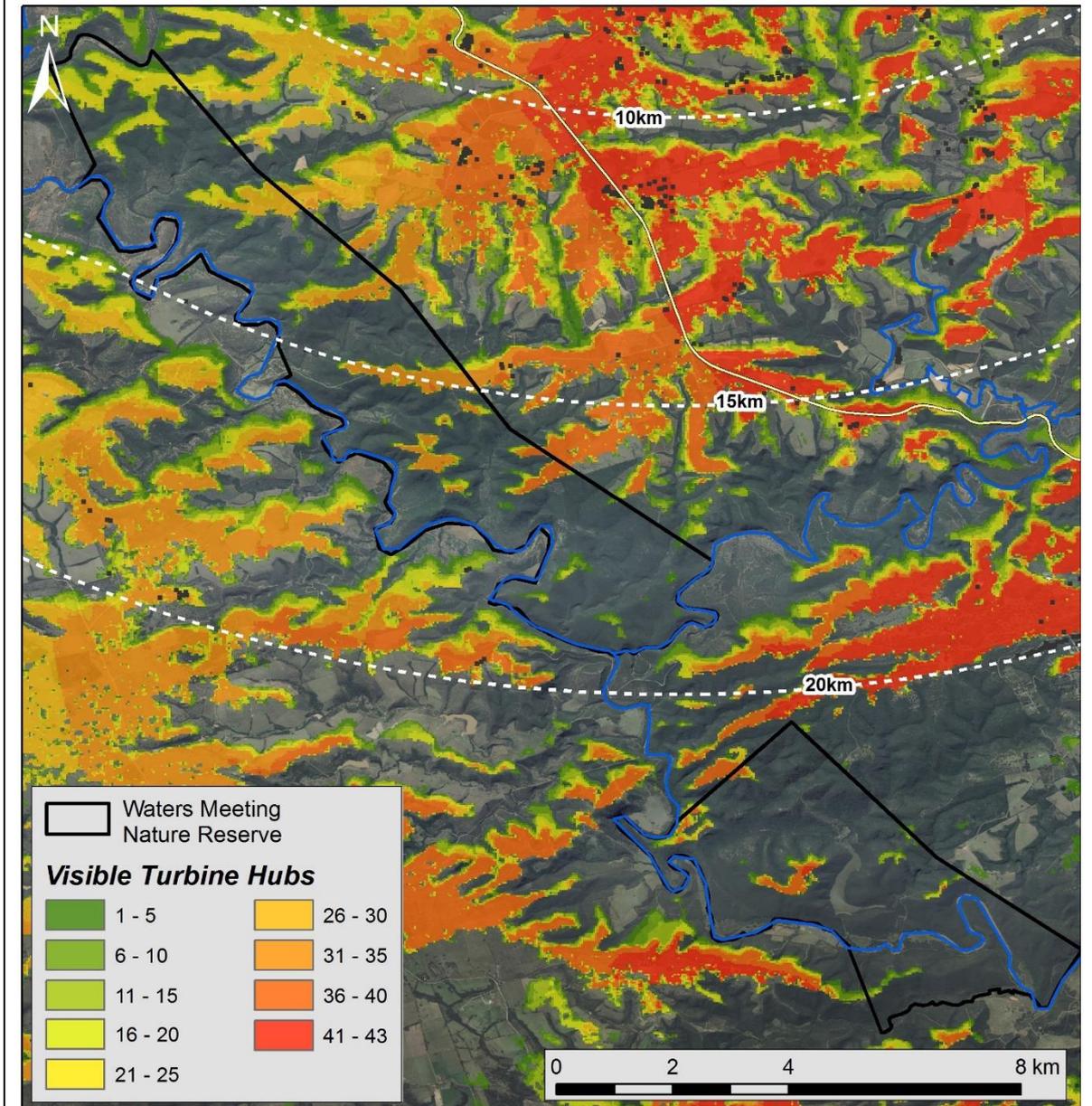
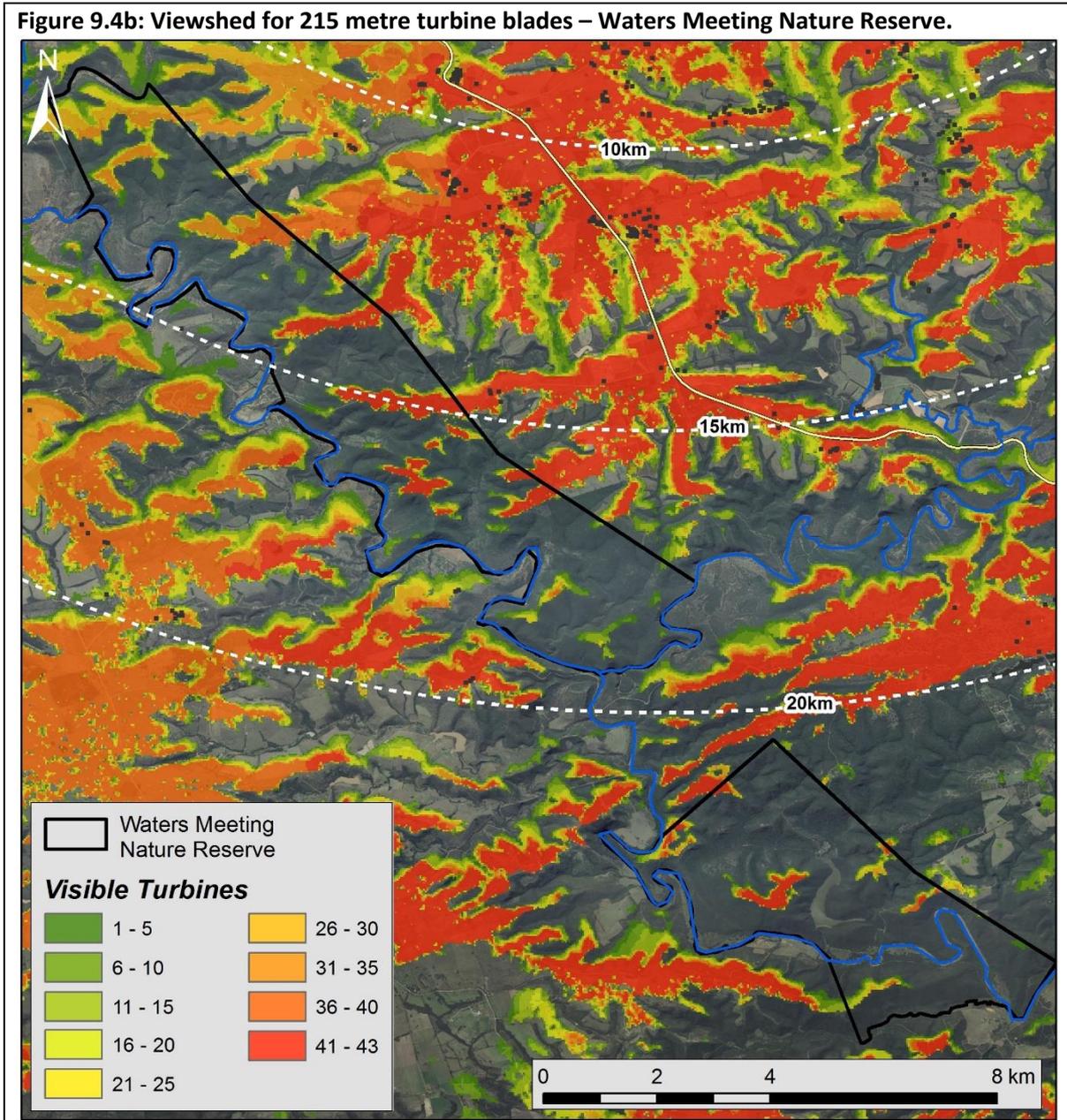


Figure 9.4b: Viewshed for 215 metre turbine blades – Waters Meeting Nature Reserve.



ROUNDHILL ORIBI NATURE RESERVE

The proclaimed Roundhill Oribi Nature Reserve is a small reserve located about 10km north of Bathurst and is owned and Managed by the Ndlambe Municipality.

Observations:

- The Roundhill Oribi Nature Reserve is located about 14-16 km south east of the proposed WEF site.
- Up to about 15 turbine hubs will be visible for the vast majority of the reserve (approximately 90% of the reserve).
- Up to 40 turbine blades will be visible from elevated locations (approximately 30% of the reserve).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.5a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.5b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 14-16 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve being > 10km away from the WEF.

Figure 9.5a: Viewshed for 130 metre turbine hubs – Roundhill Oribi Nature Reserve.

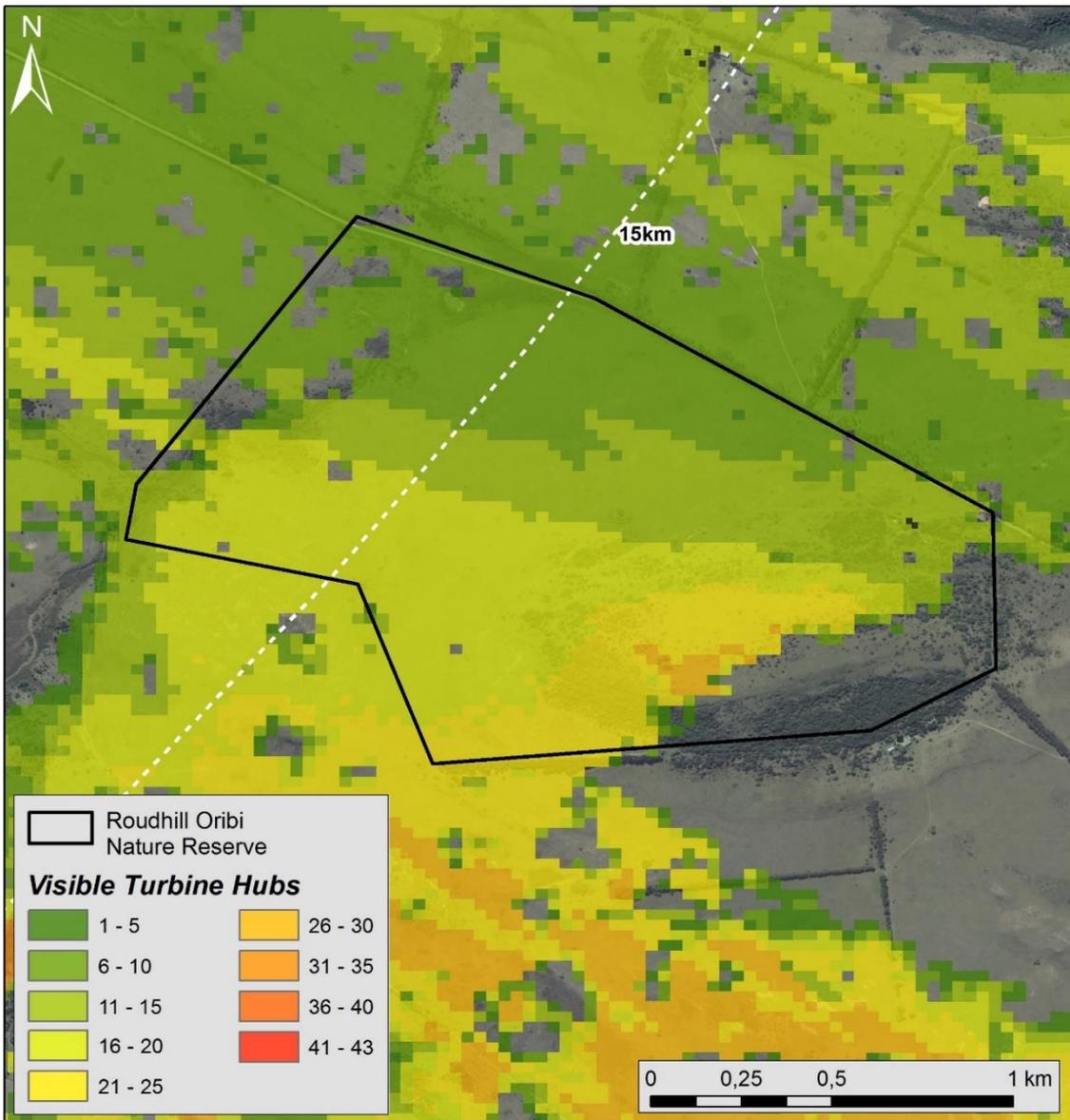
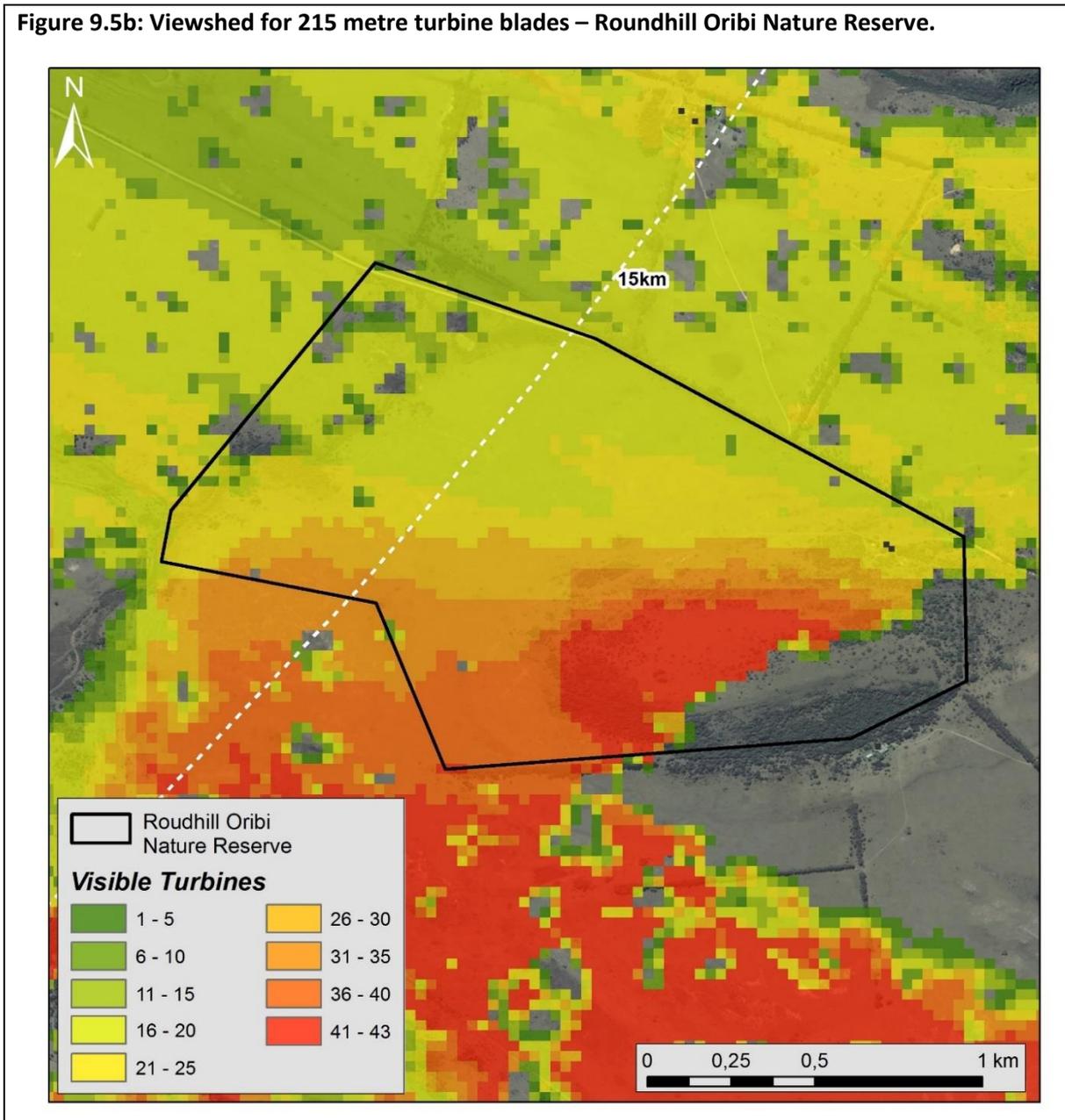


Figure 9.5b: Viewshed for 215 metre turbine blades – Roundhill Oribi Nature Reserve.



KAP RIVER NATURE RESERVE

The Kap River Nature Reserve is a proclaimed reserve that covers an area of 670 ha and is located 28 km East of Port Alfred. The reserve offers birding, hiking, mountain biking and canoeing. Features include sub-tropical vegetation, forests, two rivers, natural diversity, birds and wild animals.

Observations:

- The Kap River Nature Reserve ranges in a distance of about 7-12 km east of the proposed WEF site.
- Up to 15 turbine hubs will be visible for the vast majority of the reserve (probably over 90% of the reserve).
- Up to 20 turbine blades will be visible for the vast majority of the reserve (probably over 90% of the reserve).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.6a).
- The visibility of the WEF blades is **MODERATE** – 25% (11) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.6b).
- The exposure to the WEF is **MODERATE** due to the 7-12 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE** to **LOW** due to a proclaimed reserve 5 km to > 10 km away from the WEF.

Figure 9.6a: Viewshed for 130 metre turbine hubs – Kap River Nature Reserve.

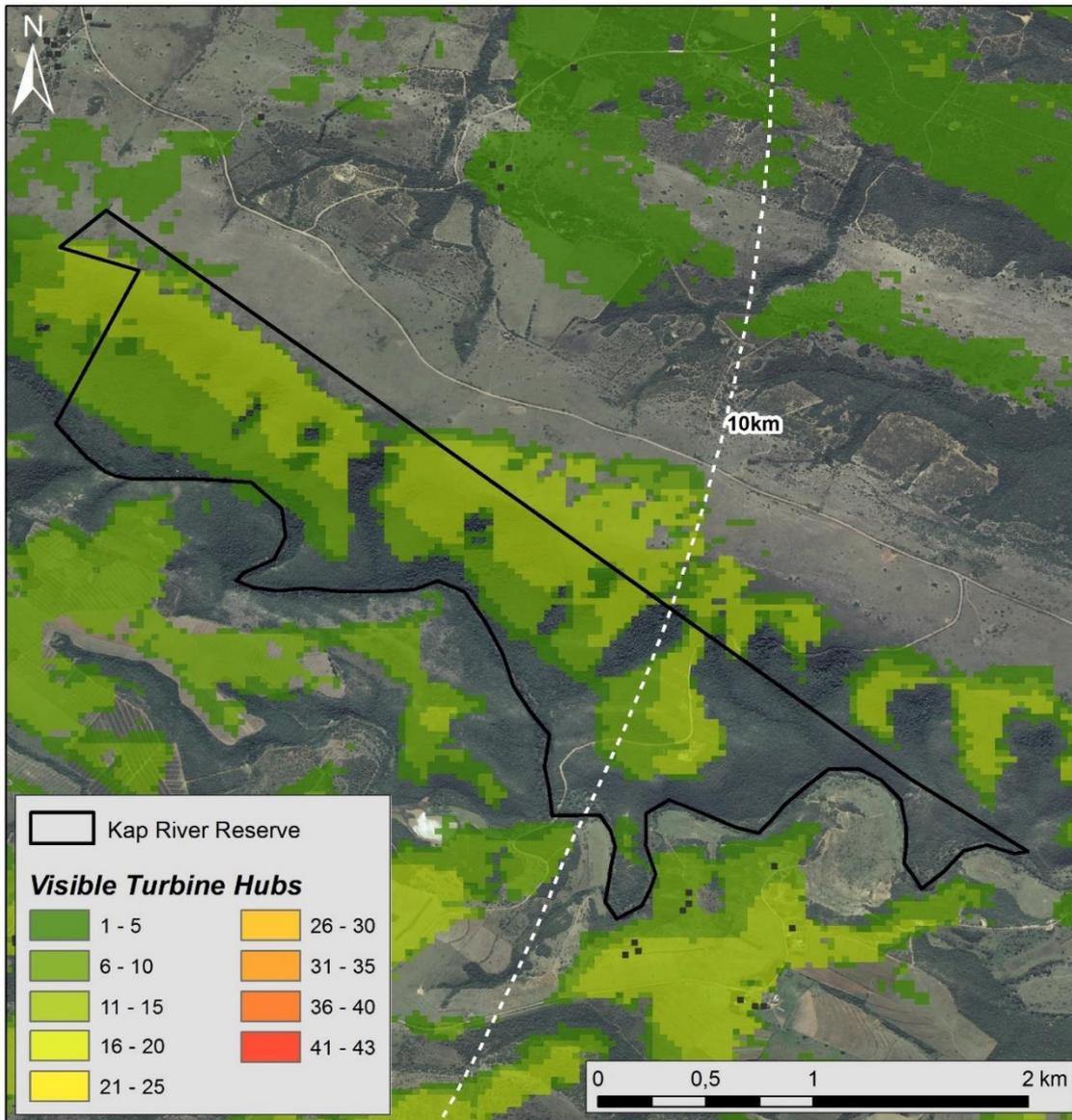
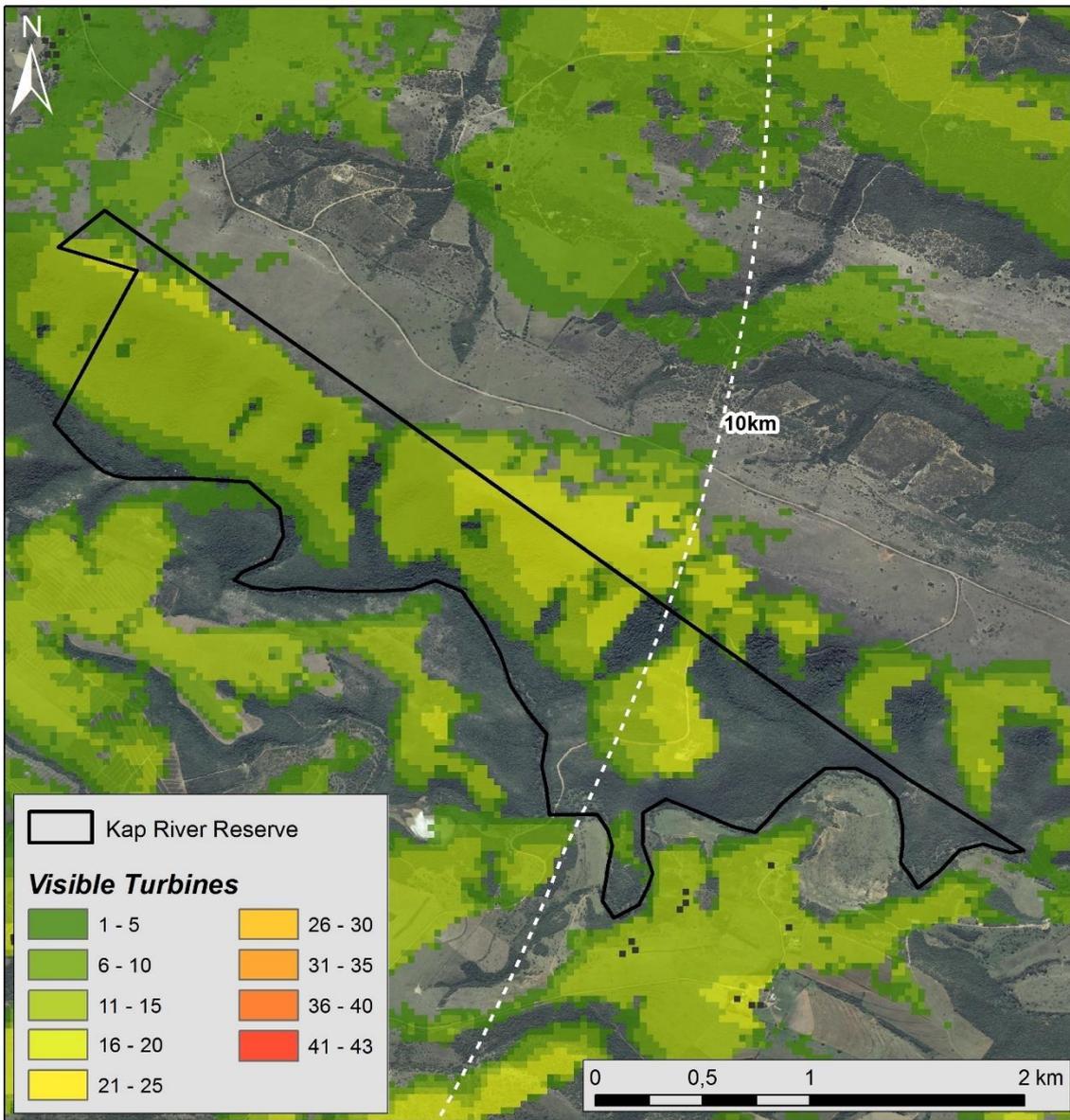


Figure 9.6b: Viewshed for 215 metre turbine blades – Kap River Nature Reserve.



GREAT FISH RIVER NATURE RESERVE

The Great Fish RIVER Nature Reserve is a proclaimed reserve that is over 45 000ha in extent. The reserve is operated by the ECPTA and includes the Andries Vosloo Kudu Reserve, Double Drift Nature Reserve and Sam Knott Nature Reserve, is hosts significant plant biodiversity, ranging from sub-tropical thicket to savannah and grassland. It's a birder's paradise with 245 bird sightings. The Adam's Krantz viewpoint over the twisting Fish River canyon is considered to be one of the most iconic Eastern Cape vistas. The reserve has a wide variety of accommodation lodges and activities including hiking and game viewing.

Observations:

- The Great Fish River Nature Reserve ranges in a distance of about 13 km to well over 50 km north to north west of the proposed WEF. The extent of the reserve relative to distance from the WEF can be summarised as follows:
 - About 10% of the reserve is located between 13 to 20 km from the WEF.
 - About 40% of the reserve is located between 20 to 30 km from the WEF.
 - About 50% of the reserve is located between 30 to 50 km from the WEF.
- There are many lower lying locations within the Reserve, particularly along the Great Fish River valley, where none or few turbine hubs or blades will be visible, particularly within the 20 to 50 km distance from the proposed WEF.
- A higher number of turbine hubs (up to 35) and blades (up to 43) will be visible from elevated ridges to the south of the reserve within a distance of about 13 to 20 km from the WEF.
- Sensitive viewing locations such as Adam's Krantz are located over 30 km from the proposed WEF.
- The research station is located about 15 km from the proposed WEF.

The following overall conclusions are made:

At 13 to 20 km

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.7a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.7b).
- The exposure to the WEF is **LOW** due to the 13-20 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE to LOW** due to a proclaimed reserve 5 km to > 10 km away from the WEF.

At 20 km or further

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.7a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.7b).
- The exposure to the WEF is **LOW** due to the > 20 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve > 10 km away from the WEF.

Figure 9.7a: Viewshed for 130 metre turbine hubs – Great Fish River Nature Reserve.

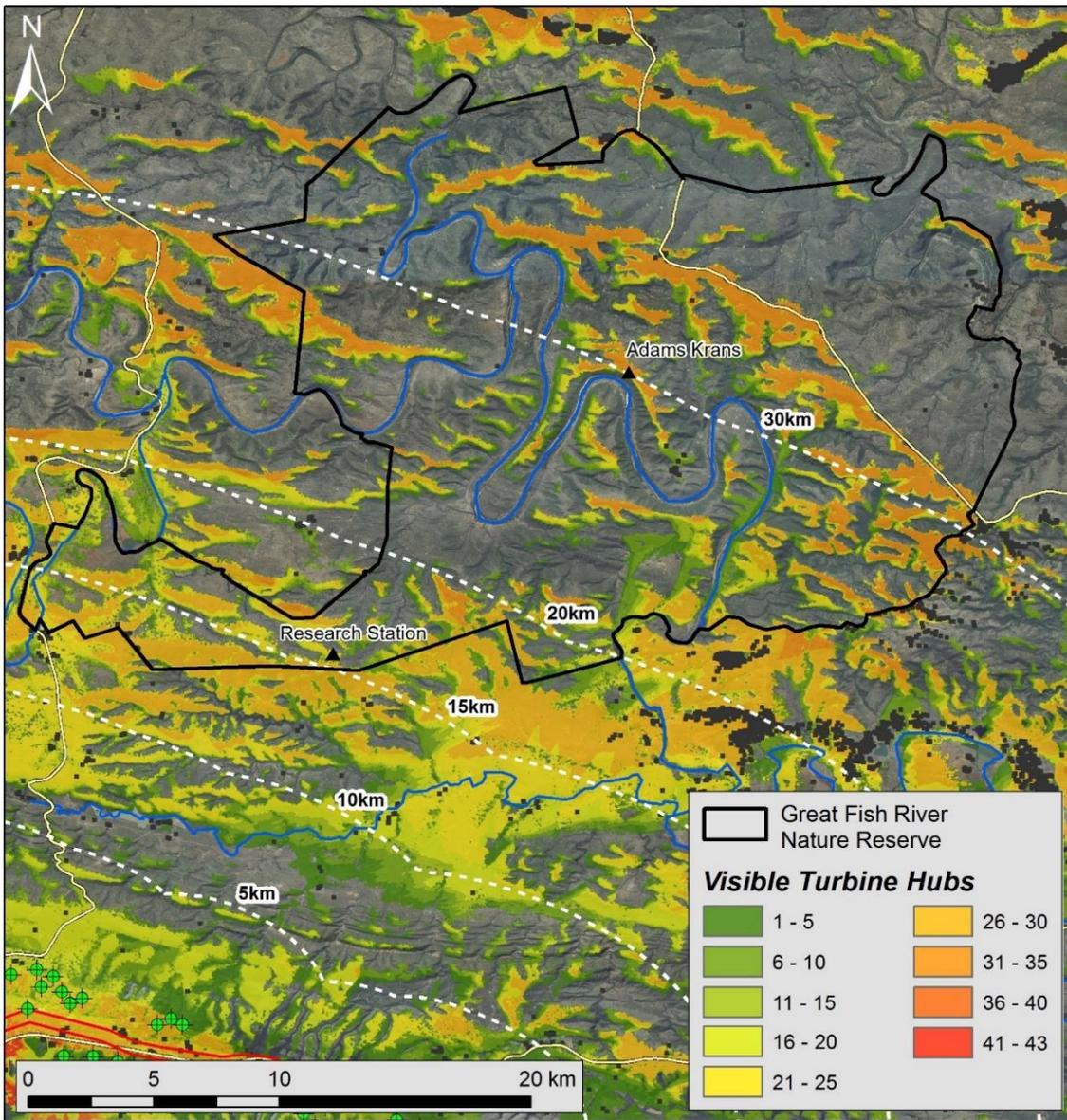
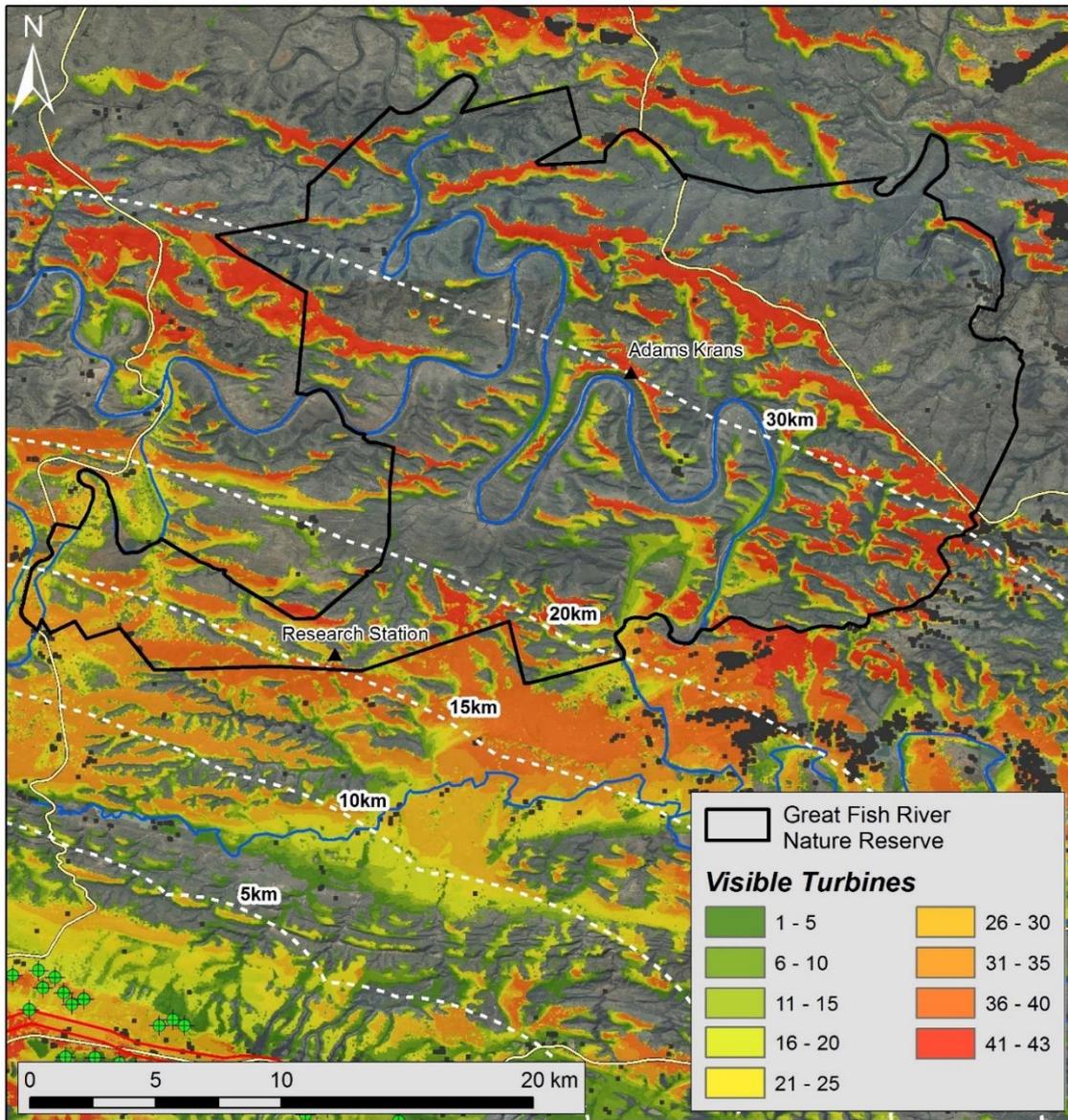


Figure 9.7b: Viewshed for 215 metre turbine blades – Great Fish River Nature Reserve.



BEGGAR'S BUSH STATE FOREST

Beggar's Bush is a proclaimed state-owned forest area located south of the N2 north east of Makhanda.

Observations:

- The Beggar's Bush State Forest is located almost immediately adjacent (0.5 – 1 km) to and south of the proposed WEF site.
- The forest area is located in low lying valleys where none or few turbines will be visible.

The following overall conclusions are made:

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.8a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.8b).
- The exposure to the WEF is **HIGH** due to 0.5 – 1 km distance from the WEF.
- The landscape sensitivity of the receptor is **VERY HIGH** due to proclaimed reserve < 3 km from the WEF.

Figure 9.8a: Viewshed for 130 metre turbine hubs – Beggar's Bush State Forest.

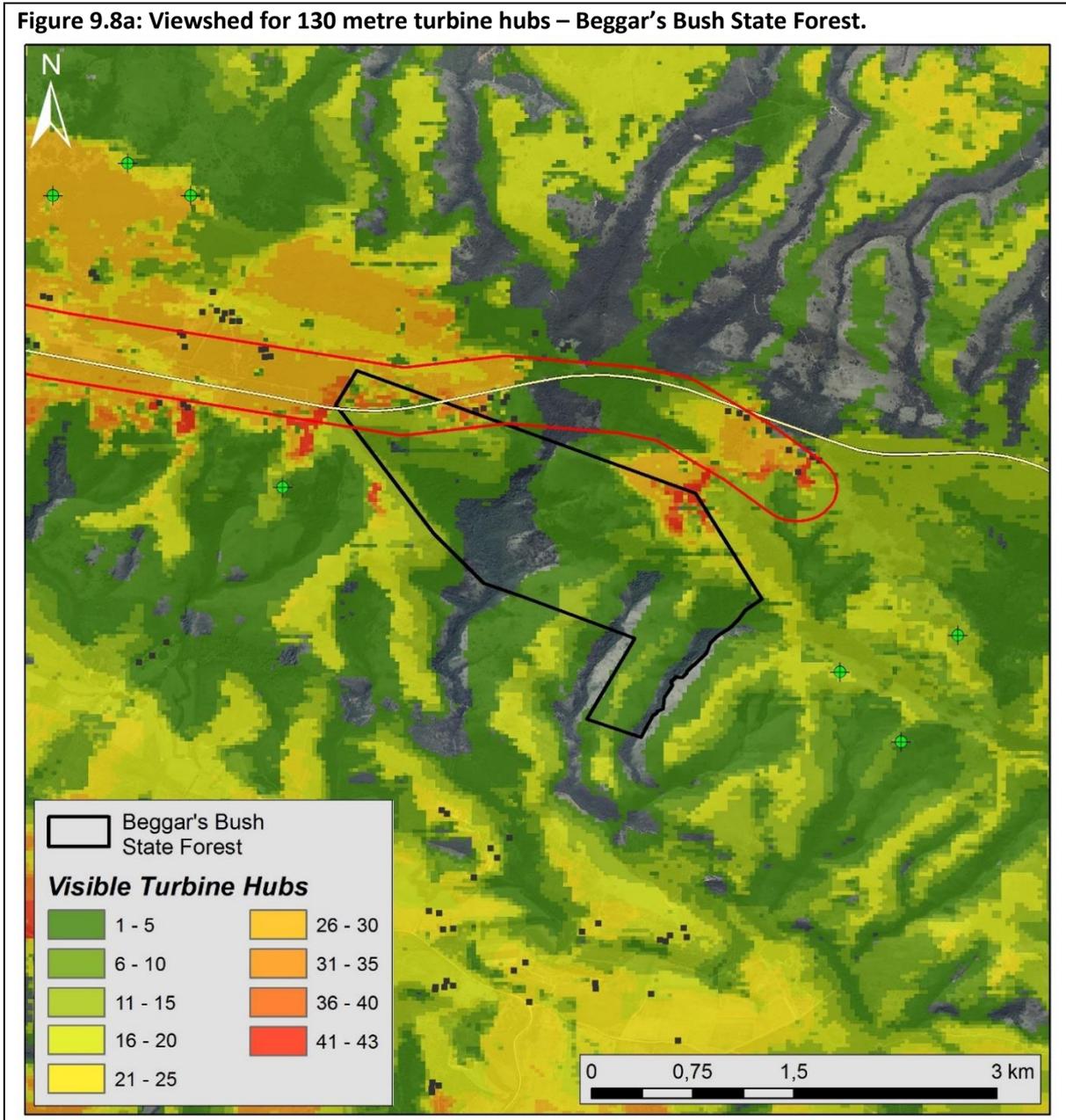
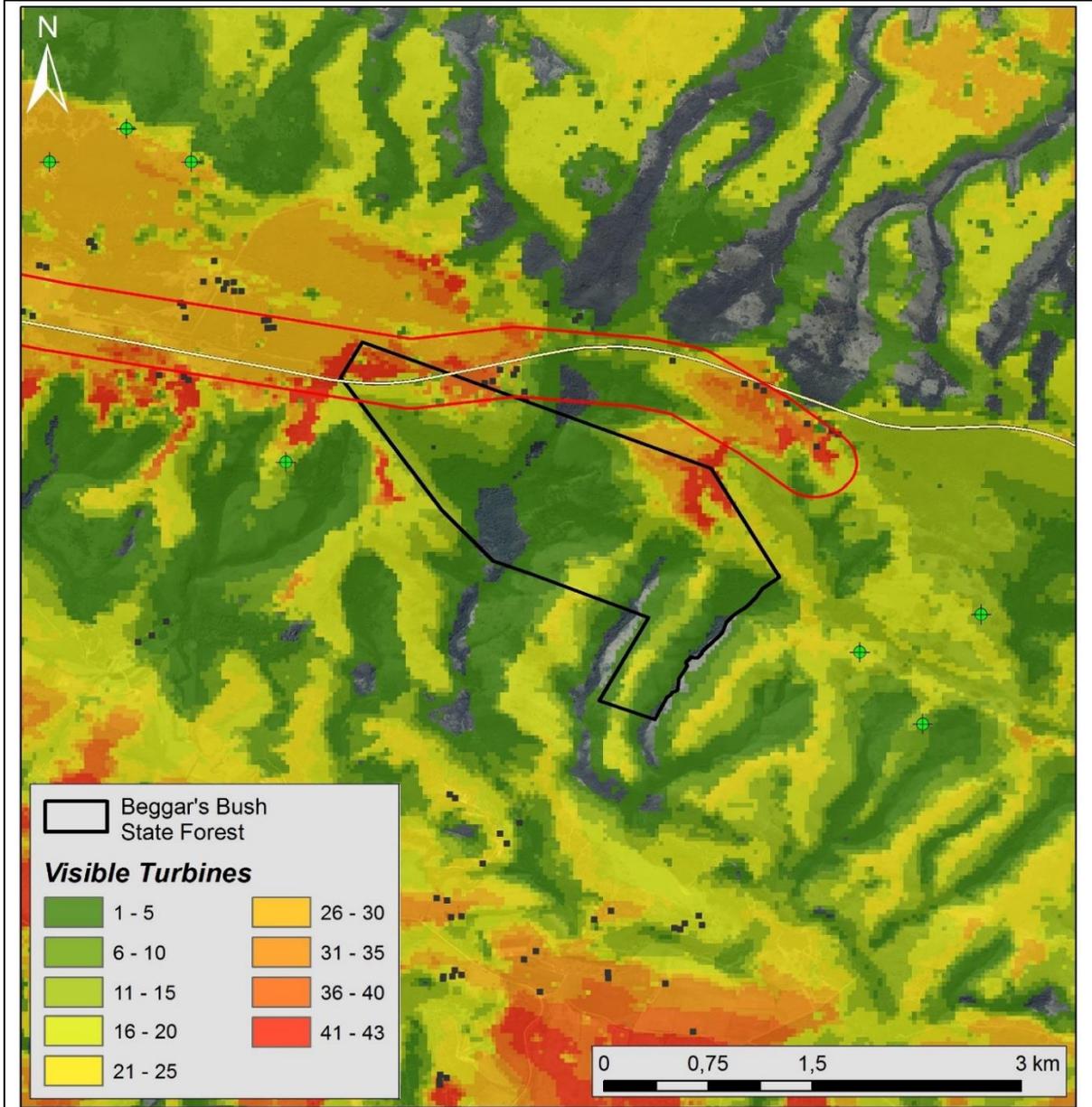


Figure 9.8b: Viewshed for 215 metre turbine blades – Beggar's Bush State Forest.



KWANDWE PRIVATE GAME RESERVE NORTH – INDALO PROTECTED ENVIRONMENT

The Kwandwe Private Game Reserve covers an area of over 22,000 ha, almost divided in half by the Great Fish River.

- A larger portion of Kwandwe about 19,000 ha, is part of the proclaimed Indalo Protected Environment.
- A smaller portion of Kwandwe is NOT part of the proclaimed Indalo Protected Environment and is located closer to the WEF.

Accommodation on offer at the reserve includes five safari lodges and a homestead.

Observations: Kwandwe North Indalo portion

- The Kwandwe Indalo Protected Environment portion is located about 8 – 20 km away from the western cluster of the WEF.
- Up to 35 turbine hubs will be visible from elevated ridges within the Indalo portion of the reserve where but these are generally beyond a distance of about 10 km from the WEF.
- Up to 43 turbine hubs will be visible from elevated locations within the Indalo portion of the reserve at about 15 km to beyond 20 km distance from the proposed WEF.
- Turbine blades will be visible from large areas of the Indalo portion particularly between the 10 and 20 km radii of the WEF.
- Lodges within the Indalo portion of Kwandwe are all located close to and south of the Great Fish River at the following distances from the WEF:
 - Melton Manor – 17 km
 - Great Fish River Lodge – 17 km
 - Ecca Lodge – 15 km
 - Uplands Homestead – 15 km
 - The Fort House – 14 km
 - KwaNdlovu Lodge – 14 km

It is also expected that the views from the lodges would mostly be in a north facing direction toward the Great Fish River and not toward the WEF.

The following overall conclusions are split between the Indalo portions of the Kwandwe Reserve:

Kwandwe North Indalo portion

The following overall conclusions are made:

- The visibility of the WEF hubs is **VERY HIGH** – 75% (31) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.9a).
- The visibility of the WEF blades is **VERY HIGH** – 75% (31) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.9b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 8-20 km distance from the WEF for the vast majority of the Reserve including lodges.
- The landscape sensitivity of the receptor is **MODERATE** to **LOW** due to a protected reserve 5 km and > 10km away from the WEF.

It should be noted that based on submissions on the draft VIA and EIAR, five (5) turbines almost immediately adjacent to the southern boundary of the un-proclaimed non Indalo portion of Kwandwe game reserve (the western cluster west of the R67), have been removed. An additional seven (7) turbines also located within 2-3 km of the Kwandwe game reserve, have also been removed from the western cluster east of the R67. This amounts to a total of 12 turbines removed from the western cluster.

Figure 9.9a: Viewshed for 130 metre turbine hubs – Kwandwe Private Game Reserve North Indalo Protected Environment.

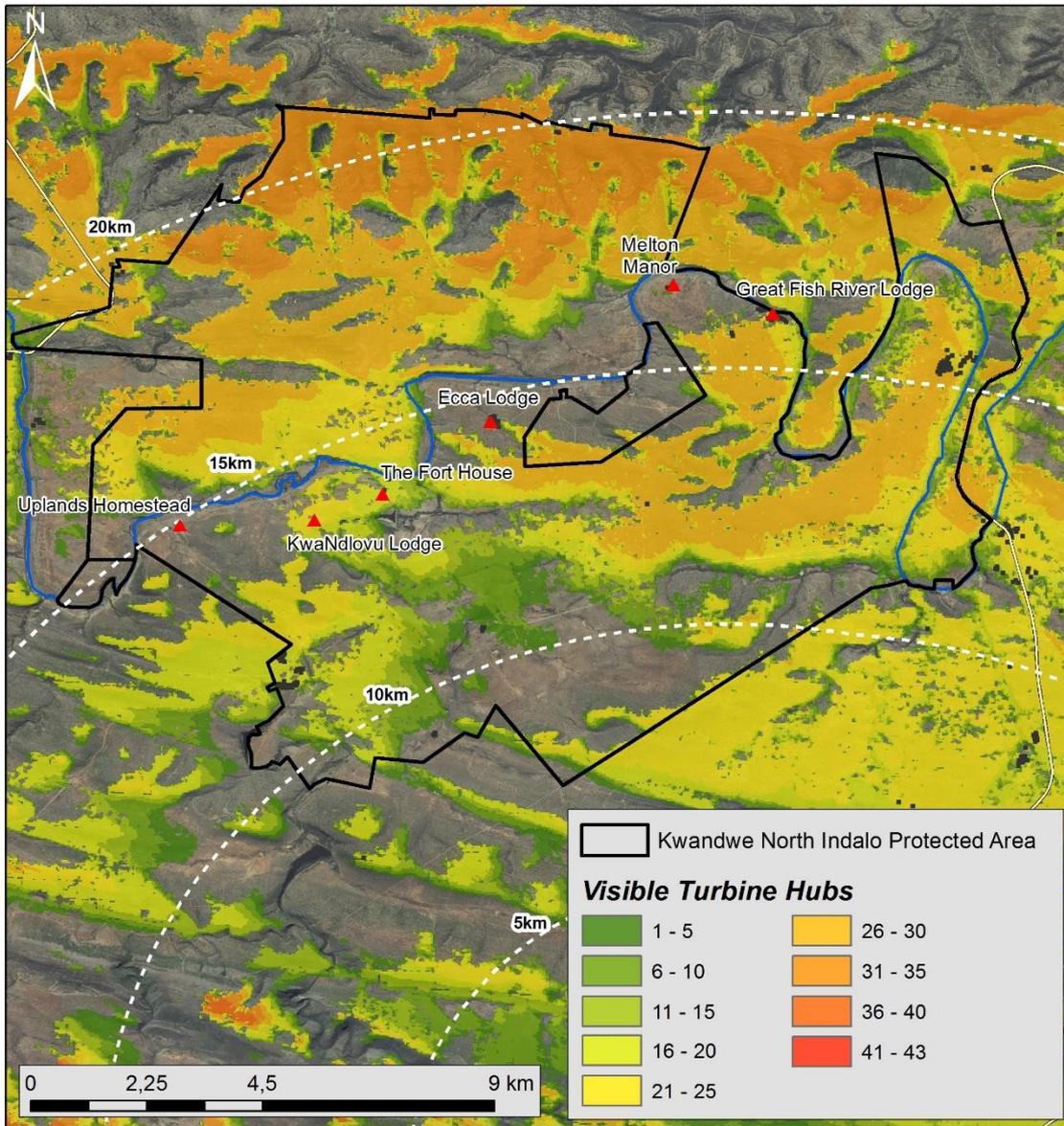
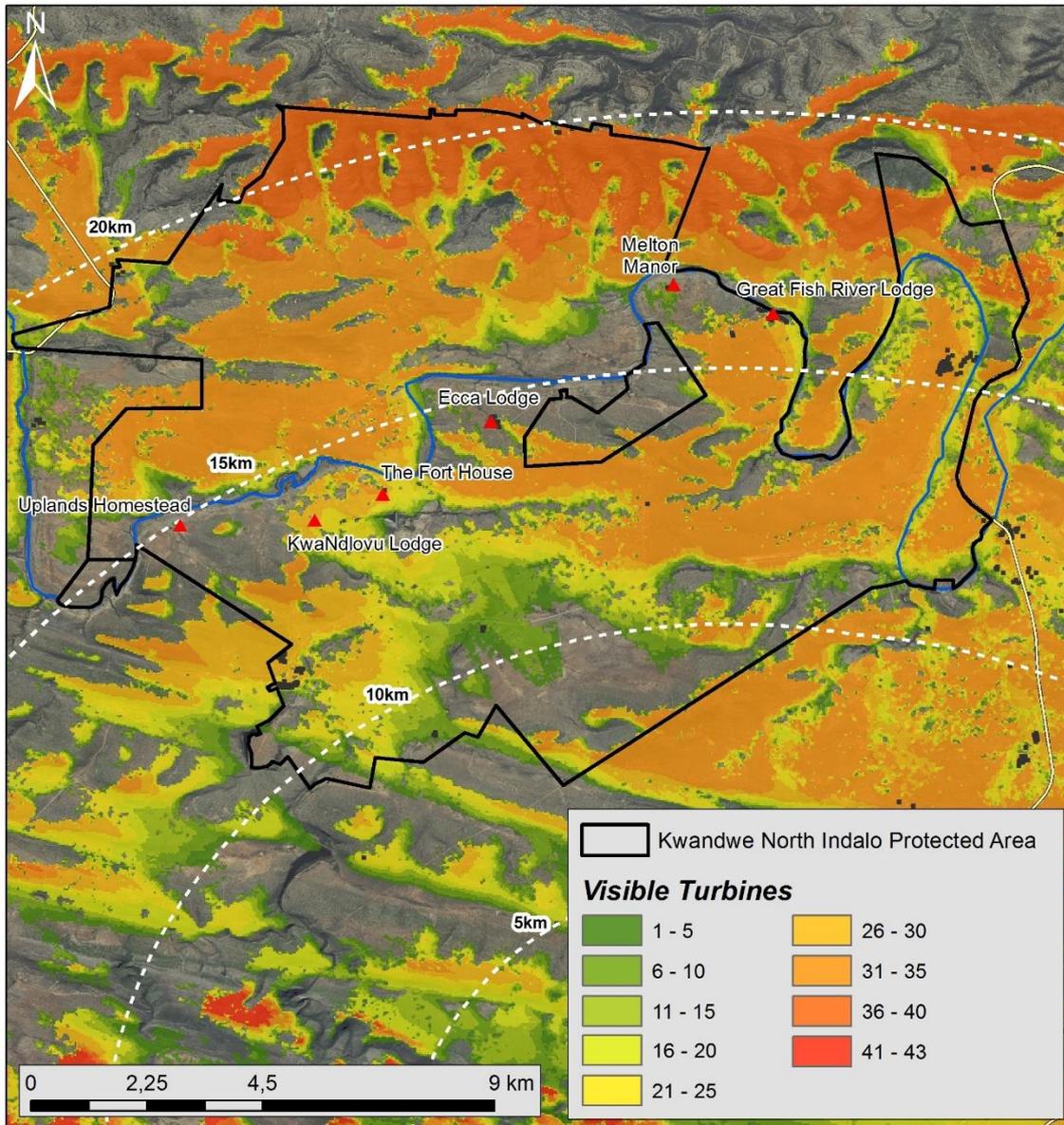


Figure 9.9b: Viewshed for 215 metre turbine blades – Kwandwe Private Game Reserve North Indalo Protected Environment.



KWANDWE WEST INDALO PROTECTED ENVIRONMENT

The Kwandwe West portion of the wider Kwandwe Indalo Protected Environment is located south of the main reserve and lies west of the Albany WEF.

Observations:

- The Kwandwe West portion of the Indalo Protected Environment ranges in distance from of about 7-10 km west of the western cluster of the proposed WEF site. The central and eastern clusters are located a 15 – 20 km away, respectively.
- There are many lower lying locations within the area where no turbine hubs and blades will be visible.
- A higher number of turbine hubs and blades (up to almost all 43 turbines) will only be visible from limited elevated locations within the 7-10 km distance from the proposed WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.10a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.10b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 7-10 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE** due to a protected reserve being between 5 – 10 km away from the WEF.

It should again be noted that a total of 12 turbines have been removed from the western cluster of the WEF closest to the reserve.

Figure 9.10a: Viewshed for 130 metre turbine hubs – Kwandwe Indalo West Protected Environment west of project site.

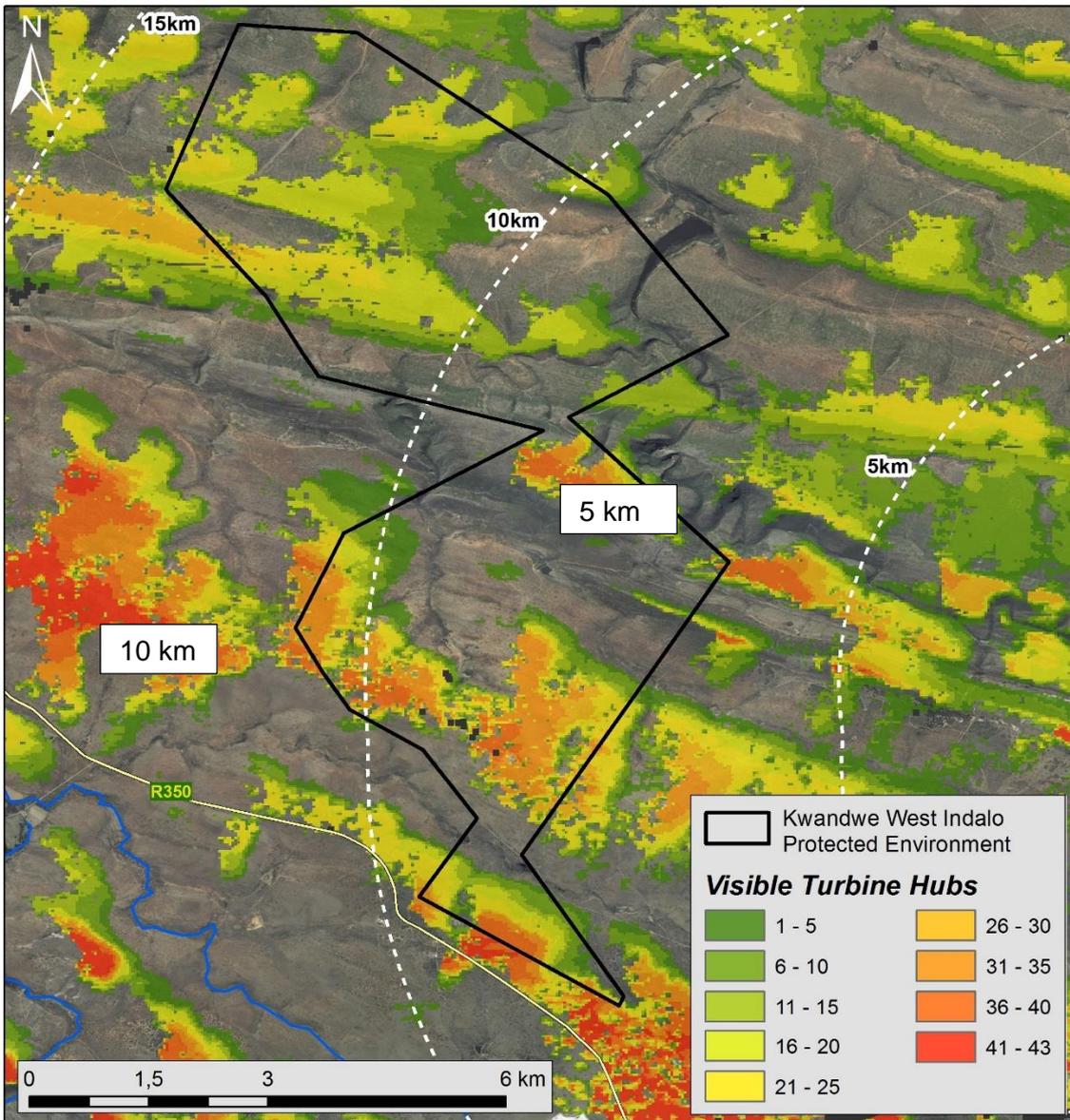
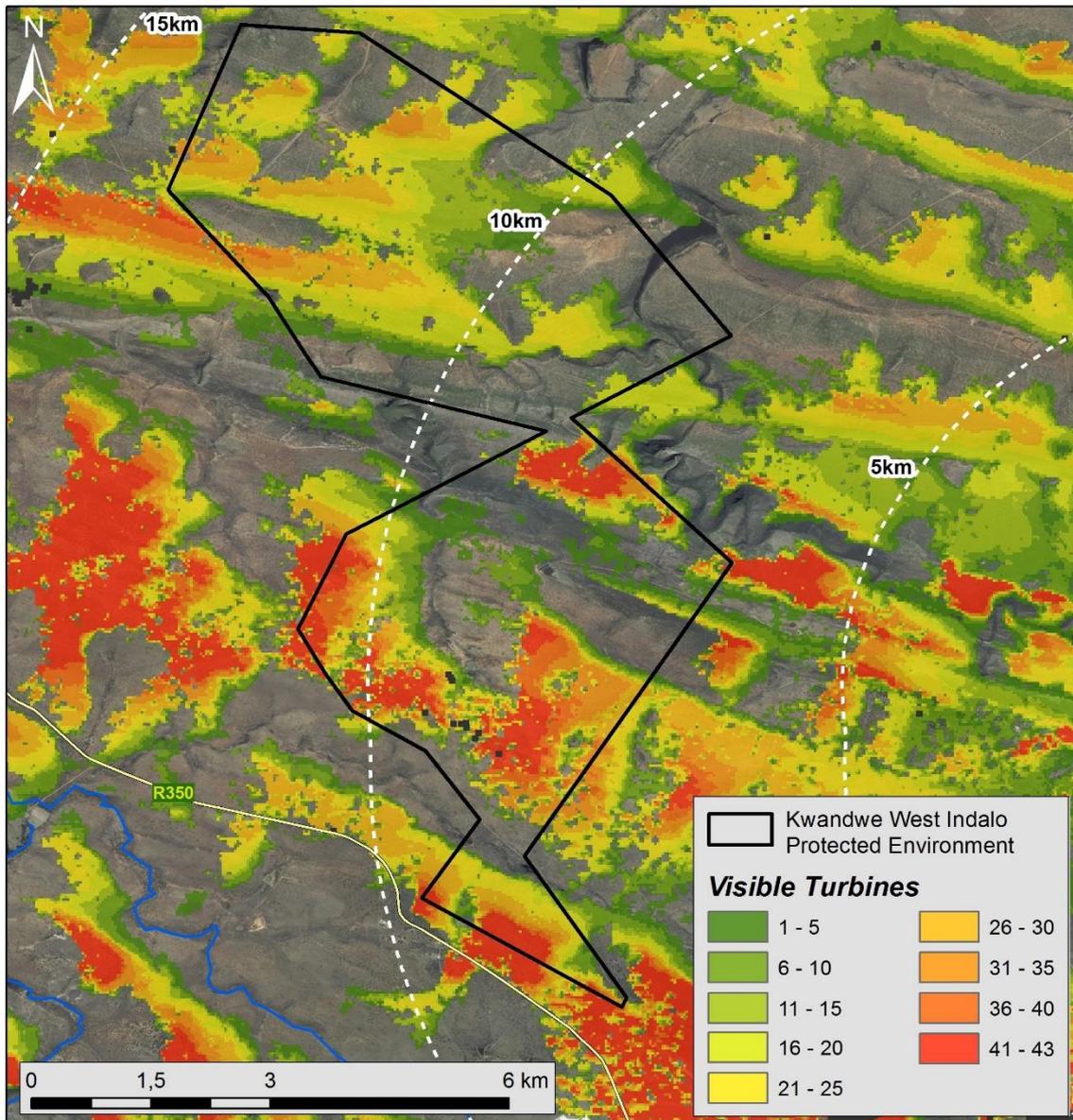


Figure 9.10b: Viewshed for 215 metre turbine blades – Kwandwe Protected Environment west of the project site.



BUFFALO KLOOF PRIVATE GAME RESERVE

Buffalo Kloof Private Game Reserve forms part of the Buffalo Kloof Protected Area and is used primarily for Hunting Safari's. Accommodation on offer at the reserve includes the original farm homestead, a 100-year-old sheep shearing shed, that has been restored and renovated, and the Spekboom Camp. It should be noted that although the viewshed indicates that turbines will be visible from the Spekboom Camp, it located approximately 14.5 km from the project site and is built with views over a valley to the south-west. The vegetation surrounding the camp is relatively high and will screen views of the windfarm. Views from the Spekboom Camp are, therefore, unlikely to be affected.

Observations:

- The Buffalo Kloof Game Reserve ranges in a distance of about 10-20 km south of the proposed WEF site.
- There are many lower lying locations within the Reserve where no turbines will be visible, particularly within the 10-15 km distance from the proposed WEF. This is mainly due to the Reserve being located in the Blaauwkrantz Valley south of the R67 ridge line which significantly visually shields the reserve from the turbines.
- Up to 20 turbine hubs and blades will only be visible from limited elevated locations within the 10-15 km distance from the proposed WEF.
- Up to 43 turbine hubs and blades will be visible from elevated locations at about 15 km to 20 km distance from the proposed WEF.
- The following lodges are located within the game reserve:
 - Hunter Lodge – 11 km from the WEF.
 - Vetpaw House – 17km from the WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.11a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.11b).
- The exposure to the WEF is **LOW** due to the 10-20 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7km away from the WEF.