

Taumatotara Windfarm  
Waitomo District, Waikato

Landscape Visual Assessment  
S92(1) Response Information





# Taumatotara Wind Farm

## Landscape and Visual Assessment for S92(1) Information Request

Prepared By

-----  
Adrian Morton  
Principle Landscape Architect

Opus International Consultants Ltd

Hamilton Environmental Office  
Opus House, Princes Street  
Private Bag 3057, Waikato Mail Centre,  
Hamilton 3240  
New Zealand

Reviewed By

-----  
Joanna Soanes  
Landscape Architect

Telephone: +64 7 838 9344  
Facsimile: +64 7 838 9324

Date: Feb 2012  
Reference: O:\env\utilities\ventus\_ener  
gy\proj\3-38585.00  
Status: Draft 1

## Contents

<b>1!</b>	<b>Introduction.....</b>	<b>1!</b>
<b>2!</b>	<b>Reference documents .....</b>	<b>1!</b>
<b>3!</b>	<b>Landscape Context.....</b>	<b>2!</b>
<b>4!</b>	<b>Methodology .....</b>	<b>3!</b>
<b>5!</b>	<b>Description of Project .....</b>	<b>5!</b>
<b>6!</b>	<b>Assessment of the Landscape and Visual Effects .....</b>	<b>5!</b>
<b>7!</b>	<b>Conclusion .....</b>	<b>7!</b>
<b>Appendix 1!</b>		
	Site Photos!	
<b>Appendix 2!</b>		
	Site Plan!	
<b>Appendix 3!</b>		
	Montages!	
<b>Appendix 4!</b>		
	Zone of Theoretical Visibility!	

## 1 Introduction

Opus International Ltd has been commissioned by Ventus Energy (NZ) Ltd to prepare a Landscape Visual Effect Assessment (LVEA) in relation to the change in height of 11 of 22 wind turbines at the consented Taumatotara Wind Farm. The report has been prepared in response to Waitomo District Council's Section 92(1), section 4.4, request for additional information in relation to the resource application reference 123391-40.

The resource consent application is to increase the tip height allowance of 11 of the currently consented 22 turbines by approximately 10% from 110m to 121.5m. The tip height increase is limited to the 11 northern most turbines (Refer to Appendix 2, Figure 1). This report provides a response in relation to the S92(1), Section 4.4 landscape and visual analysis, which will examine the requirements in relation to:

- ! effects on landscape and visual amenity,
- ! identify the distance where the effects reduce to no more than minor and identify
- ! address the methodological approach used in rating the effects.

The site is situated approximately 6.5km northwest from Te Anga, which is approximately 30km west of the Waitomo Caves area, and is located in the Waitomo District within the Waikato. The Project is situated along the ridge line with turbines being located in a north/south line, which cuts across the Taumatotara West Road.

## 2 Reference documents

As this report provides a response to the S92(1) request it should be read in association with the Taumatotara Windfarm Assessment of Environmental Effects, November 2005, which provides the original submission information for the consented windfarm scheme.

Additionally, the current resource consent application information for the increased turbine height has been submitted to the Waitomo District Council with the Taumatotara Windfarm, Assessment of Environmental Effects for a Turbine Tip Height Increase, 21 November 2011, contains relevant supporting information.

In addition, scheme montages, a site plan and plans showing the Zone of Theoretical Visibility (ZTV) (Appendix 2, 3 and 4) have been produced by Ventus and where relevant have been referenced within this report.

Specific planning policy is not considered as part of this S92(1) response and has been considered to have been adequately covered within other reports.

The Waikato Regional Landscape Assessment<sup>1</sup> (WRLA) the [redacted] is located within the Western Hill Country landscape type. The WRLA does not categorised the area as an area of Outstanding Natural Features and Landscape.

---

<sup>1</sup> Refer to note 2

In regard to landscape, visual and amenity planning matters, the assessment component of this report is in accordance with relevant provisions of Part 2 and the Fourth Schedule of the Resource Management Act 1991 (RMA).

### 3 Landscape Context

#### Broader Landscape Character

The broader context in which the Project is located in is the Western Hill Country of the Waikato District (Refer to Appendix 2 – Site Plan). The landscape is characterised by steep pastoral hill country, inter-dispersed with exotic tree stands and areas of native vegetation (Reference Appendix 1, Photos 1, 2 and 3). The Project area is located within the Western Hill Country landscape type as identified in the WRLA. This area encompasses the western hill country located along the west coast of the Waikato and includes both volcanic and sedimentary rocks, which is often overlaid by a thick layer of volcanic ash. Landcover includes areas of pasture, exotic forestry and large tracts of indigenous forest especially to the south of Kawhia.

The WRLA describes the landscape as being *“pastoral farming is the predominant productive rural land use with the majority of farms consisting of hill country. In the Hills west of Otorohanga there is an extensive system of limestone outcrops featuring pinnacles, as well as caves. The limestone forms the karst topography – an amalgamation of caves, underground channels, outcrops, and a bumpy ground surface. The karst landscape and associated caves are a special feature of the Waitomo District.”*

Overall the character of the area can be described as highly modified with buildings associated with farming development. The area is not identified as an area of high amenity within the WRLA.

#### Site Context

The topography of the area within the 10km study area (as required within the S92(1)) is characterised by steep sided hills which have well defined ridgelines with narrow valley systems occurring to the north and south of the Project site. The area's topography defines views particularly from the valley areas where ridges or the steep sided hills screen or contain views. The highest local peak (Maungaakohe) to the north of the site is approximately 344m above sea level.

The landcover is predominantly pastoral with areas of remnant native vegetation associated with the hill slopes and valley systems that run off the ridgelines. Isolated areas of exotic tree planting occur across the hilly landscape with the stands generally being located on the hill side slopes particularly to the south of the site. Generally, the ridgelines are exposed with little vegetation occurring along the ridges. The photos 1 to 6 (Appendix 1) illustrates the extent of the pastoral landscape and the visual qualities that the vegetation brings to the landscape.

Landuse within the 10km study area is predominantly pastoral with areas of exotic trees scattered across the landscape (Appendix 1, Photos 1 to 6). Rural residential buildings and associated farm buildings within the area is generally sparsely located particularly to the

north, west and east of the site, with a number of houses well dispersed along the Marokopa Valley (Appendix 1, photos 8 & 9). Within the hill country area, rural residential properties are sparsely located and are typically set within sheltered areas in lower lying areas away from the ridgeline and generally with associated vegetation.

To the north and of the site the area is highly modified with hilly open pastoral land predominating with small areas of remnant bush or tree planting. To the south of the site the landscape has been highly modified but the extent of remnant/regrowth native bush and forestry combined with the pastoral areas result in a relatively cohesive appearance a moderate degree of 'natural' appearance. The amenity value varies in relation to each property depending on the orientation of views, degree of screening vegetation and the effects of topography.

The landscape character has been assessed as having a moderate amenity value, and will be assessed in relation to the consented, yet un-built windfarm.

## **4 Methodology**

The methodology for assessing the change in height of the wind turbines utilises information obtained from both desk top study and project site investigation. The assessment will address the effects on landscape and amenity values for owners and occupiers within a 10km study area (as requested within the S(92)1), and specifically deal with view locations identified within the visual catchment area, as identified within the Zone of Theoretical Visibility (ZTV) (Appendix 4, Figures 4.0 and 4.1).

The desktop study included the review of the consented windfarm scheme documentation prepared by Ventus and the current consent application for the increased turbine height. Additionally, the report has undertaken a review of the Waitomo District Plan<sup>2</sup> for relevant planning policy documentation and the Waikato Regional Landscape Assessment<sup>3</sup> (WRLA).

The desktop study information has been utilised to describe the study area, classify the landscape character and evaluate the visual effects in relation to the increased height of the turbines on the landscape and amenity values.

A site visit was undertaken on the 14<sup>th</sup> February 2012, to examine the landscape character and amenity value of the area and consider the potential visual receptors (viewers). Receptor groups include single residential properties within a 10km study area (Refer to Appendix 4 – ZTV Plans) and travellers through the area (i.e. drives, cyclists and pedestrians). The site visit investigated and assessed potential view points from public roads and areas adjacent to residential properties particularly along Marokopa and Coutts Road where properties have a direct view of the site. During the site visit the original and the proposed new montages were assessed for accuracy and to assist in determining whether there would be additional effects with the increased turbine heights.

The landscape and visual effects rating definition used within the LVA when describing the effects in the change in turbine height can be described as follows:

---

<sup>2</sup> Waitomo District Council, Waitomo District Plan, March 2009.

<sup>3</sup> Waikato Regional Landscape Assessment, Environment Waikato, February 2010.

! **Major effect**

The Project will be a visible and immediately apparent element within the landscape and will result in a change to the overall character and/or affect to the viewer.

! **Moderate effect**

The Project may form a visible and recognisable new element within the landscape and would be discernable by the viewer.

! **Minor effect**

The Project may result in being discernable within the landscape, but will not have a marked effect on the overall quality of the landscape or affect the viewer.

! **No Effect**

The Project will not be discernable and will have no effect on the landscape or viewer.

The montages produced by Ventus utilise a 3D ground model that is photo matched to replicate the change in view. Although these do not necessarily adhere to the 'Best Practice Guideline for Visual Simulations'<sup>4</sup>, it is considered that the montage positions are sufficiently accurate to illustrate the effects of the change in turbine height and are photographically realistic to portray the proposed activity.

Ventus has prepared ZTV maps (Appendix 4) to illustrate the area over which the windfarm can theoretically be seen. The maps are useful to illustrate the potential for views and viewer catchment of the windfarm, therefore when examining the ZTV maps, it is important to understand that:

- ! ZTV maps do not show how a project will appear or the magnitude of visual effects as they only show an indicative area and extent of potential view;
- ! They do not take into consideration the potential screening effect of localised vegetation or structures within the area on individual properties;
- ! The accuracy is limited to the contour information/intervals; and
- ! ZTV's are an assessment tool which produces a baseline of the potential maximum visibility of the windfarm, however it does not consider the effects of distance of viewer and the atmospheric conditions in terms of visibility of the turbines.

Validation of ZTV's by site visit and examination of specific viewpoints will assist to further refine the potential visual effects has been undertaken during the site visit in February.

---

<sup>4</sup> Best Practice Guideline for visual Simulations', New Zealand institute of Landscape Architects – Education Foundation, March 2009.

## **5 Description of Project**

Refer to the current Resource Consent<sup>5</sup> application for project description and information pertaining to the proposed rotor types, dimensions and ancillary components.

In summary, consent has been given for the construction of access roads, the placement of transmission lines and installation of 22 number of 110m high turbines, which to date have not been constructed. The site proposed site is located within the western hill country and have well defined but level ridges with steep slopes on the flanks. The local peak to the northern end of the site has an elevation of 340m with the remainder of the site at around 320m above sea level.

The resource consent application is for the increase of 11 of the 22 turbines to utilise a nominal turbine that has a 76m hub height and 90m diameter rotor that will have a 31m clearance between blade tip and ground (i.e. 121m overall height). The turbines that will increase in height are located to the northern end of the site and are number 1 to 11 on the site plan (Appendix 2, Figure 1.0). The increased heights of the turbines will be seen in context with the consented scheme.

Other aspects, such as the access road and transmission lines of the consented project will not change and will be constructed in accordance with the current consent conditions.

## **6 Assessment of the Landscape and Visual Effects**

### **Landscape Effects**

The landscape character or amenity (landscape) is composed in the simplest form of a combination of landform, land cover and landuse. The landscape effects arise from changes to these components of the local landscape. These physical changes to the landscape from the construction of the windfarm will typically occur due to:

- ! The formation earthworks for the construction of the access road and turbine foundations;
- ! Construction of substations and ancillary control buildings;
- ! The construction and or connection to of electrical power lines; and
- ! The installation of the wind turbines.

The extent of change and their effects on character in relation to the above, have already been considered through the consenting process that was carried out in November 2005 and by 'consent' are within acceptable limits.

There will be no change in the landscape effects from the current resource consent as the number and location of turbines have not changed. The increased height of 11 of the 22

---

<sup>5</sup> Taumatotara Windfarm, Assessment of Environmental Effects for a Turbine tip Increase, 21 November 2011.



turbines as illustrated in the photographic montages (Appendix 3, Figures 2.0, 2.1, 3.0 and 3.1) provide a comparison of the consented scheme and the proposed increase in height. The montages demonstrate that the change in height will have no discernible effect on landscape character or amenity.

Additionally, the access road, power lines and earthworks will not alter in relation to the consented scheme.

### **Visual Amenity**

Landscape amenity is assessed in relation to the 'naturalness' of the place. The project area and beyond has been highly modified over time (refer to Appendix 1, Photos 1 to 3) and is not considered as being a high value landscape and has been assessed as having a low to medium degree of 'naturalness'.

Given the extent of change that has occurred within the landscape, the areas relative remoteness and low population, it is considered that the area has a good capacity to absorb change.

There will be noticeable changes to the landscape and visual amenity when the consented windfarm is constructed, as illustrated within montages 2.0 and 3.0 (Appendix 3). In comparing the consented montages with montages 2.1 and 3.1 which illustrate the change in height of the turbines there is no change to the effects on visual amenity. Therefore, the increase in height of the turbines will have less than a minor effect on the properties to the south.

The less than minor effect can be attributed to the relatively small increase in overall height, the distance between turbines and the receding alignment (south to north), which moves away from viewers located along Coutts Road and Marokopa Road minimises the visual amenity change.

From the northern aspect of the site along Taharoa Road (appendix 1, photos 4 and 5), there is housing located within the valley. Only road users will be able to see the windfarm, with glimpsed views being obtained depending on the degree of screening provided from vegetation and topography within the vicinity. Where the turbines are visible from along Taharoa Road, the change in turbine height will be less than minor in regards to visual amenity.



The cluster of housing along the end of Taumatotara West Road and the Taharoa Road intersection area (Appendix 1, photos 6, 7 and 8) will not recognise the change in turbine height due to the containment of topography and surrounding vegetation. There will no change in relation to their visual amenity.

The visual effects on amenity will result from changes to the local landscape and the degree of visibility of the wind farm in relation to the change in turbine height in comparison to the consented scheme, but increasing the height of 11 of turbines by 10%, will have no additional impact on visual amenity.


## Effects of Distance on Receptors

The Projects Visual Catchment or Zone of Theoretical Visibility (refer to Appendix 4 – ZTV Plans) illustrates the potential visibility of the windfarm from the surrounding landscape. The ZTV plans provide a comparison between the consented scheme and the proposed increased height of the 11 turbines and illustrates that the potential effect is less than minor. Effectively there is less than a minor change in the ZTV, resulting in no discernable change in the extent of the area affected.

During the site visit undertaken on the 14<sup>th</sup> February 2012, the ZTV plans (Appendix 4 – ZTV Plans) and montages (Appendix 3, photos 2.0, 2.1, 3.0 and 3.1) were used confirm that there would be no change to the visual effects for the identified receptors when comparing the consented and proposed increase in turbine height. The assessment process determined that the topography, existing vegetation, distance between turbines and the alignment along a north and south axis meant that the change in height of the turbines will be difficult to discern for properties to the south of the site.

 residents located at the end of Coutts Road are the closest from the turbines approximately 3.5km south, (refer to Appendix 1, Photos 9 to 15) and will have varying views of the turbines. The viewing distance from the windfarm is sufficient in that these properties will not discern the change in height of the turbines, particularly as the increased height turbines will be located along the ridge line on a receding axis. As the distance from the windfarm increases, the effects on properties (Appendix 1, photos 11 to 15) further  along Marokopa Road (beyond the Coutts Road intersection) will not change with increase in turbine height. For properties located along the Taumatotara West Road and Taharoa Road, they will not recognise the increased height of the turbine as the topography and vegetation will effectively screen the views of the windfarm. Therefore there will be no effect from these properties.

## 7 Conclusion

The increased height of the turbines does not change the extent of the visual catchment area or effects landscape character and visual amenity. The change in turbine height will result in no additional properties being affected when compared to the consented scheme, particularly as the area has a low density of residential properties. Additionally, the distance of receptors from the windfarm, the south to north alignment of turbines and the distance between turbines means that the change in turbine height will be difficult to discern by local residents and road users, and will result in no change to the to  effects on landscape character and visual amenity from the consented scheme.

To conclude the change in height of 11 of the 22 turbines by 10% will be acceptable having regard to:

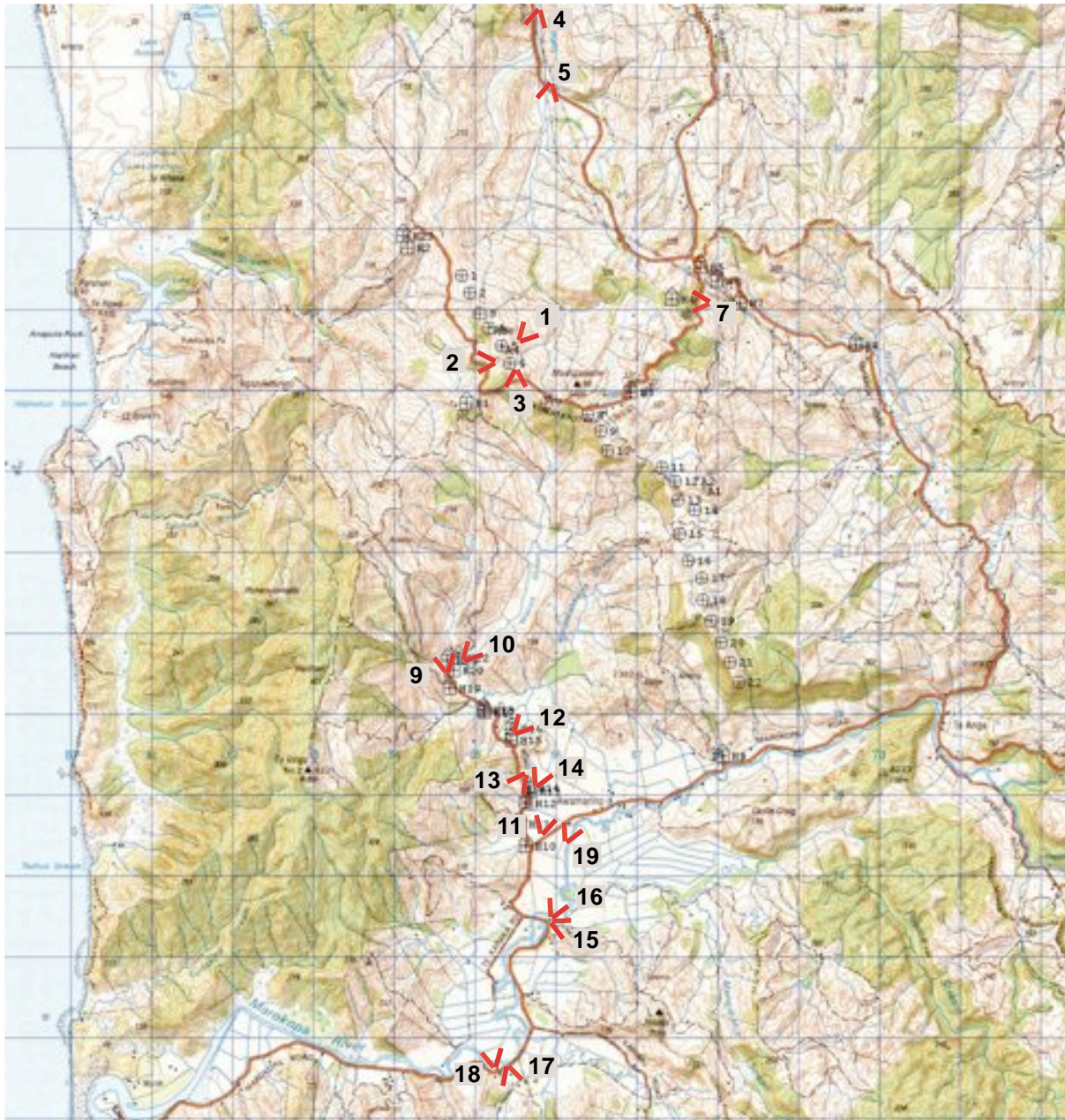
- ! The landscapes sensitivity and capacity to absorb change having already being substantially modified by human activities;

- ! The distance of viewers from the windfarm in relation to the turbine alignment and spacing, and to a degree, the containment of vegetation and topography on views; and
- ! The fact that the landscape character and amenity will not be degraded further by the turbine height increase.

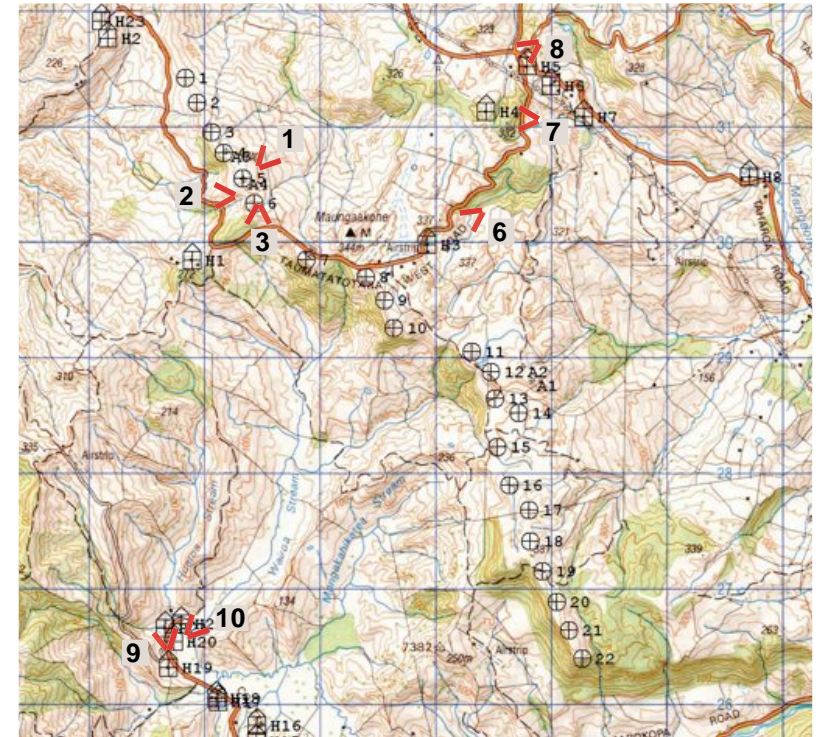
It is therefore considered that the minor increase in turbine height can be successfully implemented without further landscape and visual effects occurring when considered in relation to the consented windfarm. Furthermore, the current landscape and visual consent conditions remain valid to minimise and mitigating the effects of the windfarm as a totality.

## **Appendix 1**

### **Site Photos**



Map 1: Photographic locations.



Map 2: Photographic locations (enlarged area)



Photo 1.0: View north towards Kawhia from windfarm site.



Photo 2: View west towards coast line from windfarm site.



Photo 3: View looking south towards Marokopa Valley from windfarm site.



Photo 4: View looking south towards site/ridgeline from Taharoa Road.



Photo 5: View looking south towards site/ridgeline from Taharoa Road.



Photo 6: View of house along Taumatotara West Road with site not visible beyond ridgeline.



Photo 7: Residential property along Taumatotara West Road, views contained by surrounding vegetation.



Photo 8: View from the junction of Taharoa Road and Te Waitere Road with site not visible to the south beyond ridgeline.



Photo 9: View of residential property at end of Coutts Road.



Photo 10: View from end of Coutts Road towards the wind-farm site with topography and vegetation obscuring views.



Photo 11: View from Marokopa Road and (near Coutts Road junction) with view of rural residential property and view towards the site.



Photo 12: View from Coutts Road property with views towards the windfarm site.



Photo 13: View start of Coutts Road adjacent property with views towards the windfarm site.



Photo 14: Adjacent house to view in photo 13.



Photo 15: Farm property to the south of site, off Marokopa Road.



Photo 16: View from area adjacent to property in photo 15 looking towards windfarm site.





Photo 17: View of farm properties looking south from Marokopa Road.



Photo 18: View from farm properties (photo 17) looking north towards the windfarm site.



Photo 19: View from Marokopa Road towards windfarm (similar location to photomontage 3.0 and 3.1.

## **Appendix 2**

### **Site Plan**



## **Appendix 3**

### **Montages**





Figure 3.0: Montage showing consented 110m turbines from Marokopa Road (and Coutts Road intersection).



Figure 3.1: Montage showing consented 110m turbines (to south) and proposed 121m high Turbines (northern end of site) from Marokopa Road (and Coutts Road intersection).

## **Appendix 4**

### **Zone of Theoretical Visibility**

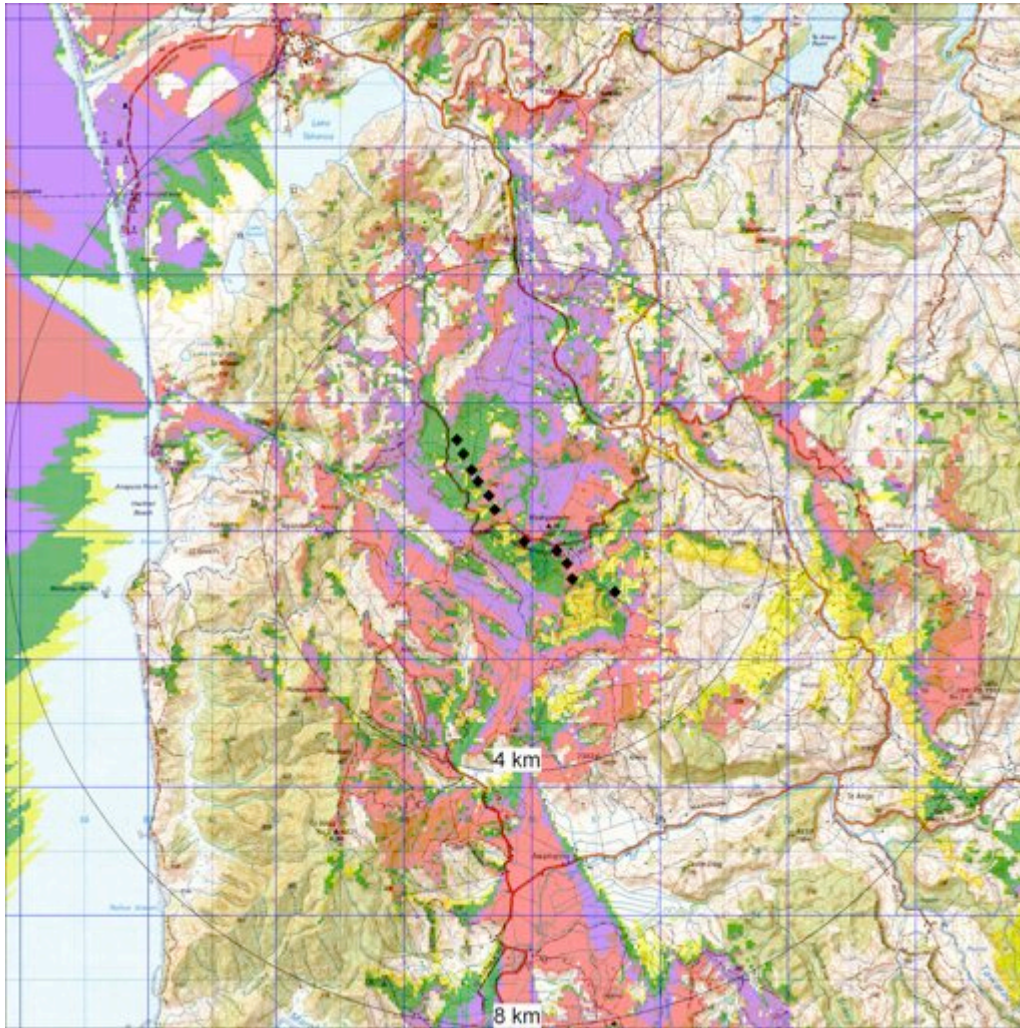


Figure 4.0: Montage showing ZTV of consented 110m turbines

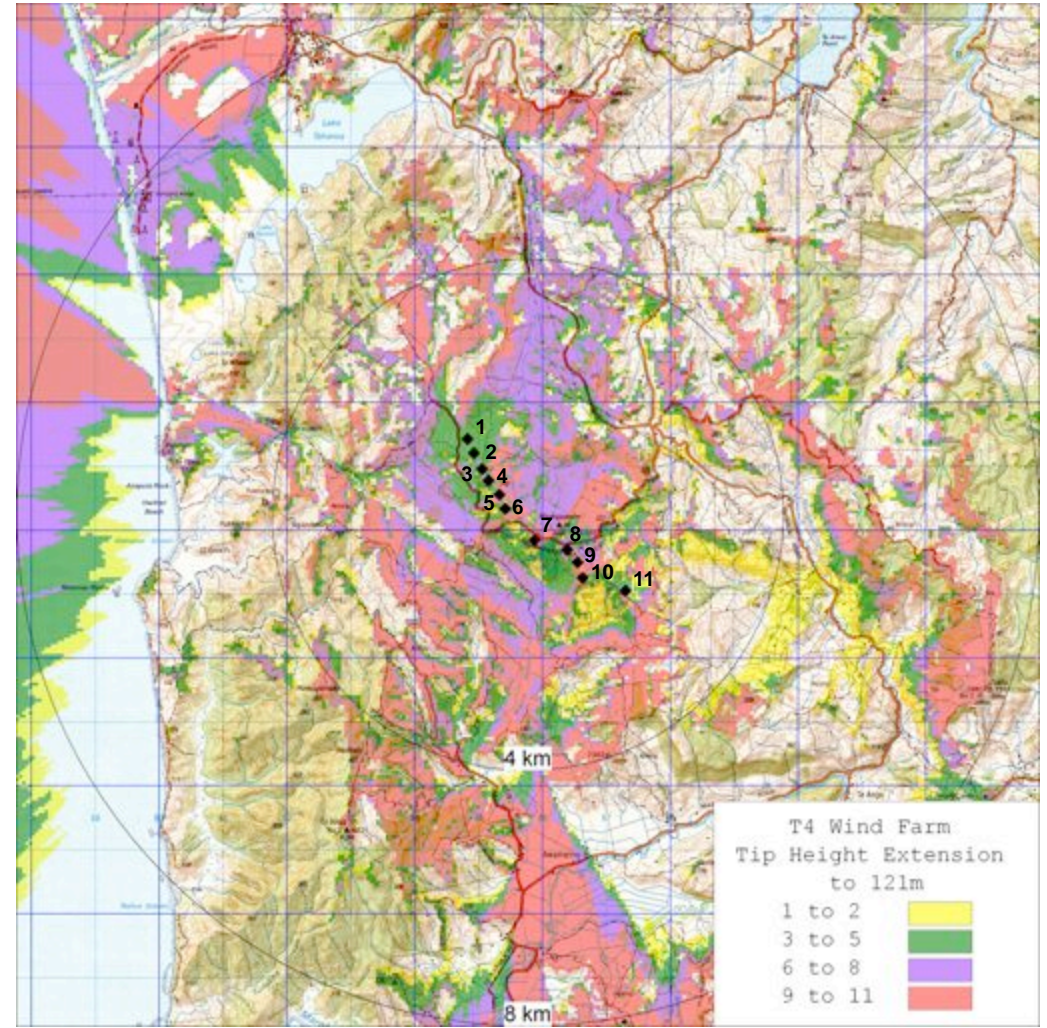


Figure 4.1: Montage showing ZTV of proposed 121m high turbines