

# **APPENDIX F:**

## **INDEPENDENT PEER REVIEW - VISUAL ASSESSMENT**

---

# ***INDEPENDENT REVIEW AMENDED DA***



## ***BANGO WIND FARM PROPOSAL***

***Prepared for  
NSW DEPARTMENT OF PLANNING  
& ENVIRONMENT***

14<sup>th</sup> July 2017  
**REF: 969-Z-03**  
**REVISION: AMENDED DA**

**O'Hanlon Design Pty Ltd**  
ABN 44 003 755 986  
1/153 Victoria Road  
Gladesville. NSW 2111  
ohd@qoh.net.au

Phone: **(02) 9420 3633**  
Fax: **(02) 9420 3655**

### 1.1 Overview

O'Hanlon Design Pty Ltd has been engaged by the NSW Department of Planning and Environment (DP&E) to review and comment on the quality and accuracy of the landscape and visual assessment report for the proposed Bango Wind Farm, provided as part of the Environmental Assessment (EA) submitted for development approval by CWP Renewables Pty. Ltd (the Proponent).

The engagement specifies the preliminary report is to include consideration of:

- Summary of significant landscape / visual issues or fatal flaws focusing on the outcomes for the project from public and private viewpoints
- High level identification of
  - Critical flaws / gaps in the methodology documentation to be addressed by the Applicant, if applicable
  - Significant landscape features relevant to the project
- Provide a conceptual framework for how landscape issues will be addressed (e.g. residence clusters)
- Preliminary recommendations on mitigation measures and identification of areas where recommendations significantly differ to VIA, if applicable.

Our methodology for preparation of this review has included two site visits, a desktop review of residences and potential viewing locations, DP&E guidelines, the proponent's Environmental Assessment (EA), and the appendix 8 Landscape & Visual Impact Assessment (LVIA). We have also analysed topographic maps for the study area and wider areas to identify possible local issues and potential cumulative or regional issues. The purpose of these reviews was to provide background information, a reference for the methodology and depth of assessment that could be considered a reasonable review.

Since the initial engagement and review the proponent has submitted an Amended DA (The ADA) based around removal of the Lang's Creek turbine cluster and a number of turbines at the north and south ends of both the Kangiara and Mt Buffalo turbine clusters.

### 1.2 Introduction

The Bango Wind Farm (BWF) project originally proposed 118 Wind Turbines to be located within the Southern Highlands between the townships of Boorowa and Rye Park and the main roads of the Hume Highway and Lachlan Valley Way. The amended DA now proposes a maximum of 75 turbine locations.

The BWF has a dual layout proposal noted as 'layout option 1' and 'layout option 2'. The ADA introduces the concept of flexibility to mix and match between the two layouts at a later stage having identified all turbines for both options in the documentation. This flexible concept means the final layout is not determined and cannot be addressed in detail. To create a benchmark for consideration the NSW Dept. of Planning and Environment has directed this assessment be based on layout option 1 as submitted in The ADA.

I note that the numbering system for the two optional layouts may lead to some identification confusion as the same numbers are used for differing co-ordinates in both layout option 1 and 2. This may make the final co-ordinates of the final turbine layout proposed in any flexible mixed proposal extremely difficult to identify.

Key Project statistics of the Amended DA submission are:

- Maximum of 75 Turbines in total
- Overall Height (top of tip): 200m (Refer report preface letter)
- Overall Height (to hub): 128m (Extrapolated - Refer report preface letter)
- Rotor Diameter: 144m (Refer report preface letter)
- Associated 132kV overhead powerlines, Collector substation and switching substation.
- The Proposed Rye Park Wind Farm (RPWF) is located between 7-8kms to the east of the proposed BWF and combined they are likely to create cumulative impacts to residences located between the proposals.

### **1.3 Public Viewpoints**

The public viewpoints most significantly fall into three groups, those along Lachlan Valley Way, those along Tangmangaroo Road and those along Wargeila Road. Each road runs basically north south.

Wargeila Road has some cumulative impacts from the Rye Park development probably noticeable only at the high points or where roadside screening is negligible.

Tangmangaroo Road is relatively lightly used, set backs are good and is unlikely to create major visual issues other than the main substation location. The ADA notes three possible switching station locations along Tangmangaroo Road. It would be prudent for the substation compound to be set well back from the road with a vegetative screen. To reduce visual impacts the most westerly switching station location is the most desirable.

Lachlan Valley Way is a main road, however the impacts are only to the east and north east at distances which appear to prevent dominance being an issue. The ADA identifies two options for entry of the Lachlan Valley Way neither have significance in the assessment of the visual impacts.

### **1.4 Conceptual Framework of the Review**

In setting a conceptual framework for the assessment of the project we identified 8 clusters of residences, each of which have a similar orientation to the proposed development with individual height and screening variations. Section 5 of the ADA now uses a similar grouping system to analyse the detailed effect of the turbine removals.

This project has some key visual properties that differ from other projects. The turbine arrangement is in identifiable north-south lineal strings that from some viewpoints, particularly from the north east and east will create a series of overlapping cascading elements. Where visible this will create a less random, more regular appearance to the wind farm reducing the cluttering effect of the large number of turbines.

The proposed overall turbine height of 200m to blade tip is significantly greater than the adjacent approved windfarms and combined with the elevated location of the turbines in the topography this feature is likely to exaggerate any dominance issues. Generally the turbine bases are located between 100m and 150m above the private and public viewing locations creating a relative height difference from viewers to tips of turbines in the order of 300m to 350m. Subject to screening available at individual viewpoints, at reduced distances of less than 2600m from the viewer, the turbines will highly dominate the landscape character. In addition some areas to the south and west of the project are less undulating with extensive views to the project over significant distances.

It is likely that the impacts at both residential and public viewpoints beyond 5km will be relatively similar. It is unlikely that viewpoints at greater distances than 5km will be significantly altered by the changes to the turbine layouts or the ADA proposed flexibility. As the viewers come closer to the turbines the change in magnitude becomes more significant and justification of final locations for turbines of the proposed height and location is a reasonable expectation. Cumulative impacts with

the Rye Park Wind Farm (RPWF) for areas north east and east of the project have variable but relevant significance.

When reviewing Table 6 of the ADA it is notable that while the adjustment and removal of turbines in the ADA does reduce the impacts, particularly on adjacent residences, the LVIA assessment methodology is not fine grained enough to reflect a change in the overall visual impact assessment rating at most residences. The exceptions are R238, R282 and R160 (reduced due to the removal of the Langs Creek turbine cluster).

Our review is structured to also note the reductions in impacts on the areas both west and north of the Langs Creek turbine cluster to clarify the overall reduction of visual impacts created by the ADA changes.

### 1.5 Photomontages

Whilst the photomontages do not form part of the assessment it is relevant to note that the background photographs do not always allow easy visibility of the turbine layout. The VIA refers to the Scottish Natural Heritage Guidelines (SNHG) for 'Visual Representation of Wind Farms' Version 2.1 December 2014. In section 4 – Visualisations Items 111,112 the SNHG, identifies that *'It is essential that all baseline, photographs are taken in good visibility'* and follows with the note that this will generally mean clear sky's to allow sufficient contrast, noting this is particularly important for long range views.

Many of the VIA photomontage baseline photographs have light to heavy cloud cover reducing the contrast and visibility of the wind turbines. This reduces the value of the photomontages.

### 1.5 Residential Cluster Review

#### Langs Creek Western Cluster (LVIA Fig 26a)

*This cluster of residences is generally located adjacent Lachlan Valley Way and Boorowa Creek at approximate RL520. The removal of the Lang's Creek turbines has significantly reduced the visual impacts on this cluster of residences.*

*Remaining views are south-east towards the Kangiara wind turbines with bases at approximately RL650 (top of blade at approximately RL850). Mt Buffalo turbines will also be visible to the south west at distances in excess of 15km.*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative- RPWF	
R009	(2.1km) 5.4km	(Low)	Low-Moderate Southern end of the Kangiara cluster visible to the south-east.	Not relevant	PM1 (general vicinity)
R034	(2.1km) 6.4km	(Low)	Low-Moderate Southern end of the Kangiara cluster visible to the south-east.	Not relevant	PM1 (general vicinity)
R036	(3.2km) 7.3km	(Low)	Low. Southern end of the Kangiara cluster visible to the south-east.	Not relevant	-

Langs Creek Northern Cluster (LVIA Figure 26a)

*This cluster of residences is located on the south/south western fringe of Boorowa at approximately RL530. The removal of the Lang's Creek turbines has significantly reduced the visual impacts on this cluster of residences.*

*Remaining views are south-east towards the Kangiara and Mt Buffalo wind turbines with bases which are at approximately RL650 (top of blade at approximately RL850).*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative - RPWF	
R019	(2.5km) 6km+	(Low to Med)	Low	No significant cumulative impacts due to overall distances to Rye Park.	-
R066	(2.8km) 7km+	(Low)	Low	No significant cumulative impacts due to overall distances to Rye Park.	PM6 (general vicinity)
R119	(0.9km) 4.1km	(Medium)	Medium	Small cumulative impacts due to overall distances to Rye Park.	-
R283 Approved DA	(2.7km) 8km+	(Medium)	Low	No significant cumulative impacts due to overall distances to Rye Park.	-

Kangiara North Cluster (LVIA Figure 26a)

*Generally this cluster is situated at RL550 – RL 580 and has views south towards the Kangiara and south east towards the Mt Buffalo wind turbines. R282 has been constructed since the original LVIA. The closest Kangiara Turbine base is at RL640 (top of blade at approximately RL840).*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative - RPWF	
R020	(1.6km) 2.1km	(High) Low to Medium	Medium - High High localised dominance impact from T76 & 98.	Medium Cumulative Effect <60 turbines to south and west.	PM10 (general vicinity)
R282	(1.7km) 2.2 km	(High) Medium	High High localised dominance impact from T76 & 98.	Medium Cumulative Effect <60 turbines to south and west.	PM10 (general vicinity)
R176	(3.0km) 3.6km	(Low) Low	Medium Medium localised dominance impact from T76 & 98.	Medium Cumulative Effect <60 turbines to south and west.	-

Mount Buffalo Northwest Cluster (LVIA Figure 26a)

*This cluster is located at approximate RLs ranging from RL520 to RL570 with views to the northwest of the Mount Buffalo wind turbine cluster which are at approximately RL610-630 (top of blade at approximately RL810-830). There are also potential long range 5-10km views to the south – west of the Kangiara wind turbine cluster and across to the Rye Park Wind farm.*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative - RPWF	
R097	(2.1km) 3.7km	Low	Low Views North up gully toward Mount Buffalo clusters.		-
R142	(2.0km) existing residence 3.0km	Low	Low Potential screening to ridge SE of residence may lessen impact.	View east of RPWF at approx. >7.5km	-
R170	(2.8km) 2.8km	Nil to Low	Nil – Low East: Likely top 20% of T103 visible		PM14 (general vicinity)
R141	(3.0km) 4.6km	Low to Medium	Low - Medium Tight cone of view up gully similar to R097.	View east of RPWF at approx. >7.5km	PM5 (general vicinity)

Rye Park North-east Cluster (LVIA Figure 26a)

*This cluster at approximately RL550 -580, which includes the town ship of Rye Park is located to the north east of the Mount Buffalo wind turbine cluster which are at approximately RL610-630 (top of blade at approximately RL810-830). There are cumulative impacts associated with the proposed Rye Park Wind Farm to the northeast to southeast (approx. 5km).*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative - RPWF	
R041	(0.7km) 1.2km	Low to Medium	Medium - High	Medium View east of RPWF at approx. >7.5km	-
R048	(2.9km) 2.9km	Low	Moderate Two 60° Sectors potentially visible	Moderate Two 60° Sectors of the proposed RPWF visible.  Overall four 60° Sectors or 180° view sector impacted. Some reasonable existing planting immediately around the residence.	-
R051	(3.6km) 5.0km	Low	Low 30° view sector south toward Mount Buffalo	Low	PM5 (general vicinity)

Mount Buffalo Eastern Cluster (LVIA Figure 26b)

*This cluster is situated at approximately RL 600 east of the Mount Buffalo wind turbines which are at approximately RL660 (top of blade at approximately RL860). There are cumulative impacts associated with the proposed Rye Park Wind Farm to the northeast to southeast (approx. 5-10km).*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Cumulative - RPWF	
R152	(2.6km) 2.6km	Low to Medium	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 2.6 and 8km.  >Two 60° view sectors	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity)
R035	(3.1km) 3.2km	Low to Medium	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 3.2 and 8km.	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity)
R152	(2.6km) 2.6km	Low to Medium	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 2.6 and 8km.	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity)
R106	(3.3km) 3.3km	Low	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 3.3 and 8km.	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity)
R190	(3.2km) 3.2km	Low	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 3.2 and 8km.	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity)
R243	(3.2km) 3.2km	Low	Medium Likely all turbines of the Mount Buffalo Cluster will be visible between 3.2 and 8km.	Medium – High  >One 60° view sector of RPWF, with approximately Four 60° view sectors in total.	PM2 (general vicinity).

This is a small tightly spaced residential cluster with good views west and east back to the Rye Park wind farm. Planting around the individual residences and some roadside planting could provide some amelioration of the cumulative impacts. Planting to ameliorate views to the west will have most effect.



Mount Buffalo South-western Cluster (LVIA Figure 26b)

Generally this cluster is situated at RL590 – RL 670 and has views to the northeast of the Mount buffalo turbines which are located at approximately RL680-740 (top of blade at approximately RL880-940). With longer distance views to the northwest of the Kangiara wind turbines located at approximately RL630 (top of blade at approximately RL830).

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			BWF	Notes	
R238	(1.0km) 1.8km	Medium	High Turbines 17, 62, 102, 111, still have significant dominance impacts.  Significant degree of impact combined with Kangiara & Mt Buffalo Clusters.	PM22 shows that mitigation landscaping could be used relatively easily to screen.  Construction rights for two residence – 1 already built.	PM22
R060	(2.4km) 2.7km	Medium	Medium – High  Turbines 25, 62, 102 and 111 still have significant dominance impacts.	Significant degree of impact combined with Kangiara & Mt Buffalo Clusters	-
R144	(2.4km) 2.5km	Low	Medium - High  Turbines 17, 25, 45, 62, 102, 111, still have significant dominance impacts.	Significant degree of impact combined with Kangiara & Mt Buffalo Clusters	-
R165	- 3.2km	Low to Medium	Medium – High	Kangiara and Mt Buffalo clusters at almost equal distances at 3.2km not clear in PM13. Project over three 60° view sectors.	PM13 in ADA
R026	- 3.3km	Low to Medium	Medium – High	Kangiara and Mt Buffalo clusters at almost equal distances of 3.3km not clear in PM13. Covers 3 60° view sectors.	PM13 in ADA
R166	(3.4km) 3.4km	Low to Medium	Medium – High	Kangiara and Mt Buffalo clusters at almost equal distances of 3.4km not clear in PM13. Covers 3 60° view sectors.	PM13 similar

The removal of turbines 92, 120 and 123 has reduce the impacts at Residences 060 and 238 however not sufficiently to reduce the overall assessment by the proponent or OHD. Turbines 17, 25, 45, 62 and 111 also create some cumulative impacts on R235 and R076 in the following Southern Kangiara cluster.

Kangiarra Southern Cluster (LVIA Figure 26b)

*This cluster of residences is located at RLs ranging from RL560 to RL610 and has views of wind turbines generally to the north and north-east. Turbines are located at approximately RL600 (top of blade at approximately RL800). This cluster contains a high number of residences within the Kangiarra Village just off Lachlan Valley Way and the combined property of R76 and R235.*

Residence	Distance (LVIA) ADA	Assessment (LVIA) ADA	OHD Comments		Photo-montage
			<b>BWF</b>	<b>Cumulative - RPWF</b>	
R076	(1.9km) 2.1km	Medium	Medium - High  The primary outlook of the residence is significantly impacted by the Mt Buffalo cluster completely changing the landscape character of the view to the east. A large percentage of view is affected. PM does not take in closest turbines to north.		PM12
R235	(1.7km) 1.9km	High	High  The primary outlook is to the north with some screening. Turbines 19, 65, 72 and 79 all create dominance issues due to the relative topography.		PM13
R062	(2.1km) 2.9km	Medium to High	Medium - High  Turbines 19, 65, 72 and 79 all create dominance issues The primary outlook of the residence is north with some screening.		-
R260	(2.0km) 2.8km	Medium to High	Medium - High  Turbines 19, 65, 72 and 79 all create dominance issues.		-
R042	(2.5km) 3.3km	Nil to Low	Low - Medium  Turbines 19, 65, 72 and 79 all create dominance issues		-
R179	(2.6km) 2.9km	Low	Low - Medium		-
R181,187,188	(2.6km) 2.9km	Nil to Low	Low - Medium		-

Analysis of the topography indicates that the four turbines noted 19, 65, 72 and 79 in the Kangiarra run create dominance issues as they are located close to the southern end of an elevated ridge line. The turbines further north in the Kangiarra run have some shielding created by the southern edge of the ridge when viewed from the adjacent residences and have greater set-backs from potential viewers.

Edward O'Hanlon RAIA  
Director  
O'Hanlon Design Pty. Ltd