

INDEPENDENT EXPERT REVIEW

**BOWMANS CREEK WIND FARM
(SSD-10315)**

PREPARED FOR
**NSW DEPARTMENT OF PLANNING &
ENVIRONMENT**

**16 NOVEMBER 2023
1042-ZO-01**

REVISION C



**O'HANLON DESIGN PTY LTD
LANDSCAPE ARCHITECTS
ABN 44 003 755 986**

1/153 Victoria Road
GLADESVILLE NSW 2111

**T 02 9420 3633
F 02 9420 3655
E ohd@qoh.net.au**

INDEPENDENT EXPERT REVIEW

TABLE OF CONTENTS

TABLE OF CONTENTS	2
DOCUMENT CONTROL	2
1. SECTION 1 - OVERVIEW	3
2. SECTION 2 - REVIEW OF METHODOLOGY AND KEY VISUAL FACTORS.....	5
3. SECTION 3 - REVIEW OF RESIDENTIAL IMPACTS & PROPOSED MITIGATION.....	10
4. SECTION 4 - SUMMARY	22
ASSESSMENT DOCUMENTS	23

DOCUMENT CONTROL

Revision	Date	Purpose	Prepared by	Reviewed by
DRAFT	19/06/2023	Internal Review - Not for External Distribution.	WF	-
A	29/06/2023	For DPE	WF	TOH
B (DRAFT)	11/09/2023	For DPE review, amended project and assessment parameters	WF	TOH
B	04/10/2023	Finalise Draft. (Confirmation of S17-2 Road Clearing, VAB AHL compliance and associated dwellings.)	WF	TOH
C	16/11/2023	S17-2 Roadside screening clarification	WF	WF

1. SECTION 1 - OVERVIEW

1.1 Overview

O'Hanlon Design Pty Ltd (OHD) has been engaged by the NSW Department of Planning and Environment (DPE) to review and comment on the quality and accuracy of the Landscape and Visual Impact Assessment (LVIA) report for the proposed Bowmans Creek Wind Farm (BCWF) originally submitted for state significant development (SSD-10315) approval by Epuron Projects Pty Ltd and then acquired during the assessment by Ark Energy (the Proponent).

The engagement specifies the provision of an independent expert review report including:

- Review and comment on the proponents LVIA methodology, assumptions and assessments of visual impacts.
- Where appropriate, assessment of compliance with the Performance Objectives of the Visual Assessment Bulletin (VAB) only.
- Identification of residences or public viewpoints where the visual impacts exceed the Performance Objective thresholds that cannot be reasonably mitigated by landscaping, and
- Commentary on the suitability of the proposed mitigation and management measures.
- Provide recommendations for any subsequent mitigation measures to meet the Performance Objectives to inform the Department's assessment.

1.2 Terms and Abbreviations

Term / Abbreviation	Meaning
AHD	Australian Height Datum
BCWF	Bowmans Creek Windfarm
CASA	Civil Aviation Safety Authority
DPE	NSW Department of Planning & Environment
EIS	Environmental Impact Statement including all updates and amendments noted listed in the assessment documents.
EP&A Act 1979	NSW Environmental Planning and Assessment Act 1979
km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
LVIA	Landscape and Visual Impact Assessment including all updates and amendments listed in the assessment documents
OHD	O'Hanlon Design Pty. Ltd.
PEP	Plant Establishment Period
RtS	Response to Submissions
RL	Reduced Level
SEARs	Secretary's Environmental Assessment Requirements
VAB	Wind Energy: Visual Assessment Bulletin (DPE 2016)
WTG	Wind Turbine Generator

1.3 Methodology

Our methodology for preparation of this review has included two site visits as described below:

- Site Visit 1 – 01/10/2021
 - Terry O'Hanlon and William Francis travelled throughout the project site on publicly accessible roads. No individual residences were visited. Partly cloudy weather conditions were experienced.
- Site Visit 2 – 27/04/2022 & 28/04/2022
 - William Francis accompanied by DPE representatives travelled throughout the project site visiting selected properties. Individual residences were visited as follows:
 - 27/04/2022: E17-3, F19-1, G17-1, Dwelling Entitlement Lot 40 DP1094039, H11-1, H11-2, H12-1. Low cloud and rain were experienced.

- 28/04/2022: Q17-1, Q17-2, Q17-3, Q17-5, S17-2, V20-1. Partly cloudy weather conditions were experienced.

A desktop review of remaining residences and potential viewing locations was completed, a review of the DPE Wind Energy: Visual Assessment Bulletin (VAB), the proponent's LVIA and associated subsequent submissions (refer to 'assessment documents' listed at the end of this report).

OHD 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 reasonable for consideration of the individual impacts.

1.4 Introduction

The Bowmans Creek Wind Farm project as originally submitted proposed 60 wind turbines to be located within the Hunter Valley region situated approximately 10km east of Muswellbrook and approximately 27km north of Singleton. The proponents final LVIA and adjusted submissions proposes 56 wind turbines.

Key Project Statistics:

- Originally proposed 60 turbines, the layout was then amended, and the total proposed number of turbines revised to 56. (WTG 10, 33, 60 & 61 removed.)
- Maximum overall height: (top of tip) 220m.
- Hub height: 140-150m.
- Rotor diameter: 160m
- Associated 330kv overhead and underground transmission line, overhead and underground reticulation powerlines, substations, access road works and an Operations and Maintenance Facility.
- Aircraft Hazard Lighting required to 31 WTGs.
- There are no approved windfarms within the immediate visual catchment.

1.5 Conceptual Framework

In setting a conceptual framework for the review of the project, we have identified 6 clusters of residences within which each residence has similar location characteristics that result in potentially similar turbine impacts for each related group of turbines with individual viewing and screening variations at each residence that affect the likely impacts.

The **Diagram 1: Residential Cluster Map** on Page 9 identifies the location of each residential cluster. **Section 3** provides commentary on individual residences, including:

- Compliance with the VAB and the visual impact at each residence, and
- The suitability of the mitigation proposals associated with each residence.

2. SECTION 2 - REVIEW OF METHODOLOGY AND KEY VISUAL FACTORS

2.1 Review of Methodology

In general, the LVIA incorporates the key elements and terminology of a standard visual impact assessment using a methodology specific to the proponent's landscape team. The LVIA methodology is consistent with similar visual assessment methodologies as it is based on the Performance Objectives outlined in the VAB and relies on professional opinion and assessment.

2.2 General Methodology

In section 3.2 of the original LVIA it is noted that the proponents LVIA has been prepared in accordance with the NSW Department Planning & Environment (DPE) Visual Assessment Bulletin (VAB).

The proponent's amended LVIA, including updates and responses to DPE requests for information, addresses the Stage 1 'Preliminary Environmental Assessment' and Stage 2 'Assessment and Determination' VAB requirements and is considered to meet the requirements of the VAB in relation to identification of impacts and, in most cases, justification at each residence within the required distances or Visual Zones.

It is our opinion that the visual assessment has responded appropriately to the guidelines defined in the VAB and that the methodology used provides sufficient information to assess the overall daytime visual impacts of the project. Refer **Section 3** for OHD comment relating to individual residences.

2.3 Baseline Study

The baseline study is an important initial step in LVIA assessment as it establishes the existing landscape and visual conditions. Ultimately the baseline study results in identification and assessment of scenic quality classes which are critical in setting the visual Performance Objectives when combined with viewer sensitivity and distance. The LVIA assesses most of the immediate project site landscape as a moderate scenic quality class.

2.4 Evaluation of Visual Performance Objectives

Section 9 of the LVIA provides an evaluation of the Visual Performance Objectives set out in the VAB. The evaluation is confirmed or updated following project adjustments in the subsequent addendum documents: Appendix D1 dated 23 September 2021, Appendix A dated 23 February 2022, Response to RFI 28 October 2022 & Response to RFI 24 March 2023. The tables throughout these documents provide evaluation of six visual Performance Objectives; Visual Magnitude, Landscape Scenic Integrity, Key Feature Disruption, Multiple Wind Turbine Effects, Shadow Flicker and Aviation Hazard Lighting against the varying levels of landscape significance established in the LVIA Baseline Study. The LVIA provides a professional opinion that the BCWF is compliant with each of the six Performance Objectives excluding the following residences:

- (Visual Magnitude) Residence P22-1 and P22-4. DPE has recently advised that P22-1 and P22-4 are now to be considered as associated residences.

As part of OHD review of the VAB Performance Objectives we note the following residences, whilst noted in the LVIA as meeting the VAB Visual Performance Objectives, are also non-compliant. Justification for non-compliance is noted in the LVIA and subsequent information. Refer to **Section 3** which provides more commentary on individual residences assessment, VAB non-conformance and associated justification.

- (Landscape Scenic Integrity) Level 2 Residence G17-1
- (Multiple Wind Turbine) Level 2 Residence O22-1.
- (Multiple Wind Turbine) Level 2 Residence Q17-1, Q17-2, Q17-3 & Q17-5.
- (Multiple Wind Turbine) Level 1 Residence S17-2.
- (Multiple Wind Turbine) Level 2 Residence T15-1.

2.4.1 Visual Performance Objectives - Thresholds

As the project site landscape has been established as a moderate scenic quality class, VAB table 8 results in a visual influence zone of VIZ1 to 2km regardless of level 1 or 2 viewer sensitivity. Following P22-1 and P22-4 becoming associated residences there are no receivers within 2km. Beyond 2km visual influence zone VIZ2 applies to residential level 2 receivers within the 2 to 8km setback.

2.4.2 Visual Magnitude

The VAB seeks to manage the control of visual impacts primarily using distance from the impact as a key factor in the assessment. The use of distance parameters combined with sensitivity creates a set of Visual Influence Zones that in turn set the visual parameters for assessing and managing the potential impacts. The VAB methodology is based on the principle that dominance of the elements in the landscape recedes as the distance increases. The dominance of elements is most pronounced when the viewer experiences that the elements in the landscape cover, or fill, a

significant proportion of the visual field. If the element is intrusive then the result is likely to be a higher influence on the existing landscape and a resultant higher degree of difficulty in avoiding undesirable impacts.

2.4.3 For Visual Influence Zone 1 the Visual Magnitude Objective is

"Avoid turbines or provide detailed justification of turbines below the blue line"

Following recent DPE advice, we note there are now no VIZ1 residences (P22-1 & P22-4 now associated). We note micro-siting of turbines adjacent S17-2 and G17-1 could result in these residences and associated micro-sited turbines becoming VIZ1.

2.4.4 For Visual Influence Zone 2 the Visual Magnitude Objective is

"Manage impacts as far as practicable, justify residual impacts and describe proposed mitigation measures below the black line. Consider screening between the blue and black line."

The LVIA addresses Visual Magnitude impacts as part of the assessment tables throughout the LVIA and subsequent responses to requests. Generally, the impacts are demonstrated to be compliant with the VAB Performance Objectives. In many cases compliance is proposed to be achieved using impact mitigation in the form of neighbour agreement and/or screening. **Section 3** provides more commentary on individual residences assessment and mitigation proposals.

Regarding level 3 receivers accessing public roads (Albano Road and Bowmans Creek Road) through the centre and southeast of the project; due to the proximity of WTG 7, 8, and 31 and to avoid elevation to VIZ1 sensitivity and to maintain compliance with the VAB any micro-siting of turbines 7, 8 and 31 should not decrease the distance between any sensitivity Level 3 viewer location and the turbines.

2.4.5 For Visual Influence Zone 1 the Landscape Scenic Integrity Performance Objective is;

"Wind turbines should not cause more than a low-level modification of the visual catchment. Turbines are seen as either very small and/or faint, or as of a size and colour contrast (under clear haze free atmospheric conditions) that they would not compete with major elements of the existing visual catchment."

Following recent DPE advice, we note there are now no VIZ1 residences (P22-1 & P22-4 now associated). We note micro-siting of turbines adjacent S17-2 and G17-1 may result in these residences and associated micro-sited turbines becoming VIZ1.

2.4.6 For Visual Influence Zone 2 the Landscape Scenic Integrity Performance Objective is;

"Wind turbines should not cause significant modification of the visual catchment. Turbines may be visually apparent and could become a major element in the landscape but should not dominate the existing visual catchment."

OHD expect that the large majority of VIZ2 receivers will view many of the turbines throughout the project as major elements within the landscape. In order to meet the Performance Objective regarding not dominating the existing visual catchment, an assessment based on professional opinion is required. We expect the assessment would consider the extent, contrast and magnitude of the turbines (size/scale considered against the distance) combined with the cumulative impacts, the scenic quality, and individual receiver's outlooks or views.

2.4.7 For Visual Influence Zone 1 and 2 the Key Feature Disruption Performance Objective are,

[For VIZ1] Avoid, and [for VIZ2] to minimise the impact of, wind turbines or ancillary facilities that result in the removal or visual alteration/disruption of identified key landscape features. This includes any major or visually significant landform, waterform, vegetation or cultural features that have visual prominence or are focal points".

The LVIA notes the community consultation identified the following key features within the greater landscape; Yellow Rock, Well Mountain and Native Dog Mountain.

- Yellow Rock is located in the south-eastern part of the project area, north of Bowmans Creek Road and east of S17-2. The closest turbine is WTG 8 at approximately 2km. Presumably identification of this key landscape feature resulted in removal of turbines north of Bowmans Creek Road in September 2021. Based on non-associated residence locations, topography and existing screening it is anticipated that the direct line of sight of S17-2 & T15-1 toward Yellow Rock does not appear to be impacted.
- Well Mountain is located in the southwestern part of the project area, north of K23-1. The closest turbine is potentially WTG 48 at approximately 2.3km. Based on the southwestern turbine array having low visibility from the Hebden/Scrumlo Road cluster, it is anticipated the residences on Scrumlo road (especially those closer to Well Mountain) have limited views of Well Mountain. It is anticipated there will be impacts on Level 3 receivers traveling north along Hebden Road toward Scrumlo Road who will be able to view Well Mountain and the turbines beyond to the northwest. LVIA PM6 Scrumlo Road provides a photomontage.
- Native Dog Hill is located in the north-western part of the project area, northwest of H11-2. The closest turbine is potentially WTG 57 at approximately 4.5km. The VIZ2 residences in this area are located between Native Dog Hill and the proposed turbines, therefore the turbines are not expected to disrupt the line of sight toward Native Dog Hill.

2.4.8 For Visual Influence Zone 1, 2 the Multiple Wind Turbine Effects are,

Avoid views to proposed, existing and approved turbines within eight kilometres from Level 1 and Level 2 viewpoints, exceeding the following threshold, or provide detailed justification:

Level 1 (high sensitivity) – Wind turbines visible within the effective horizontal views of two or more 60° sectors.

Level 2 (moderate sensitivity) – Wind turbines visible within the effective horizontal views in three or more 60° sectors.

The basic tool for cumulative impact assessment in the VAB is the 60° sector analysis multiple turbine tool. The LVIA addresses cumulative impacts as part of the assessment tables throughout the LVIA and subsequent responses to information requests. Generally, the impacts are demonstrated to be compliant with the VAB Performance Objectives. In cases where non-compliance is noted, a combination of existing vegetation, topography, marginal encroachment and distance are used to justify the non-compliance.

Section 3 provides more commentary on individual residences assessment and mitigation proposals.

The LVIA provides no assessment of cumulative impacts with any adjacent wind energy projects and OHD is not aware of any approved or proposed windfarms in proximity to the BCWF project.

2.4.9 For Visual Influence Zone 1, 2 and 3 the Shadow Flicker and Blade Glint Performance Objective are,

Finish turbine blades with a low reflectivity surface treatment to ensure blade glint is minimised.

Minimise shadow flicker to not more than 30 hours per year and utilise available mitigation options to minimise shadow flicker at dwellings.

The LVIA notes use of low reflectivity gel finish to reduce reflectivity. The LVIA table 10-1 describes shadow flicker impacts on individual residences. Table 10-1 demonstrates VAB compliance.

2.4.10 For Visual Influence Zone 1, 2 and 3 the Aviation Hazard Lighting Performance Objective are,

Aviation Hazard Lighting (AHL) must meet the requirements of the Australian Standard AS 4282-1997 and any prescribed and notified CASA requirement. Shield all AHL within two kilometres from any dwellings, avoid strobe lighting.

The Response to Additional Information Request (Feb 2022) notes that Aircraft Hazard Lighting is not required unless determined by CASA and the DPE. The LVIA makes no assessment of aircraft hazard lighting impacts as they have assumed aircraft hazard lighting will not be required by DPE. The LVIA correctly identifies that AS4282-1997 is now superseded by AS4282:2019 which notes *“Lighting for aviation safety does not fall within the scope of this standard”*.

If determined to be required, then approximately 55% of the wind turbines evenly distributed throughout the project site would be fitted with hazard lighting on the top of the nacel. Appendix D of the LVIA provided in October 2022 provided some clarity on a possible night lighting proposal if required. The lighting plan provided in Appendix D does not correctly number the proposed lit turbines, however they can be identified based on the location of unlit turbines also shown.

Should aviation hazard lighting be required, the LVIA proposes a range of aviation night lighting mitigation options including downward light shielding, non-reflective surfaces, dynamic shielding (for dual lighting) and lower intensity lighting.

If reduced lighting intensity and shielding less than 10 degrees are combined, then this is likely to exceed the VAB Performance Objective.

It is noted that there are no level 1 or 2 receivers within 2km of the project and the VAB Performance Objectives – Aviation Hazard Lighting are therefore met.

2.5 Transmission Lines & Miscellaneous Infrastructure.

Generally, the LVIA notes that transmission lines and permanent infrastructure is not expected to be visible or create any significant impacts. The only impact noted is possible filtered views to the 330kv transmission line from the Lake Liddell Recreation Park. OHD also note other low-level impacts associated with new overhead powerlines through the centre of the site and across Albano Road.

Roadworks in selected parts of the site are described in response to Request for Information appendixes. Roadside vegetation clearing required for site access may result in higher impacts to some residences. This is discussed further in **Section 3**.

2.6 Photomontages

The VAB notes; *Photomontages shall be prepared in accordance with the Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.1 December 2014 guidelines, noting they are generally consistent with the Land and Environment Court’s Photomontage Policy. The visual assessment needs to include a concise description of the complete methodology used to create any photomontages presented in the visual assessment.*

The LVIA nominates a methodology for the preparation of the photomontages and discusses the limitations of the provided photomontages. Generally, the background photographs are taken using a 50mm fixed focal length camera. The LVIA public viewpoint photomontages describe use of a 50mm prime lens camera. The residential photomontages do not note the type of lens used.

The *Scottish Natural Heritage Visual Representation of Wind Farms, Version 2.1 December 2014 guidelines* document the horizontal field of view as 53.5 degrees and the vertical field of view as 18.2 degrees. The LVIA photomontages do not note a vertical field of view and present a range of horizontal fields of view. These parameters present significant variability in the scale of the turbines when montaged into the landscape.

Residential photomontages (LVIA figure 18 to 37); with horizontal field of view ranging from approximately 95 degrees to 115 degrees. The horizontal field of view is double the guideline and presumedly has been presented this way to capture the proposal across the landscape.

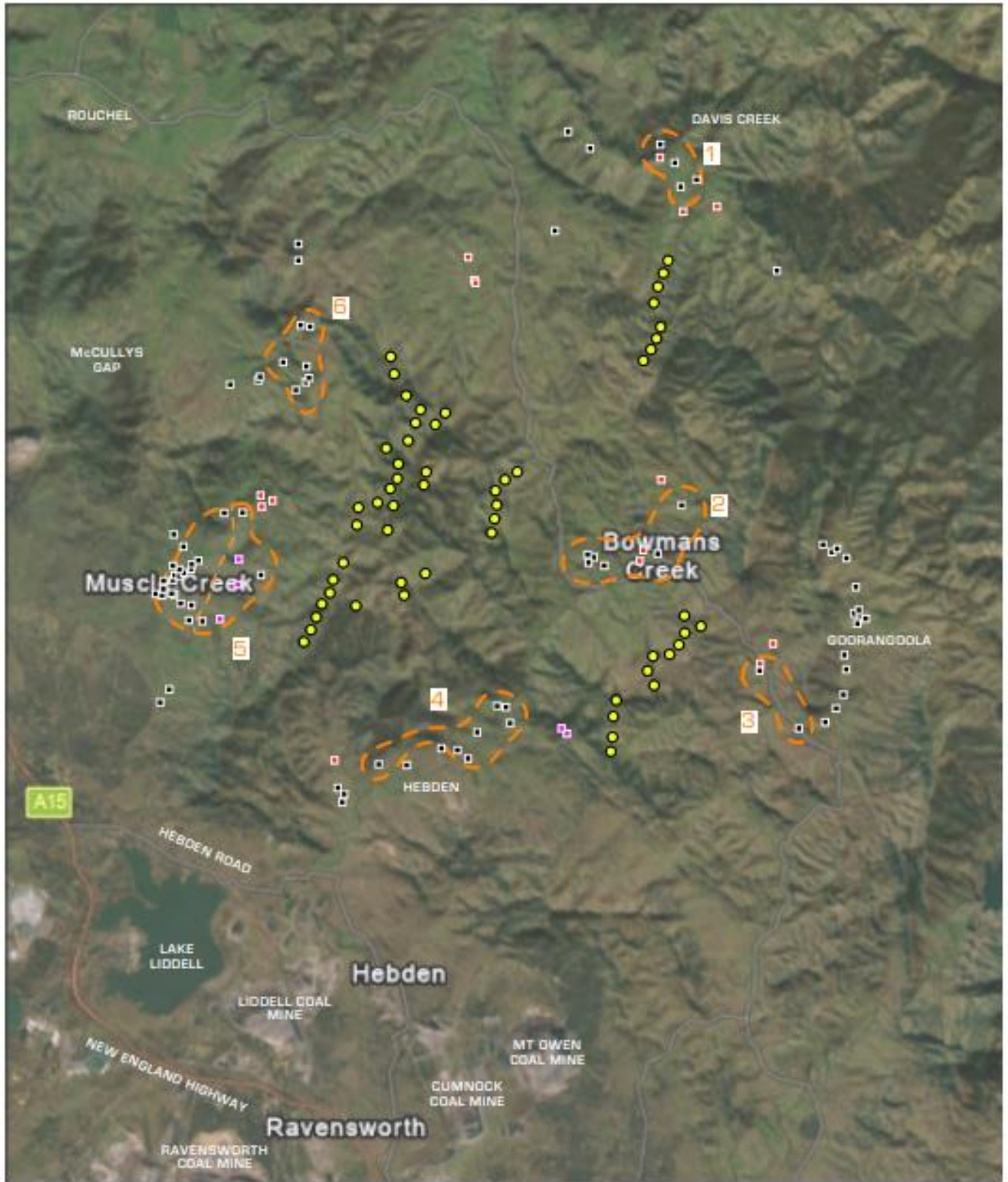
Public viewpoint photomontages (LVIA figure 39 to 41); are presented with horizontal field of view range of approximately 55 to 60 degrees. This is considered to be close enough to the guideline (53.5 degrees) that the photomontage is a reasonably accurate render of the view with the naked eye.

Public viewpoint photomontages (LVIA figure 41 to 46); are presented with horizontal field of view range of approximately 80 to 90 degrees. The horizontal field of view is nearly double the guideline and presumedly has been presented this way to capture the proposal across the landscape.




For analysis we have compared LVIA photomontage figure 25 and 40 to understand the effect or difference between compliant or near compliant and increased horizontal field of views. Comparison:

- Figure 25: G17-1
 - has a horizontal field of view of approximately 112 degrees
 - the most obvious turbines are at distances of around 2.04 km to 2.50km.
- Figure 40: PM1B
 - has a horizontal field of view of approximately 55 degrees
 - the most obvious turbines are at distances of around 4.70km to 5.30km.

In these two examples above, the turbines appear at a similar scale within the landscape despite the distance from the viewer to the turbines being approximately double. This comparison demonstrates that by increasing the horizontal field of view, the scale and impact of the turbines is visually diminished. In our opinion, for the reason demonstrated above we consider the photomontages (excluding figures 39 to 41) are non-compliant with the requirements of the VAB, whilst providing an understanding of the layout of the turbine array they should not be used for assessing the scale and magnitude of the impacts as the impact of the turbines is visually diminished.



- KEY**
- 1. Davis Creek Cluster
 - 5. Muscles Creek Cluster
 - 2. Bowmans Creek Cluster
 - 6. Sandy Creek Cluster
 - 3. Goorangoola Cluster
 - Wind Turbine
 - Residential Cluster
 - Non-Associated Residences
 - Associated Residences
 - Associated Residences - August 2023

 <p style="font-size: small;">1/100 Victoria Road Musclewood, NSW 2111</p> <p style="font-size: x-small;">(02) 9620 9800 F (02) 9620 9802 P www.ohd.com.au</p>	 <p>SCALE: APPROX</p>  <p>NORTH</p>	<p>MAPPING</p> <p>DIAGRAM 1: RESIDENTIAL CLUSTER MAP</p> <p>BOWMANS CREEK WIND FARM</p> <p>OHD #: 1042</p>
---	---	---

3. SECTION 3 - REVIEW OF RESIDENTIAL IMPACTS & PROPOSED MITIGATION

3.1 Residential Review

The tables set out below provide further commentary regarding all non-associated residences within the blue line (4.4km).

3.1.1 Davis Creek Cluster

Generally, this cluster of residences is located in the north-eastern part of the project site within a valley on or near Davis Creek or Davis Creek Road. Turbines are generally located to the south (within 8km).

3.1.1.1 Davis Creek Cluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
S4-1	3.51km	12	VIZ2	Level 2	Residence is at 3.51km to nearest turbine. OHD anticipates minimal well placed and tall screening, as proposed, could effectively screen the narrow string of turbines to the south of the property.
T5-1	2.95km	12	VIZ2	Level 2	Existing screening vegetation exists beyond the shed as demonstrated in the photomontage T5-1. OHD assume the existing vegetation is comprised of deciduous species and not in decline/dead. As proposed, supplementary evergreen screening selections appropriately placed, could be successful in mitigating impacts of the narrow string of turbines to the south of the property.
T6-2	2.58km	12	VIZ2	Level 2	Based on the photomontage T6-2 provided; as proposed, minimal well placed and tall screening could effectively screen the narrow string of turbines to the south of the property.
T6-9	2.26km	12	VIZ2	Level 2	Based on the photomontage T6-9 provided; as proposed, minimal well placed and tall screening could effectively screen the narrow string of turbines to the south of the property.

3.1.1.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

1. Due to the narrow wedge or string of turbines visible in a southerly aspect or direction, OHD consider that the proposed mitigation measures described in the LVIA could be successful for the majority of residences in the Davis Creek Cluster.

3.1.2 Bowmans Creek Cluster

Generally, this cluster of residences is located within the centre of the project site, in between the large western, the north-eastern and south-eastern turbine arrays. The Q and S properties are located on and around Bowmans Creek.

3.1.2.1 Bowmans Creek Cluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
Q17-1, Q17-2, Q17-3 & Q17-5	3.14km (Q17-1) 3.03km (Q17-2) 3.13km (Q17-3) 2.85km	8 (Q17-1) (Q17-2) (Q17-3) 72 (Q17-5)	VIZ2	Level 2	These properties are located northwest of the south-eastern turbine array and central within the project. The properties are impacted by Multiple Wind Turbine Effects with turbines located between the black and blue lines.

	(Q17-5)				<p>The original LVIA noted Multiple Wind Turbine Effects non-compliance at four 60-degree sectors. Following removal of WTG 9 and 10 early in project assessment phase, OHD assume this has been reduced to three 60-degree sectors however this is not demonstrated by the Proponent. Three 60-degree sectors are still non-compliant against the VAB Performance Objectives. No justification is specifically noted regarding this non-conformance.</p> <p>Existing screening vegetation exists in and around the 4 properties located on Bowmans Creek. As proposed, additional well placed supplementary screen planting could be successful in mitigating the Multiple Wind Turbine Effects impacts inside 4.4km.</p>
S17-2	2.04km	8	VIZ2	Level 1	<p>This property is located north of the south-eastern turbine array.</p> <p>The LVIA response dated 24/03/23 notes that S17-2 and the proposed windfarm project is compliant with the VAB - Multiple Wind Turbine Effects Performance Objective which states: "<i>Avoid views to proposed, existing and approved turbines within eight kilometres from Level 1 and Level 2 viewpoints, exceeding the following threshold, or provide detailed justification:</i></p> <p><i>Level 1 (high sensitivity) - Wind turbines visible within the effective horizontal views of two or more 60° sectors."</i></p> <p>The proponent's response notes turbines are visible in two 60-degree sectors which is non-compliant for a level 1 high sensitivity receiver against the VAB Performance Objectives.</p> <p>Existing screening vegetation exists in and around the heritage listed property. LVIA photomontages demonstrate western turbines screened by a combination of topography and vegetation at distances up to and around 5km. Turbines to the south are screened by vegetation within the road reserve. Following proponent responses to requests for information OHD understood that the section of road adjacent S17-2 was identified for road upgrade and widening, DPE have since confirmed to OHD (September 2023) that the proposed road upgrades at this location will not require any vegetation clearing within the road reserve.</p> <p>As neither the Residence owner nor the Proponent control the road reserve or the associated vegetation and noting the proximity of turbines (WTG 8 at 2.03km), and project boundary relative to Bowman's Creek Road south of S17-2; OHD suggest screen planting be provided to the boundary of the project controlled allotment addressing the road corridor immediately south of the level 1 residence S17-2 in the scenario where any existing mitigating roadside vegetation is lost or cleared. The potential project-controlled allotment screening discussed above, would be expected to perform better than the existing roadside vegetation due to the rise in topography to the south and would mitigate uncontrollable impacts associated with any loss of roadside vegetation.</p>

					<p>Given the proximity of this residence to the VIZ1 & VIZ2 threshold, the cumulative wind turbine effects, the aspect, front door location related to turbine locations, and elevation of the residence, if the screening cannot be successfully agreed, maintained, or provided then the closest wind turbines to the southeast should be considered for removal due to Magnitude impacts on the [level 1] residence.</p> <p>The potential loss of screening of WTG 8, 7 and 6 to S17-2 could be exaggerated by micrositing. (EIS notes micrositing of up to 100m may be required across the project) of the turbines. OHD recommends that the solution be prepared in detail and resolved after consideration of any proposed micrositing of WTG 8, 7 and 6.</p>
T15-1	3.34km	8	VIZ2	Level 2	<p>The property is impacted by Multiple Wind Turbine Effects with three 60-degree sectors of cumulative impact. This is a technical non-compliance and justified due to the marginal visibility of the wind turbines to the west. No photomontages have been provided for this property to demonstrate the marginal visibility.</p> <p>The closest turbines (between 3 and 4.4km) to the south are anticipated to be able to be successfully screened, as proposed, by additional spot planting included within an existing vegetation belt south of the property.</p> <p>3 turbines (beyond 4.4km) to the north could be mitigated by spot screen planting.</p> <p>6 turbines to the west, 5 of which are noted as having the blades only visible, are expected to have minimal impact at a distance over 5km. Screening should be provided to limit impact of turbines on views toward the key feature Yellow Rock.</p> <p>Detailed screen planting consultation should be agreed and implemented to mitigate cumulative impacts on this residence prior to project commencement.</p>

3.1.2.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

1. If requested by the S17-2 owner; provide vegetative screening to project site allotment immediately south of road reserve adjacent and south of S17-2 to protect the amenity of the level 1 residence S17-2. If screening cannot be provided WTG 6, 7 and 8 should be removed due to Magnitude impacts on the level 1 residence.
2. OHD considers that the screening will require specialist assessment for each individual property.
3. Confirm Q17-1, Q17-2, Q17-3, Q17-5 and T15-1 cumulative impact justification through photomontages and screening proposals prepared in accordance with the VAB.

3.1.3 Goorangoola Cluster

Generally, this cluster of residences is located within south-eastern part of the project site. Residences are located on Old Goorangoola Road to the east of the south-eastern turbine array (WTG 8 to 22).

3.1.3.1 Goorangoola Cluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
-------------	-------------------------	-------------	-----	-------------	-------------

V20-1	2.25km	7	VIZ2	Level 2	This property is located east of the south-eastern turbine array. The western curtilage of the property features some existing medium height trees between the residence and road which should offer some mitigation. As proposed, additional, taller screen planting, to the west would further assist in mitigating impacts. Any micro-siting should create greater distance between the turbines and the viewers to further reduce Magnitude impacts close to the VIZ1 threshold.
W22-1	4.30km	7	VIZ2	Level 2	Residence is located on a hillside addressing the northeast. Topography rises to the west and is expected to screen the majority of wind turbines. As proposed, screen planting to the western boundary adjacent Old Goorangoola Road is expected to be successful in screening any residual impacts.

3.1.3.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

3.1.4 Scrumlo Road Cluster

Generally, this cluster of residences is located within southern part of the project site. Residences are located along Scrumlo Road and have potential views of the larger western turbine array and the south-eastern turbine array.

DPE advice in August 2023 is that dwellings P22-1 and P22-4 should now be considered as associated dwellings.

3.1.4.1 Scrumlo Road Cluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
K23-1	4.36km	66	VIZ2	Level 2	The closest turbines to this residence are expected to be screened by topography. All visible turbines between 4.4 and 8km from receiver. Screen planting should be offered as proposed.
N21-1 & N21-2	3.52km	24	VIZ2	Level 2	As proposed screening/spot planting within existing vegetation screening west of the residences and new screening to the east of the residences should be offered to mitigate any impacts from the large western array past 4.4km.
N22-1	4.09km	22	VIZ2	Level 2	Additional screen planting to mitigate the impacts of WTG 22 to 25 (at approx. 4.09km) should be provided.
M23-1	4.32km	22	VIZ2	Level 2	As proposed, screen planting should be offered to mitigate any impacts from the south-eastern array past 4.4km.
O22-1	3.12km	24	VIZ2	Level 2	This property is located on a north facing slope. The property outlook is up a gully to the north. WTG 27-31 (due North) would be visible at approximately 5.8 to 7.5km. The property is impacted by Multiple Wind Turbine Effects with three 60-degree sectors of cumulative impact. This is a technical non-compliance and justified through visibility of the wind turbine tip of blades in 1 sector. The justification notes vegetation is likely to screen the blades in the third sector. No

					<p>Photomontage is provided to verify the proponent's assessment</p> <p>As proposed, additional screen planting to mitigate the impacts of WTG 22 to 25 (at just over 3km) should be agreed and installed prior to project commencement if acceptable to the owners.</p>
--	--	--	--	--	--

3.1.4.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

1. Confirm O22-1 cumulative impact justification through photomontages and screening proposals prepared in accordance with the VAB.

3.1.5 Muscle Creek Cluster

Generally, this cluster of residences is located in the south-western part of the project site. Turbines are generally located to the northeast through to the southeast and are within 8km. This cluster has two distinct subclusters.

1. Western Muscle Creek residences approximately 4-5km from the closest turbines, generally these residences are located close to Muscle Creek Road within a small rural community at the base of the hills approaching the project ridgeline, existing vegetation screening mitigates the majority of the anticipated impacts.
2. Eastern Muscle Creek residences, generally located on the elevated hills between Western Muscle Creek described above and the south-western turbine array. These properties have expansive views toward the project site.
 - a. DPE advice in August 2023 is that dwellings F17-1, F18-1 and F19-1 should now be considered as associated dwellings.

3.1.5.1 Western Muscle Creek Subcluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
D17-2	4.39km	66	VIZ2	Level 2	<p>The LVIA notes this property is within the 4.4km blue line but does not address the impacts on this property.</p> <p>It is unclear which exact property has been nominated as D17-2, however assuming it is the property located on the western side of Muscle Creek Road, south of E17-2, OHD consider the existing vegetative screening within the curtilage of these properties and the general Muscle Creek area will be successful in filtering turbine impacts.</p> <p>It is expected that additional spot planting or screening could be successful in mitigating any residual impacts.</p>
D18-1	4.36km	66	VIZ2	Level 2	<p>The LVIA notes this property is within the 4.4km blue line but does not address the impacts on this property.</p> <p>It is unclear which exact property has been nominated as D18-1, however assuming it is the property located on the eastern side of Muscle Creek Road, with the red roof and Beggary Creek to the north, OHD consider the existing vegetative screening from the north to the east will be successful in screening turbine impacts.</p> <p>It is expected that additional spot planting or screening could be successful in mitigating any residual impacts.</p>

D18-3, D18-2 & E18-1	4.17km	66	VIZ2	Level 2	<p>These properties are located with existing vegetative screening typically to the south and west.</p> <p>D18-3 and D18-2 appear to have some screening to the north and east which could be enhanced, as proposed, to mitigate impacts.</p> <p>E18-1 is more open to the north and east. As proposed, screening could be successful if acceptable to the owner but would constrain use of the environmentally preferable north-east aspect and reduce views.</p>
E17-1, E17-2 & E17-4	4.18km (E17-1) 4.34km (E17-2) 4.27km (E17-4)	66	VIZ2	Level 2	<p>These properties are located within the Muscle Creek community, a combination of existing topography, vegetation and shelter belt planting is expected to filter or screen views.</p> <p>As proposed provide screen planting to mitigate residual impacts.</p>
E17-7, E17-5 & E17-3	3.96km (E17-7) 4.06km (E17-5) 4.09km (E17-3)	64 (E17-7) 66 (E17-5) 68 (E17-3)	VIZ2	Level 2	<p>These properties are located to northern part of the Muscle Creek community, these properties have some scattered vegetation but generally have expansive views to the east through to the north. Turbines are expected to be highly visible, at distance, to E17-3 and E17-7.</p> <p>As proposed, screen and/or spot planting should be offered to mitigate the impacts of turbines.</p>
E18-2	3.56km	66	VIZ2	Level 2	<p>There is no specific assessment for this property in the LVIA. The assessment is tied to E19-1.</p> <p>The residence appears to have existing vegetation to the northeast. The topography falls away to the northeast toward Beggary Creek. As proposed, additional screen/spot planting to the existing vegetation stand will assist in mitigating any residual impacts.</p>
E19-2	3.51km	66	VIZ2	Level 2	<p>The LVIA notes this property is within the 4.4km blue line but does not address the impacts on this property.</p> <p>The residence appears to have no vegetation within the immediately curtilage. The topography rises to the east toward E19-1. Existing vegetation is located on this rising topography and is expected to filter the view of the turbines and possibly screen the turbines.</p> <p>Screen and/or spot planting should be offered to mitigate the impacts of remaining turbines.</p>
F16-2	3.87km	70	VIZ2	Level 2	<p>Scattered vegetation exists around this property. The majority of the existing vegetation to the southeast.</p> <p>Additional screening should be offered to mitigate impacts to the east if acceptable to the owner but would constrain use of the environmentally preferable north-east aspect and reduce views.</p>

--	--	--	--	--	--

Note: G15-3 originally was noted as a non-associated dwelling however was later shown as an associated dwelling in 'Appendix B - updated figures' Issued 28/10/2022. E17-6 moved outside the 4.4km Blue line when WTG 60 and 61 were removed.

3.1.5.2 Eastern Muscle Creek Subcluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
E19-1	3.12km	66	VIZ2	Level 2	<p>This property sits just outside the black line and has views towards the ridgeline occupied by WTG 66 to 59.</p> <p>Effective screening would need to be located close to the residence to achieve the quick screening proposed. As the land falls away from the residence toward the turbines, screening at a distance from the residence, similar to distances shown in the photomontage, are likely to take in excess of a decade to establish and achieve any significant screening outcomes.</p>
F16-1	3.41km	59	VIZ2	Level 2	<p>Based on the photomontage F16-1 it appears that proposed screening (some of which is already established/establishing) would be effective in reducing impacts. The powerline easement will need to be maintained as cleared but already contains industrial power infrastructure. Turbines will always be visible down the transmission easement/clearing. As proposed, additional screening should be offered to the landholder.</p>
Lot 40 DP1094039 Dwelling Entitlement	Assumed similar to F18-1 (2.58km)	Assumed similar to F18-1 (68)	Likely VIZ2	Likely Level 2	<p>Ark Energy Response to request for information dated 24/03/2023 notes a photomontage has been prepared for this residence/site however OHD have been unable to locate and assess this photomontage.</p> <p>OHD assume the visual impacts to be similar to F18-1. (F-18-1 at 2.59km, Lot 40 DP1094039 Shed at approximately 2.99km).</p> <p>The final residence location can be determined or orientated to suit the approved wind farm layout. To avoid turbine views the new residence would likely be oriented to the less environmentally favourable south and south - west aspect.</p>
G17-1	2.04km	64	VIZ2	Level 2	<p>Site visit confirmed residence in an elevated position with unscreened 360-degree views. A vegetated hillside exists immediately east-northeast of the residence and potentially reduces the impacts of WTG59 and 70 depending on receiver location. Primary views from the residence appear to be to the west in contrast to the views from the residential curtilage including the driveway and barn, considered a secondary view, which take in near 360-degree views including to the east and southeast where the closest turbines are proposed.</p> <p>The proponent has removed 3 originally proposed turbines to the north-east and has proposed vegetation screening to turbines</p>

					<p>WTG66, 67, 68, 64 and 69 that remain to the east south-east marginally beyond the VIZ 1-2km threshold. Those turbines located just beyond the VIZ 1 threshold fall within the VIZ 2 Visual Performance Objectives which require the Proponent to <i>manage the impacts as far as practicable</i>.</p> <p>The proponent considers residual impacts can be managed through screening. <i>The Photomontage prepared from dwelling G17-1 illustrates direct and open views toward 4 turbines on an elevated ridgeline east of dwelling G17-1. Existing mature eucalypt trees beyond the dwelling screen/filter views toward other turbines on the ridgeline. A cross section analysis has determined that screen planting between 7m to 8m in height at 30m from the dwelling would provide screening toward wind turbines.</i> [Appendix A 23 February 2023.] but also notes in relation to residual impacts <i>"Photomontage from dwelling G17-1 illustrates direct and open views toward 4 turbines on an elevated ridgeline east of dwelling G17-1."</i> [Response to RFI dated 24 March 2023.]</p> <p>OHD consider that screening of those turbines will need to be either located immediately adjacent to the eastern side of the building and more extensively around the curtilage to be effective. Given the topography, screening located further away from the viewpoints may take decades to become effective.</p> <p>Due to the distance between G17-1 and WTG 64 (2.04km), the removal of northeastern turbines from earlier schemes and proposed mitigation measures to manage residual impacts, the visual impact appears to just meet the VAB Performance Objective - Visual Magnitude.</p> <p>Consideration should be given to the potential micro-siting (EIS notes micro-siting of up to 100m may be required across the project) of WTG 64 which could place it within the 2km threshold. Given that the primary views from the property appear to be to the west, the proposed screening solution may be acceptable to the residents however it is also possible that extensive screening on the eastern, environmentally more advantageous, side is unacceptable to the residents.</p> <p>In relation to VAB Performance Objective - Landscape Scenic Integrity, the response from the Proponent to a request for additional information dated 24/03/2023 notes: <i>"Turbines could be considered dominant in the visual catchment in the ESE to SE direction."</i> We agree with that LVIA assessment and consider the turbine array (WTGs 69, 64, 68, 67 & 66) to the East/Southeast, are dominant and non-compliant with the VAB Performance Objective - Landscape Scenic Integrity.</p>
--	--	--	--	--	---

3.1.5.3 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

1. Consider potential micro-siting Visual Magnitude impacts associated with WTG64 on G17-1.
2. Proponent to confirm that reasonable screening of turbines 66, 67, 68, 64, and 69 can be achieved within the curtilage of the residence.
3. Implement screening or removal of turbines in an east – southeast direction to reduce Landscape Scenic Integrity impacts upon the existing visual catchment.
4. Removal of turbines along the southwestern array would also reduce impacts on the following properties outside the black line which have views toward the project ridgeline: E17-3, E17-7 & Dwelling Entitlement Lot 40 DP1094039.
5. Any turbine removals would also improve the outlook for all level 3 receivers driving into Muscle Creek from the west.

3.1.6 Sandy Creek Cluster

Generally, this cluster of residences is located in the north-western part of the project site. Turbines are generally located to the east through to the south (within 8km)

3.1.6.1 Sandy Creek Cluster Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
H11-1, H12-2 & H12-3	2.57km (H11-1) 2.67km (H12-2) 2.57km (H12-3)	57 (H12-3) 57 (H12-3) 57 (H12-3)	VIZ2	Level 2	<p>These three residences are located immediately east of Sandy Creek Road. Generally, they address the views to the northwest with existing topography rising to the south and/or southeast.</p> <p>Photomontages appear to show land to southeast of the residences slowly rising. Proposed screen planting is likely to be successful due to existing topography. Proposed screening to the southern aspect considered reasonable.</p>
H11-2	3.26km	57	VIZ2	Level 2	<p>This property is the most elevated property within 4.4km of the total project. The property has near 360-degree views. Whilst the turbines do impact the residences views, which are generally arranged to take advantage of the near 360-degree outlook, it is considered that the majority of beneficial views are from the northeast around to the southwest including direct views northwest to the community identified landscape feature of Native Dog Hill.</p> <p>It may be possible to provide the proposed screening to the southeast of the residence on the driveway approach to the residence to screen impacts to southeast, this would however begin to enclose a property which is setup to take in expansive views. The degree of impact on the overall outlook can be adjusted depending on the desired screening. It appears possible to screen selected parts of the turbine array and maintain the feeling of an expansive outlook albeit with a significant number of turbines visible.</p> <p>This property is likely to be affected in a southeasterly direction by aviation hazard lighting as it has the most elevated and extensive views of the bulk of the BCWF turbine array. The VAB Performance Objectives – Aviation Hazard Lighting requires shielding to residences within 2km. H11-2 is outside the 2km setback and therefore is</p>

					compliant with the Performance Objectives of the VAB.
H12-1	3.02km	51	VIZ2	Level 2	<p>The photomontage has been prepared from the driveway in the western curtilage of the property. This location is elevated above the residence.</p> <p>Proposed vegetation screening from the East through to the southeast around the existing Dam between the residence and Sandy Creek Road could be successful in mitigating visual impacts. Note the proposed screening may take some time before becoming effective. Anticipated in excess of a decade, species and location dependent. Advanced species with associated establishment management plans could be conditioned for this residence.</p>

Note: Regarding 2 residences located in the north-western part of the project site on Sandy Creek Road approximately 1.2km north of H11-1; The original LVIA dated 17 March 2021, figure 2 (page 36) shows these two residences in red indicating associated dwellings. These two residences are still shown in red in the 'Appendix E – updated figures' Issued 25/02/2022. However, 'Appendix B – updated figures' Issued 28/10/2022 appears to show these two dwellings as black indicating they are non-associated dwellings. DPE has confirmed to OHD (September 2023) that these residences are associated.

3.1.6.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

1. Due to the string of turbines spanning from the east to the south careful screening design and placement will be required in order to achieve the outcomes documented in the LVIA.
2. OHD considers that the screening will require specialist assessment for each individual property.
3. OHD consider that the proposed mitigation measures described in the LVIA could be successful for the majority of residences in the Sandy Creek Cluster.

3.1.7 Individual Residences not associated with Clusters

Generally, these residences are located between the black and blue lines around the perimeter of the project site located at distances from identified clusters

3.1.7.1 Individual Residences not associated with Clusters Table:

Residence #	Distance to nearest WTG	Closest WTG	VIZ	Sensitivity	OHD Comment
D21-2	4.31km	66	VIZ2	Level 2	<p>D21-2 is located to the southwest of the southern string of the large western turbine array.</p> <p>Proposed screen and/or spot planting should be offered to mitigate the impacts of remaining turbines.</p>
G11-1 & G12-1	4.11km (G11-1) 4.08km (G12-1)	57	VIZ2	Level 2	<p>G11-1 is located to the west of the northern part of the large western turbine array.</p> <p>A desktop study indicates rising topography and vegetative screening to the east of the residences and is assumed to screen turbines below the blue line. This should be confirmed post construction with additional screening or spot planting provided if required.</p>
H8-1	4.03km	57	VIZ2	Level 2	<p>H8-1 is located to the northwest of the northern part of the large western turbine array.</p> <p>A desktop study indicates vegetative screening to the south of the residence and is assumed to screen turbines below the blue line. This should be</p>

					confirmed post construction with additional screening or spot planting provided if required.
P7-1	3.52km	17	VIZ2	Level 2	<p>P7-1 is located to the northwest of the north-eastern turbine array.</p> <p>A desktop study indicates scattered spot planting exists around the residence. On review of Photomontage P7-1 it appears that proposed screening or additional spot planting within the south-eastern curtilage of the residence could be successful in mitigating impacts.</p>
Q5-1	4.11km	12	VIZ2	Level 2	<p>Q5-1 is located to the northwest of the north-eastern turbine array.</p> <p>A desktop study indicates this property is located on Davis Creek, the quickly rising topography to the south is assumed to screen the project from this location. This should be confirmed post construction with additional screening or spot planting provided if required.</p>
W8-1	3.31km	12	VIZ2	Level 2	<p>W8-1 is located to the east of the north-eastern turbine array.</p> <p>A desktop study indicates dense vegetation to the north and western sides of the residence. OHD assume this vegetation will be successful in screening turbines to the west. This should be confirmed post construction with additional screening or spot planting provided if required.</p>

3.1.7.2 Summary:

If agreed by property owners, provide all mitigation measures proposed in the LVIA.

3.2 Proposed Mitigation

Screening: Should consent be provided, the Proponent should be required to undertake consultation with all landowners within the blue line regarding proposed screening species, locations, management and timeframes to achieve effective screening outcomes. The design and consultation process should be undertaken by qualified landscape/horticultural professional in accordance with, and with experience in *Planning for Bushfire Protection* (by RFS) and with extensive knowledge of local species and the local environment to ensure maximum growth rates and benefits for the affected properties.

In accordance with the VAB the Proponent in many cases proposes to mitigate visual impacts using screening. The proposals for vegetative screens on the BCWF project are extensive and significant. Failure of some of the vegetative screens could result in high variability of the efficiency of the proposed mitigation outcomes across the project and specifically to individual residences. We have no data or direct feedback on the success rates of vegetative screening however anecdotal evidence indicates a manageable level of variability. Success of the screening will depend on the design, plant selection and maintenance regimes implemented particularly in the initial Plant Establishment Period (PEP). The PEP should consist of a high degree of regular care and maintenance initially on a fortnightly basis and gradually extending to out to monthly and quarterly over at least a three-year period.

Generally, vegetative screening mitigation proposals should only be associated with private property as the screening can be linked to the anticipated impacts on a level 1 or 2 receivers' property. Screening within private property allows the screening outcome to be controlled between the proponent and the property owner. Reliance on existing or new vegetative screening within road reserves should be avoided as the authorities who manage or work within these road reserves may have development plans or maintenance requirements for the road reserve that may reduce the effectiveness of the proposed mitigation, leaving viewers exposed to unintended visual impacts.

In some locations, due to the topographical conditions at the particular viewing location, we have indicated long lead times for vegetative screening to reach the heights and density required for appropriate mitigation. In those cases, the success of the screening is highly dependent on regular attention during the PEP, if planting fails to thrive within

the three-year PEP, it would be reasonable for the screen to be replicated with a complimentary 3-year PEP. This would provide an opportunity to supplement less successful screen elements.

4. SECTION 4 - SUMMARY

4.1 Summary

OHD considers that the LVIA and associated assessments have been prepared within the guidelines of the Wind Energy: Visual Assessment Bulletin (VAB) and that the methodology used for assessment is reasonable for the purpose of identifying the likely visual impacts.

As anticipated by the VAB – Visual Magnitude is the most significant element of the visual impacts associated with the BCWF. Simplistically, this is due to the elevated location of turbines, the relative aspects of residential outlooks and the proximity of residences. As identified in the LVIA, the majority of visual impacts will be created in the south-eastern and south-western part of the project site.

Central to the site, S17-2 is a heritage listed property and as such a level 1 sensitivity receiver, mitigation of potential impacts at the residence is heavily reliant on existing roadside screening. Should any of the existing mitigating roadside vegetation be cleared or lost, at any point in the project's lifetime; additional supplementary planting should be immediately provided south of the existing mitigating roadside planting within the project site. Should the screening within the project site not be achievable then further turbine removal should be considered due to residual Visual Magnitude, Multiple Wind Turbine Effects and Landscape Scenic Integrity impacts.

In the south-western part of the site, micro-siting of WTG 64 could result in non-compliant VAB - Visual Magnitude Objectives in relation to G17-1. In our professional opinion, further removals and/or adjustment of the south-western array is required, to meet the VAB - Landscape Scenic Integrity objectives at G17-1.

Given the LVIA's significant commitments to extensive vegetative screen, the success of the bulk of the LVIA proposed mitigation measures will be heavily dependent on successful screen or spot planting. To enhance the likelihood of screening success the DPE should consider insertion of conditions to require landscape consultation and plans be prepared and agreed as part of the project pre-construction deliverables. If so conditioned, the planning of the individual screening elements should be and undertaken by horticulturist and/or landscape professionals in consultation with individual landowners. Screen or spot planting should be offered to all residences within the blue line. To ensure the highest chances of successful screening it would also be appropriate to clearly identify who is responsible for the care of vegetative screens during the Plant Establishment Period.

William Francis
Principal
AILA Registration No. 5768.
O'Hanlon Design Pty. Ltd

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

ASSESSMENT DOCUMENTS

This assessment is based on the following documents:

- *Bowmans Creek Wind Farm Environmental Impact Statement. Prepared by Hansen Bailey. 17 March 2021.*
 - o *Specifically Including: Appendix H: Bowmans Creek Wind Farm Landscape and Visual Impact Assessment. Prepared by Green Bean Design. 17 March 2021.*
- *Bowmans Creek Wind Farm Amendment Report. Prepared by James Bailey & Associates. 24 September 2021.*
 - o *Specifically Including: Appendix D1: Bowmans Creek Wind Farm Landscape and Visual Impact Assessment Amended Report. Prepared by Green Bean Design. 23 September 2021.*
- *Response to Additional Information Request. Prepared by James Bailey & Associates. 25 February 2022.*
 - o *Specifically Including: Appendix A – Visual Assessment. Prepared by Green Bean Design. 23 February 2022.*
 - o *Specifically Including: Appendix C – Photomontages. Prepared by Green Bean Design.*
- *Response to Request of 10 June 2022. Prepared by Ark Energy. 28 October 2022.*
 - o *Specifically Including: Appendix A – Visual Assessment. Prepared by Green Bean Design. 23 February 2022.*
 - o *Specifically Including: Appendix C – Photomontages. Prepared by Green Bean Design.*
- *Response to Additional Information Request. Prepared by James Bailey & Associates. 25 February 2022.*
 - o *Specifically Including: Appendix A – Photomontages & Wireframes. Prepared by Ark Energy. October 2022.*
 - o *Specifically Including: Appendix B – Updated Figures. Prepared by James Bailey & Associates & Ark Energy. October 2022.*
 - o *Specifically Including: Appendix D – Obstacle Lighting Plan. Prepared by Aviation Projects. 23 June 2022.*
- *RFI response letter 20230324 Ark Draft Response. Prepared by Ark Energy. 24 March 2023.*
- *DPE Confirmation of associated receivers 30 August 2023.*
- *DPE Confirmation of associated receivers and S17-2 road side clearing 14 September 2023.*
- *1:25,000 topographical maps (NSW Government Spatial Services)*
 - o *9033-1S Aberdeen*
 - o *9133-4S Rouchel Brook*
 - o *9033-2N Muswellbrook*
 - o *9133-3N Dawsons Hill*