NSW GOVERNMENT | Planning & Environment

MAJOR PROJECT ASSESSMENT: Gullen Range Wind Farm MP07_0118 (Mod 1)

Secretary's
Environmental Assessment Report
Section 75W of the
Environmental Planning and Assessment Act 1979

July 2014

ABBREVIATIONS

Department	Department of Planning and Environment
EA	Environmental Assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPI	Environmental Planning Instrument
GRWF	Gullen Range Wind Farm
MD SEPP	State Environmental Planning Policy (Major Development) 2005
Minister	Minister for Planning
Part 3A	Part 3A of the *Environmental Planning and Assessment Act 1979*
PAC	Planning Assessment Commission
Proponent	Gullen Range Wind Farm Pty Ltd
RtS	Response to Submissions
Secretary	Secretary of the Department of Planning and Environment

Cover Photograph: photograph of a constructed turbine

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EXECUTIVE SUMMARY

The Gullen Range Wind Farm (GRWF) was approved by the then Minister for Planning and Infrastructure in June 2009. Initially the Proponent sought approval for up to 84 turbines, but the Minister deleted 11 turbines due to potential impacts on aviation safety at Crookwell aerodrome.

In 2009, the merits of the Minister's approval were subject to appeal in the Land and Environment Court brought on by the Proponent (seeking to reinstate the deleted turbines) and two other parties, Parkesbourne/Mummel Landscape Guardians Inc and J & A King due to the impact of the proposed turbines on properties on either side of Gullen Range.

The Land and Environment Court upheld the decision (dated 4 August 2010) and confirmed the deletion of the 11 turbines. The Court's approval included a condition specifying that if the Proponent wished to proceed with certain turbines, it must offer to buy adjacent properties on the grounds of unacceptable visual impact. Also, the Project Approval includes a condition restricting the Proponent from the ability to move turbines by up to 250 metres without further assessment and approval in accordance with the *Environmental Planning and Assessment Act, 1979.*

The Proponent began construction of the Gullen Range Wind Farm in late 2012 and in late 2013 the Department became aware that turbines were potentially not being erected in the locations approved by the Project Approval. The Proponent's response to the Department's investigations was that the relocated turbines were consistent with the Project Approval. According to the Proponent, it conducted investigations to evaluate the environmental and social impacts of the new locations and determined that the impacts were consistent with the approved layout.

The Department disagrees with this view and considers that a minor relocation is taken to mean small, or insignificant. The detailed evaluations undertaken by the Proponent to determine whether the project was consistent or not, demonstrates that some of the relocations were not insignificant with the greatest relocation being 187m. Separate compliance action is still being considered by the Department in this respect.

While maintaining the view that the relocated turbines are consistent with the Project Approval, the Proponent ceased construction of 16 turbines that had been moved closer to homes and lodged the current modification request under section 75W of the Act to amend the Project Approval to determine the acceptability of the turbine locations.

The modification seeks approval (retrospective in the majority of cases) to modify the final location of 69 of the 73 wind turbines to different locations within the approved project footprint. Most of the wind turbines (68%) have moved less than 50m from the approved location, however, 19% have moved between 50m to 100m and 13% of the wind turbines have moved at a distance greater than 100m, with the maximum distance being 187m from the original approved location.

Some of the wind turbines have also moved to a different elevation with 27% of the turbines having a comparatively higher elevation of greater than 5m, when compared to the original Project Approval. The Proponent selected two turbine models which are relatively smaller than the maximum size proposed in the Project Approval, with the constructed turbines being approximately 5m to 9m shorter and 5m to 23m narrower in blade diameter, (depending on the turbine model).

The modification was placed on public exhibition for a period of 30 days from 3 April 2014 until Friday 2 May 2014. The Department received 5 submissions from public authorities and 76 submissions from the general public. None of the public agencies objected to the Project, the Upper Lachlan Shire Council requested the modification to be placed on hold until a Judicial Inquiry be conducted into the project. Most of the public submissions (63%) objected to the modification with a further 22% providing comments on the modification proposal. Key issues raised in public submissions included concerns regarding visual impacts, noise impacts, loss of

amenity, property devaluation, health and safety, proximity of turbines to residences, appropriate mitigation and compensation and a request for a public inquiry.

The Proponent prepared a submissions report in response to the submissions received. This report was submitted to the Department in June 2014.

The Department has undertaken a comprehensive assessment of the merits of the proposed modification and considers the key issues to include:

- verification of turbine locations;
- visual impact;
- noise; and
- biodiversity.

A range of other issues including Aboriginal heritage, air safety, telecommunications, soil and water management, traffic, shadow flicker and health were also considered by the Department.

The Department engaged an independent surveyor to verify the locations of constructed turbines, compare these locations to the approved turbine locations in the Project Approval and to survey the locations of residents within 2km of the wind farm. Analysis of data from the Independent Surveyor shows that the constructed locations as identified in the Modification Application were reasonably accurate and suitable for use in the assessment of environmental and social impacts of the proposal. There were some differences noted in the surveyed location of residences compared to the residence locations used in the modification application, however, where the independent surveyor found that residences were actually closer to the turbines than shown in the modification application, these distances ranged from 1m to 34m.

The Department's assessment of visual impacts focussed on evaluating whether the visual impact from wind turbines constructed in a different location has given rise to a different level of impact. The Department reviewed photomontages for the approved and constructed layouts from 18 different viewpoints. The Department notes photomontages were not constructed to represent each non-associated residence within 1km to 2km of the turbines, making it difficult to fully evaluate possible changes to visual impacts upon each of those residences. Therefore, the Department visited the area around the wind farm including specific residences, on two occasions, to view the constructed wind turbines and compare the actual view with the photomontages. There are 45 non-associated residences within 2km of the wind farm. The Department's assessment concluded that in most instances, the change in the visual impact from the constructed layout and approved layout was not discernible, however, in the case of two turbines, the Department has concluded that the constructed location of turbine BAN_09 and BAN_15, which have moved 167m and 178m respectively from their approved locations, have caused greater visual impacts.

In the case of BAN_09, the Department recommends the affected residence B29 (a lifestyle landholding) be provided the opportunity to be acquired by the Proponent, or request that BAN_09 be relocated to its original location. In the case of turbine BAN_15, the Department recommends that this turbine be relocated to its original location. The Department recommends further conditions to provide priority screening and landscaping for K2 and for screening the substation from view of the PW4 property.

The Department's assessment of noise involved the Department's own noise expert and an independent expert to review the predicted difference in noise impacts from the constructed layout of turbines. The reviews conclude the proposed relocation of the turbines will result in an insignificant change in wind turbine noise from the wind farm and that it is capable of meeting the noise limits in the Project Approval.

The biodiversity assessment was subject to review by the Office of Environment and Heritage and found that the existing Compensatory Habitat Package requires revision to increase the size of

the offset area to ensure that the updated areas of biodiversity loss are used to calculate the size of the offset, include all known roosting and nest trees for the Powerful Owl within the project boundary and a number of other improvements to ensure the Box Gum Woodland within the offset area is managed appropriately to meet specific conservation criteria.

The Department also considers it appropriate that the current instrument of approval be amended to reflect contemporary practice with respect to low frequency noise, tonality, decommissioning and community consultation.

The Department's assessment has concluded that subject to the imposition of the recommended conditions of approval, that the modification can be supported. Key recommendations in this respect include:

- residence B29 be given the opportunity to be acquired or request that turbine BAN_09 be relocated to its original approved location;
- BAN_15 be relocated to its original approved location;
- additional landscaping conditions to ensure the visual impacts of the substation are minimised;
- the Compensatory Habitat Package be revised and the offset area increased to account for the updated areas of biodiversity loss; and
- the Project Approval be updated to reflect current practice with respect to noise, tonality, decommissioning and community consultation aspects.

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BACKGROUND

The Gullen Range Wind Farm was approved by the then Minister for Planning and Infrastructure on 26 June 2009. Initially, the Proponent south approval for up to 84 turbines, but the Minister deleted 11 turbines due to potential impacts on aviation safety at Crookwell aerodrome.

In 2009, the merits of the Minister's approval were subject to appeal in the Land and Environment Court brought on by three separate sets of proceedings which were commenced challenging aspects of the Minister's determination. The three appeals were heard simultaneously. An appeal by the Proponent sought the reinstatement of the turbines removed in the vicinity of the Crookwell airstrip. The two additional proceedings dealt with matters of impact of the proposed turbines on properties on either side of the Gullen Range and were brought by the Parkesbourne/Mummel Landscape Guardians Inc and J & A King.

The Land and Environment Court upheld the decision and modified conditions of the Project Approval on 4 August 2010, which included confirming the deletion of the 11 turbines. The Court's approval included a condition specifying that if the Proponent wished to proceed with certain turbines, it must offer to buy adjacent properties on the grounds of unacceptable levels of visual impact, and/or noise impact and shadow flicker on those residences. The Project Approval includes a condition restricting the Proponent from the ability to move turbines by up to 250m without further assessment and approval in accordance with the *Environmental Planning and Assessment Act, 1979.* This condition was included by the Minister (and supported by the Court) to give certainty and finality to the project approval and counter the Proponent's request for flexibility in micrositing turbines by up to 250m. The Court granted consent to the Gullen Range Wind Farm for 73 turbines.

Construction of the Gullen Range Wind Farm began in late 2012. During the latter half of 2013, the Department received phone calls and correspondence from the local community suggesting that the turbines were not being constructed in the approved locations.

The Proponent considers the relocated turbine locations are consistent with the Project Approval, as it had conducted investigations to evaluate whether the environmental and social impacts of the proposed relocations would be consistent with the impacts of the approved layout.

The Department disagrees with this view and considers that a minor relocation is taken to mean small, or insignificant. The detailed evaluations undertaken by the Proponent to determine whether the project was consistent or not, demonstrates that some of the relocations were not insignificant with the greatest relocation being 187m.

While maintaining the view that the relocated turbines are consistent with the Project Approval, the Proponent ceased construction of 16 turbines that had been moved closer to homes and lodged the current modification request under section 75W of the Act to amend the Project Approval to determine the acceptability of the new turbine locations.

At the time the Modification Environmental Assessment was lodged, the construction status of the wind turbines was:

- 13 turbines have footings constructed but are yet to undergo erection of towers, nacelles and rotors;
- 2 turbines are partially erected (base and mid-tower sections erected). The erection of the upper tower is yet to be undertaken;
- 31 turbines have been erected and are awaiting commissioning; and
- 27 turbines are installed, commissioned and are able to generate electricity.

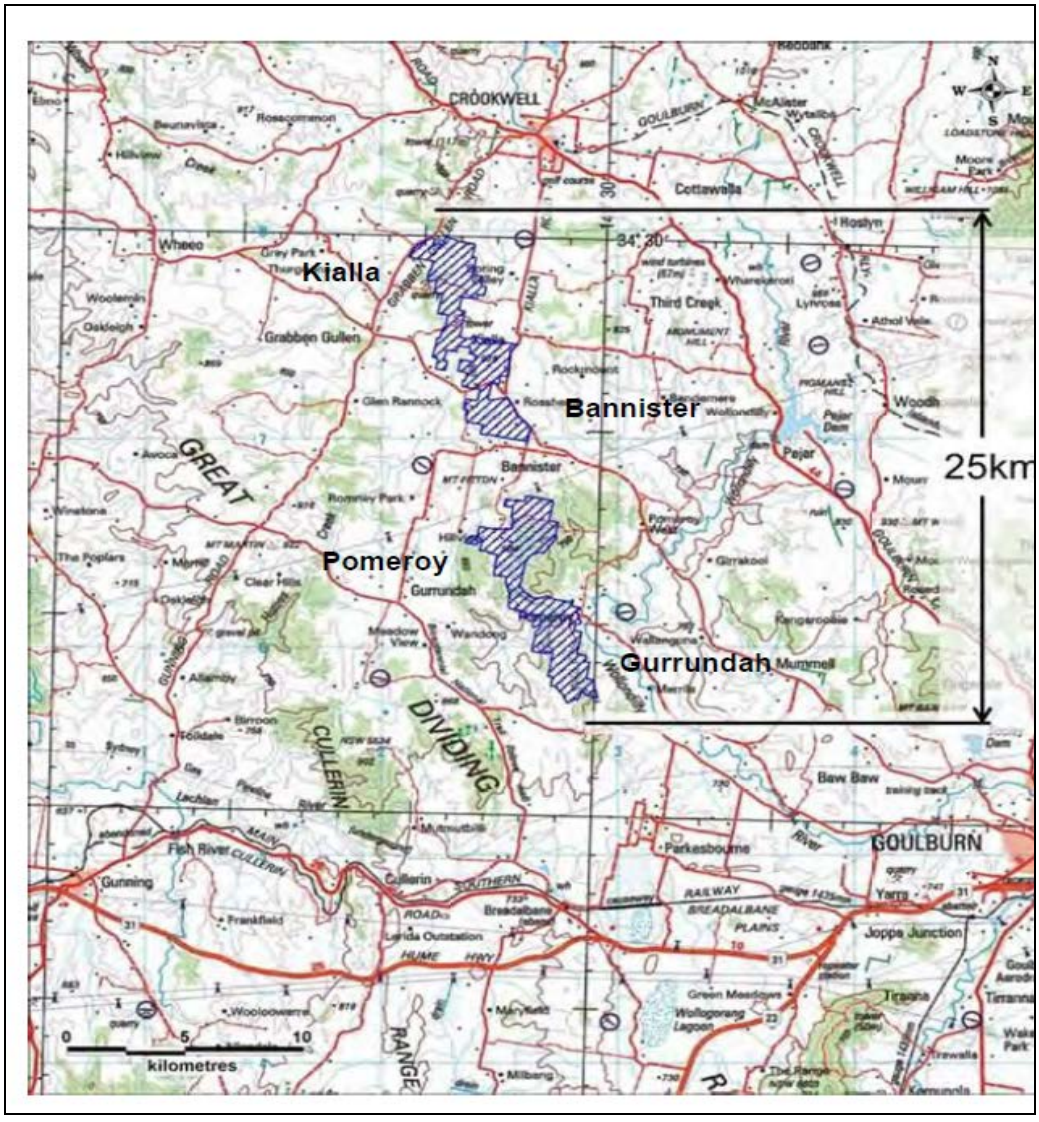
The modification application process is available to the proponent to determine the acceptability of the turbines. It enables a merit assessment, community consultation, consideration of issues

raised by Government authorities and the wider community and a final decision by the Planning Assessment Commission.

1.1. Location

The Gullen Range Wind Farm (GRWF) is located approximately 20km to 30km north west of Goulburn in the Southern Tablelands of NSW within the Upper Lachlan Shire local government area, as shown in **Figure 1**.

Figure 1: Project Location



The 73 turbine sites within the GRWF are located along a 25km strip along the north-south ridges of the Great Diving Range. The northern area of the wind farm is approximately 6km south of Crookwell and the southern extent is approximately 9km north of Breadalbane. The approximate viewshed of the GRWF includes several small towns including:

- Crookwell, approximately 5km to the north-east,
- Laggan, approximately 15km to the north-east,
- Grabben Gullen, approximately 3km to the west, and
- Breadalbane, approximately 10km to the south.

The project is located within rural lands that are predominantly used for grazing and contain scattered rural residences and other buildings, as well as lifestyle landholdings.

At the time of the original Environmental Assessment for the GRWF, there were:

- 32 non-associated residences within 1.5km of the nearest turbine, and
- 86 non-associated residences more than 1.5km and less than 3km from the nearest turbine.

The Proponent has confirmed in its Response to Submissions, that there are 45 non-associated residences within 2km of the wind farm.

PROPOSED MODIFICATION

2.1. Modification Description

The Proponent seeks to modify the existing approval to relocate 69 turbines within the approved project footprint. The revised turbine locations are detailed in **Table 1**.

Table 1: Final design turbine locations and difference (source: Table 2-2 Modification EA)

Turbine ID	Surveyed Final Design Coordinates and elevation			Distance relocated (m) <50 50-100 >100	Direction moved	Change in Turbine Level (m)
	Easting	Northing	Level Base of Tower			
KIA_01	722206	6178258	987.42	35.7	East	7.4
KIA_02	722106	6178003	968.24	43.4	North	7.5
BAN_01	722867	6177000	961.07	47.4	SE	5.5
BAN_02	722816	6176718	960.89	12.6	South	-0.1
BAN_03	722567	6176552	959.37	36.8	South	-0.6
BAN_04	722477	6176299	957.8	12.8	South	-1.2
BAN_05	723284	6176726	964.46	12.5	South	-1.3
BAN_06	723235	6176463	971.72	4.5	West	2.6
BAN_07	723092	6176141	973.04	33.3	NW	-7.7
BAN_08	723327	6175886	1000.99	187.0	SSW	14.8
BAN_09	722740	6174867	952.9	167.0	West	-3.8
BAN_10	722846	6174519	959.13	80.4	South	-0.9
BAN_11	723242	6174950	964.19	48.5	North	1.0
BAN_12	723177	6174649	968.18	64.8	West	5.1
BAN_13	723736	6174579	960.3	168.6	ESE	-3.6
BAN_14	723832	6174779	974.36	85.0	South	-5.6
BAN_15	724314	6174314	965.87	177.9	North	2.9
BAN_16	724441	6173780	971.89	14.0	South	1.9
BAN_17	724453	6173505	975.64	13.9	West	0.6
BAN_18	723870	6173444	957.43	32.0	West	0.7
BAN_19	724307	6173286	969.32	2.2	SE	-0.7
BAN_20	724521	6172964	970.76	0.0	N.A.	0.8
BAN_21	724485	6172357	968.7	111.9	SSE	7.6
BAN_22	724466	6172100	981.57	22.0	South	1.6
BAN_23	724269	6171949	975.81	16.1	NW	1.4
BAN_24	724049	6171628	955.85	123.6	South	2.3
BAN_25	724647	6171804	986.26	50.9	NW	1.3
BAN_26	724630	6171532	985.61	46.6	NW	1.6
BAN_27	724502	6171321	980.48	20.6	East	4.3
BAN_28	724213	6171232	973	9.9	NW	3.0

Turbine ID	Surveyed Final Design Coordinates and elevation			Distance relocated (m) <50 50-100 >100	Direction moved	Change in Turbine Level (m)
	Easting	Northing	Level Base of Tower			
BAN_29	723793	6171252	959.5	7.1	West	4.5
BAN_30	724099	6171000	955.16	1.0	N.A.	1.2
POM_01	725833	6166934	898.69	115.2	NE	-1.3
POM_02	726044	6166594	888.82	45.0	SW	5.2
POM_03	726063	6166277	884.18	102.2	West	4.2
POM_04	726461	6166355	873.2	96.2	SW	12.5
POM_05	726800	6166565	865.08	8.1	West	5.1
POM_06	727033	6165858	862.62	56.7	SW	2.6
POM_07	727112	6165618	844.99	23.4	West	-0.2
POM_08	725438	6165310	888.16	0.0	NA	-11.8
POM_09	724870	6165173	883.05	28.3	SSW	-2.9
POM_10	725390	6165082	892.5	92.5	East	-6.0
POM_11	725525	6164826	889.87	64.4	NW	-10.1
POM_12	724220	6164723	890.59	10.2	North	-8.6
POM_13	724725	6164560	888.39	6.0	North	-4.2
POM_14	725064	6164835	892.14	36.4	SW	1.3
POM_15	725079	6164566	901.81	8.5	SW	2.7
POM_16	725216	6164233	893.4	18.1	South	8.4
POM_17	725509	6163949	865.02	7.2	SW	7.6
POM_18	725752	6163649	849.99	11.0	North	10.0
POM_19	724788	6163595	899.03	56.6	North	0.2
POM_20	725434	6163257	833.73	7.6	West	13.7
POM_21	725752	6162969	828	7.2	NE	8.0
POM_22	726057	6162593	821.56	81.5	SE	6.0
POM_23	726339	6162361	812.01	20.2	East	12.2
GUR_01	727827	6161200	787.19	2.2	South	2.2
GUR_02	727730	6160921	805.09	8.9	North	-3.8
GUR_03	727826	6160598	820.43	10.0	North	-3.0
GUR_04	727464	6160571	799.12	13.5	NW	-0.8
GUR_05	727307	6160350	816.25	3.2	West	1.3
GUR_06	727298	6160051	779.65	10.8	NE	2.7
GUR_07	727912	6160363	836.3	101.5	North	12.0
GUR_08	727832	6159846	773.02	0.0	N.A.	-0.7
GUR_09	727269	6159369	811.32	36.9	South	1.7
GUR_10	727389	6158918	819.87	60.5	SSE	8.5
GUR_11	727520	6158639	833.15	6.4	NW	3.1
GUR_12	727479	6158308	839.08	59.7	South	7.5
GUR_13	727642	6158039	824.07	19.0	SW	4.1
GUR_14	727753	6157727	832.16	0.0	N.A.	2.2
GUR_15	727834	6157450	833.9	43.7	North	5.1
GUR_16	728211	6159145	785.91	12.0	SW	1.6
GUR_17	727997	6158925	803.51	29.4	South	3.5
GUR_18	728036	6158675	810.96	55.3	East	4.4
	Note: GW100 is a GW100-2.5 and has hub height of 80 metres. GW82 is a GW82-1.5 and has a hub height of 85 metres.					

Table 1 shows the distance each wind turbine has been relocated from the approved location in the Project Approval. Of the 73 wind turbines, 69 turbines have been relocated from their approved location, as follows:

- 9 turbines have moved greater than 100m from the approved location,
- 13 turbines have moved between 50m–100m from the approved location, and
- 47 turbines have moved less than 50m from the approved location.

The remaining four turbines have been built in their approved location. The greatest distance that a wind turbine has moved is 187m for wind turbine BAN_08.

Table 2 summarises the extent of changes to turbine locations within each turbine group. The average change in distance for each of the turbine group ranges from 26.3m (Gurrundah group) to 53.7m (Bannister group).

Table 2: Summary of Relocated Turbines by Turbine Group (Source Table 2-3 Modification EA)

	Kialla	***Bannister***	***Pomeroy***	***Gurrundah***
Minimum (m)	35.7	0	0	0
Maximum (m)	43.3	187.0	115.2	101.5
Average (m)	39.5	53.7	39.2	26.3

The Proponent provides a range of reasons for the relocation of the turbines from the "approved" locations, such as:

- The need for spacing and turbine optimisation by increasing the separation between the turbines to reduce wake effects and energy loss;
- increasing the setback to residences to reduce noise impacts;
- to avoid Endangered Ecological Community (EEC) woodland or mature vegetation; and
- to avoid overhanging crown land parcels.

The adjustment to turbine locations has also resulted in changes to hardstand areas adjacent to turbine sites and marginal changes to parts of the access tracks and electrical cabling that link to the adjusted turbine locations. These changes have been identified as in some cases increasing the length of access tracks and cabling routes and in other areas as reducing the length of tracks.

The final design elevations were also surveyed and the change in elevation from the approximate elevation provided in the Environmental Assessment (2009) is also included. The change in elevation for the wind turbines are provided in **Table 1** and summarised in **Table 3**. The highest increase in elevation is 14.8m for wind turbine BAN_08.

Table 3: Extent of Elevation Change for Final Wind Turbine Positions

Extent of elevation change from approved layout	**No of turbines**
Final turbine position lower	22
Final turbine position 0 – 5 m higher	31
Final turbine position 5 – 10 m higher	15
Final turbine position greater than 10 m higher	5

The Modification Environmental Assessment explains that the elevations used in the original Environmental Assessment (2008) were based on 5 metre mapping contours, rather than surveyed data and therefore the change in elevation is in part due to the approximate nature of elevation data used in the Environmental Assessment (2008).

The Proponent has installed slightly smaller wind turbines than those proposed in the original Environmental Assessment. The maximum turbine design in the Environmental Assessment (2008) included wind turbines up to 135m in height, however the installed wind turbines are the GW82-1.5 and GW100-2.5 which have blade tip heights of 126m and 130m respectively.

The installed wind turbines also have a smaller maximum rotor diameter (82m and 100m respectively), compared to the turbine design in the Environmental Assessment (2008) which indicated turbines up to a maximum rotor diameter of 105m. The GW82-1.5 has been selected for 17 turbines with the GW100-2.5 model being selected for the remaining 56 turbines. In terms of physical dimensions, both of the constructed turbines are relatively smaller (or the same) as the turbine for the approved layout and the constructed turbines will produce less output at 1.5 MW or 2.5 MW respectively, compared to up to 3.3 MW in the approved project. Therefore, the final design of the constructed GRWF will produce 165.5 MW, compared to up to 278 MW as detailed in the Environmental Assessment (2008).

STATUTORY CONTEXT

3.1. Modification of the Minister's Approval

On 26 June 2009, the then Minister for Planning and Infrastructure granted Project Approval with conditions for the Gullen Range Wind Farm. The Land and Environment Court subsequently granted consent, following appeals against the Minister's determination.

Although Part 3A of the EP&A Act was repealed on 1 October 2011, the project remains a 'transitional Part 3A project' under Schedule 6A of the Act. In accordance with clause 3 of schedule 6A of the Act, section 75W of the Act as in force immediately before its repeal on 1 October 2011 and as modified by schedule 6A, continues to apply to transitional Part 3A projects.

Section 75W of the Act provides that a Proponent may request the Minister to modify the approval of a transitional Part 3A project. The Minister's approval is not required if the project, as modified, will be consistent with the original approval. The Proponent's view is that the construction of turbines in different locations to the approved layout was consistent with the existing Project Approval.

The Department disagrees with this view and considers that a minor relocation is taken to mean small, or insignificant. The detailed evaluations undertaken by the Proponent to determine whether the project was consistent or not, demonstrates that the relocations were not insignificant with the greatest relocation being 187m. Notwithstanding the Proponent's original view, it decided to lodge a modification request under section 75W of the Act to amend the Project Approval to the constructed turbine locations.

It is the Department's view that the subject modification is not consistent with the approval, but does not constitute a project in its own right, and therefore a modification in accordance with section 75W of the Act is considered appropriate.

3.2. Delegated Authority

The Proponent is a private company and has provided, with its modification application for the proposal, a statement indicating it has made a reportable political donation. In addition, during exhibition of the modification application, the Department received more than 25 submissions by way of objection. Consequently, pursuant to the Minister's delegation of 14 September 2011, the modification application is subject to determination by the Planning Assessment Commission.

CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under section 75X(2)(f) of the Act, the Secretary is required to make the modification request publicly available. The Department publicly exhibited the Environmental Assessment from Thursday 3 April 2014 until Friday 2 May 2014 on the Department's website, and at the:

- Planning and Infrastructure, Information Centre, Sydney;
- Nature Conservation Council of NSW; and
- Upper Lachlan Shire Council.

The Department also advertised the public exhibition in the Crookwell Gazette on 3 April 2014 and Goulburn Post on 2 April 2014 and notified relevant state and local government authorities and some neighbouring landowners in writing.

The Department received 81* submissions during the exhibition of the Environmental Assessment including 5 submissions from public authorities and 76 submissions from the general public. A summary of the issues raised in submissions is provided below.

4.2. Public Authority Submissions

Upper Lachlan Shire Council (ULSC) requested that consideration of the modification be placed on hold whilst a judicial inquiry is conducted into the Proponent's breaches of development consent conditions; resiting of wind turbines without seeking development consent; major damage to a main road; and disregard for negative impacts for non-host residences.

Environment Protection Authority (EPA) agreed that predicted noise levels for the final turbine locations are below the applicable noise limits for all relevant integer wind speeds and there is no significant increase in impact for each receiver nearest to the constructed wind turbine location. However, the EPA qualifies this by noting that the revised noise assessment is based on four turbines (BAN_08, BAN_13, BAN_14 and BAN_15) being operated in curtailed sound power level mode for wind speeds of 9 metres/second. The EPA notes that this aspect of the operation would be addressed in the operational procedures such as the Noise Management Plan, which has already been approved by the then Director-General.

Office of Environment and Heritage (OEH) provided comments on biodiversity and Aboriginal heritage aspects of the project. OEH was unable to fully assess the biodiversity aspects of the modification until it receives comprehensive maps showing the correct boundaries and locations of all Endangered Ecological Communities, threatened fauna records and threatened fauna habitat and the PVP offset area.

The OEH expressed concerns at the discrepancy in the vegetation information provided in the modification application compared to previous documents provided such as the Compensatory Habitat Package, Bird and Bat Management Plan and Powerful Owl Management Strategy.

Following a site visit by OEH, the OEH provided further advice on biodiversity matters, focusing on revising the Compensatory Habitat Package, additional measures for the Little Eagle and Powerful Owl and monitoring for the Powerful Owl. These matters are discussed further in **Section 5**. Separate to the modification, the OEH requested clarification on a

* Includes late submissions

number of compliance matters regarding Aboriginal heritage and is waiting on receiving detailed information regarding the salvage activities that were undertaken in September 2012.

Trade and Investment (T&I) noted that the Revised Statement of Commitments includes a commitment that the Proponent will undertake consultation with titleholders of mineral exploration leases. T&I provided no further comment regarding the proposal.

T&I (Crown Lands) noted that as turbine GUR_01 has been constructed less than 15m from a Crown Road, that when considering the proximity of the turbine, blade orientation, and overhang, the Crown road is likely to be impacted and will need to be closed. T&I (Crown Lands) also noted that turbine GUR_07 was moved toward Sugarloaf Trig Reserve which resulted in direct impacts on the Reserve, however, this impact was acknowledged between the Proponent and NSW Land and Property Information, and T&I is satisfied that any impacts on the Trig Reserve have been appropriately mitigated by the Proponent.

Civil Aviation Safety Authority (CASA) stated that all land use planning authorities in Australia are required to assess the potential impacts on aviation safety from proposed wind farms using Guideline D of the National Airports Safeguarding Framework (NASF) and considers the approach adopted by the Department regarding this wind farm is consistent with NASF Guideline D.

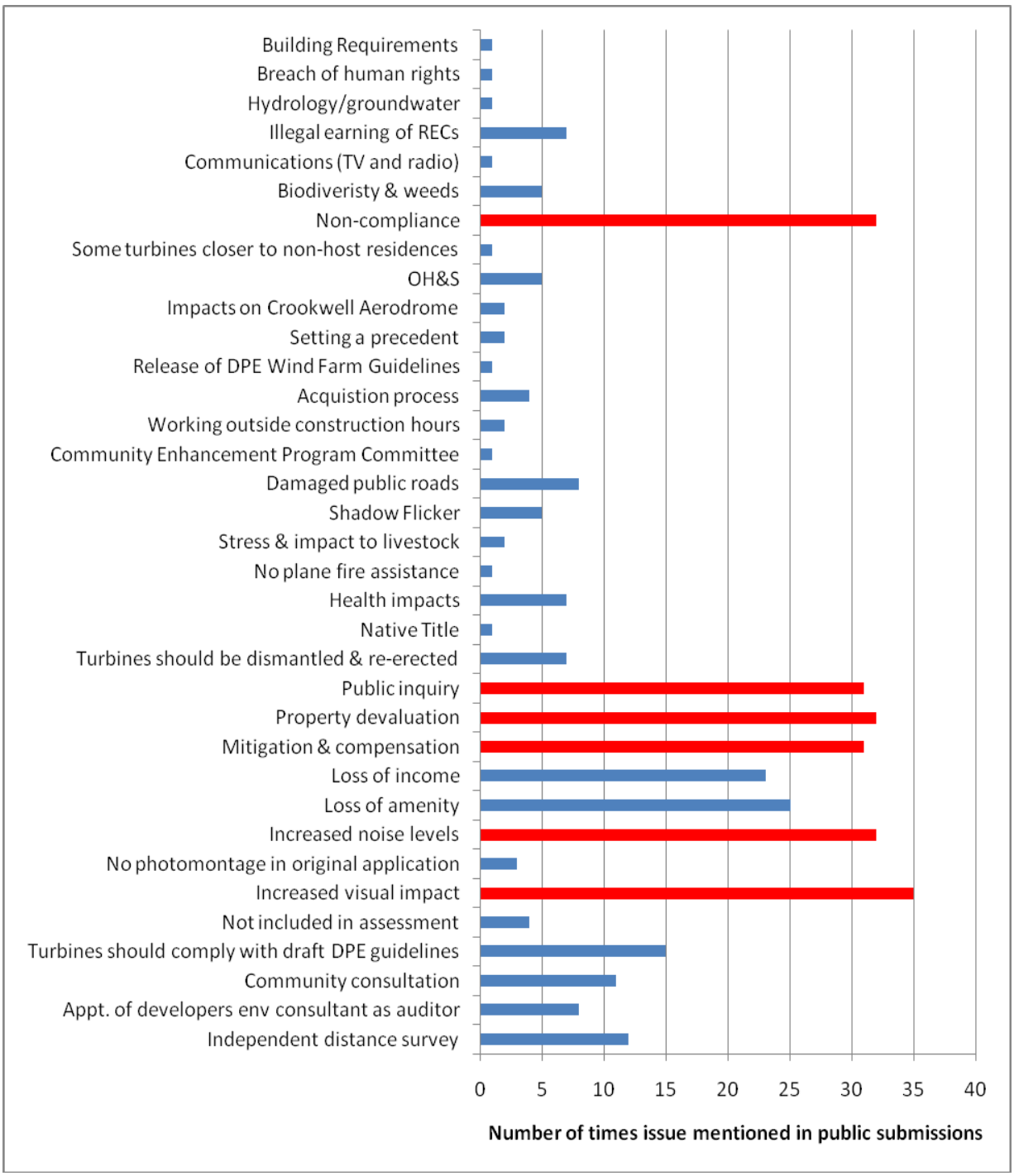
4.3. Public Submissions

A total of 76 submissions (including late submissions) were received from the general public. This included submissions from the following special interest groups:

- Boorowa District Landscape Guardians Inc;
- Crookwell District Landscape Guardians, Inc; and.
- Parkesbourne/Mummel Landscape Guardians Inc.

Of the 76 public submissions, there were 67 unique submitters with 42 (63%) objecting to the project, 10 (15%) supporting the project and 15 (22%) not objecting but raising concerns regarding visual impacts, noise impacts, loss of amenity, property devaluation, health and safety, proximity of turbines to residences, appropriate mitigation and compensation and a request for a public inquiry. The key issues raised in public submissions objecting to the project are shown in **Figure 2** and are discussed in **Table 4**.

Figure 2: Summary of Key Issues (Objections)



NB: The six issues mentioned most frequently are highlighted in red.

Table 4: Summary of Issues Raised in Public Submissions objecting to the project

Issue	Reason for Objecting to the Project	No. of times issue raised (Proportion of submissions %)
Higher visual impacts	• Increased visual impact at non host residences, due to relocation closer to homes and increased elevation. • Requested photomontages were not provided. • Photomontages referenced have no relevance. • Visual impact (given the wind farm is largely constructed) is greater than indicated by the Proponent. • Visual screening needs to be immediate (using mature trees) and effective. • Visual impacts from the turbines have diminished enjoyment of living in their home.	35 (46%)
Higher noise impacts	• Lack of rigour in noise assessment. • Greater noise impacts due to cumulative effects of turbines being moved closer to residences. • Cumulative noise has not been addressed in the modification application (as only noise created by individual noise turbines has been modelled). • Increased Van der Berg effect from increased turbine elevation has not been assessed. • Noise monitoring should be independently assessed (as some houses have a much higher elevation than noise monitoring locations and are also closer to the turbines). • Aerodynamic "swish" can clearly be heard and this should be investigated. • Derived noise limits are based on a scattering of background noise due to local wildlife and frogs when background noise applied to the property should be the same as for other properties.	32 (42%)
Non-compliance	• The developer has many breaches of compliance. • The Department's inability to ensure the developer complies with conditions of approval.	32 (42%)
Property value	• Greater property devaluation will occur as a result of increased proximity to turbines causing greater noise and visual pollution.	32 (42%)
Mitigation and compensation	• Relocation of turbines closer to dwellings could be managed by the Proponent acquiring those properties. • Property owners should have a choice to have their property acquired or the closest turbines removed or other forms of compensation and mitigation. • If turbines are not resited to their correct locations, compensation should be paid to any non-hosting residence that is disadvantaged by turbines being moved closer to their house. • Mitigation measures proposed by the developer are unrealistic.	31 (41%)
Public Inquiry	• An independent Public Inquiry is requested due to the lack of oversight from the Department on changes made between the planning phase and construction phase. • Call for Public Inquiry into the processes for approving and monitoring this development.	31 (41%)

Issue	Reason for Objecting to the Project	No. of times issue raised (Proportion of submissions %)
Loss of amenity	• Increase in noise and visual pollution reduces residents' enjoyment of outdoor activities.	25 (33%)
Loss of income	• Increased noise and shadow flicker effects will cause dangerous working conditions for some farmers, reducing the amount of land from which income can be made. • Loss of ability to subdivide their property due to Council's restrictions regarding proximity to turbines.	23 (30%)
2 km setback and DPI Draft Wind Farm Guidelines	• The 2km setback (as per the Draft DPI Guidelines) should be applied to the modification application. • Turbines which do not comply with the draft DPI Guidelines (those within 2 km of a non-associated residence without the property owner's agreement) should be removed. • If a modification application can be applied retrospectively, then the Draft Guidelines should be applied retrospectively.	15 (20%)
Independent distance survey	• An independent survey needs to be prepared by the Department of the distances of turbines from non host residences and the distances between turbines. • The independent survey should include a comparison of these distances to those provided in the projects original Environmental Assessment. • This survey data should be released in time to allow the community to prepare submissions based on independent information.	12 (16%)
Community Consultation	• The Proponent has not complied with reasonable community consultation processes by moving turbines with no prior notification to the Department or the nearest non-host residents. • Received no verbal consultation from Goldwind regarding the relocated turbines.	11 (14%)
Appointment of developer's environmental consultants as auditor	• The appointment of the developer's environmental consultant as the auditor for construction does not make sense. • The independent Environmental Representative is a Director of the company that produced the original Project Approval Application document so they cannot be independent. • The independent Environmental Representative has had a conflict of interest.	8 (11%)
Public roads	• Kialla Road was resurfaced but is now in a worse state than what it was previously. • The developer has been using roads not approved by the Project Approval. • The developer has restructured roads and left them in worse conditions than before construction. • Range Road is presently a traffic hazard and the developer has rejected Council's estimate of cost repairs to repair Range Rd since December 2013.	8 (11%)

Issue	Reason for Objecting to the Project	No. of times issue raised (Proportion of submissions %)
Health impacts	• Wind Turbine Syndrome is accepted by the medical fraternity and recommended setbacks should be adhered too. • Negative health impacts to residents from electrical grounding of multiple 3 MW wind turbines discharging into the grounds and their surroundings.	7 (9%)
Turbines should be dismantled	• Turbines should be dismantled and re-erected in their correct position. • Damage on the relocated sites should be rehabilitated. • No turbine that has moved greater than 10 m should be commissioned.	7 (9%)
Illegal earning of RECs	• Department is permitting a number of these illegally constructed turbines to operate and earn Renewable Energy Certificates (RECs).	7 (9%)
Biodiversity and weeds	• Dangers to local and migrating bird life. • Increased invasion of noxious weeds. • Some turbines are on the edge of threatened reptile habitats and the construction process would disturb these environments. • Vehicles were not washed down between properties to minimise the spread of noxious weeds.	5 (7%)
Occupational Health and Safety	• Turbines close to property boundaries pose a significant occupational health and safety hazard. • It will become too dangerous to undertake normal farming procedures due to the noise and shadow flicker emitted by the turbines in close proximity. • Shadow flicker will create a distraction from the concentration needed when using farm machinery and will mask clear unrestricted vision needed for the use of chainsaws. • As farmers in close proximity to turbines, there is no mention of mitigating noise in our workplace. • Aware of people working on close proximity to turbines having to leave the property due to the headaches suffered as a result of noise from the turbines.	5 (7%)
Shadow Flicker	• Noting that a new study on shadow flicker will need to be undertaken to establish the impact of relocated turbines. • Shadow flicker [and noise] that are already apparent makes it dangerous for people to work in their paddocks and carry out normal farming procedures. • Shadow flicker will cause an occupational health and safety issue.	5 (7%)

✦*Totals and percentages do not add up as each submission generally raised more than one issue.*

The key issues raised in public submissions supporting the project are listed in **Table 5**.

Table 5: Summary of Issues Raised in Public Submissions supporting the project

Issue	Reason for Support for the Project
Delays with wind farm	• Delays are affecting ongoing operation of farm and family. • Project should be allowed to proceed with no further delays.
Turbines moved reasonably	• Movement of turbines was within project boundaries. • Movements of turbines will not increase impact on surrounding properties. • Adjustments to the turbine locations were approved by the Environmental Representative. • Further relocation of turbines at this late stage could be considered environmental vandalism. • The initial approval permitted the "minor" relocation of turbines and the changes to the turbine locations are minor and insignificant.
Project benefits	• Environmental benefit being the production of clean energy (once the project is completed). • Employment and related benefits to the Goulburn and Crookwell communities. • Annual community fund which will provide much needed funds to local projects. • Compensation of neighbours to the turbines should be increased to promote community acceptance of the project.
Visual Impact	• Visual impact of final design layout is consistent with the level of visual impact of the approved layout.
Noise levels	• There will be no impacts on noise levels. • The wind farm will achieve compliance with relevant noise limits at all receivers.
Aviation Impacts	• There will be no aviation impacts for the changes in turbine locations and elevations.
Addressed assessment requirements	• The assessment requirements for this application including environmental and social impacts have been comprehensively addressed.

4.4. Proponent's Response to Submissions

Gullen Range Wind Farm Pty Ltd provided a response to the issues raised in the submissions (refer **Appendix C**). The Gullen Range Response to Submissions was placed on the Department's website on 24 June 2014.

The Department has since received four submissions from the public in response to the Response to Submissions Report. The submissions discuss issues that are broadly consistent with issues raised during exhibition of the modification application, and also provide further detail and clarification. In addition to issues raised previously, the following key matters were noted in these submissions:

- concern at the Proponent's "tone" and discrediting of information presented in public submissions to the modification application;
- request for an independent public inquiry to review the noise guidelines for wind farms in NSW; and
- requests for the application of day-time and night-time noise levels.

ASSESSMENT

The Department considers the key environmental and social issues for the modification to be:

- verification of wind turbine locations;
- visual impact;
- noise impact; and
- biodiversity.

Other issues are discussed in **Table 16**.

5.1. Verification of Wind Turbine locations

The modification application includes surveyed data for each of the 73 turbines within the final layout. This includes all turbines that have been installed and commissioned, erected, partially erected or have their footings constructed. The Proponent commissioned a survey of the turbine locations in February 2014 and this data is presented in the Modification Environmental Assessment. The location of residences in the Modification Environmental Assessment is derived from air photo imagery (from the original Environmental Assessment 2008).

Consideration

Some public submissions raised concern about the accuracy of the survey data provided by the Proponent and requested an independent survey be conducted to verify the locations of the turbines. The Department notes the community concern regarding:

- the changes in turbine locations from the original approved layout, to the final design layout,
- the accuracy of the Proponent's assessment in identifying the turbine locations and the distance each turbine has moved from the original approved layout, and
- the accuracy of the Proponent's assessment in identifying the distances from each non-associated resident to the nearest turbines.

The Department considers the accuracy of the turbine and resident locations, and the accurate determination of the distances that constructed turbines have moved from the original approved layout, underpins the assessment of impacts on the environmental and social aspects of the project.

The Department observed some lack of detail and inaccuracies in the "Consistency Review" in the reporting of turbine distances to the closest non-associated resident (Table 4-2 of the Consistency Review). Although this table reported the distance to the closest non-associated resident for the approved and final layout, it did not identify the actual residence for each respective turbine. It also did not clearly report that in some cases, turbines that had been moved away from some residences, had actually moved closer to other residences. For example POM_01 was reported in Table 4-2 of the Consistency Review as having moved 12% further from a receiver, however, it did not identify that as a result, POM_01 had actually moved closer to a different receiver (PW34). The Department further notes that the Visual Impact Assessment in the Consistency Review and the Modification Environmental Assessment sourced turbine and residence distance data from the authors of the Consistency Review and it is unclear whether this data was based on surveyed data or data from the Consistency Review.

Given these issues and the public concern regarding the accuracy of data, the Department commissioned an independent Registered Surveyor (MSA), to survey the locations and elevation of the 73 wind turbines within the GRWF and the location of 49 non-associated residences within 2km of the wind farm. The purpose of the survey was to accurately identify

the locations of the turbines and nearest residences to enable a comparison of the surveyed coordinates with that reported by the Proponent. This would assist in determining whether the turbine location and distance data presented in the Modification Environmental Assessment is "*fit for purpose".* The MSA report and data is included in **Appendix D**.

Specifically, the Department considered the following aspects of the turbine and residence locations required careful evaluation and verification:

1. Turbine location
    a) Comparison of approved layout as reported in the Environmental Assessment 2008 to the final (as constructed) layout and calculate the distance that each turbine has moved; and
    b) Comparison of the change in final turbine location to that reported in the Proponent's Modification Environmental Assessment.
2. Turbine elevation
    a) Comparison of turbine elevation in the Modification Environmental Assessment to the turbine elevation surveyed by MSA.
3. Residence locations
    a) Survey residence locations for all non-associated residents within 2km of the GRWF;
    b) Determine the distance from each non-associated residence (within 2km of the GRWF) to the closest turbine (for the final layout); and
    c) Compare this distance with the distance reported for each non-associated residence in the Modification Environmental Assessment.

The findings of each aspect of the Independent Surveyors Review are discussed below.

Turbine Location

Appendix D shows the difference in easting and northing co-ordinates between the Proponent's surveyed turbine locations and the turbine locations surveyed by MSA. Small differences are noticed between the two sets of survey data with a median difference in the easting and northing of -0.036 and 0.045 respectively. **Appendix D** includes the easting and northing co-ordinates of the Approved Layout and the surveyed final layout and calculates the distance each turbine has been constructed from its approved location. The relocated distance for each turbine calculated by MSA is the same as the distance reported by the Proponent in the Modification Environmental Assessment (refer to **Section 2.1**), with the exception of four turbines, which differed by up to 1m.

The Department considers the relocated layout of turbines presented in the Modification Environmental Assessment is representative and accurate.

Turbine Elevation

Appendix D shows the difference in elevation for each turbine from the survey undertaken by MSA and the elevation reported in the Modification Environmental Assessment. The median difference in the relative level (RL) of each turbine base is 0.4m and ranges from a minimum of 0.09m to a maximum of 1.21m. The difference in elevation can be explained by MSA and the Proponent's surveyor basing their respective surveys on two different components of the wind turbine, with the Proponent's surveyor using the top of the cairn (base of the tower) and MSA surveying the elevation of the concrete footing (which is approximately 0.5m below the top of the cairn). The Department therefore considers the elevation reported in the Modification Environmental Assessment to be sufficient for the purposes of the impact assessment.

Residence Locations

Appendix D includes the surveyed residence locations for non-associated residences within 2km of the GRWF and compares this with the Proponent's coordinates for residences. Some differences in location are noted with the median difference in easting and northing data both

being -1m. The Department considers that the MSA Surveyors data will be more accurate as it is surveyed data as compared to the Proponent's data which is sourced from aerial photograph imagery.

Appendix D also provides the distance calculated by MSA from each non-associated residence within 2km of the GRWF, to the closest turbine. It also compares this distance to the distance reported in the Modification Environmental Assessment and shows the difference (in distance) for each turbine. The median difference between the MSA data and the Proponent's data is 0m, the largest difference where the closest turbine is closer to the residence is 34m and the largest difference where the closest turbine is further away from the residence is 170m. For the 46 residences surveyed:

- 8 residences had no difference in distance when comparing the MSA data and the Modification Environmental Assessment data;
- 17 residences were further away from the nearest turbine according to the MSA data; and
- 21 residences were closer to the nearest turbine according to the MSA data.

Of the 21 non-associated residences that were calculated to be closer to the nearest turbine, four of these residences were calculated to be closer by more than 10m, as follows: G28 (12m), K19 (16m), K18 (21m) and G43 (34m). The median difference that a residence was closer to a turbine than reported in the Modification Environmental Assessment is 3m, and ranged from 1m to 34m. These differences in distances would largely be explained by the greater accuracy in residence locations derived from the MSA Surveyors data. A summary of the difference in data and distance between non-associated residences and the closest turbine is shown in **Table 6**, for each turbine group.

Table 6: Summary of difference in Proponent and MSA Surveyors Data

	Median (m)	Minimum (m)	Maximum (m)
Bannister Group			
Difference between approved location (2008) and constructed location	33	0	187
Difference in RL	0.42	0.24	1.21
Difference in distance from Modification compared to MSA survey, for non-associated residence (within 2km) to the closest turbine	-1.7	-170	8
Gurrundah Group			
Difference between approved location (2008) and constructed location	12	0	101
Difference in RL	0.38	0.28	1.19
Difference in distance from Modification compared to MSA survey, for non-associated residence (within 2km) to the closest turbine	1	-8[†]	34
Pomeroy Group			
Difference between approved location (2008) and constructed location	23	0	115
Difference in RL	0.42	0.09	0.60
Difference in distance from Modification compared to MSA survey, for non-associated residence (within 2km) to the closest turbine	2	0	9
Kialla Group			
Difference between approved location (2008) and constructed location	40	36	43
Difference in RL	0.37	0.29	0.44
Difference in distance from Modification compared to MSA survey, for non-associated residence (within 2km) to the closest turbine	3	0	21

[†] Negative numbers denote the closest turbine is further away

The Department considers the MSA data shows the turbine locations provided in the Modification Environmental Assessment are reasonably accurate and appropriate for use in the assessment of environmental and social impacts of the relocated turbine locations. However, the greater accuracy of the MSA data of residence locations has caused some differences in the distance between non-associated residence locations and the closest turbine, however, in the 21 cases where the residence has been determined to be closer to the turbine than reported in the Modification Environmental Assessment, these distances range from 1m to 34m.

5.2. Visual Impact

The Proponent's consultant ERM originally prepared the Landscape and Visual Assessment for the Environmental Assessment (2008) and the Statement of Evidence in 2009 for Landscape and Visual Impacts. ERM reviewed the original visual assessment to determine whether the change in turbine locations and reduced turbine height has changed the level of visual impact (included in Appendix A3 of the Modification Environmental Assessment). To undertake this review, ERM has:

- Reviewed the final location of turbines using the zones of visual influence, to determine whether there would be an increase in predicted visual impacts;
- Reviewed the change in visual impact from the reduction in turbine height; and
- Compared the indicative layout in the Environmental Assessment (2008) and the final design using photomontages.

ERM prepared 18 photomontages for the Modification Environmental Assessment as summarised in **Table 7**.

Table 7: Summary of Photomontages in the Modification EA

Photomontage location	Within 2.0km of nearest turbine	2.0-4.0km of nearest turbine
Publicly accessible locations	4	2
Non-associated residences	10	2

The Modification Environmental Assessment concluded the following:

- Of the 14 turbines identified as having moved closer to a non-associated residence, there has been no change in the level of visual impact (based on distance and zone of visual influence);
- The reduction in turbine height (from 135m to either 130m or 126.5m) would not make a difference to the level of visual impact;
- The amended locations of the wind turbines and reduction in wind turbine heights do not cause a perceptible change in the level of visual impact and there would not be a discernible difference to the viewer; and
- The visual impact of the final layout is consistent with the level of visual impact anticipated by the initial visual assessment of the approved layout.

Consideration

The public submissions identified increased visual impact as the issue of most concern. The submissions were concerned with four main issues:

- An increase in visual impact in cases where constructed turbines are located in a closer position relative to a residence, or at a different elevation causing different visual impacts;
- An increase in visual impact than what was originally predicted, as most of the turbines have been constructed and can now be viewed in the landscape;
- Photomontages taken from locations other than a residence are generally not representative and not useful in predicting visual impacts; and
- Visual screening needs to be immediate.

Public Domain

The visual impact of the GRWF in the public domain will largely occur whilst driving along rural roads in the local road network. Within the local road network there are several viewpoints from which a large number of turbines are visible as seen in the photomontages for:

- Viewpoint 2 (Range Road),
- Viewpoint 3 (Pomeroy Road),
- Viewpoint 5 (Kialla Road).

The Department notes from the photomontages, the overall visual impact in the landscape from the public domain is similar to the impact of the approved layout and the changed locations of turbines are generally not perceptible. Additionally, considering the view towards the turbines would be from a moving position whilst travelling in a vehicle, the change in visual impacts from the relocated turbines is considered to not be significantly different. The Department viewed the visual change in the landscape during its site visit (**Figure 3**)

Figure 3: View towards turbines from Pomeroy Road (source: Department's site visit 9/4/14)).

Residences

The Department acknowledges that some residents are concerned about the change in the visual landscape from their property. As most of the wind turbines are now constructed, residents and others can view the change in the landscape and this has possibly given rise to residents' concerns about the visual impact from their residence or property more broadly. Additionally, some residents expressed concern that wind turbines that had moved closer to their property were creating a larger visual impact than what was originally predicted.

The Department's assessment of the visual impact is focussed on evaluating whether the visual impact from wind turbines constructed in a different location (from the layout originally approved) has given rise to a different level of visual impact. The Department notes that photomontages have not been provided for all non-associated residences within 1km to 2km of the turbines. The Department has also taken this opportunity to consider visual impacts more broadly, particularly for the closest non-associated residences to the GRWF.

In undertaking its' assessment, the Department has relied on the following sources of information:

- Land and Environment Court Judgement (7 May 2010) as visual impacts were considered extensively and included in the Judgement;
- Proponent's Modification Application including the visual assessment;
- Proponent's Response to Submissions Report;
- The Department's site visit on 9 April 2014, which viewed the visual impact from five properties and the area more broadly from publicly accessible roads; and
- A second site visit by the Department on 18 July 2014, to view the area following the exhibition of the modification application and Response to Submissions.

The Department provides the following comments based on the site visits, review of the Modification Environmental Assessment and Submissions Report and the evaluation of independent survey data[‡]. The Department has assessed the impacts of residents according to the Turbine Groups below.

Bannister Turbine Group

The Modification Environmental Assessment includes ten photomontages of views from the east and west of the Bannister wind turbines. These photomontages compare views towards the approved layout and the final constructed layout of the turbines. The Department has provided comments on the changes in the visual impacts shown by the photomontages as summarised in **Table 8**.

Table 8 Bannister Turbine Group – Visual Impact

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km) *	Department's comments
View Point 1 Gravel lane	• 1.3km to the nearest turbine	• Not provided in the Mod EA. • 8 turbines are within 2km of the viewpoint (BAN_03, BAN_04, BAN_07, BAN_08, BAN_09, BAN_10, BAN_11, and BAN_12). •	• The overall visual impact in the landscape is similar. • On close examination, the constructed positions of BAN_09 to BAN_15 have slightly moved, however, the overall visual change in the landscape is similar to the approved layout. • It appears the hub height of BAN_09 (with reference to the tree in the middle ground) is slightly higher in the constructed layout, when compared to the approved layout. This may be because BAN_09 has moved relatively closer to this viewpoint.
View Point 2 Range Road	• 1.25km to the nearest turbine	• Not provided in the Mod EA. • 12 turbines are within 2km of the	• The overall visual change in the landscape in this photomontage is not discernible. • Close examination shows that the constructed locations of some of the wind turbines between BAN_10 to

[‡] The Department has used the surveyed distances by MSA when discussing the change in turbine locations.

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km) *	Department's comments
		viewpoint (BAN_10, BAN_12, BAN_16, BAN_17, BAN_18, BAN_19, BAN_20, BAN_21, BAN_22, BAN_23, BAN_24 and BAN_29). •	BAN_15 have moved slightly, or are screened in one layout and not the other (behind trees or behind other turbines), however the overall visual change in the landscape, between the two layouts is generally not perceptible.
View Point 4 Leahy Rd/Walcoms Lane	• 2.5km to the nearest turbine	• No turbines are located within 2km.	• The visual change in the distant landscape view to the Banister turbines in this photomontage is not discernible. • There appears to be slightly less Bannister turbines in the constructed view (compared to the approved layout).
Viewpoint B5	• 1.7km	• One turbine within 2km. • BAN_15 is 121m closer.	• The visual change in the landscape in this photomontage is not discernible. • BAN_15 has moved northwards and is now largely screened from view behind a tree in the foreground, therefore the usefulness of this photomontage to determine whether a relocation of 120m in turbine location, is somewhat limited.
Viewpoint B19	• 1.2 km	• 9 turbines within 2km. • 1 turbine has not changed its relative position. • 5 turbines have moved further away, ranging from 4m-35m. • 3 turbines moved closer: • BAN_21, 70m closer. • BAN_22, 3m closer. • BAN_27, 20m closer.	• The visual change in the landscape shown in this photomontage is barely discernible; • With close examination, the constructed position of BAN_28 is not behind BAN_27, as shown in the approved layout, however, the overall change in the visual landscape between the approved and constructed views is not discernible.
Viewpoint B26	• 1.7km	• 4 turbines within 2km. • All turbines further way (from 3m to 139m).	• The visual change shown in photomontage is not perceptible. • There may be minor changes in the distant views of the Bannister turbines (BAN_16 to BAN_26) however, these changes are not discernible.

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km) *	Department's comments
Viewpoint B28	• 1.2km	• 7 turbines within 2km. • Four turbines have moved closer. • BAN_03, 20m closer. • BAN_09, 166m closer. • BAN_10, 5m closer. • BAN_12, 63m closer.	• The visual change in the landscape shown in this photomontage is not perceptible. • On close examination, BAN_07 is now screened from view behind a tree. • On close examination, BAN_09 appears to be slightly taller in the constructed layout (perhaps as it is 166m closer), however, the overall visual impact appears similar.
Viewpoint B31	• 1.5km	• 5 turbines within 2km and all 4r turbines have moved closer. • BAN_09, 70m closer. • BAN_10, 79m closer. • BAN_12, 14m closer. • BAN_18, 32m closer.	• The visual change in the landscape between the two layouts is difficult to discern. • On close examination, BAN_09 has moved relative to the surrounding turbines, however, the overall visual impact when comparing the two layouts is similar.
Viewpoint B77	• 1.1km	• 4 turbines within 2km. • Three turbines have moved closer. • BAN_09, 154m closer. • BAN_10, 38m closer. • BAN_12, 53m closer.	• The visual changes in the overall landscape shown in these photomontages are barely perceptible. • On close examination small changes are noted such as: BAN_08 appears to have a higher constructed elevation; constructed wind turbines BAN_10 and BAN_12 are now screened by existing vegetation; BAN_09 appears slightly taller in the constructed layout; BAN_10 appears significantly shorter in the constructed layout; and very minor changes in the distant views to the wind turbines BAN_15 to BAN_29.

* This column includes distance data from the Mod EA. The Department has estimated the number of turbines within 2 km of each public viewpoint from maps within the modification application.

The Bannister Turbines have the highest number of non-associated residences (20) within 2km of the wind turbines. This group also includes the highest number of turbines (30) and has the highest proportion (33 %) of turbines relocated more than 50m from the approved layout, with:

- 4 turbines relocated between 50 m and 100 m;
- 2 turbines relocated between 100 m and 150 m; and
- 4 turbines relocated between 150 m and 187 m.

The following Bannister turbines have moved greater than 100m:

- BAN_08, 187m;
- BAN_09, 167m;
- BAN_13, 169m;
- BAN_15, 178m;
- BAN_21, 112m; and
- BAN_24, 123m.

The Department has focussed on evaluating the potential changes in visual impacts on this group of residences and particularly for residences where turbines have moved relatively closer to the residence. The residences range in distance from 1.1km to 2km from the wind turbines with a median distance of 1.5km. The closest non-associated residences are B29 and B77, both 1.1km from the nearest turbine and B28 at 1.3km from the nearest turbine.

A summary of the photomontages that the Modification Environmental Assessment used to evaluate the visual impact of residences and their distance to the closest turbine is summarised in Table 9.

Table 9: Photomontages used in Mod EA to evaluate impacts on residences

Photomontage	Photomontage is applied to the following Residences
VP1	B29 (1.1km), B55 (1.4km)
VP2	B17 (1.5km), B124 (2km)
VP4	B10 (1.5km), B11 (1.8km), B21 (1.6km), B22 (1.6km), B23 (1.7km), B24 (1.5km), B54 (1.7km)
B5	B5 (1.8km), B12 (1.6km), B13 (1.5km), B14 (1.7km)
B19	B19 (1.3km)
B26	B12 (1.6km), B26 (1.8km)
B28	B28 (1.3km), B29 (1.1km), B55 (1.4km)
B31	B30 (1.6km), B31 (1.6km), B32 (1.5km)
B77	B77 (1.1km)

NB: This data is sourced from the non-associated residence data folder for the Bannister Turbines (Appendix A11-2 in the Modification EA). Distances for each residence to the closest turbine was sourced from MSA and rounded down to the nearest 100 m).

One of the closest non-associated residences in this group is B77 and as noted in **Table 8**, the overall change in visual impact from the photomontages of the view from B77 is barely perceptible. Minor changes are noted between the approved and final layouts when closely examining the photomontages. These changes do not result in an overall change in the level of visual impact. Similarly, the change in visual impact as shown in the photomontages at B28 is not sufficiently perceptible to cause a change in the level of visual impact originally assessed.

The other closest residence, B29, is a small landholding of approximately 2ha (lifestyle landholding) and has 3 turbines within 1.5km and a further 6 turbines between 1.5km and 2km of the residence. Of the 9 turbines within 2km of the residence, 6 turbines have moved closer to the B29 residence, of which 3 turbines have moved closer by more than 50m to B29:

- BAN_08, 146m closer;
- BAN_09, 162m closer; and
- BAN_12, 64m closer.

The resident has included in its submission a photograph of the existing view from within the vicinity of B29. From the angle of the photograph, BAN_11 and BAN_14 are screened by one isolated mature paddock tree. However, turbines BAN_09 and BAN_12 are clearly and directly in view. The Proponent commented on this photograph in the Response to Submissions Report and suggested the photograph was taken further away from the

residence, which the owner of the B29 residence disputes and has provided a further submission to indicate the photographs were taken close to the residence.

Given this is a lifestyle allotment, rather than a working farm, the Department considers this property requires careful consideration. The Department notes several turbines (particularly BAN_09 and BAN_12) intrude on the outlook from B29 and being a lifestyle landholding (rather than a working agricultural property), the Department considers the change in the final layout of BAN_09 (moving 162m closer to the residence) has caused a greater visual impact on B29 and would not be able to be effectively screened. The Department considers the visual impact from BAN_09 will affect the intended use of the B29 property and therefore the Department has recommended that the owner of B29 be given the opportunity to request acquisition or otherwise turbine BAN_09 should be relocated to its original approved position. The Department has recommended an additional condition in the Project Approval to address this issue.

Residence B28 and B55 are in a similar area as B29, although they are slightly further away, with B28 and B55 being approximately 1.3 km and 1.4 km from BAN_09, the nearest turbine. The Department reviewed the photomontage for B28 (refer to Table 8) and considers that overall the visual change in the landscape of the constructed and approved turbine layouts is not perceptible. It would appear than BAN_09 is slightly taller in the constructed layout, which is likely to be a result of the relocation of BAN_09, being moved 166 m closer to this residence. The Department also notes from the B28 photomontage, that ancillary farm buildings and mature trees (including mature eucalypt trees and pine trees), are presently around the residence, and are sited to some extent, between the B28 residence and the wind turbines. These buildings and trees appear to shield to a large extent, the view of the wind turbines from the residence. The Department also observed from its site visit, that B55 is located adjacent to Range Road and has considerable clump of mature trees around the residence curtilage, which would largely screen views of the wind farm from this residence. The Department also notes that both residences can access the landscaping provisions in Condition 2.3 of the Project Approval if they wish.

The Department visited B12 to observe the wind turbines from the residence and property. There are no direct photomontages available for this property and the Modification Environmental Assessment suggests the B26 and B5 photomontages are the nearest photomontages available. The Department considers that B26 is not sufficiently representative as the turbines in the outlook from B26 have moved further away and the location is significantly further away. Also, the B5 photomontage only includes one turbine within 2km of the viewpoint (BAN_15) and although it has moved 121m closer to the B5 residence, this turbine is largely screened in the foreground of B5 which limits the usefulness of this photomontage for residence B12.

The B12 residence has five turbines between 1.6km and 2km from the residence of which two turbines have moved closer (BAN_13 and BAN_15 are closer by 65m and 166m respectively). Additionally, it is also noted that the wind turbines border three of the property boundaries of B12. The usefulness of the B5 photomontage for this property is limited, given that the turbine which has moved the closest (BAN_15) is screened from view by a tree in the foreground at the B5 residence. Also, B12 has four turbines within 2km of the residence and B5 has one turbine within 2km.

The Department was able to view turbines from the back garden of the house, (across a wetland constructed by the resident) and view turbines in a southerly direction, BAN_15, the tips of BAN_18, and the tops of BAN_16, BAN_19, BAN_17, BAN_20 and BAN_21). The Department notes the top of the existing vegetation in the middle ground is beginning to shield the following turbines, BAN_17, BAN_20 and BAN_21. Of this group of turbines, BAN_15 is the only turbine within 2km of the residence and has also moved 166 m closer to the residence. The Department considers that additional plantings will be able to screen

BAN_16, BAN_17 and BAN_19 over time, from the view of the back garden. The resident will be able to access landscaping provisions in accordance with Condition 2.3 of the Project Approval. However, the Department considers that it will be difficult to screen BAN_15 and the visual impact of this turbine would have been comparatively smaller, had it not been relocated from its approved location and constructed closer to B12. Therefore, the Department has recommended a condition that requires the Proponent to relocate BAN_15 from the constructed location, to its originally approved location or if this is not suitable, it can be removed from the GRWF.

The resident of this property also expressed concern that significant portions of their property (working cattle property) will be affected by shadow flicker which will cause issues in using farming equipment on their property. The Department considers that shadow flicker is an amenity issue and that shadow flicker will not cause issues when operating machinery.

B13 is located in a similar position to B12 and has four turbines within 2km, with two of these turbines having moved closer (BAN_13, 110 m closer and BAN_15, 134m closer). The Modification Environmental Assessment states that this residence has high screening around the residence and therefore considers the change in visual impact from the residence will generally not be discernible. Residences B14 and B5 are further away and therefore have comparatively less turbines within 2km (three turbines and one turbine respectively). B26 has four turbines within 2km of the residence and each of these has moved further away (ranging from 3m to 139m). As discussed in **Table 8**, the photomontages of the approved and constructed layout from this residence shows the visual change between the two layouts is generally not perceptible The Department considers that residences such as these shall not view a significant change in the landscape compared to the approved project and will also be able to access landscaping mitigation measures in accordance with Condition 2.3 of the Project Approval to assist in reducing the visual impact.

B19 has 9 turbines within 2km of the residence. A photomontage for the approved and constructed layout is available for this property (refer to **Table 8**). On viewing the photomontages, the Department considers that the difference in visual impacts between the two turbine layouts is barely discernible.

A group of non-associated residences exists to the south of the Bannister Turbine group comprising B10 (1.5km), B11 (1.8km), B21 (1.6km), B22 (1.6km), B23 (1.7km), B24 (1.5km), B54 (1.7km). (It is noted that the Proponent's Response to Submissions confirms that B20 is an associated property). It is noted that these residences have between three to five turbines within 2km of their residence and that in these cases, turbines have either remained in their original approved position or moved further away from each residence. The Department therefore considers the change in visual impact from the approved and constructed layout to not be sufficiently perceptible and these residences will be able to access landscaping provisions in accordance with Condition 2.3 of the Project Approval if they wish to minimise the visual impact of the wind turbines.

Residences B7, B17 and proposed residence locations B121a and B122a are now associated properties as confirmed in the Proponent's Response to Submissions and therefore do not warrant further assessment of visual impacts. (The proposed residence locations B121a and B122a were subject to the acquisition schedule in Condition 2.25 of the existing Project Approval).

A group of non-associated residences exists to the west of the Bannister Turbine Group comprising B30 (1.6km), B31 (1.6km), B32 (1.5km) and B31a (1.5km). (B31a was assessed in the Response to Submissions Report as it had not been assessed in the Mod Environmental Assessment). All of these residences (with the exception of B30) have the same four turbines within 2km of the residence and all have moved closer by 8m to 80m. B30 has three turbines within 2km and they have moved closer by 22m to 88m. The

photomontages from B31 for the approved and constructed layouts show there is little difference in the overall visual impact in the landscape (as discussed in Table 12). However, the Department notes from its site visit that from this broad area (viewed from Range Road), approximately up to 15 turbines are obvious in an arc from the north-east to the south-east of these turbines, which includes turbines beyond 2km. The Department acknowledges that the turbines are very obvious features in the landscape, particularly given the number of turbines across the ridge. The Department recognises these turbines are obvious impacts which are largely related to the legacy of the original Project Approval, rather than the relocated turbines which is the subject of this modification application. The residences in this area will be able to access landscaping measures in accordance with Condition 2.3 of the Project Approval to reduce the visual impact of the turbines.

Gurrundah Turbine Group

The Modification Environmental Assessment includes four photomontages of views from the north, east, south and south-east of the Gurrundah Group of Turbines. These photomontages show the views towards the approved layout and the final constructed layout of the turbines. The Department has provided comments on the changes noted in the visual impacts shown by the photomontages as summarised in **Table 10**.

Table 10: Gurrundah Turbine Group Visual Impact

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km)*	Department's comments
Viewpoint 3 Pomeroy Rd	• 1.4km to the nearest turbine according to application	• Not provided in the Mod EA • 2 turbines approximately at 2km from the viewpoint: • GUR_03 and GUR_07.	• The changed location of GUR_07 is slightly discernible, however, the overall visual impact in the landscape is similar (with turbine GUR_07 constructed 101m from its original approved position). • Other changed locations of the Gurrundah turbines are generally not perceptible and it is noted that the turbines within the Gurrundah Group have moved least in distance, compared to the other turbine groups.
Viewpoint G31	• 1.5km	• 2 turbines within 2km. • GUR_14 has not changed location. • GUR_15 has moved further away by 37m.	• The visual change in the landscape in this photomontage is not discernible.
Viewpoint G35	• 1.9km	• 4 turbines within 2km. • 3 turbines have moved closer and GUR_14 has not changed location. • GUR_12, 31m closer. • GUR_13, 19m closer. • GUR_15, 7m closer.	• The visual change in the landscape shown in this photomontage is barely discernible. • With close examination GUR_10 is noted to have moved slightly in the landscape (it has moved in distance by 61m), however the visual change in the landscape is generally the same.
Viewpoint G38	• 1.8km	• GUR_01 is the	• The visual change in the landscape

	only turbine within 2km and has not changed location.		shown in this photomontage is barely discernible. • The noticeable difference is that the constructed orientation of GUR_01 and GUR_02 is perpendicular to the viewer, however, the visual impact in the landscape is similar.

* This column includes distance data from the Mod EA. The Department has estimated the number of turbines within 2 km of public viewpoints from maps within the modification application.

Table 10 highlights the usefulness of specific photomontages to evaluate the change in visual impact for the Gurrundah Turbines, by identifying which turbines (if any) have moved relative to each viewpoint and whether that distance was closer or nearer to the viewpoint. As seen in **Table 10**, the photomontages for Viewpoint G31 and G38 are somewhat limited in demonstrating the change in visual impact within 2km of turbines, as in each of these viewpoints the turbines within 2km have either not moved or have moved slightly further away. These viewpoints are more useful for discerning the change in visual impact for more distant views to the turbines (greater than 2km).

There are 12[§] non-associated residences within 2km of the nearest turbine in the Gurrundah Group. The Department notes the closest non-associated residences within the Gurrundah Group range in distance from 1.3km to 1.9km to the closest turbine, with the exception of G32 which is 1.0km from the nearest turbine. Also, within this group of turbines, GUR_07 has the largest relocation distance of 101m from its original location. The turbine GUR_07 is not within 2km of the viewpoints G31, G35 and G38, therefore these photomontages are limited in discerning whether the change in location of GUR_07 has caused a perceptible visual effect in the landscape. A summary of the photomontages that the Modification Environmental Assessment used to evaluate the visual impact of residences is summarised in **Table 11**.

Table 11: Photomontages used in Modification EA to evaluate impacts on Gurrundah residences

Photomontage	Photomontage is applied to the following Residences
VP3	G26, G28, G33, G39, G40 and G43
G31	G31
G35	G35
G38	G38, G36, G32, G33

NB: This data is sourced from the Non-associated residence data folder for the Gurrundah Turbines (Appendix A11-4 in the Modification EA).

In the case of G32 (the closest residence to the Gurrundah turbines), the closest constructed turbines have moved marginally closer to the residence (GUR_01 at 1m and GUR_02 at 9m). The Land and Environment Court considered the visual impact upon this residence and recognised that topographic features would shield partially or completely the closest turbine from view of the residence. The Land and Environment Court concluded that the visual impact on this property did not warrant amending or refusing the project. The Department considers the small change of 1m-9m in the constructed distance of the nearest turbines would not alter the predicted visual impact of the wind turbines on G32. Additionally, the photomontages of G38 for the constructed and approved layout show the visual change in the landscape to views of GUR_01 and GUR_02 are not significantly discernible. The Department acknowledges that Viewpoint G38 is further away from GUR_01 (1.8km) compared to G32 (1.1km), however considers that there has not been a perceptible change in the visual impact from G32.

[§] 11 non-associated residences were identified in the Modification EA, however one residence (G52) was identified during the exhibition period. Therefore, there are 12 non-associated residences within 2 km of the Gurrundah Group.

The Department visited G43 (where the closest turbine is GUR_07, which had moved the greatest distance to the residence, being 97m[**] closer to G43 compared to the approved layout and is approximately 1.6km from the residence) to observe the change in the visual landscape from this residence. The Department notes the turbines are not directly visible from the residence, due to the intervening topography between the residence and the turbines. However, the turbines can be viewed uphill and at some distance from the residence. The Department acknowledges the constructed wind turbines are a change in the rural outlook, however, the Department observed that the views to the wind turbines are elevated on a ridge and are relatively distant and are from area on the property on not from the residence. The Photomontage VP3 was also used to evaluate the change in visual impact. VP3 was taken on Pomeroy Road, slightly closer to the wind farm than G43 but with a similar outlook. It is noted when comparing photomontages for the approved layout and constructed layout for VP3 that the overall visual impact in the landscape is similar and generally not perceptible between the different turbine layouts in the two photomontages.

For other non-associated residences within this group where turbines have moved closer, the distance that turbines have moved closer ranges from 1m to 43m, with the exception of GUR_07 which has moved 84m closer to residence G33. With reference to G33, the Department notes the Land and Environment Court had determined that due to the lower elevation of this residence, it would only see the tops of the rotors, and therefore the Department considers the change in location of GUR_07 would not alter the predicted visual impact on this property.

The Department considers the change in visual impact from the approved and constructed layouts for residences in **Table 11** to not be sufficiently perceptible to warrant further mitigation beyond the landscaping provisions provided by Condition 2.3 in the Project Approval. This is based on an evaluation of the photomontages, the Department's site visit and recognition that the turbines in the Gurrundah group have only moved relatively small distances, with the exception of GUR_07. The Department's assessment has focussed on evaluating whether the changed location of GUR_07 has given rise to significantly different visual impacts and is satisfied that the visual impacts in this case are sufficiently consistent for the approved and constructed layouts.

The Department has reviewed residence G52, as this residence was not identified in the Modification Environmental Assessment, although it was assessed during the Land and Environment Court proceedings in 2009. The Court at that time found that part of the GUR_01 may be viewed, however, the Gurrundah turbines would be largely screened. The Court also predicted that it would be likely that a number of the Pomeroy turbines would be viewed to the east and north-east and concluded that given the topography, the visual impacts on this property are acceptable.

As this property was not assessed in the Mod Environmental Assessment, the Proponent prepared a datasheet and review of visual impacts in the Response to Submissions Report. It is noted that this residence has 6 turbines within 2km. The Gurrundah turbines are the closest in distance to the residence however, these are located behind the house and are screened by large trees. Within 2km, the turbine GUR_07 has moved the closest to the residence, by 101m and is approximately 1.8km from the residence. However, as the Gurrundah turbines are largely screened from the residence, the change in location of GUR_07 relative to the residence has not caused a greater visual impact. There is a more distant view to the Pomeroy turbines which are approximately 3.7km to 5.5km from the residence. The Department understands that the owners of G32 are most concerned about the view to the Pomeroy Turbines, due to the orientation of their house. The Department acknowledges that these seven turbines (POM_01 to POM_07) will be visible on the

[**] The distance to GUR_07 from G43 was adjusted using data from the Independent Survey (MSA Surveyors).

ridgeline and are broadly consistent with distant views experienced by other residents, where their house is orientated towards a view of the turbines. The resident is able to access landscaping provisions under Condition 2.3 of the Project Approval as they are located within 3 km of the turbines. The Department is satisfied that the visual impact on this residence is acceptable and may be ameliorated to some extent.

The Department understands that some people would prefer to retain their previous rural outlook without the wind turbines. However, residences within 3 km are able to access landscaping treatments in accordance with Condition 2.3 of the Project Approval to assist in ameliorating their view of the wind turbines. The Department concludes that the change in visual impact as a result of the difference in the constructed layout has not given rise to a perceptible change and increase in visual impact (compared to the original assessment) for this area.

Pomeroy Turbine Group

The Modification Environmental Assessment includes four photomontages of views from the west and north of the Pomeroy Group of Turbines. These photomontages show views towards the approved layout and the final constructed layout of the turbines. The Department has provided comments on the changes noted in the visual impacts shown by the photomontages as summarised in **Table 12**.

Table 12 Pomeroy Turbine Group – Visual Impact

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km)	Department's comments
View Point 4 Leahy Rd/Walcoms Lane	• 2.5km to the nearest turbine	• No turbines are located within 2km.	• The changed location of POM_04 is slightly discernible, however, the overall visual impact in the landscape is similar (with turbine POM_04 constructed 96 m from its original approved position). • Other changed locations of the turbines are generally not perceptible and it is noted that in the edge of the distant view, there appears to be slightly less Bannister turbines in the constructed view (compared to the approved layout).
Viewpoint PW3	• 2.2km	• No turbines are located within 2km.	• The visual change in the landscape in this photomontage is not discernible. • Close examination shows that POM_01 and POM_08 have moved slightly in the landscape however the overall visual impact is consistent with the approved layout.
Viewpoint PW9	• 1.2km	• 4 turbines within 2km. • All 4 turbines moved closer, ranging from 3m to 18m.	• The visual change in the landscape shown in this photomontage is barely discernible; • With close examination POM_11 is now screened behind the water reservoir and POM_16 is not visible in the constructed landscape.
Viewpoint PW12	• 3.2km	• No turbines are located within 2km.	• The visual change in the landscape shown in this photomontage is not perceptible.

There are 5[††] non-associated residences within 2km of the nearest turbine within the Pomeroy Group. Four of these residences are 1.3km to 1.9km from the nearest turbine whilst PW34 is the closest, 856m from the nearest turbine (POM_01). Wind turbines POM_01, POM_03 and POM_04 have moved the furthest distance in this group, from their original location, by 115m, 102m and 96 m respectively. A summary of the photomontages that the Modification Environmental Assessment used to evaluate the visual impact of residences in this group is summarised in **Table 13**.

Table 13: Photomontages used in Mod EA to evaluate impacts on residences

Photomontage	Photomontage is applied to the following Residences
VP4	PW34
PW3	PW4, PW29, PW34
PW9	PW9, PW8[‡‡]
PW12	None

NB: This data is sourced from the Non-associated residence data folder for the Pomeroy Turbines (Appendix A11-3 in the Modification EA).

The Department visited PW34 to examine the visual impact on this property. The Department notes that a direct photomontage of the visual impact is not available for this property and photomontages VP4 and PW3 would not be reasonably representative for this property. Also, the Land and Environment Court was unable to visit this residence in 2009 due to time constraints. During the Department's site visit, the Department was able to view wind turbines from several locations from PW34. The nearest turbine (POM_01) has moved 124m[§§] closer to the residence and was able to be viewed after a short walk through vegetation around the residence and is not viewed directly from the residence.

However, the residence and its garden are orientated towards the location of POM_02, POM_03, POM_04 and POM_05. The footings of this group of turbines are at a similar elevation to the garden which causes the blades of the wind turbine to seem more direct and in view. A further eight turbines are in the mid-range of view (POM_06, 1.6km, POM_07, 1.9km and the cluster of POM_8 to POM_13, located beyond 2km). Residence PW34 has four constructed turbines within 1km as follows:

- POM_01 (856m as measured by MSA);
- POM_02 (969m according to the Modification Application);
- POM_04 (1km according to the Modification Application); and
- POM_05 (895m according to the Modification Application).

The view towards POM_02, POM_03, POM_04 and POM_05 is shown in **Figure 4**.

[††] The Proponent's RtS states that PW34 is now an associated property, however, given the proximity of PW34 to the turbines, the Department has evaluated the impact on this property as if it was non-associated.

[‡‡] The residence data tables state that a photomontage viewpoint is available from PW8, however, as it was not included in the Mod EA, the viewpoint photomontage for PW9 was used instead.

[§§] Using data from MSA Surveyors

Figure 4: View towards turbines from PW34 (source: Department's site visit 9/4/14)).

The Department considers the visual impact on the curtilage of the residence (which does not have vegetation screening towards the turbines POM_02, POM_03, POM_04 and POM_05) to be high. With the elevation of turbines (POM_02, POM_03, POM_04 and POM_05) ranging from 864m to 888m (as measured by MSA) being similar to the elevation of PW34 (873 according to the Modification Application), the wind turbine blades do intrude into the view of the curtilage of this residence and its garden in an unacceptable manner, which the Department does not consider could be ameliorated appropriately. Therefore, the Department recommends the acquisition schedule in the Project Approval (Condition 2.25) is amended to include Residence PW34.

Figure 5: View towards turbines from PW4 (source: Department's site visit 9/4/14)).

The Department also visited PW4, which has one turbine within 2km of the residence (POM_01 is 1.9km from the residence). POM_01 has been constructed 87m*** closer to PW4, compared to the originally approved layout. PW4 also has four other turbines (POM_2, POM_3, POM_4 and POM_5) between 2km and 3km from the residence in one direction and a group of wind turbines (POM_8 to POM_15), approximately 2km to 3km from the residence. The Department observed from the site visit that intervening ground rising upwards from the residence and horse yard to a ridge, coupled with existing vegetation, screens wind turbines POM_02, POM_03 and POM_04 from the horse yard. The top of the wind turbine POM_01 and its blades could be viewed from the horse yard (refer to **Figure 5**). The Department considers with additional planting on the rising ground or ridge, the view from the horse yard to POM_01 could be effectively screened. The resident of PW4 is able to access these landscaping provisions through Condition 2.3 of the existing Project Approval.

During the site visit, a distant outlook towards a different Pomeroy group of wind turbines (POM_8 to POM_15) was viewed from the PW4 property (however not from the residence curtilage). The Department recognises that the distant views from the property to the constructed wind turbines POM_8 to POM_15 represents a change in the visual landscape, however these views are relatively distant and not surrounding or intrusive into the views of the residence. The resident can seek to have these views ameliorated through the landscaping provisions in Condition 2.3 of the existing Project Approval. The Department also viewed the constructed substation and a closer view of POM_01 to POM_07 from the PW4 property (refer to **Figure 6**).

Figure 6: View towards the substation from the PW4 property (source: Department's site visit 9/4/14)).

*** Data sourced from MSA Surveyors

The existing Project Approval requires the Proponent to prepare a Landscape Management Plan (Condition 7.5(b)) which requires the Proponent to develop appropriate landscaping for the visual impacts on site including the substation. The Department notes the substation is approximately 1.3 km from the PW4 residence, however is not viewed from the residence curtilage but from several areas on the PW4 property. The Department has recommended further conditions regarding the screening of the substation to ensure views to the substation are screened in an appropriate and timely manner. These additional conditions will require the Proponent to commence screening of the substation immediately and to utilise advanced and mature plantings, to ensure the screening is established as quickly as possible. Further, the Department will require the planned screening of the substation to be reviewed by an Independent Landscape Architect to ensure all reasonable screening mechanisms are used to immediately and effectively reduce the visual impact of the substation on surrounding properties such as PW4. The Department recognises that tree plantings and similar strategies may sometimes fail due to environmental conditions or poor plant selection. Therefore the Department has also recommended that Proponent monitor the effectiveness of all visual mitigation measures, particularly the measures used to minimise the visual impacts of the substation on surrounding properties.

To provide additional assurance that visual impacts from the substation are managed at an acceptable level, the Department has also recommended that the Proponent commission an Independent audit of the performance of the mitigation measures which will be undertaken by an Independent Landscape Expert whose appointment must be approved by the Secretary. The Independent Landscape Expert will assess the performance of the visual mitigation measures with specific reference to the effectiveness of measures in screening the substation from surrounding properties. The Independent Landscape Expert will also review the adequacy of the Landscape Management Plan and recommend actions or measures to improve the visual mitigation measures if required. The Independent Audit will be undertaken within six months of the granting of the modified approval and every two years thereafter and the results will be reported to the Secretary.

The Department considers that for other residences in this group (PW8, PW9 and PW29), the change in the Pomeroy wind turbines ranging from 0m to 115m (with a median change of 23m) will not cause substantively different visual impacts than previously assessed. The Department considers that the change in visual impact is not substantially perceptible in the photomontages for Viewpoints PW3, PW9 and PW12 (refer to **Table 13**). Also, residence PW29 has been identified as having high levels of existing vegetation (hence screening) around the residence, such that views to the turbines should be largely screened. If a resident within 3km of the GRWF considers turbines viewed from their property should be screened, they will be able to access the landscaping provisions to assist in mitigating the visual change in the landscape, in accordance with Condition 2.3 of the Project Approval.

Kialla Turbines

The Modification Environmental Assessment includes three photomontages of views from the east and west of the Kialla wind turbines. These photomontages and the Department's comments regarding the changes in the visual impacts of the approved and final layout of turbines are summarised in **Table 14**.

There are 8 non-associated residences within 2km of the nearest turbine within the Kialla Group. All of these residences are approximately 1.6km to 1.9km from the nearest turbine with the exception of K2, which is 1km from the nearest turbine (KIA_01). The Kialla group contains two turbines, KIA_01 and KIA_02 which have moved 36m and 43m respectively from their approved locations. A summary of the photomontages that the Modification Environmental Assessment used to evaluate the visual impact of residences is summarised in **Table 15**.

Table 14 Kialla Turbine Group – Visual Impact

Photomontage	Distance to nearest turbine	Overview of relocated turbines (within 2km) *	Department's comments
View Point 5 Kialla Rd, north-east of the Kialla turbines.	• 3.6km to the nearest turbine	• No turbines are located within 2km.	• The overall visual impact in the landscape of the approved layout and constructed layout is similar. • On close examination, the constructed positions of some of the Bannister turbines have moved slightly, however, the overall visual change in the landscape is the same as the approved layout.
View Point 6 Gunning Rd north-west of the Kialla turbines.	• 1.2km to the nearest turbine.	• Not provided in the Mod EA. • Two turbines are approximately within 2km of the viewpoint.	• There is rising ground in the foreground towards the direction of the turbines, which largely screens most of the turbines from view (mostly the tops of the rotors are in view). • The overall visual change in the landscape between the approved and constructed layouts is similar.
K1	• 1.9km to the nearest turbine.	• 3 turbines within 2km. • 2 turbines have moved closer (BAN_01, 7m closer and KIA_01, 35m closer).	• The overall visual change in the landscape in this photomontage is not discernible. • There is existing screening from vegetation and topographic effects which shows that the turbines are generally not visible.

* This column includes distance data from the Mod EA. The Department has estimated the number of turbines within 2 km of each public viewpoint from maps within the modification application.

Table 15: Photomontages used in Mod EA to evaluate impacts on residences

Photomontage	Photomontage is applied to the following Residences
VP5	K3 (2km)
VP6	K2 (1km), K4 (1.5km), K14 (1.6km), K18 (1.7km), K19 (1.9km), K20 (1.6km).
K1	K1 (1.9km)

NB: This data is sourced from the non-associated residence data folder for the Pomeroy Turbines (Appendix A11-3 in the Modification EA). Distances for each residence to the closest turbine was sourced from MSA and rounded down to the nearest 100 m).

The closest residence to the Kialla Turbines is K2, which has KIA_01 and KIA_02, 1km and 1.1km from the residence. KIA_01 has moved 20m away from the residence, whereas KIA_02 has moved 43m closer to the residence. There is no photomontage available for this residence and the Modification Environmental Assessment uses the VP6 photomontage for visual assessment. It is noted that the VP6 photomontage is limited in its ability to be applied to this residence as the photo was taken in front of rising ground towards the turbines which may not represent the topography in the immediate vicinity of K2. The submission from K2 notes that turbines are visible from the bedrooms. The Department acknowledges that as the residence is at a distance of 1 km from the turbines, this is generally regarded as high visual impact. The Proponent's Response to Submissions Report also confirms that it considers this residence has a high visual impact. The Department considers this residence should be able to access landscaping and visual mitigation measures as a priority and has

recommended a condition requiring the Proponent to implement immediate and mature sized plantings to ameliorate the visual impact of KIA_01 and KIA_02 on this residence, on granting of the modified Project Approval.

Other non-associated residences to the east and north of the Kialla turbines include K4 (1.5km), K14 (1.6km), K18 (1.7km), K19 (1.9km) and K20 (1.6km). It is noted that for reasons stated above, the usefulness of VP6 in evaluating the change in visual impact on these properties is somewhat limited. The Department considers that as these residences are 1.5km and further from the Kialla turbines, there will be some visual impacts from the turbines, depending upon the level of vegetation or topographic screening around the residence. These residences are noted to have high vegetation screening around the residence (based on the residence data sheets in Appendix A11-1 of the Modification Environmental Assessment) with the exception of K18 and K19. The closest turbines to K18 and K19 are located approximately 1.7km to 1.9km away. The Department considers that the minor change in KIA_02 relative to K18 (a movement of 42m) will not cause sufficiently different visual impacts when compared to the approved layout.

K3 is located north-east of the Kialla turbines with KIA_01 approximately 2km from the residence and KIA_02 a couple of hundred metres beyond that. The Department considers that at this distance, the perceptibility of visual change between the constructed and approved layouts will be minimal.

K1 is east of the Kialla turbines and has two Bannister turbines and one Kialla turbine within 2km of the residence. As disused in **Table 14**, as K1 has existing screening from vegetation and topographic effects, the wind turbines from the approved or constructed layouts are generally not visible.

The Department also notes that these residences (and other non-associated residences located up to 3km from the closest turbine) will be able to access landscaping measures in accordance with Condition 2.3 of the Project Approval. This will assist those residences who expressed concern about the visual impacts of the turbines and are located between 2km and 3km of the turbines.

Summary

The Department considers that in most cases, turbines constructed in different locations to the approved layout have not caused significant differences to the visual impact predicted for the approved layout. In viewing the photomontages prepared by the Proponent, it is possible to notice some subtle changes in the visual landscape where constructed turbines appear in slightly different positions, or in situations where the turbines are constructed in significantly closer locations relative to a viewpoint, the specific turbine may appear to be taller and closer to the viewer.

However, the Department concludes the relocation of two turbines over 150m have caused a different level of visual impact to what was predicted. To reach this conclusion, the Department has considered the presence and proximity of non-associated residences and the likely views of those residences to the turbines which have been relocated the greatest distance. These two turbines include turbine BAN_09 (relocated 167m) and the affected residence B29 and turbine BAN_15 (relocated 178m) and the affected residence B12. The Department has recommended conditions requiring these two turbines to be relocated to their original position, however in the case of B29, the Department has also recommended this residence be given the opportunity to request acquisition if they wish, due to the change in visual impact from BAN_09.

Additionally, the Department notes from its site inspections, that the visual impact of the approved project (which is largely constructed) appears greater than the first photomontage picture provided for each viewpoint. The Department acknowledges that the visual impacts in

some cases are higher than anticipated, even where the relocated turbines are close to their original position, given the number of turbines on exposed ridges and in proximity to a reasonably settled area. The Department notes that residences (within 3km of the wind farm) will be able to access landscaping provisions to screen views towards the turbines. The Department has also recommended conditions for landscaping at K2 and to screen views of the substation from PW4.

5.3. Noise

The Modification Environmental Assessment includes a noise assessment which reviews the difference in predicted noise levels between the approved layout and the final design layout. The Consistency Review includes a revised Noise Impact Assessment for the final turbine models and locations selected. The documents conclude that the predicted noise from the final turbine and wind farm layout achieves the relevant noise limits at all assessed receivers.

Consideration

Concern about noise impacts was the second highest issue in the public submissions received. Public submissions raised the following key issues:

- Lack of rigour in the noise assessment;
- No assessment of cumulative noise effects from movements of more than one turbine closer to a residence;
- Increased Van der Berg effect from increased turbine elevation has not been assessed;
- Increased noise levels across a farming property which will affect its use for farming purposes; and
- Background noise data used were not representative.

The Department commissioned Wilkinson Murray to conduct an independent review of the Proponent's noise impact assessment and this is included in **Appendix D**.

The Department notes the original and revised Noise Impact Assessments were conducted in accordance with the South Australia EPA's "Environmental Noise Guidelines: Wind Farms" (2003) which is the referenced guideline in NSW for the assessment of wind farm noise on non-associated residences. The noise impact assessment includes predicting the noise emissions from the operation of all wind turbines, for all wind speeds from 3m/s to 12 m/s.

Although some public submissions expressed concern about an increased Van der Berg effect from an increase in elevations, the Department notes that for the constructed wind turbines that have moved to a higher elevation, in most cases this was within 5 m RL of the original approved layout.

The revised Noise Impact Assessment identifies that a Noise Operating Strategy is required to ensure that the noise limits in the Project Approval can be achieved at residence B12. The Proponent has an approved Operational Noise Management Plan which has set out the required curtailment of turbines BAN_08, BAN_13, BAN_14 and BAN_15 to meet the noise limits in the Project Approval. The Operational Noise Management Plan also includes a Noise Compliance Plan (as required by Condition 2.21 of the Project Approval).

Wilkinson Murray conducted independent noise modelling of the approved and proposed turbine layouts to determine the difference in noise levels between the two layouts. The predicted difference in noise levels were either the same or within 0.1 dB which shows a very good correlation between the noise levels predicted by the Proponent and Wilkinson Murray. Both reviews undertaken by the Department and Wilksinson Murray conclude that the proposed relocation of the turbines will result in an insignificant change in wind turbine noise from the GRWF and that it is capable of meeting the noise limits in the Project Approval.

Resident B12 expressed concerns about noise levels across the entire property (not limited to its residence) and whether they will be able to operate machinery and other farming

activities safely. The Department acknowledges the concerns raised, however recognises that based on current and best practice, predicted noise levels (and resulting noise criteria) are only provided to protect the noise amenity of a receiver within their dwelling, not within the outside "working" environment.

Resident B29 expressed concerns regarding the use of elevated background noise levels to calculate the noise limits for their property. The Department considers the measured background noise (and resulting predicted noise levels) are not inconsistent with what is expected within a rural environment.

Overall, the Department is satisfied that the modified constructed layout will be able to meet the noise limit criteria, in accordance with the approved Operational Noise Management Plan and Noise Compliance Plan. However, to address concerns expressed by residents about noise levels experienced by the operation of the turbines whilst they are in commissioning stages, the Department has recommended additional conditions which will allow landowners to request independent noise monitoring at their residence and to require the Proponent to make the Noise Compliance Report publicly available. Additionally, the Department has recommended conditions for the Project Approval, to reflect contemporary practice with respect to low frequency noise and tonality.

5.4. Biodiversity

The Proponent overlaid the 69 turbines that were proposed to be relocated onto constraints maps to identify if they would be positioned within an Endangered Ecological Community (EEC) or other ecological constraints. This process identified that four of the 69 wind turbines that were to be relocated from their original layout (POM_04, POM_06, BAN_14 and BAN_05) would require further ecological assessment to avoid EECs. The Proponent summarised the ecological impact assessment for each of these turbines and these were endorsed by the Environmental Representative. The proponent's assessment concludes that none of the turbine movements will result in additional impacts to biodiversity and some of the turbine movements have resulted in a benefit to the ecological communities.

Consideration

A small proportion of public submissions expressed concern regarding biodiversity issues for the project and included the following aspects:

- Dangers to local and migrating bird life;
- Invasion of noxious weeds such as thistles, blackberries and serrated tussock;
- Impacts from wind turbine BAN_05 on biodiversity;
- Lack of vehicle washdown facilities at each property boundary to prevent the spread of noxious weeds; and
- Some turbines are on the edge of threatened reptile habitats and the construction process would disturb these environments.

The OEH expressed significant concern regarding the validity of vegetation mapping and the correct boundaries and locations of all EECs, threatened fauna records and fauna habitat, the Property Vegetation Plan (PVP) offset area and the changes in turbine locations and infrastructure. OEH also noted the mapping and descriptions provided in the Modification EA were inconsistent with other previously approved documents such as:

- Compensatory Habitat Package;
- Bird and Bat Management Plan; and
- Powerful Owl Management Strategy.

The OEH attended a site visit with the Proponent to view the site and discuss biodiversity issues in more detail. As a result of the site visit and review of documentation, the OEH has the following concerns:

- Turbines POM_03, POM_04, POM_06 and POM_07 have moved closer to the known habitat for the Powerful Owl and Little Eagle;
- Most of the Box Gum Woodland within the Compensatory Habitat Package is infested with serrated tussock and only some parts of the Box Gum Woodland meets "*Box Gum Woodland in moderate to good condition with a native understory but with low diversity*";
- the area of offset is not being managed for conservation but showed signs of heavy grazing; and
- the turbine within the Pomeroy cluster has been operating (the blades were turning for at least 12 months) but no monitoring of the impacts of the turbines on the Powerful Owl or Little Eagle had been undertaken. The OEH is concerned that there may have already been impact on the Powerful Owl due to the turbines being active and no monitoring being done, to determine if any birds have been struck by the turbines.

As a result of OEH's concerns, OEH has made a number of recommendations:

1. To ensure the CHP adequately offsets the vegetation types impacted by the development, an updated assessment of the amount and type of vegetation impacted by the development is required;
2. A larger area of Box Gum Woodland is required to offset the development and the Compensatory Habitat Package should be extended to include the Powerful Owl nest tree located in the creek line;
3. Due to the increased risk to the Little Eagle (from the movement of the POM_03 and POM_04 turbines), these turbines should be switched off during the fledgling period; and
4. Monitoring of the impact of the GRWF on the Powerful Owl should begin immediately and should be discussed further with OEH. Monitoring shall focus on turbines POM_03, POM_04, POM_06 and POM_07 to determine any impacts on the Powerful Owl population.

The Department acknowledges the importance of ensuring that ecological mapping and analysis is correct, as it is used as a basis for many other management decisions and commitments regarding the biodiversity aspects of the project. The Department agrees with the OEH that an updated assessment is required, of the amount and type of vegetation impacted by the development. Correct mapping and calculation of areas of biodiversity loss (attributable to the relocated turbines and infrastructure) is required, to ensure the correct calculation of the offset area for the project. This updated assessment would be used to inform the revision and finalisation of the CHP in consultation with the OEH. The Department has recommended a condition requiring the Proponent to provide an updated vegetation assessment. Although the Compensatory Habitat Package (as required by Condition 2.35 of the existing Project Approval) has previously been approved, the Department has recommended altering this condition to require the Proponent to amend and update the CHP to include:

- The updated areas of biodiversity loss, which will also account for the mapping discrepancies;
- A larger area of Box Gum Woodland;
- the Powerful Owl nest tree located in the creek line and all known roosting and nest trees for the Powerful Owl within the project boundary;
- Measures to ensure that spraying using a boom spray or aerial spraying is not undertaken within the offset areas of Box Gum Woodland, or within the other areas of the CHP. (Spraying for noxious weeds is to be undertaken using a hand held spray device on target species only and other woody weeds should be removed by hand);
- measures to ensure no grazing is being permitted within the CHP area without consultation with OEH;
- Feral animal control including control and removal of feral goats, pigs and control of foxes; and

- Practices to ensure the Box Gum Woodland is actively rehabilitated to within NSW Vegetation Biometric benchmark level for Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands in the Hawkesbury Nepean CMA. This rehabilitation should be within benchmark in the next 5 years.

The Department has recommended a condition requiring the Proponent to submit the CHP for further approval prior to the operation of the wind farm. The CHP and nest trees and surrounding habitat should be protected in perpetuity.

The Department has also recommended a condition to require the Proponent to turn off POM_03 and POM_04 during the fledgling period for the Little Eagle, as this species is known to fly at rotor sweep height and forage in open areas. Additionally, the Department has recommended a condition requiring the Proponent to monitor and limit the presence of rabbit within the foraging areas for the Little Eagle, as secondary poisoning from rabbit baits is listed as a threat to this species.

The Department is also concerned that the moving of turbines POM_06 and POM_07 closer to the known breeding site for the Powerful Owl may impact on this species. The OEH notes the turbines are now located closer to the foraging habitat for the Powerful Owl which increases the collision risk for this species, whilst hunting for prey. The Department agrees that protection of the known nesting tree and roosting site of the Powerful Owl is required. The Department therefore recommends the CHP be extended to include all known roosting and nest trees for the Powerful Owl within the project boundary and that the boundary of the CHP should be finalised in consultation with the OEH.

The Department notes the Proponent has an approved Bird and Bat Adaptive Management Program which includes monitoring of at risk species such as the Powerful Owl. Additionally, Condition 2.33 requires the Proponent to monitor the dispersal of the Powerful Owl juveniles. The Department has recommended an additional condition requiring the Proponent to undertake consultation with the OEH (within 1 month from the date of determination of modification 1), regarding the monitoring for the impact of the wind farm on the Powerful Owl population, particularly for turbines POM_ 3, POM_4, POM_6 and POM_7.

Also, the Department has recommended an additional condition to require the Operational Environmental Management Plan to include specific measures to ensure that noxious weeds are not transported beyond individual property boundaries. The current Operational Environmental Management Plan includes some information on weed control and a weed strategy, however, the Department considers that stronger measures are required to ensure that noxious weeds are not spread beyond property boundaries. The Department recognises this issue is related to the management, monitoring and compliance of the operational phase of the project (rather than a specific issue related to the Modification Application), however given the issues raised, and further review of the currently approved documents, considers that it is appropriate to require the Proponent to revise its existing measures to ensure the risk of further spread of noxious weeds is minimised.

5.5. Other Issues

The Proponent has assessed the potential impacts of the modified project in relation to archaeology, air safety, telecommunications, soil and water management, traffic and transport, shadow flicker and health. The Department is of the opinion that the Proponent has undertaken an adequate assessment of the issues. The Department's consideration of these issues is provided in **Table 16**.

Table 16: Other Issues

Issue	*Department's Consideration*
Archaeology	The Proponent's archaeologist prepared a desktop assessment of the impacts of the relocated turbines on Aboriginal cultural heritage. This assessment included a search of the Aboriginal Heritage Management System (AHIMS) database to identify whether any Aboriginal sites occurred within the relocated locations of the turbines. The revised AHIMS search indicated that no Aboriginal sites have been recorded within the relocated turbine layout. The Proponent's archaeologist conducted an Aboriginal site salvage collection in September 2012 which included the collection of 171 artefacts from 18 sites. No known sites were found within the turbine locations, therefore the site collection effort was conservative and expanded to include any known Aboriginal sites within the vicinity of the approved turbine locations. These on-site collection efforts included the location of any sites within the as-built turbine locations. The Modification Environmental Assessment concludes that there will be no increase in impacts on Aboriginal sites or objects for the final project layout when compared to the approved layout. Additionally, the remaining 10 Aboriginal sites not previously salvaged will not be impacted by the final turbine layout. The OEH raised a number of issues about Aboriginal cultural heritage including the need to justify salvaging sites which were not going to be impacted. The OEH considers the site salvage collection in 2012 constitutes an impact as other forms of mitigation such as fencing and signage should have been implemented. The OEH also provided comments on the Aboriginal Heritage Management Plan (AHMP). This matter is largely a compliance matter for the approved project. The Department notes the Proponent's commitment in the RtS to provide a further response on the matters of concern to OEH and include a revised and updated AHMP.
Air Safety	An assessment of the impacts of the relocated turbines on Crookwell and Ashwell aerodrome was undertaken by the Proponent. The Crookwell aerodrome is located approximately 4km south of Crookwell, and is utilised by emergency services to fight bushfires and provide training, as well as functioning as an emergency medical evacuation site. The Project Approval deleted 11 turbines from the original project application, to maintain the aerodromes current use and safety level and to minimise impacts on its emergency service operations. This was to ensure that no turbine was located within a 3600m circular area of the aerodrome, consistent with the requirements of a code 2, non instrument runway. The Proponent's assessment concluded that the closest relocated turbine to the Crookwell aerodrome (KIA_01), was approximately 32m closer to the aerodrome, and resulted in no increase on aviation impacts. The Ashwell airstrip is utilised as a private airstrip, and the closest relocated turbine, being turbine POM_19, has moved 40m further away from the airstrip, and resulted in no increase on aviation impacts. The constructed turbines have also been constructed to a maximum height of either 126 m or 130m, which is shorter than the maximum approved height of 135 m.

Issue	***Department's Consideration***
	The Department is satisfied that the impacts on air safety, particularly on the Crookwell aerodrome and Ashwell airstrip, of the modified project have been satisfactorily addressed by the Proponent, and considers that the modified project will not result in any unacceptable impacts.
Telecommunications	The Proponent has assessed the potential impacts that may arise from the relocated turbines on telecommunication services. The assessment concluded that the final design layout shall not significantly change the impacts of the project. The Proponent has also previously undertaken an assessment of the existing quality of the television/radio transmission at 54 locations within 5km of the GRWF prior to construction. This study was required by Condition 2.54 of the Project Approval. The Department considers that existing conditions in the Project Approval (Conditions 2.55 and 2.56) are appropriate for managing any issues with telecommunications interference, once the GRWF is fully constructed and commissioned. The Department also notes the Proponent has committed to providing additional assessment of potential impacts and to consult further with the Rural Fire Service in its updated Statement of Commitments (Commitment 38a. in Appendix 11 in the Response to Submissions). The Department is satisfied that the additional commitment should ensure that if there are any communication issues for the RFS as a result of the GRWF, that these will be resolved.
Soil and Water Management	The Proponent states that soil and water management issues have been managed in the same way for the relocated turbine locations as they would have been for the approved locations. The Proponent also states that the construction has been undertaken in accordance with the approved Construction Environmental Management Plan (CEMP) which includes a subplan "Soil and Water Management Plan". The Department considers that soil and water management measures are site specific and that provided the measures and objectives are followed in the CEMP, there would be no substantive soil and water management issues regarding the relocation of wind turbines. The Department is satisfied that this issue has been addressed and notes the Proponent has identified further work needs to be undertaken regarding site rehabilitation works.
Traffic and Transport	The Proponent's assessment considers that changes to turbine locations have had little impact on traffic and transport issues with the main changes involving minor adjustments of access routes to the adjusted turbine locations. The original Environmental Assessment (2008) considered traffic and transport impacts of the construction of 84 turbines. However, as a smaller number of turbines was approved (73 turbines), this has resulted in a reduced volume of imported components and therefore reduced volume of construction vehicle movements. The Proponent further states that the weight and size of the turbine components has been reduced when compared to other turbine models considered in the approved project (see table below), which has resulted in marginally smaller transport vehicles.

Issue	*Department's Consideration*

Transport component	EA 2008 (84 turbines)	Final Design (73 turbines)		
Tower sections	336	GW82 - 4 parts	68	236
		GW100 - 3 parts	168	
Nacelles	84 (60-70 tonnes)	73 (40-50 tonnes)		
Rotors	84	73		
Blades	252	219		
Concrete for Footings	33,600m^3	29,200m^3		

Therefore, the Department considers that the levels of construction traffic would have been marginally lower than what was originally proposed.

The Department notes the Proponent has prepared a post-construction dilapidation report which was submitted to the relevant road authorities in March 2014. The Proponent has also commissioned a further report on the recommended works.

The Council has raised issues about the damage caused by the GRWF to one of the Shire's main roads and a number of public submissions raised similar concerns.

Condition 2.49 of the Project Approval requires the Proponent to restore the roads to the state described in the original pre-construction road dilapidation report and the Proponent shall fund the remedial road works. The Proponent states in the Response to Submissions that the remedial roadworks to be conducted are the subject of current consultation between the Councils and the GRWF. The Department expects this issue shall be resolved in accordance with the existing Condition 2.49, which includes guidance if there is a dispute between the parties.

Shadow Flicker

The Department considers that shadow flicker is a consideration in terms of amenity and possible annoyance. The modified project includes the relocation of a number of turbines, some of which have moved closer to non-associated residences.

The Proponent prepared a shadow flicker assessment of the revised turbine locations, which the Department notes is based on using conservative modelling assumptions for a theoretical maximum case scenario. The assessment concludes that there have been marginal increases or decreases in calculated shadow flicker for some non-associated residences. Further, the Proponent concludes that shadow flicker for non-associated residences remains below 30 hours per annum.

The Department notes the theoretical maximum shadow flicker exceeds 30 hours per annum for the modified layout, for one non-associated residence, B19, with 37 hours per annum predicted. However, once this prediction is adjusted for turbine orientation and cloud cover, the predicted shadow flicker is 20 hours per annum. The Department acknowledges that there are a number of assumptions in calculating the theoretical maximum shadow flicker and the maximum theoretical levels predicted are probably unlikely to occur. The Project Approval requires the Proponent to ensure that any non-associated residence does not experience shadow flicker more than 30 hours per annum.

The Department also notes shadow flicker is predicted to remain consistent for many non-associated residences with the approved layout or in some cases, it is predicted to marginally increase for some non-associated residences, with the increases ranging from 1 hrs/annum to 3

Issue	***Department's Consideration***
	hrs/annum. The adjusted shadow flicker for all non-associated residences, including those that were assessed in the RtS, are however still expected to be below 30 hours per annum. The Department also notes that shadow flicker is expected to increase for some associated residences. Notwithstanding, the Department understands that the owner of these residences would have reached a commercial agreement with the Proponent and expect that any residual amenity impacts at these residences would be accounted for in such agreements. The Department is generally satisfied this matter has been addressed in the Proponent's EA and Submissions Report.
Health	The Proponent assessed the variations to turbine locations in terms of noise, shadow flicker and electromagnetic radiation and concluded there were negligible differences between the approved layout and the relocated turbine layout. The Proponent also summarised literature from the National Health and Medical Research Council (NHMRC) and the Australian Medical Association (AMA) regarding possible human health effects from wind farms. The Proponent summarised the NHMRC's position as showing that there appears not be a strong link between the operation of wind farms and human health effects but there is an association between wind farm noise and factors such as annoyance, sleep disturbance, poorer sleep quality and quality of life. The Proponent concludes the changes to turbine locations are small and changes to aspects such as noise and shadow flicker have been assessed, therefore there would unlikely be additional impacts compared to the approved layout. The Department acknowledges the community's concern regarding potential health effects emanating from wind farms, however, the Department is guided by the literature reviews undertaken by the NHMRC which uses a robust evidence-base to determine its position (which is supported by NSW Health) regarding human health effects from wind farms. At this stage, the NHMRC has identified wind farm noise has possibly been a concern for poorer sleep and poorer quality of life outcomes. The Project Approval has existing conditions to ensure noise levels from GRWF do not cause unreasonable noise impacts on nearby non-associated residents. Therefore, the Department is satisfied that the risk for residual health effects from the wind farm is minimal.
Crown Road	The Crown Road referred to in the submission from the Department of Trade and Investment (Crown Lands) is a "paper road" and is required to be closed, due to the proximity and overhang of turbine GUR_01. The Department has recommended a condition requiring the Proponent to consult with and comply with the requirements of the NSW Crown Lands Division in relation to any Crown land affected by the Project to enable the lawful use of that land by the Project.

RECOMMENDATION

The Department has undertaken a detailed assessment of the Modification Application of the Gullen Range Wind Farm, considering the Proponent's Environmental Assessment, Response to Submissions Report and Statement of Commitments. In assessing the Application, the Department has also considered the views of local and State authorities and the issues raised by the public and community in their submissions during exhibition of the Application.

Based on this assessment, the Department considers the key environmental issues associated with the project to be verifying the locations of the constructed turbines, visual impacts, noise and biodiversity. The Department sought independent expert advice in relation to the turbine locations and noise impact assessment.

The Department considers the modification, subject to recommended conditions, can be revised and operated to achieve acceptable visual, noise and biodiversity outcomes.

To minimise potential visual impacts that may arise, the Department recommends:

- Amending the Project Approval by a number of stringent conditions which require the relocation of one turbine (BAN_15) to its approved location;
- The opportunity for one non-associated residence to be acquired or have the relevant turbine (BAN_08) relocated to its approved location;
- Stringent landscaping measures including mature plantings to screen the substation from view of non-associated residences; and
- Priority landscaping measures for a residence predicted to have high visual impact from the original application.

In relation to noise, the Department notes that whilst the Proponent has demonstrated that the modified project can meet the noise limits in the Project Approval, a condition is still recommended which provides non-associated residences the opportunity to request independent noise monitoring. This is to address the residences' concerns that wind turbines which have been operating for some time (under the commissioning stage), have already caused unacceptable noise impacts to surrounding neighbours.

The Department recommends a number of additional conditions to ensure the existing Compensatory Habitat Package is revised and extended to include a greater area of Box Gum Woodland and to include all known roosting and nest trees for the Powerful Owl within the project boundary. The Department has also included a number of other conditions to ensure the rehabilitation of the Box Gum Woodland within the Compensatory Habitat Package will achieve the appropriate benchmark in the next 5 years.

Overall the Department is satisfied that with the implementation of the measures outlined in the recommended conditions of approval and the Proponent's proposed mitigation measures, the potential impacts of the proposed modification to the Gullen Range Wind Farm would be appropriately mitigated and/or managed to an acceptable level of environmental and social performance.

The Department therefore recommends the Planning Assessment Commission consider the findings and recommendations of this report and determine to approve the modification to the Project, subject to the recommended conditions.

Prepared by

Karen Jones 28.7.14
Director
Infrastructure Projects

Approved by

28.7.14
Chris Wilson
Executive Director
Development Assessment Systems & Approvals

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6470

APPENDIX B SUBMISSIONS

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6470

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6470

APPENDIX D OTHER RELEVANT REPORTS OR DOCUMENTS

- MSA Surveyors

See the Department's website at
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6470

- Wilkinson Murray

APPENDIX E RECOMMENDED CONDITIONS OF APPROVAL

Attached