



**Planning &
Infrastructure**

Compliance Audit Report



Cullerin Range Wind Farm

February 2013

Cover Photograph: Cullerin Range Wind Farm

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FOREWORD

Wind farms will play an important part in the State's energy future. However, it is important the community has confidence these installations are operating in line with their consent conditions.

Although investigations conducted by the Department of Planning and Infrastructure to date have found the NSW Government approved wind farms to be complying with noise limits, the Department has continued to receive noise complaints from nearby residents.

In early 2012, the Minister for Planning and Infrastructure asked the Department to commission an independent compliance audit of operational wind farms in NSW, to gauge whether they are meeting their consent conditions.

The wind farm audits cover the Cullerin Range, Woodlawn and Capital wind farms in southern NSW, which are the State's three operational NSW Government approved wind farms.

An independent specialist noise consultant was commissioned to audit compliance against the noise limits and the Department's Compliance Unit audited compliance against other consent conditions including those relating to visual amenity, flora and fauna impacts, shadow flicker, community contributions and radio/television interference.

Key stakeholders were consulted as part of the audit process including local residents, local councils, the Environment Protection Authority and the wind farm operators. Consultation with local residents included the distribution of a survey questionnaire, meetings with residents and a telephone contact line.

A separate audit report has been prepared for each of the three wind farms and a fourth report prepared describing the community consultation undertaken in association with the audits. All the reports are publicly available on the Department's website at www.planning.nsw.gov.au.

EXECUTIVE SUMMARY

Wind farm compliance audits

The NSW government commissioned independent compliance audits of the State's three government-approved wind farms that are currently in operation, namely Cullerin Range, Woodlawn and Capital, which are all located in southern NSW.

The compliance audits were conducted by the Department of Planning and Infrastructure. The purpose of the audits was to evaluate compliance of the wind farms with their respective approval conditions relating to wind farm operation. Compliance with conditions relating to design and construction of the wind farms is outside the scope of the audits.

Due to the highly specialised nature of monitoring wind farm noise and analysing noise monitoring data, the Department engaged the services of a specialist, independent acoustical consultant, Renzo Tonin & Associates, to audit compliance with the noise criteria..

The audits also addressed compliance with other operational conditions relating to issues such as visual amenity, flora and fauna impacts, aircraft movements, shadow flicker and television reception.

Cullerin Range audit

This report addresses the compliance audit of Cullerin Range Wind Farm against the operational consent conditions in the then Minister's Project Approval (MP05_0167) issued on 21 February 2007. Separate reports address the audits of the other two wind farms.

The audit findings are based on evidence gained during the audit, including through reviewing relevant documentation, noise monitoring and analysis by the acoustical specialist, a site inspection, interviews with the proponent's representatives and survey responses/interviews with nearby residents.

Continuous noise monitoring over a period of 4 weeks was undertaken at five locations in the vicinity of Cullerin Range wind farm using unattended monitors. Further, shorter term attended monitoring was undertaken at four additional locations to supplement the unattended monitoring results.

Community Consultation

The Department conducted active community consultation in association with the three wind farm audits, including the following activities:

- Placing information about the wind farm audits on the Department's website
- Issuing all land owners within 4km of a wind farm with a survey questionnaire relating to the operation and performance of the wind farm
- Conducting face-to-face meetings with those who indicated in their survey responses that they wished to speak with the auditors
- Reviewing responses to the surveys and reporting on the outcomes of the consultation.

Those matters raised by residents that fell within the scope of the audit are addressed in the audit findings.

A comprehensive report on the Department's community consultation has been published to complement the audit reports and is available at www.planning.nsw.gov.au.

Audit findings

The audit found Cullerin Range wind farm to have a high standard of compliance with the key operational conditions of approval.

The independent acoustical specialist also found Cullerin Range wind farm to be compliant with the approved noise criteria at all residential properties that were monitored during the period of the audit.

The audit identified one non-noise related non-compliance, relating to the need for the geotechnical investigation for construction of the turbine structures to have taken into account the potential for mine shafts in the area.

The audit also made a number of observations and recommendations to improve environmental performance or community access to information. The observations addressed issues such as reporting on road conditions, public safety, habitat protection and provision of information to the community.

Acknowledgements

The auditors wish to acknowledge the residents in the vicinity of Cullerin Range wind farm who allowed noise monitoring for this audit to be undertaken on their properties. The auditors also wish to acknowledge those residents who responded to the community survey questionnaire and who spoke candidly with the auditors under the community consultation activities associated with this audit.

The auditors also wish to acknowledge the co-operation afforded to them by the proponent, Origin Energy, during the audit process.

ABBREVIATIONS

Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department of Planning and Infrastructure
EA	Environmental Assessment
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Minister	Minister for Planning & Infrastructure
OEMP	Operation Environmental Management Plan
Proponent	Taurus Energy Pty Ltd (now Origin)
the Act	<i>Environmental Planning and Assessment Act 1979</i>

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1 INTRODUCTION

1.1 Background

For projects approved by the Minister administering the EP&A Act, the Department is responsible for monitoring compliance with, and enforcement of, the Minister's conditions of approval. The Department's compliance activities are carried out in accordance with its Compliance Policy and associated guidelines, available on the Department's website.

Compliance auditing is one of a number of methods used by the Department to monitor compliance. This report addresses the recently completed compliance audit of Cullerin Range Wind Farm.

This is one of three compliance audits of the State's operational NSW government approved wind farms, which are all located in southern NSW. The other two wind farms audited under this campaign were Capital and Woodlawn.

The audit evaluated compliance of Cullerin Range wind farm against the conditions of approval relating to its operation. The audit paid particular attention to evaluating compliance with noise criteria, but also addressed other operational requirements including visual impacts, flora and fauna impacts, aircraft movements, shadow flicker and television reception.

This report has been prepared to present the findings of the compliance audit described herein and no responsibility is accepted for its use in any other context or for any other purpose.

1.2 Description of Project

1.2.1 Location

The Cullerin Range Wind Farm is located at Cullerin, approximately 32 kilometres west of Goulburn, NSW. A location map is provided at **Figure 1**.

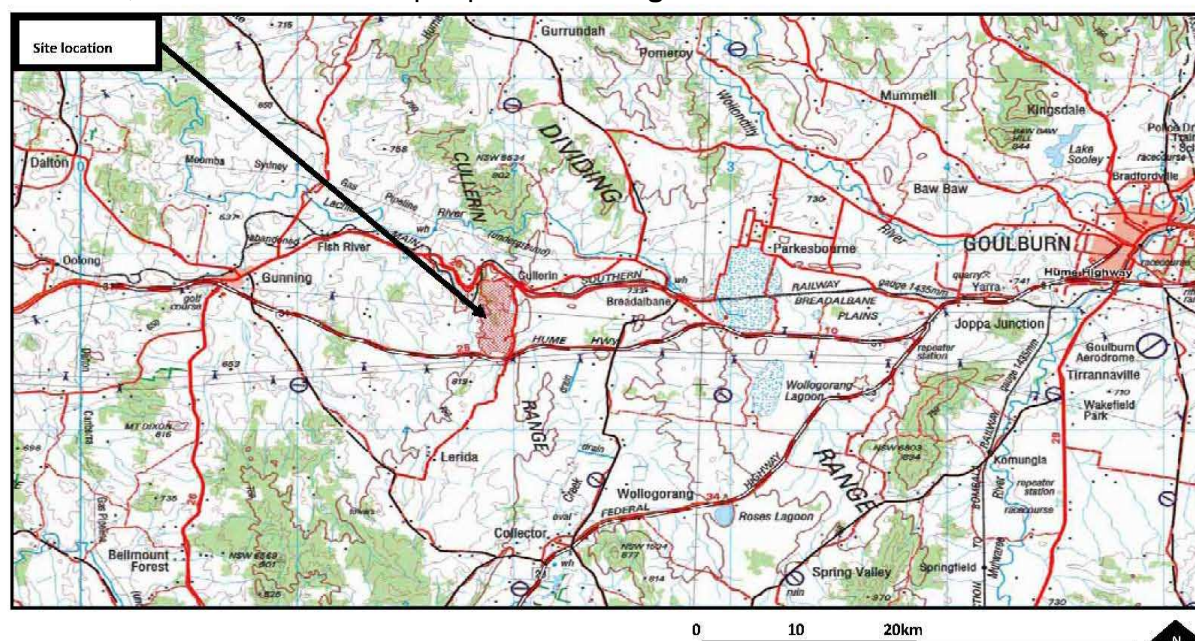


Figure 1: Location of Cullerin Range Wind Farm (Source: nghanenvironmental Annual Environmental Management Report September 2011)

1.2.2 Operation

The Cullerin Range Wind Farm consists of 15 wind turbines, each with an external transformer nearby. A control room, offices and substation are located adjacent to one of the turbines, feeding power into Essential Energy's Yass - Goulburn 132 kV transmission line which intersects the project at this location.

An aerial photograph showing the locations of the wind turbine structures and the noise monitoring points used in this audit is provided at **Figure 2**.

The wind farm is capable of generating up to 30 megawatts (MW) of electricity and up to 95,000 MWh of renewable electricity per annum, sufficient for the average consumption of up to 12,200 homes.

The wind farm commenced operation in July 2009.

1.3 Statutory framework

The Cullerin Wind Farm was approved by the then Minister for Planning on 21 February 2007, pursuant to section 75J of the *Environmental Planning and Assessment Act 1979* ("the Act") subject to conditions.

A copy of the project approval (MP05_0167) is provided at **Appendix G**. The project approval and assessment reports are available on the Department's website at:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=138.

At the time of the audit, the wind farm was not required to have an environment protection licence issued by the Environment Protection Authority (EPA).

1.4 Key issues

The principal environmental issue for wind farm operation is noise impacts on neighbouring land uses. Wind turbine noise is generated primarily from the movement of turbine blades through the air, but may also arise from mechanical noise in the gearbox or bearings of the nacelle (the housing behind the turbine blades). Further noise can be emitted as a "hum" from the electrical substation associated with the wind farm.

Other environmental issues associated with wind farm operation can include visual amenity impacts of the turbine structures, birds and bats being struck by the turbine blades, shadow flicker where the turbine blades come between the sun and a receiver when the sun is low in the sky, and telecommunications interference.

All the above potential environmental impacts are covered by this audit because they are addressed by conditions of the Cullerin Range wind farm project approval.

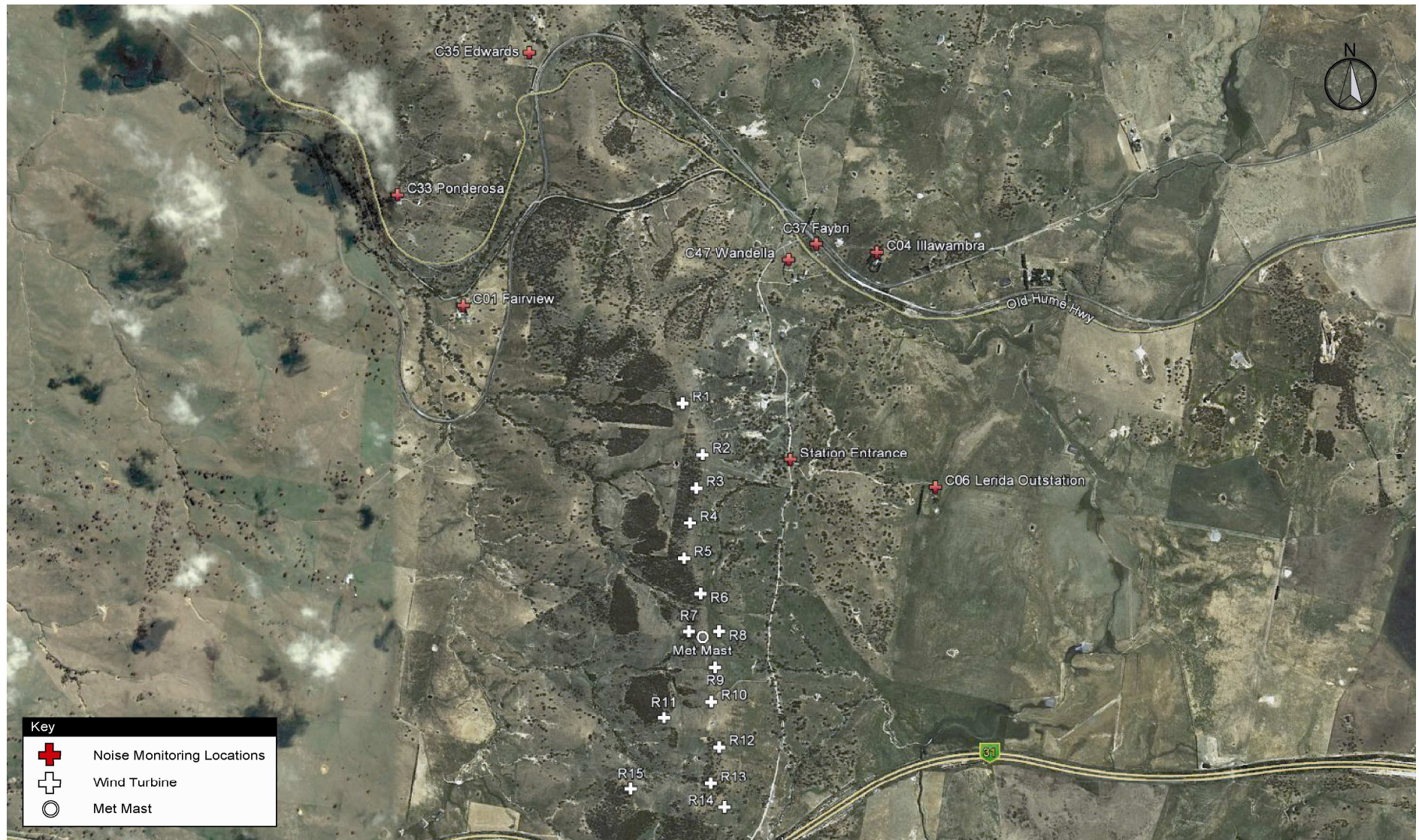


Figure 2: Locations of Cullerin Range Wind Farm turbines and noise monitoring points (Source: Renzo Tonin & Associates)

2 AUDIT PROCESS

2.1 Objectives

The objectives of this compliance audit were to:

- evaluate the project's compliance with the audit criteria (the conditions of approval relating to wind farm operation);
- present the findings of the audit;
- make recommendations in response to any non-compliances found or observations made by the audit.

2.2 Scope

The scope of the audit is limited to evaluating compliance of Cullerin Range wind farm with its respective approval conditions relating to wind farm operation. Compliance with conditions relating to design and construction is outside the scope of the audit.

The audit findings are made only in respect of verifiable evidence obtained during the audit process. Any allegations made to the auditors during the audit process are not addressed in the audit findings unless those allegations were within the scope of the audit and were verified by audit evidence.

The audit period, i.e., the period over which compliance was evaluated, varies depending on the audit criteria. For noise compliance, the audit period was the period during which noise monitoring data was obtained during the audit. For compliance with non-noise conditions, the audit period was the period covered by the audit evidence and may be any time between commencement of operation and the completion of the audit.

The scope of this compliance audit does not extend to the investigation of alleged breaches. Any alleged breach found by the audit would be assessed and, if necessary, investigated outside the audit process in accordance with the Department's published Compliance Policy and Breach Management Guidelines, which are available on the Department's website.

2.3 Methodology

The methodology employed by the Department's compliance audits is consistent with the auditing principles set out in the relevant Australian and New Zealand Standard: *AS/NZS ISO 19011:2003 Guidelines for quality and/or environmental management systems auditing*.

The methodology for this compliance audit involved the following key tasks:

- Tender process and engagement of independent acoustical specialist
- Information and documentation review
- Noise monitoring and analysis
- Site inspection and meetings with proponent
- Evaluation of compliance against the audit criteria
- Preparation and review of draft report.

These tasks are described below.

2.3.1 Independent acoustical specialist

In recognition of the need for specialist acoustical expertise to evaluate compliance with the noise criteria, the Department conducted a NSW Government e-tendering process for an

independent specialist with the necessary expertise to conduct the required noise monitoring, data analysis and evaluation of compliance.

The successful tenderer was Renzo Tonin & Associates, a company that demonstrated complete independence from the three wind farms to be audited and their operators, together with the required level of expertise to conduct the audits with a high degree of competence and integrity.

The work of the acoustical specialist was conducted in close consultation with, and overseen by, the Department's Technical Specialist on noise.

Further, the acoustical specialist's principal, Mr Renzo Tonin, signed a deed confirming his independence (see **Appendix D**).

2.3.2 Information and documentation review

The independent acoustical specialist reviewed noise compliance monitoring data provided by the proponent, prior to conducting its own monitoring.

To support the noise monitoring conducted under the audit, the acoustical specialist also obtained and reviewed all relevant wind farm operating data for the period during which noise monitoring was undertaken, together with operating data for other times to gauge whether the wind farm was operating normally during the monitoring period.

To assist evaluation of compliance with non-noise approval conditions, the Department obtained relevant reports and information from the Department's files and the proponent.

2.3.3 Noise monitoring and analysis

The independent acoustical specialist conducted the following activities relating to noise monitoring and analysis:

- reviewed noise data and wind farm operational records that had been provided by the Proponent on request
- conducted continuous noise monitoring over a period of 4 weeks from Monday 21 May 2012 to Monday 18 June 2012 inclusive, at five residential locations in the vicinity of the wind farm (identified as Fairview, Illawambra, Lerida Outstation, Faybri and Wandella 2) using unattended monitors
- conducted further short term attended noise monitoring at four additional locations (identified as Ponderosa, Edwards, Station entrance and another location 5 km from the project site) to supplement the unattended monitoring results, with the independent specialist in attendance to gain an appreciation of the acoustic environment
- analysed the noise monitoring data and evaluated compliance with the noise criteria.

The wind farm audits were timed to ensure noise monitoring occurred during the cooler months of the year as these months generally present worst case conditions for noise impacts on residences from the operation of wind turbines.

The duration of 4 weeks was chosen for the continuous noise monitoring on the basis that the independent specialist required at least 2 weeks' of data to conduct a meaningful assessment of compliance with the noise criteria.

2.3.4 Site inspection and meetings with proponent

The Department conducted a site inspection and held a meeting with the proponent on the 5 June 2012. The audit included a full inspection of the entire wind farm site and a detailed inspection inside one of the turbine towers, together with an inspection of the site office,

control room and substation. An audit meeting was held with the proponent on the day of the inspection and the audit checklist completed.

The site inspection included an inspection of the noise monitoring equipment and locations used for the audit and visits to several residences in the vicinity of the wind farm turbines.

The site inspection also included an inspection of the Breadalbane Community Centre which was constructed from community contributions made by the wind farm proponent.

2.3.5 Evaluation of compliance against the audit criteria

Compliance with the audit criteria was evaluated in two ways. Evaluation against the noise criteria was conducted by the acoustical specialist following analysis of the noise monitoring data obtained during the audit.

For evaluation against the non-noise conditions, the Department completed an audit checklist, which is provided at **Appendix A**.

2.3.6 Preparation and review of draft report

The draft audit report was forwarded to the proponent for comment on matters of fact and its comments (see **Appendix F**) have been considered in finalising the audit report.

2.4 Audit criteria

The criteria for this audit are the conditions of approval (MP05_0167) relating to the operation of Cullerin Range Wind Farm. A copy of the approval is provided at **Appendix G**.

It should be noted that Condition 2 of the approval requires the project to be carried out generally in accordance with the project's environmental assessment, the proponent's Statement of Commitments and the proponent's submissions report. These documents were therefore taken to form a component of the audit criteria and were reviewed as appropriately related to the audit scope.

2.5 Audit team

The team for this audit consisted of the following Departmental officers:

- Rob Sherry – Lead Auditor
- John Sparkes – Auditor

Representatives from Upper Lachlan Council and the EPA were invited to be Observers, but were unavailable at the time of the audit.

The noise compliance monitoring, analysis and evaluation were conducted by the following staff from the acoustical specialist:

- Renzo Tonin
- Glen Slough (also in attendance as observer during the Departments on-site audit)

The noise compliance monitoring, analysis and evaluation were overseen by the Department's Technical Specialist for noise, Jeff Parnell.

3 COMMUNITY CONSULTATION

The Department undertook community consultation in association with the three wind farm compliance audits. Community consultation included the distribution of community survey questionnaires to all land owners within 4 km of each of the wind farms and providing the opportunity for questionnaire recipients to meet with the audit team to discuss compliance related issues.

Of the 17 survey questionnaires sent to residents within 4km of Cullerin Range wind farm, 11 were completed and returned. It should be noted that a wide range of issues were raised in the questionnaire responses and subsequent face to face discussions with the auditors – many falling outside the scope of the audit. Those matters that fell within the scope of the audit and are addressed in the audit findings (Section 5) relate to:

- Noise
- Off site landscaping
- Television and radio interference
- Public safety from turbine operation
- Bird and bat monitoring
- Community contributions

A separate report has been prepared that describes the community consultation undertaken by the Department in association with the three wind farm audits, the range of issues raised by community members and the Department's responses to the issues raised. See the Department's publication *Community Consultation associated with Compliance Audits of Cullerin Range, Woodlawn and Capital Wind Farms* which is available on the Department's website.

4 WIND FARM GUIDELINES

The Department has prepared the *Draft NSW Planning Guidelines: Wind Farms* to ensure effective consultation with local communities and to deliver improved consistency, transparency and rigour in the planning assessment process.

Information collected during the wind farm audits has been considered in the finalisation of the Guidelines.

5 AUDIT FINDINGS

5.1 Presentation of audit findings

5.1.1 Categories of findings

This report categorises the audit findings as either **compliant** or **non-compliant**. In addition, for some items that were otherwise found to be compliant, the auditors identified potential opportunities for improved environmental performance or community access to information – these items are identified as **observations**. The audit report includes required actions for the proponent to address any non-compliances and recommended actions to address any observations.

5.1.2 Significance-rating of non-compliances

The level of significance of non-compliances found by the Department's audits are estimated as high, moderate or low according to the following qualitative risk assessment process.

Non-compliances are assessed against two criteria: the "likelihood of impact occurring" and the "estimated level of impact".

The *likelihood of impact occurring* is assessed as "almost certain", "likely" or "unlikely" by considering factors including the past performance of the project (from recent audits, inspections and reports from other authorities), monitoring and reporting conducted by the proponent as required by conditions of approval and the general performance of the project measured by this audit.

The *estimated level of impact* is assessed by considering the nature and scale of the potential impact with level of sensitivity of the receiving environment to the impact.

After these assessments are made, the information is transferred into the significance-rating matrix shown in **Table 1**.

Table 1: Significance-rating of non-compliances

Likelihood of impact occurring	Estimated level of impact		
	<i>High</i>	<i>Moderate</i>	<i>Low</i>
<i>Almost certain</i>	High	High	Moderate
<i>Likely</i>	High	Moderate	Low
<i>Unlikely</i>	Moderate	Low	Low

A non-compliance rated as high significance (red code) suggests that it is associated with a high impact risk and needs to be addressed as a priority. A non-compliance rated as moderate significance (orange code) may still carry a significant impact risk but can be given a lower priority than a highly significant matter. A non-compliance of low significance (yellow code) will still need to be addressed on a routine basis.

Some non-compliances relate to administrative and reporting matters with little direct impact on the environment or communities, but are still important to the integrity of the regulatory system. Non-compliances in this category are given a blue code.

5.2 Overview of findings

The audit found Cullerin Range wind farm to have a high standard of compliance with the key operational conditions of approval.

The independent acoustical specialist also found Cullerin Range wind farm to be compliant with the noise criteria at all residential properties monitored during the period of the audit. A copy of the Noise Compliance Report prepared by the independent specialist is provided at **Appendix C**.

Overall, the audit identified one non-compliance, relating to geotechnical stability of the turbine foundations, which was assessed to be of moderate significance (orange code).

The audit also made five observations, with recommendations to improve environmental performance or community access to information.

The findings are further detailed in the following sections.

5.3 Compliance with noise limits

5.3.1 Noise limits

The noise limits are specified by the conditions of approval.

At non-host residential receivers the noise limits are derived from the South Australian Environmental Protection Authority's *Wind Farms; Environmental Guidelines* (SA Guidelines, 2003) assessment criteria. However, where the predicted noise levels were below the SA Guidelines criteria the approval reduced the noise limits to the predicted levels or 35 dB(A) whichever was the higher. The approval therefore set noise limits that were equivalent to or more stringent than the SA Guidelines criteria.

For example, as discussed on pages 10 and 11 of the Noise Compliance Report (**Appendix C**), at receiver C35 the approval (using Condition 36) has set noise criteria at 35 dB(A) for all wind speeds (because the predicted noise levels were below 35 dB(A)), whereas the SA Guideline would have set limits of 35 dB(A) for wind speeds up to 6m/s, increasing to 40 dB(A) at 8 m/s and 45 dB(A) at 10 m/s.

The noise criteria for residential receivers who are wind farm hosts are generally higher than the criteria for non-host receivers, however in some cases the noise compliance audit found that the wind farm hosts were experiencing noise levels below the levels recommended by the SA Guidelines for non-hosts.

The noise criteria applying to each monitoring location for this audit are detailed in the following sections. A more detailed discussion of how the noise criteria are derived for each monitoring location is provided in the Chapters 3, 4 and 5 of the Noise Compliance Report at **Appendix C**.

5.3.2 Unattended monitoring

The primary source of noise data for this audit came from monitors placed at each monitoring location for a period of four weeks. These monitors recorded noise levels continuously and were therefore "unattended".

The unattended monitoring was conducted from Monday 21 May 2012 to Monday 18 June 2012 inclusive, at five residential locations in the vicinity of the wind farm. Photographs of the noise monitors set up at the unattended monitoring locations are provided in **Appendix A** and in the Noise Compliance Report at **Appendix C**.

The monitoring locations were chosen from the 22 locations used in the Environmental Assessment to predict noise levels from operation of the wind farm. From these locations, the independent specialist identified 5 locations to give the best possible representation of noise impacts on the local community. These locations were C04 Illawambra, C33 Ponderosa, C35 Edwards, C37 Faybri and C47 Wandella 2.

However, due to difficulties locating monitors at C33 Ponderosa and C35 Edwards, an alternative location was chosen as C01 Fairview, which is in a similar direction from the wind farm as Ponderosa and Edwards but closer to the turbines. This was considered to be an optimum alternative representative location, despite being on a host property. A fifth monitor was located at C06 Lerida Outstation to the east of the wind farm, also a host property.

The final unattended monitoring locations used by this audit were therefore:

- C01 Fairview
- C04 Illawambra
- C06 Lerida Outstation
- C37 Faybri
- C47 Wandella 2.

The unattended monitoring locations, together with the wind turbine locations, are shown in **Figure 2**.

In respect of the C47 Wandella 2 location, unattended noise logging was only conducted for the second two weeks of the monitoring period, however this provided the independent specialist with enough data to make a meaningful assessment of compliance at this location.

5.3.3 Attended monitoring

Noise data and observations from attended monitoring are able to supplement the data gained from the continuous, unattended monitoring. An advantage of attended monitoring is that the attendant can gain an appreciation of the acoustic environment and note the prevalence of non-wind farm noise such as barking dogs, birds, insects and traffic and train noise. Importantly, the attendant can also note the level of audibility of the wind turbines.

Attended noise surveys were undertaken at the entrances of C33 Ponderosa and C35 Edwards to obtain a brief appreciation of noise at those properties where unattended monitoring wasn't able to be conducted. Further attended monitoring was conducted at a location labelled "Station Entrance" on Lerida Road and another location approximately 5km to the east of the wind farm on Cullerin Road, from which some limited information was obtained.

Attended surveys were also conducted at several unattended monitoring locations at night during the survey period whenever weather conditions permitted, particularly during times of low wind speeds at microphone height when turbine noise could be expected to be the most audible. Attended monitoring at these locations enabled the independent specialist to observe and note the various contributors to the measured noise during the period of attendance. The measurement locations were as close as possible to the unattended loggers.

The attended monitoring locations are shown in **Figure 2**.

5.3.4 Findings of noise monitoring

Following analysis of the noise monitoring data, the independent specialist found that the noise levels measured at all the above monitoring locations complied with the approval conditions.

A full report on the independent specialist's noise monitoring, assessment and findings on compliance is provided at **Appendix C**. A summary of the findings for each monitoring point is provided below.

C01 Fairview

Fairview is a host property to the north-west of the wind farm. The noise limits for this location are provided in **Table 2**, together with the measured noise levels. Under the approval conditions, the noise criteria for host properties are higher than for non-involved properties and at this location the criteria effectively become 45 dB(A) up to a wind speed of approximately 11 m/s and increasing for higher wind speeds.

The audit found compliance with the noise criteria at this location. Importantly, the audit found that the monitoring data at this location also would have been compliant if the property was not a host property (uninvolved). Under these circumstances the criteria would have been 35 dB(A) up to a wind speed of approximately 3 m/s and increasing for higher wind speeds.

Table 2: C01 Fairview compliance assessment

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.1	46.9	48.9	51.1	53.3
Measured				33.6	36.0	36.6	36.9	36.9	36.9	36.9	36.9			

C04 Illawambra

Illawambra is a non-involved property to the north-east of the wind farm, just north of the Old Hume Highway. The noise limits for this location are provided in **Table 3**, together with the measured noise levels. As the site was surrounded by densely planted trees the measured noise was found to be higher at this location than at other monitoring locations because of the wind noise through the trees.

Attended monitoring was also conducted at this location and found that turbine noise could just be heard during times when traffic is at its quietest.

Overall, the audit found the measured noise levels at this location to be compliant with the consent conditions.

Table 3: C04 Illawambra compliance assessment

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.3	35.0	35.1	36.4	38.3	40.8	43.6	46.5	49.4	52.2	54.5	56.3	57.3	57.5
Measured	28.4	28.6	29.6	31.2	33.3	35.8	38.6	41.6	44.5	47.3	49.9	52.2	53.9	55.1

C06 Lerida Outstation

Lerida Outstation is a host property to the east of the wind farm. The noise limits for this location are provided in **Table 4**, together with the measured noise levels. The unattended monitoring at this location indicated compliance with the noise criteria of 45 dB(A) up to a wind speed of approximately 10 m/s and increasing for higher wind speeds. In addition, the audit found that the monitoring data at this location also would have demonstrated compliance or near compliance if the property was uninvolved with a criterion of 35 dBA.

Table 4: C06 Lerida Outstation compliance assessment

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.1	47.0	48.8	50.3	51.4	52.1
Measured	36.5	35.5	35.2	35.3	35.9	36.9	38.1	39.5	41.1	42.6	44.0	45.3	46.4	47.1

C37 Faybri

Faybri is a non-involved property located generally north of the wind farm between the Old Hume Highway and the main southern rail line. The noise limits for this location are provided in **Table 5**, together with the measured noise levels. The measured noise levels at this location were found to be compliant with the noise limits.

Attended monitoring was also conducted at this location between 10.40pm and 11.00pm on 21 May 2012. Notes taken describe the acoustic environment as including dog barking, insect noise, a heating unit operating outside the house at a low level, truck noise from the Hume Highway and the passage of one train. Turbine noise is not noted as being audible.

Table 5: C37 Faybri compliance assessment

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.6	37.0	38.8	40.8	42.9	45.2	47.4	49.4	51.2	52.7	53.8
Measured	33.9	32.1	31.5	31.8	32.9	34.6	36.8	39.3	42.0	44.7	47.2	49.4	51.2	52.3

C47 Wandella 2

Wandella 2 is a non-involved property located generally north of the wind farm, just south of the Old Hume Highway. The noise limits for this location are provided in **Table 6**, together with the measured noise levels. The measured noise levels at this location were found to be compliant with the noise limits.

Table 6: C47 Wandella 2 compliance assessment

10m Wind Speed m/s	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Criteria	35.0	35.0	35.0	35.6	37.0	38.8	40.8	42.9	45.2	47.4	49.4	51.2	52.7	53.8
Measured	29.7	29.6	30.2	31.3	32.8	34.6	36.6	38.6	40.6	42.3	43.7	44.6	45.0	44.6

5.4 Findings related to non-noise conditions

This section addresses those matters where the audit found non-compliance, made observations or considered the matter significant enough to warrant a comment. Matters addressed by the audit but not further described in this section were found to be compliant and satisfactorily managed by the proponent. These matters include:

- Visual amenity and landscaping
- Shadow flicker
- Noise monitoring
- Complaints management
- Annual reporting

All matters addressed in the non-noise component of this audit are detailed in the Audit Checklist at **Appendix A**.

5.4.1 Generating capacity

The audit found technical data from the turbine manufacturer (Repower Systems) that indicates the rated power of each turbine as 2.05 MW. The total rated power with the 15

turbines in operation would therefore equate to 30.75 MW, an apparent exceedance of the approved limit by 0.75 MW, or 750 kW.

The auditors sought an explanation from the proponent of the apparent discrepancy. The proponent indicated that the 30 MW limit is not exceeded due to the following reasons:

- The rated capacity of each turbine is a short term maximum value and not a long term rated output;
- For short durations in the event the standard 2000 kW rating is exceeded the losses between the generator in the turbine and the connection point are estimated at 65 kW per turbine plus 160 kW in the main transformer and any required site load (estimated at 25-30 kW); and
- Regardless of the value used, the site is limited by the SCADA control system that attempts to optimise all turbines to achieve the set point on the control system which cannot be set higher than 30 MW.

The proponent also provided an image of the manufacturer's generator rating plate on one of the turbines which indicates the rated electrical power to be 2000 kW.

The auditors accepted the proponent's advice.

5.4.2 Traffic and transport

Condition 57 requires the Proponent to prepare road dilapidation reports for the construction (and decommissioning) route where it traverses Lerida Road, part of Cullerin Road and old Sydney Road prior to and after construction. The audit could not find evidence that the post-construction dilapidation report had been done. As there is no time frame specified in the approval for completion of the report the auditors could not find non-compliance with the condition, however were of the opinion that it would be reasonable for the proponent to have completed the report by the time of the audit.

This matter has therefore been recorded as an **observation** with a recommendation the post-construction road dilapidation report be completed within three months from the date of this report.

5.4.3 Geotechnical stability

Condition 60 required the proponent to conduct detailed geotechnical investigations in the area of the proposed turbines to determine the ground stability and soundness of the strata taking into account the potential for any mine shafts.

The audit's review of the geotechnical investigation report (Coffey Geotechnics, 2008) found that the report did not address how the investigation took into account the potential for any mine shafts in the area of the proposed turbines. When questioned by the auditors, the proponent stated that no further geotechnical investigations had been conducted. The proponent further indicated that a former gold mine shaft was located 150 metres east of Turbine 1, had been backfilled and was not considered a geotechnical risk. The proponent made a commitment to confirm the geotechnical investigation's consideration of mine shafts in the area.

Whilst this construction stage requirement is technically outside the scope of the audit, it is relevant to the ongoing safe operation of the wind farm and therefore the audit has found the matter to represent **non-compliance** with Condition 60. The matter was also raised as a concern by a resident during the community consultation associated with the audit. The audit requires that within one month from the date of this report the proponent provides evidence that the potential for mine shafts was considered in the geotechnical investigations.

This non-compliance was assessed in accordance with the significance-rating procedure described in Section 5.1. The assessment considered the likelihood of foundation failure to be low (unlikely) and the level of impact of any such failure to be high. Therefore the overall significance rating of this non-compliance is assessed to be **moderate** (orange code).

5.4.4 Public safety

Concerns were expressed by a resident concerning safety of the public (including road traffic) due to ice falling from turbine blades. The proponent demonstrated it has a system in place to sense when ice may be present on turbine blades and accordingly shut down the relevant turbines until the sensors indicate it is safe to re-commence. The audit has addressed this matter as an **observation** and recommends that for turbines where there is a potential hazard to public safety from falling ice upon start-up, the proponent consider the use of additional visual checks as part of the start-up process.

5.4.5 Flora and fauna

Condition 62 requires the proponent to design, construct, operate and maintain the project in a manner that avoids damage to or loss of the orchid *Diurus aequalis* and its habitat. The audit found no evidence of the orchid habitat being identified and has addressed this matter as an **observation**, recommending that the areas of habitat be identified and mapped in a revised Operational Environmental Management Plan (OEMP) within 3 months from the date of this report.

5.4.6 Television and radio interference

Condition 78 places obligations on the Proponent to rectify transmission problems reasonably attributable to the project at any dwelling within 5km of a wind turbine. Some residents reported to the auditors that television and radio reception had been impacted following construction of the wind farm.

The Proponent advised that it undertook the following measures where complaints had been received:

- modified and/or replaced receiving antenna;
- improved existing antenna systems;
- installed digital set top boxes.

The auditors were satisfied that the mitigation measures undertaken by the Proponent were appropriate to demonstrate compliance with the approval. The Proponent also made a commitment to the auditors that it will continue to address any complaints concerning television or radio interference that it receives.

5.4.7 Community enhancement program

Condition 93 addresses a community enhancement program under which the proponent funds community infrastructure and services in the locality of the project to the value of \$25,000 per year indexed to CPI.

Several residents expressed dissatisfaction with the administration of the funding, as funding for the first 13 years, given to Council to be held in Trust, was allocated to the recently completed Breadalbane Community Centre and Park. However, the proponent has made another \$100,000 available over and above the required amount, for the period 2009-2013. The proponent indicated the additional funding is allocated through a community enhancement committee consisting of Origin Energy, the Mayor of Upper Lachlan Shire Council, a land owner and two community members.

The audit notes the proponent's contributions to the community over and above those required by the approval.

5.4.8 Statement of Commitments

Condition 2 of the approval requires the proponent to carry out the project generally in accordance with a number of documents that supported the project application, including the Statement of Commitments within the proponent's Environmental Assessment. The auditors evaluated conformance with those Commitments that were within the scope of the audit. The audit generally found conformance with the Statement of Commitments, with the exception of the two matters described below.

Commitment No. 19 includes the placement of signage on local roads within 1km of the turbines to warn horse riders of the risks associated with the sudden start-up of turbines and blade flicker. The proponent indicated that it had discussed the proposed signage with Council but no agreement had been reached. The audit has addressed this matter as an **observation**, recommending the proponent continue to engage with Council to provide appropriate signage and report progress to the Department within six months from the date of this report.

5.4.9 Public availability of information

Condition 88 requires the proponent to make all documents required under the approval publicly available upon request, subject to confidentiality.

Whilst the auditors found no non-compliance with this condition, it is recommended that the proponent consider proactively placing documentation relating to the approval on the project's web site. It is considered this could increase public awareness of the operational stage of the project and complement the Department's publication of this audit report on the internet. This matter has therefore been addressed as an **observation**.

It is recommended that the proponent consider placing the following documentation on its web site and progress be reported to the Department within three months from the date of this report:

- Statutory approvals
- Current OEMP
- Annual Environmental Management Reports
- Information on the community enhancement program
- Noise compliance assessment plan
- Noise monitoring reports
- Bird and bat monitoring reports
- Independent Environmental Audit reports.

5.5 Summary of findings

5.5.1 Non-compliances

The audit found one non-compliance with the project approval, detailed in **Table 2**.

Table 2: Non-compliances and required actions

Reference No.	Condition	Non-compliance	Required Action
N1	60	The geotechnical investigation report for the project does not address how the investigation took into account the potential for any mine shafts in the area of the proposed turbines.	Provide evidence that the geotechnical investigations took into account the potential for any mine shafts in the area of the proposed turbines. <i>Due date:</i> One month from the date of this report.

5.5.2 Observations and recommended actions

The audit made five observations in relation to matters that were otherwise compliant but with the potential for improved environmental performance or community access to information. A list of the observations is provided in **Table 3**.

Table 3: Observations and recommended actions

Reference No.	Condition	Observation	Recommended Action
O1	57	A post construction road dilapidation report has not been prepared. (No time frame was specified for its preparation)	Provide a post construction road dilapidation report for the construction route where it traverses Lerida Road North, part of Cullerin Road and Old Sydney Road, prepared in consultation with Council. <i>Due date:</i> Three months from the date of this report.
O2	NA	The wind farm has a system in place to sense when ice may be present on turbine blades and shuts down the relevant turbines until the sensors indicate it is safe to recommence. No visual checks undertaken as part of the start-up process.	Report on the use of additional visual checks as part of the start-up process when there is the potential for ice on turbine blades. <i>Due date:</i> Three months from the date of this report.
O3	62	The habitat of the orchid <i>Diurus aequalis</i> has not been identified on site and referred to in the OEMP.	Identify and protect the orchid habitat on site and refer to the orchid in a revised OEMP. <i>Due date:</i> Three months from the date of this report.
O4	2	Statement of Commitment No. 19: Agreement was not reached with Council on the placement of signage on local roads within 1km of the turbines to warn horse riders of risks associated with start-up and blade flicker.	Continue to engage with Council to provide appropriate signage. <i>Due date:</i> Report progress to the Department within 6 months from the date of this report.
O5	88	Public education and awareness of the operational stage of the project could be increased by proactive placement of project related information on the project's website.	Place project related information on the project's website including: <ul style="list-style-type: none"> • Statutory approvals • Current OEMP • Annual environmental management reports • Information on the community enhancement program • Noise compliance assessment plan • Noise monitoring reports • Bird and bat monitoring reports

			<ul style="list-style-type: none"> Independent environmental audit reports. <p><i>Due date:</i> Report progress to the Department within 3 months from the date of this report.</p>
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5.5.3 Summary of actions arising from the audit

The actions arising from this audit are summarised as follows.

Geotechnical stability

- N1: Provide evidence that the geotechnical investigations took into account the potential for any mine shafts in the area of the proposed turbines, within one month from the date of this report.

Traffic and Transport

- O1: Provide a post construction road dilapidation report for the construction route where it traverses Lerida Road North, part of Cullerin Road and Old Sydney Road, prepared in consultation with Council, within three months from the date of this report.

Public safety

- O2: Report on the use of additional visual checks as part of the start-up process when there is the potential for ice on turbine blades, within three months from the date of this report.

Flora and fauna

- O3: Identify and map the orchid habitat in a revised OEMP, within three months from the date of this report.

Warnings to horse riders

- O4: Report progress to the Department within six months from the date of this report on continuing engagement with Council to provide appropriate signage on local roads within 1km of the turbines to warn horse riders of risks associated with start-up and blade flicker -.

Project information on website

- O5: Report progress to the Department within 3 months from the date of this report on placement of project related information on the project's website including:
 - Statutory approvals
 - Current OEMP
 - Annual environmental management reports
 - Information on the community enhancement program
 - Noise compliance assessment plan
 - Noise monitoring reports
 - Bird and bat monitoring reports
 - Independent environmental audit reports.

6 PROPONENT'S COMMENTS ON DRAFT AUDIT REPORT

The proponent was forwarded the draft audit report to provide comments on matters of fact and on any progress with the draft recommended actions. A copy of the proponent's comments, together with the auditors' responses, is provided at **Appendix F**.