

STATE SIGNIFICANT DEVELOPMENT ASSESSMENT Rye Park Wind Farm (SSD 6693)



Assessment Report Section 89E of the *Environmental Planning and Assessment Act 1979*

March 2017

Cover Photograph: Sourced from Green Bean Design Pty Ltd, Rye Park Wind Farm Revised Landscape & Visual Impact Assessment, April 2016.

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EXECUTIVE SUMMARY

Rye Park Renewable Energy Pty Ltd (RPRE), a wholly owned subsidiary of Tilt Renewables Ltd, proposes to develop the Rye Park Wind Farm, located approximately 10 kilometres (km) north-west of Yass in the Southern Tablelands and South West Slopes of NSW.

The site is located in the Hilltops (formerly known as Boorowa), Yass Valley and Upper Lachlan local government areas (LGAs), and forms part of a larger rural area used primarily for grazing.

The project involves the development of:

- 109 turbines with a tip height of up to 157 metres (m) and hub height of up to 101 m over six precincts (North, North Western, North Eastern, Central, Intermediate, Southern);
- ancillary infrastructure, including internal access roads, operation and maintenance facilities, internal electricity transmission lines, one connection substation and up to three collector substations; and
- upgrades to the local road network to facilitate the delivery of turbines to the site.

The project is classified as State Significant Development under the *Environmental Planning and Assessment Act 1979* (EP&A Act), and the consent authority for the project is the NSW Minister for Planning. However, under the Minister's delegation of 14 September 2011, the NSW Planning Assessment Commission must determine the development application for the project as it attracted more than 25 public objections.

Consultation

From 12 May 2014 until 4 July 2014, the Department exhibited the Environmental Assessment (EA) for the project. During the EA exhibition period, the Department received 130 submissions, including 12 from public authorities, 3 from special interest groups and 115 from the general public.

The Department also exhibited RPRE's response to submissions (RTS) which included a number of changes to the project from 18 May 2016 to 23 June 2016. During the RTS exhibition period, the Department received a further 241 submissions (either as new submissions or as updates to previous submissions), including 10 from public authorities, 5 from special interest groups and 226 from the general public.

Most of the public submissions on the EA and RTS came from special interest groups or residents living more than 5 km from the project site, with approximately 25% of these submissions coming from people living over 50 km from the project site. This gives some idea of the regional interest in wind farm projects in the Southern Highlands. However, there were also strong concerns expressed by the local community, with approximately 30% of the submissions from special interest groups or residents living within 5 km of the project site. These included substantial submissions from the Boorowa District Landscape Guardians, Rye Park Action Group and Yass Landscape Guardians.

The public authorities provided advice relevant to their respective regulatory responsibilities, and recommended a range of conditions, which have been adopted by the Department.

Most public submissions objected to the project, raising concerns about the:

- adequacy of RPRE's community consultation;
- visual and noise impacts of the project, which could have an adverse effect on surrounding property values;
- biodiversity impacts of the project, including the amount of vegetation clearing required, the impacts on threatened species and ecological communities, and the potential for birds and bats to be struck by the turbines;
- water and soil impacts of the project, citing the number of proposed water crossings and the highly erodible nature of the soils in the area; and
- health impacts, including impacts from infrasound and electro-magnetic fields, and the mental health impacts on local residents opposed to the project.

The Department has assessed the development application, EA, submissions, RTS and additional information provided by RPRE in accordance with the requirements of the EP&A Act.

Rye Park Wind Farm

As part of this assessment, the Department commissioned an independent peer review of the project's visual impacts. The Department also held a community information session in June 2016, consulted widely with local residents, and inspected the site and surrounds on a number of occasions to get a better appreciation of the key issues.

Assessment

Visual

Concerns about visual impact dominated the public submissions on the project. Many people thought the project would have significant visual impacts on several residences close to the site, including those in Rye Park village, and exacerbate the cumulative visual impacts of wind farms in the region.

The sensitivity of the landscape and the proximity of residences, and hence the nature and extent of the impacts of the project, vary considerably across the site.

Following detailed assessment, the Department has concluded that the most significant impacts are largely confined to the project's North Western precinct, located in proximity to Rye Park village, and the project's Northern and Intermediate precincts.

The Department's assessment found that 22 non-associated residences would have moderate/high or high visual impacts, namely:

- 5 residences located in proximity to the Northern precinct, for which RPRE has recently secured visual impact agreements;
- 6 residences located immediately to the west of the North Western precinct;
- 9 residences in proximity to the Intermediate precinct; and
- 2 isolated residences and one parcel of vacant land with dwelling entitlements.

Additionally, the Department's assessment found that the turbines in the North Western precinct would have high visual impacts on Rye Park village, which is comprised of approximately 30 non-associated residences.

While turbines in the Northern precinct would be visible from a number of residences in the area, the most significant visual impacts associated with these turbines are confined to 5 non-associated residences. In late 2016, RPRE reached agreements with the owners of these residences to accept the visual impacts of the project. With these agreements in place, the Department considers the visual impacts of the Northern precinct to be acceptable.

However, the visual impacts of the proposed turbines in the North Western and Intermediate precincts would be much more extensive due to their elevated location along prominent ridgelines and their close proximity to a larger number of non-associated residences, including Rye Park village.

Rye Park village, which is zoned RU5 – Village, is situated just over 3 km to the west of the North Western precinct. The village is located on an easterly facing hill with the primary views towards the proposed turbines.

Based on advice from the independent visual expert, the Department considers that with the combination of proximity, the elevated position of the turbines along the nearby ridgeline, and the extensive horizontal views of turbines from the village, the project would result in an unacceptable visual impact on the village and a number of nearby residences.

Due to the nature and extent of the impacts, there are limited options to avoid or mitigate the visual impacts to acceptable levels, apart from removing turbines from the proposed layout. In consultation with the independent visual expert, the Department has recommended that all 16 turbines in the North Western be removed to reduce the impacts to an acceptable level. The Department considers this approach is consistent with the objective of maintaining the character of rural villages under the applicable statutory planning scheme.

There are also a number of residences to the west of the Intermediate precinct that are predicted to experience high visual impacts. Many of the residences would be less than 2 km from the turbines, and combined with the elevated location of the turbines on the ridgeline, the Department considers that all 9 of the turbines in the Intermediate precinct would need to be removed to reduce the visual impacts to acceptable levels.

In contrast to the turbines in the Northern, North Western and Intermediate precincts, the residual visual impacts of the turbines in the North Eastern, Central and Southern precincts are comparatively low.

However, while the majority of non-associated residences located in proximity to these precincts would have low to moderate visual impacts, 2 residences and a parcel of land with dwelling entitlement rights are predicted to experience moderate/high or high visual impacts.

Reducing the visual impacts at one of these residences and at the parcel of vacant land would involve the removal of at least 14 turbines. Combined with the removal of the North Western and Intermediate precincts, this has the potential to affect the viability of the project, and the Department does not consider that these impacts are so significant or widespread to warrant jeopardising the benefits of the project as a whole.

Consequently, the Department has recommended that these landowners be granted acquisition rights. This would provide appropriate compensation to these landowners if they choose to sell their properties as a result of the impacts of the project, without compromising the broader benefits of the project.

In regards to the remaining non-associated residence with significant visual impacts, the Department considers that the impact is linked to the construction of a single turbine, and has recommended that this turbine not be constructed unless RPRE is able to reach an agreement with the landowner in regard to visual impacts.

The Department has also recommended conditions requiring RPRE to further reduce the visual impacts of the project by giving the owners of all non-associated residences within 4 km of a turbine the ability to ask for additional screening or landscaping measures to be implemented at the residence.

With the recommended changes to the proposed layout and the implementation of additional mitigation, the Department considers the residual visual impacts of the project would be acceptable.

<u>Noise</u>

The site sits in a quiet rural area with low background levels. Using conservative assumptions, noise modelling suggests the project would be able to comply with the relevant noise criteria at all non-associated residences under all wind speeds.

In order to protect the amenity of surrounding residents, the Department has recommended conditions requiring RPRE to comply with the relevant noise criteria, and undertake detailed noise compliance monitoring following commissioning of the wind turbines to determine compliance with the noise limits.

The Department also notes RPRE would be required to obtain an environment protection licence (EPL) from the EPA for the project.

Although several submissions were concerned about the potential health risks associated with the low frequency noise and infrasound emissions of the project, detailed assessment has shown that the project would not generate excessive low frequency noise.

The Department notes that the National Health and Medical Research Council (NHMRC) has concluded that, *"there is no direct evidence that exposure to wind farm noise affects physical or mental health"*, and that any further health-based studies should be limited to areas within close proximity of wind turbines.

Biodiversity

With regard to biodiversity values, the project site and surrounds is characterised by cleared farmland mostly derived from Box Gum Woodland on the lower slopes and flats with Inland Scribbly Gum Dry Forest vegetation on the steeper sheltered slopes. Remnant stands of the original vegetation remain as paddock trees or larger scattered patches of woodland on the lower slopes with more extensive forested areas on the ridge tops.

RPRE has designed the project to avoid disturbance of native vegetation where practicable, including removing or micro-siting a number of turbines to reduce impacts on biodiversity. However, the project would still involve clearing of up to 254 hectares (ha) of native vegetation, including 50.2 ha of Box Gum Woodland endangered ecological community (EEC).

Rye Park Wind Farm

The Department's assessment found that despite this disturbance (which represents around 2% of the site), the project would not result in any significant impacts on threatened species or EECs, and would not pose a significant or unacceptable level of risk to bird and bat species in the vicinity of the proposed turbines. RPRE proposes to further reduce the biodiversity impacts through additional micro-siting of wind turbines, and offset the residual impacts of the project in accordance with the requirements of the *NSW Biodiversity Offsets Policy for Major Projects*.

Overall, the Department considers that with the implementation of the recommended conditions requiring RPRE to avoid areas of endangered ecological communities and vulnerable flora, prepare a Biodiversity Management Plan, prepare a Bird and Bat Adaptive Management Plan and implement a biodiversity offset strategy, the residual biodiversity impacts of the project would be suitably minimised, managed and/or offset.

Traffic

With suitable road upgrades already agreed with Boorowa, Yass Valley and Upper Lachlan Councils, regular road maintenance, and the implementation of standard traffic control measures and a driver's code of conduct, the Department is satisfied that the project would not result in any unacceptable impacts on the capacity, efficiency or safety of the road network.

Socio-Economic

Even with the removal of the North Western and Intermediate precincts, the project would result in a range of social and economic benefits for the wider community, including:

- facilitating the development of the renewable energy industry in NSW, and implementation of the state's Renewable Energy Action Plan;
- making efficient use of the region's significant wind resources;
- generating approximately 815,000 megawatt (MW) hours of electricity a year, or enough power for 102,000 homes, and helping Australia to meet its renewable energy target by 2020;
- reducing the greenhouse gas emissions associated with electricity production in NSW;
- making a positive contribution to the local economy by creating jobs, and providing income to for the associated landowners;
- upgrading the local road network for all road users; and
- providing ongoing funding for community enhancement projects in the local area (over \$200,000 a year), consistent with other benefit-sharing schemes across NSW.

A number of submissions raised concerns about potential adverse impacts of the project on property values in the area. However, the Department notes the project is a permissible land use under the relevant planning instruments and with the removal of the turbines in the North Western and Intermediate precincts is not predicted to generate any significant residual environmental impacts at nearby residences.

Summary

The Department acknowledges the community opposition from local landowners and special interest groups to the project. However, with the removal of the turbines in the North Western and Intermediate precincts the Department considers that the project would achieve a reasonable balance between maximising the use of the site's wind resources and minimising the potential impacts on the local community and the environment.

To address the residual impacts of the project, the Department has recommended a range of detailed conditions to ensure these impacts are effectively minimised and/or offset. These conditions use a risk-based approach that focuses on performance-based outcomes. This reflects current government policy, and the fact that wind farms require relatively limited ongoing environmental management once the turbines have been commissioned.

Importantly, while the removal of the turbines in the North Western and Intermediate precincts would reduce the number of turbines to 84, the project would still provide an installed capacity of up to 300 MW, with all the associated benefits to the wider community including job creation, capital investment, reductions in greenhouse gases, and community funding contributions.

Given these benefits can be achieved without causing any significant adverse impacts on the environment or the local community, the Department considers the project is approvable, subject to strict conditions.

1. PROJECT

Rye Park Renewable Energy Pty Ltd (RPRE), a wholly owned subsidiary of Tilt Renewables Ltd, proposes to develop the Rye Park Wind Farm (the project), located approximately 10 km north of Yass on the Southern Tablelands and South West Slopes of NSW (see Figure 1).

The site is located in the Hilltops (formerly known as Boorowa), Yass Valley and Upper Lachlan LGAs, and forms part of a larger rural area used primarily for grazing.

The project involves the installation, operation, maintenance and decommissioning of a wind farm of up to 109 turbines with a tip height of up to 157 m and hub height of up to 101 m.

The project also involves the development of associated ancillary infrastructure including:

temporary construction compounds, concrete batching plants, site offices and equipment storage; and
 permanent access tracks, operation and maintenance facilities and on-site electrical infrastructure, ultimately connecting to the grid via the Yass to Bannaby 330 kV transmission line.



Figure 1: Project Location

During the development of the project, RPRE reduced the number of turbines proposed to be constructed from 126 to 109 to resolve a number of outstanding concerns in relation to aviation, biodiversity, visual, noise and traffic and transport impacts. A comparison of the key project changes are summarised in Table 1.

Table 1: Amendments to the project during the assessment process

Detail	EA January 2014	RTS May 2016
Number of wind turbines	126	109
Length of high voltage overhead power line	35 km (up to 330kV)	35 km (up to 330 kV)
Number of site substations	2	3
Maximum tip height	157 m	157 m

Inclusive of all 109 proposed turbines, the project would generate around 482 megawatts (MW) depending on the mix of turbine models chosen. As such, if all the turbines are constructed, the project would generate up to 1,056,000 megawatt hours (MWh) of electricity annually, which is enough to power about 132,000 homes.

The project is described in full in the Environmental Assessment (EA) (see Appendix A) as amended by the Response to Submissions (RTS) (see Appendix B). The major components of the project are summarised below in Table 2 and shown on Figures 2 and 3.

To provide flexibility in the requirements for micro-siting of turbines, the Department requested that RPRE identify a development corridor (i.e. where turbines and ancillary infrastructure can be located). The purpose of the development corridor is to identify locations where turbines and ancillary infrastructure could be sited without materially changing the key environmental impacts of the project (i.e. visual, noise, biodiversity and heritage impacts).

RPRE developed a development corridor for both turbines and infrastructure with consideration of the environmental constraints. Refer to Figures 2 and 3 for the location of the development corridor.

RPRE also consulted further with Hilltops, Yass Valley and Upper Lachlan Councils (the Councils) during the assessment process, and the project includes the road upgrades required for the project and voluntary planning agreements for community contributions.

 Table 2: Major components of the project

Aspect	Description
Project summary	 Development of a wind farm including: up to 109 turbines and associated infrastructure in 6 discrete precincts, including the Northern precinct (11 turbines), North Western precinct (16 turbines), North Eastern precinct (16 turbines), Central precinct (42 turbines), Intermediate precinct (9 turbines) and Southern precinct (15 turbines); temporary and permanent ancillary infrastructure on site to facilitate the construction and operation of the turbines; and upgrades to a number of local roads to cater for construction traffic and enable turbines
	to be delivered to the site using over-dimensional vehicles.
Disturbance area	Approximately 14,000 na
Wind turbines	 109 turbines and associated crane hard stand areas; Maximum height (to blade tip) - 157 m; Tower heights - up to 101 m; Blade lengths - up to 65 m; and Maximum capacity of up to 3.5 MW¹.
On-site ancillary infrastructure	 Electrical infrastructure, including: up to 3 x 22 kV or 33 kV / 330 kV collection substations; one 330 kV connection substation; up to 35 km of an up to 330 kV overhead transmission line; 22 kV or 33 kV underground power lines (5.3 km outside access tracks); Up to 3 temporary construction compounds, including staging areas, storage and 2 concrete batch plants; Up to 143.4 km of internal access tracks (128 km new, 15.4 km upgraded existing); Up to 2 permanent operation and maintenance facilities incorporating a control room and equipment storage; and

¹ The project may use a mix of turbine models across the site to better utilise the on-site wind resource profile.

Aspect	Description
	Up to 6 permanent meteorological masts.
Off-site road works	 Road upgrades along: 0.66 km of Trucking Yard Road; 0.99 km of Dillon Street; 1.1 km of Long Street; 19.4 km of Boorowa Rye Park Road; 9.7 km of Grassy Creek Road; 13.5 km of Maryvale Road; 1.9 km of Yass Street; 18.3 km of Cooks Hill Road; 23.9 km of Rye Park Dalton Road; 1.4 km of Flakney Creek Road; 3.4 km of Flakney Creek Road; 4.3 km of Coolalie Road; 6.9 km of Coolalie Road; 1.44 km of Bushs Road; and Bridge/culvert upgrades at: Boorowa Rye Park Road over Dirthole Creek; Grassy Creek Road over Pudman Creek; Yass Street over Bobby's Creek; the creek crossing on Flakney Creek Road; Rye Park Dalton Road over Pudman Creek, Flakney Creek and Blakney Creek; and Intersection treatments at: Dillon Street/Long Street; Long Street/Boorowa Rye Park Road; Grassy Creek Road/Grassy Creek Road, Grassy Creek Road/Maryvale Road; Yass Street/Boorowa Rye Park Road, Grassy Creek Road/Grassy Creek Road, Grassy Creek Road/Maryvale Road;
Over-dimensional	• Hume Highway, Lachlan Valley Way, Trucking Yard Road, Dillon Street, Long Street,
and heavy vehicle	Boorowa Rye Park Road, Grassy Creek Road, Maryvale Road, Yass Street, Rye Park
liansport toules	Dalton Road, Flakney Creek Road and Blakney Creek Road; and
Employment	Construction - up to 250 people: and
	 Operations - up to 12 people.
Capital investment value	\$621 million
Voluntary planning	 Contribute \$2,500/turbine (plus CPI) each year to Hilltops, Upper Lachlan and Yass Valley Councils to fund community projects in the surrounding area
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2. STRATEGIC CONTEXT

2.1 Wind Energy

Renewable Energy Action Plan

In September 2013, the NSW Government released the Renewable Energy Action Plan.

The plan seeks to:

- encourage the development of renewable energy in NSW, and help meet the national Renewable Energy Target (RET) of 20% renewable energy by 2020; and
- reduce the state's greenhouse gas emissions.

It identifies wind as one of the key sources of renewable energy in NSW, as the state has valuable wind resources by international standards with many of these resources located near existing electricity transmission infrastructure.

The best wind resources in NSW are generally located along the Great Dividing Range and the Western Slopes, including the Southern and Central Tablelands.

The site for the Rye Park Wind Farm falls within this area, and has strategic potential for wind farm development given its access to moderate to high average wind speeds and its proximity to the TransGrid Yass to Bannaby 330 kV transmission line.

If it proceeds, the Department is satisfied the project would be consistent with the strategic intent of the *Renewable Energy Action Plan*, and assist Australia in meeting its renewable energy target.



Figure 2: Project Layout and Development Corridor (northern region)



Figure 3: Project Layout and Development Corridor (southern region)

Other Wind Farms

There are 16 operational, approved and proposed wind farms within 80 km of the site (see Table 3).

Wind farm	Approximate distance from project	Status	Number of turbines	Tip height
Bango	8 km west	Proposed	122	200 m
Biala	30 km east	Proposed	31	185 m
Capital I	60 km south east	Operational	67	124 m
Capital II	60 km south east	Approved	41	157 m
Collector	40 km south east	Approved	55	150 m
Conroy's Gap	25 km south west	Approved	15	126 m
Crookwell 1	50 km east	Operational	8	67 m
Crookwell 2	50 km east	Approved	46	128 m
Crookwell 3	50 km east	Proposed	29	151 m
Cullerin Range	35 km south east	Operational	15	126 m
Gullen Range	40 km east	Operational	73	135 m
Gunning	30 km east	Operational	31	121 m
Paling Yards	80 km north east	Proposed	55	175 m
Taralga	80 km east	Operational	51	130 m
Woodlawn	60 km south east	Operational	23	124 m
Yass	40 km west	Approved	79	150 m

Table 3: Wind farms in the region

This is a consequence of the region's superior wind resources, and proximity to major electricity transmission lines. However, this has also given rise to growing community concerns about the cumulative impacts of wind energy development in the region, and in particular the visual impacts of these projects on the broader landscape in the Southern Highlands and South West Slopes.

However, most of these wind farms are located over 25 km from the project site, and are not expected to cause any cumulative impacts with the project on individual residences, and even impacts on the broader landscape would be mitigated to a large extent by the rolling hills that characterise the topography of the region.

The only proposed wind farm within the project's 10 km view shed is the Bango Wind Farm, which would be located approximately 8 km directly west of the project site (see Figure 4). A proposal for a wind farm at Rugby, which also would have been located within the project's 10 km view shed, has been formally withdrawn.

The key issue for cumulative impact with the Bango Wind Farm is the visual impact, which is discussed further in Section 5.1. At this distance, cumulative impacts relating to noise are unlikely to be significant, although cumulative noise impacts have been considered in the noise assessment as discussed in Section 5.2.

NSW Wind Energy Framework

In December 2016, the Department released the new Wind Energy Framework (the Framework).

The Framework replaces the draft wind farm planning guidelines, which were exhibited in 2011, and seeks to provide greater clarity, consistency and transparency for industry and the community regarding both assessment and decision-making on wind energy projects.

The Framework provides a merit-based approach to the assessment of wind energy projects, which is focused on the issues unique to wind energy, particularly noise and visual impacts. The key documents comprising the Framework include:

- Wind Energy Guideline;
- Visual Assessment Bulletin;
- Noise Assessment Bulletin; and
- Standard Secretary's Environmental Assessment Requirements (SEARs).

However, it is important to note that the Framework only applies to new large-scale wind energy projects where SEARs have been issued after the date the Framework was published (i.e. December 2016). As the assessment requirements for the Rye Park Wind Farm were issued in 2011, the Framework does not apply.



NSW Government Department of Planning & Environment

Le	egend
1	Adjunbilly Wind Farm
2	Birrema Wind Farm
38	Yass Wind Farm (Coppabella)
30	Conroys Gap Wind Farm
4	Rugby Wind Farm (Withdrawn)
5	Capital Wind Farm (I & II)
6	Woodlawn Wind Farm
6a	Collector Wind Farm
7	Cullerin Wind Farm
8	Gunning Wind Farm
9	Gullen Range Wind Farm
9a	Biala Wind Farm
10	Crookwell Wind Farm
11	Crookwell 2 Wind Farm
12	Crookwell 3 Wind Farm
13	Taralga Wind Farm
14	Golspie Wind Farm
15	Paling Yards Wind Farm
16	Rye Park Wind Farm
17	Bango Wind Farm
0	Operational wind farm
0	Approved wind farm (not constructed)
0	Proposed wind ferm development beyond 50 km of the Rys Park wind ferm
0	Proposed wind ferm development between 20 km and 50 km of the Rys Peril wind ferm
	Proposed Rys Park wind farm project boundary
	Proposed Rugby and Bengo wind farm investigative areas
0	Locality
	Hume Highway
	Great Southern Railway
	 Existing transmission line
Figu Regi	re 30 ional wind farm development
E Rye	PURUN Park Wind Farm Pty Ltd
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13	andscape architects

2.2 Regional and Local Population

The area surrounding the project site has scattered rural residences located primarily along Blakney Creek North Road to the east, Grassy Creek and Maryvale Roads to the north, Coolalie Road to the south and Rye Park – Dalton Road and Cooks Hill Road to the west (see Figures 2 and 3).

The closest village zoned RU5 - Village to the project site is Rye Park village, which is located approximately 3 km to the west of the North Western precinct. The Rye Park village has approximately 30 residences and the broader suburb hosts a population of 237 (2011 census). Based only on the distance from turbines, the village could be affected by the visual, noise, and traffic impacts of the project (see Section 5).

Other villages zoned RU5 near the project site include Jerrawa, Dalton and Rugby, which all are located more than 6 km from the site and comprise a relatively small number of rural residences and homesteads, and are largely shielded from views towards the turbines by intervening vegetation and topography.

The nearest regional centres include Yass, located 10 km to the south of the project site with a population of over 6,000 residents, and Boorowa, located 15 km to the north west of the project site with a population of over 1,000 residents (2011 census). Due to their distance from the site and intervening topography, these regional centres are unlikely to experience any visual or noise impacts as a result of the project.

Associated Landowners

The project has 43 host or 'associated' landowners, who own land both on and adjoining the project site. They have entered into commercial agreements with RPRE to facilitate the development of the project, including accepting the impacts of the project.

Non-associated Landowners

The remaining land is generally in private ownership, and the majority of the owners of this land are not associated with the project in any way.

Within 5 km of the site there are 205 non-associated residences, including (see Figures 2 and 3):

- 25 non-associated residences located within 2 km;
- 29 non-associated residences located between 2 and 3 km;
- 94 non-associated residences located between 3 and 4 km; and
- 57 non-associated residences located between 4 and 5 km.

2.3 Key Infrastructure

Road Network

The project is located in proximity to major transport routes including the Main Southern Railway and the Hume Highway. The Main Southern Railway extends roughly east to west directly adjacent to the southern boundary of the project site and the Hume Highway extends roughly east to west approximately 6 km south of the project site (see Figures 2 and 3).

Lachlan Valley Way is a state road that would provide access to the project site from the Hume Highway via Boorowa. A series of local roads, including Boorowa Rye Park Road, Rye Park Dalton Road, Grassy Creek Road, Maryvale Road, Pudman Creek Road, Blakney Creek Road, Coolalie Road, Jerrawa Road and Cooks Hill Road would also be used to access the site.

Over-dimensional and heavy vehicles would leave the Hume Highway via the project's designated heavy vehicle transport route (see Figures 18 and 19) at either:

- Lachlan Valley Way, a state road that provides access to the project site via Boorowa and a series of local roads including Boorowa Rye Park Road, Grassy Creek Road, Maryvale Road, Yass Street, Rye Park Dalton Road, Flakney Creek Road and Blakney Creek Road; or
- Jerrawa Road, a local road that provides access to the Southern precinct of the project site via Coolalie Road and Bushs Road.

While no specific access route has been designated for light vehicles, it is anticipated that the majority of employees and contractors would use Cooks Hill Road, which provides the most convenient connection to Yass.

Various upgrades have been agreed with applicable Councils to ensure these roads are suitable for overdimensional and heavy vehicles associated with the project (see Section 5.4). Upgrades of Cooks Hill Road have also been agreed, including sealing the unsealed sections within the Upper Lachlan LGA, to ensure this road is suitable for the project-related light vehicle movements.

Electricity Transmission Lines

There are a number of existing electricity transmission lines in the vicinity of the project site (see Figures 2 and 3). The project would connect to the TransGrid Yass to Bannaby 330 kV transmission line, which runs in an east to west direction through the Southern precinct of the project.

2.4 Natural Environment

The Southern Tablelands and South West Slopes are characterised by areas of extensively cleared agricultural grazing land comprised of rolling hills and gentle ridgelines with scattered remnants of vegetation. Remnant stands of the original vegetation remain as roadside vegetation, paddock trees or larger scattered patches of woodland on the lower slopes with more extensive forested areas on the ridge tops. The closest conservation area is the Bango Nature Reserve, which covers an area of 409 ha, and is located adjacent to the Southern precinct of the project site.

Apart from the Bango Nature Reserve, the regional setting is not characterised by areas identified as having high scenic value or that have been zoned for recreation, tourism, environmental management or conservation. However, the local community places importance on the landscape as many residents have chosen to live in the area for its rural character.

The project lies within the Lachlan River catchment, with a small portion of the south west corner located within the Murrumbidgee Catchment. The project site contains a number of high order creeks, lower order creeks and drainage lines. The major creek with a potential to be impacted by the project is Blakney Creek. An access track that crosses Blakney Creek at the eastern boundary of the project site, adjoining Blakney Creek North Road, would be used to access the project site and would require upgrading.

3. STATUTORY CONTEXT

3.1 State Significant Development

The project was declared a major project under Part 3A of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) in October 2008.

Although Part 3A was repealed on 1 October 2011, the project remained a 'transitional Part 3A project' under Schedule 6A of the EP&A Act. On 21 March 2014, the project was transitioned to the State Significant Development (SSD) process under Part 4 of the EP&A Act. The previous assessment actions undertaken under the Part 3A assessment process (including exhibition of the EA) were accredited under the SSD process.

The project is classified as SSD under Section 89C of the *Environmental Planning & Assessment Act* 1979 (EP&A Act). This is because it triggers the criteria in Clause 20 of Schedule 1 to *State Environmental Planning Policy (State and Regional Development)* 2011, as it is development for the purpose of electricity generating works using wind power that has a capital investment value of more than \$30 million.

Consequently, the Minister for Planning is the consent authority for the development.

However, under the Minister's delegation dated 14 September 2011, the independent Planning Assessment Commission must determine the development application for the project as there were more than 25 public objections.

3.2 Permissibility

The project is located across the Hilltops, Upper Lachlan and Yass Valley LGAs (see Figure 5). The portions of the project site that are in the Hilltops LGA and Yass Valley LGA are zoned RU1 – Primary Production under the *Boorowa Local Environmental Plan (LEP) 2012* and *Yass Valley LEP 2013*, respectively. The part of the project site that is in Upper Lachlan LGA is zoned RU2 – Rural Landscape under the *Upper Lachlan LEP 2010*.



Figure 5: Distribution of project infrastructure across the three LGA boundaries

Electricity generating works, which include a building or place used for the purpose of making or generating electricity, are permissible with development consent within land zoned RU1 under the *Boorowa LEP 2012* and land zoned RU2 under the *Upper Lachlan LEP 2010*.

However, electricity generating works are prohibited within land zoned RU1 under the Yass Valley LEP 2013.

Under *SEPP (Infrastructure) 2007*, development for the purposes of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Zone RU1 is a prescribed rural zone. As the proposal is for electricity generating works within a prescribed rural zone in the *Yass Valley LEP 2013*, it is therefore permissible with consent in the land zoned RU 1.

3.3 Environmental Planning Instruments

Several other environmental planning instruments apply to the project, including:

- SEPP (Infrastructure) 2007;
- SEPP (State and Regional Development) 2011;
- SEPP (Rural Lands) 2008;
- SEPP No.44 Koala Habitat Protection;
- SEPP No.55 Remediation of Land; and
- Upper Lachlan Development Control Plan 2010.

The Department has assessed the project against the relevant provisions of these instruments (see this report and Appendix C), as well as RPRE's consideration of these matters in the EA.

3.4 Integrated and Other NSW Approvals

Under Section 89J of the EP&A Act, a number of other approvals are integrated into the SSD approval process, and consequently are not required to be separately obtained for the proposal. These include:

- various approvals relating to heritage required under the *National Parks and Wildlife Act 1974* and *Heritage Act 1997*;
- an authorisation under the Native Vegetation Act 2003 for the clearing of native vegetation; and
- certain water approvals under the Water Management Act 2000.

Under Section 89K of the EP&A Act, a number of further approvals are required, but must be substantially consistent with any development consent for the proposal. These include:

- an EPL under the Protection of the Environment Operations Act 1997; and
- approvals for various road upgrades under the *Roads Act 1993*.

The Department has consulted with the relevant government authorities responsible for these integrated approvals (see Section 4), considered their advice in its assessment of the merits of the project (see Section 5), and included suitable conditions in the recommended conditions of consent to address these matters (see Appendix G).

3.5 Commonwealth Approvals

RPRE also needs to obtain approval from the Commonwealth Minister for the Environment and Energy under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), because the project is a "controlled action" under that Act due to the potential for significant impacts on listed threatened species, vegetation communities and migratory species.

The Commonwealth Department of the Environment and Energy (DoEE) has advised that the project would be assessed through preliminary documentation, which is the least intensive form of assessment under the EPBC Act for a controlled action.

This means that the NSW and Commonwealth assessment processes are entirely separate, and the NSW Planning Assessment Commission has no obligation to consider matters under the EPBC Act, although the DoEE has advised that the final decision at the Commonwealth level is unlikely until the Commission has determined the application under the EP&A Act.

3.6 Section 5A-D Considerations

Section 5A-D of the EP&A Act outline several matters that a consent authority must take into consideration, including whether the development is likely to have a significant effect on:

- threatened species, populations and ecological communities, and their habitats, having regard to the '7 part test of significance' and the *Threatened Species Assessment Guidelines – The Assessment of Significance*, dated August 2007; and
- critical habitat, having regard to the relevant register.

The Department has considered these matters, and concluded that the project is unlikely to have a significant impact on any of these matters (see Section 5.3 and Appendix D).

3.7 Section 79C Considerations

Section 79C(1) of the EP&A Act outlines the matters that a consent authority must take into consideration when determining development applications. These matters can be summarised as:

- the provisions of environmental planning instruments (including draft instruments), development control plans, planning agreements, and the EP&A Regulations;
- the environmental, social and economic impacts of the development;
- the suitability of the site;
- any submissions; and
- the public interest, including the objects in the EP&A Act and the encouragement of ecologically sustainable development (see Appendix D).

4. CONSULTATION

4.1 RPRE's Engagement

RPRE prepared a *Community and Stakeholder Engagement Plan* (see Appendix J of the RTS) and has confirmed that it has implemented the following aspects of this plan:

- establishing a project website, phone number and email address;
- distributing twelve newsletters to the local community between 2009 and 2015;
- establishing and operating a Community Consultative Committee (CCC) since June 2012 comprising an independent chairperson, four members of the local community, a representative from each of the three Councils and a RPRE representative. The CCC has met 11 times since it was established;
- door-knocking and face-to-face meetings; and
- a community information day in Rye Park in September 2015, which was advertised in the project newsletters, local newspapers and was attended by approximately 60 people.

4.2 Department's Engagement

During the assessment process, the Department has visited the site on several occasions, held a community information session, and consulted with local residents, Council, public authorities and RPRE. This engagement is summarised in Table 4 below.

4.3 Exhibition

The Department:

- publicly exhibited the EA from 12 May 2014 until 4 July 2014 (54 days);
- notified relevant State government authorities and the Councils;
- notified relevant electricity supply and transmission authorities, in accordance with SEPP (Infrastructure) 2007;
- notified affected landholders; and
- advertised the exhibition in the Boorowa News, Crookwell Gazette, Young Witness, Cootamundra Herald, Yass Tribune and Bathurst Western Advocate.

In undertaking these processes, the Department has satisfied the notification requirements of Section 89F of the EP&A Act and SEPP (Infrastructure) 2007.

Date	Description	Attendees
20 January 2016	 Visit to site and surrounds to understand biodiversity impacts 	 Department planning officers OEH RPRE
21 January 2016	 Visit to site and surrounds to understand visual impacts 	Department planning officersIndependent visual expert
17 February 2016	Attend Community Consultative Committee (CCC) Meeting	Department planning officersRPRE
8 June 2016	 Community Information Session in Rye Park 	 Department planning officers
28 July 2016	 Visit to site and surrounds to understand visual impacts 	 Department planning officers RPRE Independent visual expert
29 July 2016	 Visit to site, surrounds and non-associated residences to confirm impacts and discuss issues 	Department planning officers
16 August 2016	 Visit to site, surrounds and non-associated residences to confirm impacts and discuss erosion and sedimentation issues 	Department planning officersEPA
During assessment process	 Consultation with agencies, particularly OEH and the Councils to resolve residual concerns; and Consultation with RPRE and its consultants 	 Department planning officers OEH Hilltops, Upper Lachlan and Yass Valley Council RPRE

Table 4: Department's engagement

4.4 Response to Submissions

RPRE provided a detailed response to the issues raised in submissions on the EA (see Appendix B), which was exhibited from 18 May 2016 to 23 June 2016 (37 days) on the Department's website and at the same locations that the EA was exhibited. The Department also advertised the exhibition of the RTS in the Boorowa News, Crookwell Gazette, Young Witness, Cootamundra Herald, Yass Tribune and Bathurst Western Advocate and notified landholders who lodged a submission during the EA exhibition period as well as relevant state and local government authorities.

4.5 Summary of Submissions

During the exhibition period of the EA, the Department received a total of 130 submissions, including:

- 12 from government agencies:
- 3 from special interest groups; and
- 115 submissions from the general public.

In response to RPRE's RTS, the Department received a further 241 submissions (either as new submissions or as updates to previous submissions), including:

- 10 from government agencies;
- 5 from special interest groups; and
- 226 from the general public.

A summary of the submissions is provided in Table 5 and a full copy of the submissions is attached in Appendix E.

Table 5: Summary of submissions

Submitters		Nu	mber	Objection / Support
Sur	millers	EA	RTS	Objection/Support
Gov	vernment Agency	12	10	
•	Office of Environment and Heritage		\checkmark	
•	Environment Protection Authority	\checkmark	\checkmark	
•	Department of Primary Industries	\checkmark	\checkmark	
•	Division of Resources and Energy, Department of Industry	\checkmark		
•	Roads and Maritime Services	\checkmark	\checkmark	
•	Airservices Australia	\checkmark	\checkmark	a ,
•	CASA	\checkmark	\checkmark	Comment
•	Division of Resources and Energy, Crown Lands	\checkmark		
•	Department of Defence	\checkmark	\checkmark	
•	Hilltops Council	\checkmark	\checkmark	
•	Upper Lachlan Council	\checkmark	\checkmark	
•	Yass Valley Council	\checkmark	\checkmark	
Spe	ecial Interest Group	3	5	
•	Australian Wind Alliance		\checkmark	Ourse and
•	Doctors for the Environment Australia		\checkmark	Support
•	Boorowa District Landscape Guardians			
•	Flyers Creek Wind Turbine Awareness Group	\checkmark		
•	Rye Park Action Group		\checkmark	Object
•	Yass Landscape Guardians		\checkmark	
Waubra Foundation		\checkmark		
Cor	nmunity	115	226	
		4	20	Support
•	< 5 km	39	42	Object
		0	1	Comment
		2	30	Support
•	5 – 50 km	46	43	Object
		0	1	Comment
		2	42	Support
•	> 50 km	22	29	Object
		0	1	Comment
•	unknown	0	16	Support
		0	1	Object
TO	AL	130	241	

4.6 Key Issues - Government Agencies

None of the government agencies have objected to the project, and most of the issues raised by agencies have been addressed through the provision of additional information, or through the recommended conditions of consent.

The *Environment Protection Authority (EPA)* has no residual concerns with the project but recommended a number of conditions regarding water and waste management, chemical storage, air quality, blasting and noise criteria, which the Department has incorporated in the recommended conditions of consent as discussed in Section 5.2 and 5.5.

The *Office of Environment and Heritage (OEH)* raised concerns regarding potential biodiversity impacts, particularly in relation to impacts to hollow bearing trees, intact remnant vegetation and Aboriginal heritage. It recommended a number of conditions of consent to address these concerns, which the Department has incorporated into the recommended conditions as discussed in Section 5.3.

The **Department of Primary Industries (DPI)** raised concerns regarding the potential impact on the habitat of the Southern Pygmy Perch (*Nannoperca australis*), a threatened species listed as vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act), known to inhabit Blakney and Pudman Creeks. It recommended a number of conditions of consent to address these concerns, which the Department has incorporated into the recommended conditions as discussed in Section 5.5.

The **Division of Resources and Energy (DRE) - Crown Lands** noted that a number of the turbines would be located in proximity to Crown roads and the transmission line would traverse a number of Crown roads and waterways. It recommended that the future use of any Crown roads not be compromised as a result of the project. The Department has incorporated this recommendation into the conditions.

Roads and Maritime Services (RMS) has no residual concerns with the project but recommended a number of conditions regarding traffic management, and road and intersection upgrades of the transport route, which the Department has incorporated into the recommended conditions as discussed in Section 5.4.

Hilltops Council, Upper Lachlan Council and *Yass Valley Council* all raised concerns in regards to the potential impacts on the local road network during construction of the project. The Department has recommend conditions of consent to ensure that the required road upgrades are undertaken to the satisfaction of the Councils as discussed in Section 5.4.

Airservices Australia has no residual concerns about the project and noted that the project would not adversely impact the performance of any of its communications, navigation and surveillance facilities or impact any registered or certified aerodromes.

The *Civil Aviation Safety Authority (CASA)* did not object to the project, but noted that the Lowest Safe Altitude (LSALT) would need to be increased by up to 200 feet on four Instrument Flight Rules (IFR) routes (W762, W478, W836 and W872) to ensure aircraft in transit along these routes maintain a safe separation from any terrain or obstacle.

4.7 Key Issues - Community

Of the 115 submissions from the general public received on the project's EA, 107 objected to the project and 8 supported the project. Of the 226 submissions from the general public received on the project's RTS, 115 objected, 108 supported and 3 submissions made comments that did not support or object to the project.

As summarised in Table 5, the submissions from the general public were spread generally equally across residents residing in local towns (within 5 km of the project site), the regional area (between 5 - 50 km of the project site) and across the state, with 12 from out of state (i.e. Australian Capital Territory, Queensland).

The key issues raised in submissions related to the adequacy of RPRE's consultation with the local community, the visual, noise, social and economic impacts of the project, and the impacts of the project on biodiversity, health, property values, water resources and soil.

The Department has met with a number of community members that lodged a submission at their residence to get an appreciation of the potential impacts on their property and further understand their concerns.



A breakdown and summary of the key issues raised by the general public is provided in Figure 6 and described below.



Community consultation:

- dissatisfaction with the community consultation undertaken by RPRE, with many residents feeling that they had been left out of, or ignored, in the consultation process; and
- lack of genuine opportunities to provide input into the assessment process.

In response to these concerns, and in addition to the formal statutory consultation requirements, the Department publicly exhibited RPRE's RTS and undertook an extensive engagement process with the local community, including visiting the site on several occasions, holding a community meeting, and consulting with local residents, Council and public authorities (see Table 4 above).

Visual:

- size and scale of the project;
- change to the landscape character;
- impacts on Rye Park village;
- perceived underestimation of the visual impacts of the project; and
- potential cumulative visual impacts from the proposed Bango Wind Farm.

In response to these concerns, the Department commissioned independent visual expert to peer review and verify the visual impacts of the project. Based on this assessment, the Department has recommended the removal of 25 out of the 109 turbines to reduce the visual impacts of the project on the local community (see Section 5.1).

Noise:

- noise from both the construction and operation of the wind farm; and
- low frequency noise and infrasound from wind turbines.

Both the EPA and the Department have undertaken a detailed assessment of the predicted noise impacts of the project, in accordance with applicable guidelines and policies. This assessment found that the project would be able to meet applicable noise criteria, and the Department has recommended strict noise limits to protect the amenity of nearby residents (see Section 5).

Biodiversity:

- amount of vegetation clearing required;
- impacts on threatened fauna and flora species and ecological communities; and
- potential for birds and bats to be struck by the wind turbines, particularly in regard to the flight paths of the Superb Parrot.

The biodiversity impacts of the project have been considered in detail by OEH and the Department in accordance with the NSW Biodiversity Offsets Policy for Major Projects and Framework for Biodiversity Assessment.

The Department has recommended a range of conditions to avoid impacts on threatened species, limit clearing of native vegetation, implement adaptive management measures to reduce the risk of blade strike on birds and bats, and compensate for the residual impacts of the project by retiring credits under the biodiversity offsets scheme (see Section 5.3).

Traffic and transport:

- increased traffic; and
- damage to the transport route road network.

Both the Department and RPRE have undertaken extensive consultation with the local Councils on the proposed transport routes, and have agreed on road upgrades for the local road network. The Department has also recommended that PRRE be required to implement a detailed Traffic Management Plan for the project to address concerns about road safety (see Section 5.4).

Other issues:

- Social and economic impacts on the social fabric of the local community, and impacts on infrastructure and services;
- Health health impacts from wind turbines, including impacts from electro-magnetic fields;
- Property values depreciation of property values, and impacts on the potential to sub-divide land into rural-residential lots;
- Water and soils impacts on soil and water resources, particularly with the highly erodible soils in the area;
- Bushfires increased risk of bushfires, and interference with aerial fire-fighting operations;
- Aboriginal heritage potential impacts on Aboriginal heritage sites and cultural heritage values;
- Radio communications interference with telecommunication signals; and
- *Decommissioning and rehabilitation* responsibility for decommissioning wind turbines and associated infrastructure after the operational life of the project.

Sections 5.5 of the assessment report provides a summary of the Department's consideration of these matters and recommended conditions.

4.8 Key Issues - Special Interest Groups

Of the 7 different special interest groups that made a submission, 2 supported and 5 objected to the project.

The **Australian Wind Alliance** and **Doctors for the Environment Australia** both support the project on the grounds of the economic benefits it would provide to the local area and the contribution it would have towards Australia's renewable energy target.

The Boorowa District Landscape Guardians, Flyers Creek Wind Turbine Awareness Group, Rye Park Action Group, Waubra Foundation and Yass Landscape Guardians all object to the project and have concerns regarding noise impacts, perceived negative health impacts, impacts to biodiversity, adverse impacts to property values, and the potential impact to aerial agricultural and bush-firefighting activities.

The **Boorowa District Landscape Guardians** produced a very detailed submission on the project, including a peer review of RPRE's noise assessment by The Acoustic Group Pty Ltd and a peer review of RPRE's biodiversity assessment by Australian Wildlife Services. These peer reviews have been specifically addressed in Sections 5.2 and 5.3, respectively.

The Department has considered all of the issues raised by the community and special interest groups in its assessment of the project.

5. ASSESSMENT

In its assessment of the merits of the project the Department has considered the:

- EA, submissions, and the RTS;
- advice from Commonwealth, State and local government agencies;
- advice of the independent visual expert commissioned by the Department;
- findings of its site visits and consultation with the local community;
- relevant environmental planning instruments, policies and guidelines; and
- relevant provisions of the EP&A Act, including the objects of the Act.

The following is a summary of the findings of the Department's assessment.

5.1 Visual

Visual Context

The proposal is located on elevated ridges and spans approximately 45 km from north to south, with a variable width of 2 to 3 km east to west. The sensitivity of the landscape and the proximity of residences, and hence the nature and extent of the impacts of the project, vary considerably across the site

RPRE has commissioned two visual assessments over the last four years:

- Landscape and Visual Impact Assessment, Green Bean Design, November 2013; and
- Revised Landscape and Visual Impact Assessment, Green Bean Design, April 2016.

A number of submissions regarding the landscape and visual impacts of the project were received from the public, expressing concern about the size and scale of the wind farm and a perceived underestimation of the visual impacts of the project in RPRE's assessment. Concerns were also expressed that there would be cumulative visual impacts due to the proximity of the project to the other operational, approved and proposed wind farms in the region as listed in Table 3, most notably, the proposed Bango Wind Farm.

In response to these concerns, the Department commissioned O'Hanlon Design Pty Ltd – Landscape Architects (OHD) to undertake an independent peer review and verify the visual assessments commissioned by RPRE (see Appendix F).

Avoidance and Mitigation Measures

As discussed in Section 1, RPRE has reduced the maximum number of proposed turbines over the project's development. While this was not necessarily done for the purpose of reducing visual impact in all cases, the Department acknowledges that it does result in a reduced visual impact to the landscape values and to some non-associated residences.

RPRE is also proposing to implement a range of mitigation measures to minimise visual impacts, including:

- painting wind turbine generators off-white/grey and finishing the blades with a treatment that minimises potential for any glare or reflection;
- providing vegetation screening around substations and control buildings where they are visible from neighbouring residences;
- locating powerlines, substations and control buildings in areas which minimise the visual impact, where practical; and
- using building materials and treatments for associated infrastructure which visually complement the surrounding environment.

Importantly, RPRE has also committed to implementing appropriate visual mitigation (e.g. landscaping and screening) at any non-associated residences within 4 km of a wind turbine where an assessment shows that visual screening might improve visual amenity from the residence, and where the applicable landowner requests such mitigation.

The Department supports the proposed avoidance and mitigation measures and has recommended conditions formalising these measures.

Additionally, RPRE has obtained visual impact agreements with the landowners of the 5 non-associated residences located in proximity to the Northern precinct (R1, R15, R131, R132 and R328), in which the landowners accept the visual impacts of the project.

Assessment

RPRE adopted a zone of visual influence of 10 km to assess the visual impacts of the project. Figure 7 shows the areas from which wind turbines would be visible from hub height and above in the surrounding area.

The assessment concluded that residences greater than 10 km from the project would be unlikely to experience any visual impacts due to a combination of distance and screening from topography and vegetation.

In addition to undertaking a quantitative analysis of visibility, RPRE undertook a qualitative assessment of visual impact from 113 viewpoints, including:

- 44 viewpoints within 2 km;
- 39 viewpoints between 2 km and 3 km;
- 23 viewpoints between 3 km and 5 km, including those in the Rye Park village; and
- 7 viewpoints between 5 km and 10 km of the project.

Of the 113 viewpoints, photomontages have been prepared for 36 locations, including 22 non-associated residences located within 3 km of the proposed turbines, to demonstrate the scale and impact of the development.

RPRE's LVIA found that 16 non-associated residences have the potential to experience either moderate/high or high visual impacts from the project. Fourteen (14) of these residences are impacted by the turbines in either the Northern, North Western or Intermediate precincts. The remaining 2 residences have unique circumstances with impacts attributed to either the Central or Southern precincts.

The Department, with the assistance of the peer review prepared by OHD, undertook an assessment of the visual impact of the project on Rye Park village and key non-associated residences located within approximately 3 km of a turbine.

The Department's assessment agreed with RPRE's LVIA as it found the most significant visual impacts would largely be confined to the North Western precinct, located in proximity to Rye Park village, and the project's Northern and Intermediate precincts.

In addition to the 16 non-associated residences that RPRE's LVIA identified as having either moderate/high or high impacts, the Department's assessment found that a further 6 non-associated residences, Rye Park village itself, which is comprised of approximately 30 non-associated residences, and a vacant parcel of land (Lot 75 DP754136), have the potential to experience either moderate/high or high visual impacts from either the North Western or Intermediate precincts.

The location of Rye Park village, Lot 75 DP754136 and all 22 of the potentially moderate/high or highly impacted non-associated residences located outside of Rye Park village are shown on Figure 7 (denoted by yellow highlight).

Twenty (20) of the 22 non-associated residences predicted by the Department to have moderate/high or high visual impacts are predicted to primarily be impacted by turbines in either the Northern, North Western or Intermediate precincts. This includes:

- 5 residences located in proximity to the Northern precinct, for which RPRE has secured visual impact agreements;
- 6 residences located immediately to the west of the North Western precinct; and
- 9 residences in proximity to the Intermediate precinct.

The remaining 2 non-associated residences are the same 2 residences that RPRE's LVIA identified as having moderate/high or high impacts attributed to either the Central or Southern precincts.

Northern Precinct

Table 6 summarises RPRE's assessment, the Department's consideration and recommendations for the most affected non-associated residences with impacts primarily attributed to turbines in the Northern precinct, The Department also notes that there are a number of other residences with views of these turbines, but that these impacts were assessed as being low to moderate. Figure 8 provides an example of the predicted views of the project from residence R1.

Residence	Distance to closest wind turbine (km)	RPRE's assessed impact	Department's assessed impact	Recommended mitigation strategy
R1	0.91	High	High	Visual agreement
R15	2.42	Moderate/High	Moderate/High	Visual agreement
R131	2.17	Moderate/High	Moderate/High	Visual agreement
R132	2.47	Moderate/High	Moderate/High	Visual agreement
R328	2.21	Moderate/High	High	Visual agreement

Table 6:	Visual	Impact	Assessment -	Northern	precinct
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The Department supports visual impact agreements for all of the non-associated residences significantly affected by the Northern precinct, as it considers that the predicted moderate/high to high impacts would not be able to be effectively mitigated by visual screening given the surrounding topography and elevation of the turbines.

As RPRE has already secured visual impact agreements with all non-associated residences with moderate/high or high impacts attributed to the turbines in the Northern precinct, the Department considers the visual impacts from this precinct are acceptable.



Figure 7: Zone of visual influence and residence/properties with moderate/high or high visual impacts

discourse same	24					
NOTES	3:					
The ZV	I methodology is a purely geometric					
assess	assessment where the visibility of the					
propos	proposed Rye Park wind farm is determined					
a mon	errain model of the site and the					
surrour	surrounding terrain.					
This as	sessment methodology is assumed to					
be con	servative as the screening affects of any					
structu	res and vegetation above ground level					
wind fa	considered in any way. Therefore the					
location	ns indicated on the ZVI maps due to the					
local pr	esence of trees, vegetation or other					
screen	ing potential. While the ZVI maps are a					
useful	visualisation tool, they are very					
conser	vauve in nature.					
Additio	nally, the number of turbines visible at					
any on	e time is also affected by the weather					
weathe	er tends to mask the visibility of the					
propos	ed wind project.					
LEGEN	ID:					
Numbe	r of wind turbine to hub					
neight	visible					
<u> </u>	Jp to 109					
_ι	Jp to 80					
ι.	Jp to 60					
	In to 40					
	F					
	Jp to 20					
1	Involved residential dwelling within					
	3 km of wind turbine					
1	Uninvolved residential dwelling within					
	3 Kill of white tability					
1	Uninvolved residential dwelling between					
	3 km and 5 km of wind turbine					
1	Uninvolved residential dwelling between					
	5 km and 10 km of wind turbine					
	Non residential structure					
	Proposed Rye Park wind turbine					
	(indicative layout)					
1	Distance from proposed Rye Park					
(wind turbine					
	Moderate/bigh or bigh visual impacts					
	mouerateringh of high visual impacts					
Figu	ire 25					
7\/I	Diagram 2 Hub beight					
	Pragram 2 may neight					
-	DUDAN					
E	PURON					
_						
Rye	Park Wind Farm Pty Ltd					
G	REEN BEAN DESIGN					

landscape architects



Uninvolved residential dwelling R1- Proposed view through 110°. Approximate distance to closest visible Rye Park wind turbine 990 m

Figure 8: Residence R1 photomontage looking towards turbines in the Northern precinct

North Western Precinct

Table 7 summarises RPRE's assessment, the Department's consideration and recommendations for the most affected non-associated residences located outside of Rye Park village with impacts primarily attributed to turbines in the North Western precinct.

Residence	Distance to closest wind turbine (km)	RPRE's assessed impact	Department's assessed impact	Recommended mitigation strategy
R18	1.99	Moderate	Moderate/High	Remove North Western precinct
R19	1.61	Moderate	Moderate/High	Remove North Western precinct
R20	1.87	Moderate	Moderate	Remove North Western precinct
R22	1.85	Low/Moderate	Moderate	Remove North Western precinct
R26	1.67	Low/Moderate	Moderate	Remove North Western precinct
R29	1.76	Low/Moderate	Moderate	Remove North Western precinct
R65	1.91	Low	Low	Remove North Western precinct
R177	3.10	Low/Moderate	Moderate	Remove North Western precinct
R179	3.10	Low/Moderate	Moderate	Remove North Western precinct
R188	3.10	Low/Moderate	Moderate	Remove North Western precinct
R199	3.10	Low/Moderate	Moderate	Remove North Western precinct
R204	2.67	Low/Moderate	Moderate	Remove North Western precinct
R230	3.10	Low/Moderate	Moderate	Remove North Western precinct
R266	2.06	Low/Moderate	Moderate/High	Remove North Western precinct
R267	2.50	Low/Moderate	Moderate/High	Remove North Western precinct
R268	2.52	Low/Moderate	Moderate/High	Remove North Western precinct
R269	2.67	Low/Moderate	Moderate	Remove North Western precinct
R270	2.70	Low/Moderate	Moderate	Remove North Western precinct
R271	2.75	Moderate/High	Moderate/High	Remove North Western precinct
R325	3.10	Low/Moderate	Moderate	Remove North Western precinct

Table 7: Visual Impact Assessment – North Western precinct

Rye Park village, which is comprised of approximately 30 non-associated residences, is situated just over 3 km from the North Western precinct of turbines and would have cumulative 180° horizontal views to turbines. The village is located on an easterly facing hill with the primary views towards the proposed turbines.

The village is zoned RU5 – Village (see Figure 9) which is a sensitive land use designation in the Standard Instrument under the EP&A Act. One of the objectives of the zone under the applicable LEP is "to ensure that development maintains and contributes to the character of rural villages". The Department considers that for this objective to be meaningful and achievable, proposed developments in the surrounding landscape must also be considered, particularly if the impacts of these developments are likely to be incompatible with maintaining the character of nearby rural villages such as Rye Park.

The Department therefore considers that under the applicable statutory planning scheme there is an obligation to ensure that any development on land in proximity to village zones does not transform the landscape to the extent that it materially alters the character of rural villages.

In this case, and based on advice from the independent visual expert, the Department considers that with the combination of proximity, the elevated position of the turbines along the nearby ridgeline, and the extensive horizontal views of turbines from the village, the project would transform the views from the village to a rural-industrial landscape (see Figure 10 – noting that there are viewing locations closer to the wind farm than shown on this photomontage).

In addition to the impacts on Rye Park village, the Department considers the impacts from the North Western precinct on 6 non-associated residence located outside of, but in proximity to, Rye Park village would also be moderate/high, as summarised in Table 7.



Figure 9: Rye Park village zoning map

Due to the nature and extent of the impacts, there are limited options to avoid or mitigate the visual impacts to acceptable levels, apart from removing turbines from the proposed layout. During the assessment process, RPRE proposed the removal of up to 6 of the turbines with the highest visual impacts on Rye Park village (Turbine Nos. 16, 45, 47, 133, 134 and 144) (see Figure 11).

While the Department considers that RPRE has made a genuine attempt to reduce visual impacts by proposing the removal of these turbines, the Department considers that removing these turbines would not materially or sufficiently reduce the visual impacts of the project on Rye Park village (and nearby residences), as illustrated by comparing Figures 10 and 11.

Consequently, in consultation with the independent visual expert, the Department considers that it is necessary to remove all 16 turbines within the North Western precinct to reduce the impacts to an acceptable level and to maintain the character of Rye Park village as a 'rural village' under the applicable statutory planning scheme.

The Department also notes that even with the removal of the North Western precinct, a large number of turbines would remain visible from parts of the village.

However, it is considered that the residual impacts would not be significant as the turbines would be significantly further away (around 4 km), and would not be located on land within the primary outlook from the village (i.e. to the east). In other words, the proposed turbines would not 'dominate' the visual catchment of the village and the residences both within and nearby.



Figure 10: Photomontage from a public viewpoint on Kershaw Street in Rye Park village looking towards turbines in the North Western precinct



Figure 11: Photomontage from a public viewpoint on Kershaw Street in Rye Park village looking towards turbines in the North Western precinct with the removal of Turbine Nos. 16, 45, 47, 133, 134 and 144

In making the recommendation to remove the North Western precinct, the Department recognises this would materially reduce the total output from the wind farm, and involves the removal of some of the highest yielding turbines in the proposed layout. However, the Department considers that this trade-off is necessary to protect the interests of the local community, maintain the rural character of the landscape around the village, and uphold the integrity of the statutory planning scheme.

North Eastern and Central precincts

Table 8 summarises RPRE's assessment, the Department's consideration and recommendations for key non-associated residences with impacts primarily attributed to turbines in the North Eastern and Central precincts.

Residence	Distance to closest wind turbine (km)	RPRE's assessed impact	Department's assessed impact	Recommended mitigation strategy
R4	2.63	Low	Low	Visual impact mitigation measures
R6	1.35	Low	Low	Visual impact mitigation measures
R7	1.40	Low	Low/Moderate	Visual impact mitigation measures
R8	1.53	Low	Low	Visual impact mitigation measures
R9	1.63	Low (Nil)	Low	Visual impact mitigation measures
R10	1.83	Low	Low	Visual impact mitigation measures
R11	1.63	Moderate	Moderate	Visual impact mitigation measures
R24	2.01	Low	Low/Moderate	Visual impact mitigation measures
R28	2.14	Low	Moderate	Visual impact mitigation measures
R38	1.74	Moderate/High	Moderate/High	Acquisition upon request
R75	2.70	Low (Nil)	Low/Moderate	Visual impact mitigation measures
R111	2.31	Low/Moderate	Low/Moderate	Visual impact mitigation measures
R112	2.49	Moderate	Moderate	Visual impact mitigation measures
R113	2.55	Low	Low/Moderate	Visual impact mitigation measures
R286	2.51	Moderate	Moderate	Visual impact mitigation measures

Table 8: Visual Impact Assessment – North Eastern and Central precincts

The Department considers that the majority of non-associated residences with visual impacts primarily attributed to the North Eastern and Central precincts would have low to moderate impacts, which could be mitigated with visual impaction mitigation measures (i.e. visual screening), and has recommended conditions accordingly.

However, there is one non-associated residence, R38, that both RPRE and the Department consider would have moderate/high visual impacts. Figure 12 provides an example of the predicted views of the project from this residence.

The Department does not consider that screening would be effective in reducing visual impacts at this residence taking into consideration its proximity to the nearest wind turbine (1.74 km), the relative height of the wind turbines and the degree of visual horizon that would be affected (240°).

In this case, the Department considers that at least 10 turbines would need to be removed to sufficiently mitigate the visual impacts on this property (Turbine Nos. 62, 67, 71 - 76, 78 and 141). The removal of such a large number of turbines would have a material impact on the viability to the wind farm and the associated renewable energy benefits.

The Department notes that it would have preferred RPRE to have reached agreement with the affected landowner. However, in the absence of any agreements, the Department's preferred alternative is providing voluntary acquisition rights linked to the construction of the 10 turbines listed above.

This approach would provide certainty for all stakeholders as it would allow RPRE to proceed with the project and allow the landowner to sell the property at a fair price (including reasonable compensation) if they wish to do so.

From the State's perspective, it would also allow the considerable benefits of the project to be realised while protecting the interests of the most significantly affected non-associated landowners.



Figure 12: Residence R38 photomontage looking towards turbines in the Central precinct

Rye Park Wind Farm

In addition to the residences listed in Table 8 impacted by the North Eastern and Central precincts, Lot 75 DP754135 is a property with a dwelling entitlement approximately 80 hectares (ha) in size that would be impacted by turbines in the Central precinct. This property adjoins the eastern boundary of the project site, and is wholly located between approximately 0.8 km and 1.5 km of the nearest wind turbine (refer to Figure 7). The 4 turbines nearest to this property (Turbine Nos. 146, 147, 148 and 149) were not included in the original project layout in the EA, and were added to the project in the RTS.

Figure 13 provides a photomontage looking towards the Central precinct from a public viewpoint on Maryvale Road near Lot 75 DP754136, to give a sense of the visual impacts on this property.

While Lot 75 DP754136 does not currently have a dwelling, it does have a dwelling entitlement that permits the landowner to make an application for the construction of a dwelling on the parcel of land. Based on its assessment, the Department considers that the visual impacts on a dwelling built anywhere on this property would be high, and would not be able to be mitigated given the topography in this location and the proximity to the 4 closest turbines in the Central precinct.

As the only way to effectively mitigate the visual impacts would be to remove the 4 most visually prominent turbines, the Department considers that the landowner of Lot 75 DP754136 should be offered acquisition rights linked to these turbines (i.e. in a similar manner to R38 discussed above).

It is important to recognise that while the Department considers that the visual impacts on both R38 and Lot 75 DP 754136 would be high, the landowners may be prepared to accept these high impacts on their land, subject to entering into a suitable negotiated agreement with RPRE.

As such, the Department's recommended conditions allow for RPRE to secure visual impact agreements with the landowners of R38 and Lot 75 DP754136 related to the relevant turbines, as an alternative to voluntary acquisition.

It is recognised that the removal of the most visually prominent turbines in proximity to R38 and Lot 75 DP754136 would not completely mitigate the visual impacts of the project. As such, the Department considers that landscaping should also be offered to the landowners, unless and until the properties are acquired or a visual agreement is in place with the landowners.

For the remaining residences assessed as having low or moderate visual impacts from the turbines in the North Eastern and Central precincts, as stated previously, the Department considers that additional visual mitigation in the form of landscape treatments would be effective in minimising visual impacts.

In this regard, the Department has recommended that RPRE be required to consult with and offer additional visual mitigation (i.e. visual screening) to the landowners of residences identified as having low to moderate impacts in Table 8.

Intermediate precinct

Table 9 summarises RPRE's assessment, the Department's consideration and recommendations for key non-associated residences with impacts primarily attributed to turbines in the Intermediate precinct.

Both RPRE's assessment and the Department consider the impacts from the Intermediate precinct would be moderate/high or high on at least 9 non-associated residences. The Department considers these impacts cannot be mitigated by visual screening given the topography in the location and the close proximity of the residences to the turbines, with the closest turbine being located 1.26 km away from the nearest residence R47. Figure 14 provides an example of the predicted views of the project from residence R50.

In the absence of RPRE visual impact agreements with the 9 moderate/high to highly impacted residences, the removal of turbines in the Intermediate precinct is the most appropriate mechanism to effectively mitigate the visual impacts. In this case, the Department considers that provision of acquisition rights does not strike the appropriate balance, as there are a relatively large number of residences impacted by a relatively small number of turbines. As such, the Department has recommended that all 9 of the turbines (Turbine Nos. 90, 93 – 99 and 101) in the Intermediate precinct be removed.



Public view location PM3 Maryvale Road - Existing view north to east south east. Photo coordinate Easting:687538 Northing:6176699 (MGAz55)



Public view location PM3 Maryvale Road- Proposed view through 120°. Approximate distance to closest visible wind turbine 3,028 m

Figure 13: Photomontage looking towards the Central precinct from a public viewpoint on Maryvale Road in the vicinity of Lot 75 DP754136





Uninvolved residential dwelling R50- Existing view north to east . Photo coordinate Easting:680717 Northlng:6161789 (MGAz55)



Uninvolved residential dwelling R50 - Proposed view through 120°. Approximate distance to closest visible wind turbine 1,661 m

Figure 14: Residence R50 photomontage looking towards turbines in the Intermediate precinct



Table 9: Visual Impact Assessment - Intermediate precinct

Residence	Distance to closest wind turbine (km)	RPRE's assessed impact	Department's assessed impact	Recommended mitigation strategy
R45	1.71	Low/Moderate	Moderate	Remove Intermediate precinct
R47	1.26	Moderate/High	High	Remove Intermediate precinct
R48	1.45	Moderate/High	High	Remove Intermediate precinct
R50	1.68	High	High	Remove Intermediate precinct
R53	1.63	Moderate/High	Moderate/High	Remove Intermediate precinct
R68	2.23	Moderate/High	High	Remove Intermediate precinct Micro-site the 330 kV transmission line
R83	2.07	Moderate	Moderate/High	Remove Intermediate precinct
R85	2.29	Moderate/High	Moderate/High	Remove Intermediate precinct
R86	2.68	Moderate/High	Moderate/High	Remove Intermediate precinct
R170	1.90	Low	Moderate	Remove Intermediate precinct
R324	1.91	Moderate/High	Moderate/High	Remove Intermediate precinct

Southern precinct

Table 10 summarises RPRE's assessment, the Department's consideration and recommendations for key non-associated residences with impacts primarily attributed to turbines in the Southern precinct.

The Department considers that the majority of non-associated residences with visual impacts primarily attributed to the Southern precinct would have low to moderate impacts, which could be mitigated with visual impact mitigation measures and has recommended conditions accordingly.

Residence	Distance to closest wind turbine (km)	RPRE's assessed impact	Department's assessed impact	Recommended mitigation strategy
R56	1.17	Moderate/High	Moderate/High	Visual agreement
R90	2.52	Low (Nil)	Moderate	Visual impact mitigation measures
R63	1.91	Low	Low/Moderate	Visual impact mitigation measures
R98	2.93	Low/Moderate	Low/Moderate	Visual impact mitigation measures
R100	2.85	Low	Low/Moderate	Visual impact mitigation measures
R101	2.20	Low	Low/Moderate	Visual impact mitigation measures
R102	2.44	Low/Moderate	Moderate	Micro-site the 330 kV transmission line Visual impact mitigation measures
R153	2.99	Low (Nil)	Low	Visual Impact mitigation measures
R315	2.18	Low	Low/Moderate	Visual impact mitigation measures

Table 10: Visual Impact Assessment – Southern precinct

However, there is one non-associated residence, R56, that both RPRE and the Department consider would have moderate/high visual impacts. Figure 15 provides an example of the predicted views of the project from this residence.

The Department considers that the moderate/high impact could be entirely avoided by not constructing Turbine No. 145, which could not otherwise be mitigated by visual screening given the nature of the topography in this location and the close proximity of this turbine (1.17 km). As such, the Department has recommended that RPRE should not be allowed to construct this turbine unless it is able to formalise an agreement with the landowner of residence R56 in regards to visual impacts.

Additional Visual Mitigation

The Department has also recommended that the landowner of any non-associated residence within 4 km of a wind turbine be entitled to request visual impact mitigation measures (such as landscaping and vegetation screening) to further minimise visual impacts. For residences located beyond 4 km from the nearest turbine, the Department is satisfied that it is unlikely that the wind turbines would dominate the landscape and/or have significant visual impacts.

Public Viewpoints

As there are no public lookouts in the area, public viewpoints would be limited to road users. The Department notes that the Hume Highway and Lachlan Valley Way are the only major roads near the project site with high volumes of traffic, and that any views of the project would be fleeting. Motorists on local unsealed roads, including Rye Park – Dalton Road, may experience views of the turbines where open views exist. However, given the largely transient nature of views from moving vehicles and the low traffic volumes on these roads, potential impacts on road users would not be significant.

Ancillary Infrastructure

In regards to the project's ancillary infrastructure (e.g. collection substations, connection substation, 330 kV transmission line and cabling), RPRE has sited this infrastructure to minimise its visual impacts by locating it in areas screened by local topography and vegetation, where possible.

As such, potential views of the ancillary infrastructure would be limited to road users and a small number of rural residences, mostly on either side of the proposed 330 kV transmission line. The proposed 330 kV transmission line follows the ridgeline generally in a north to south direction in proximity to the turbine locations, until it terminates at the proposed connection substation, located adjacent to Days Road at the project's southern end.

Figure 16 provides an example of the predicted view of the 330 kV transmission line from a public viewpoint located on Rye Park – Dalton Road, in the vicinity of non-associated residence R53.

RPRE's LVIA determined that the 330 kV transmission line would not have a significant visual impact on any non-associated residences due to the undulating nature of the local landform and distribution of tree cover along the transmission line's route.

The Department also undertook an assessment of the visual impact associated with the project's ancillary infrastructure noting that RPRE has sited the 330 kV transmission line infrastructure to minimise its visual impacts, where possible, including siting the transmission line as far as possible to the east of the brow of the ridgeline in the vicinity of residence R53.

While the 330 kV transmission line would be visible to a number of non-associated residences that would be located on either side of the it, the Department considers that the 330 kV transmission line would only have a moderate to high impact on two non-associated residences that would be located in close proximity to it.

The Department considers the predicted high visual impact on residence R68 is partially attributed to the 330 kV transmission line, which is proposed to be located 200 m to the west. While the Department's recommendation to remove the turbines in the Intermediate precinct would mitigate the impact on this residence from turbines, there would still be visual impacts on this residence from the 330 kV transmission line.

Additionally, the Department considers the predicted moderate visual impact on residence R102 is partially attributed to the 330 kV transmission line, which is proposed to be located 600 m to the west.

The Department considers the visual impacts from the 330 kV transmission line on residences R68 and R102 could be mitigated by micro-siting the relevant portion of the transmission line further to the west of its current alignment in the final design. It is important to note that this micro-siting would be limited due to biodiversity constraints in the area, notably the location of Golden Sun Moth (*Synemon plana*) habitat, which is further discussed in Section 5.3. The Department has also recommended conditions requiring RPRE to offer visual mitigation measures to the landowner of these residences.

With the micro-siting of the 330 kV transmission line, the Department considers the project's ancillary infrastructure is unlikely to have a significant visual impact given there are existing transmission lines and agricultural infrastructure in the area, the limited size of the infrastructure, the relatively low visual sensitivity of the existing land use, and RPRE's proposed landscape treatments and selection of ancillary infrastructure components with low visual contrast.



Uninvolved residential dwelling R56- Existing view west to north north east. Photo coordinate Easting:686542 Northing:6153137 (MGAz55)



Uninvolved residential dwelling R56- Proposed view through 120°. Approximate distance to closest visible wind turbine 1,166 m

Figure 15: Residence R56 photomontage looking towards Turbine No. 145 in the Southern precinct





Public view location PM8 Rye Park-Dalton Road. Existing view north north west to east. Photo coordinate Easting:680365 Northing:6159222 (MGAz55)



Public view location PM8 Rye Park-Dalton Road, Proposed view toward proposed wind turbines and 330 kV powerline,

Figure 16: Photomontage of 330 kV transmission line from a public viewpoint on Rye Park – Dalton Road

Other Visual Effects - Shadow Flicker and Blade Glint

Shadow flicker occurs when rotating blades momentarily block the sun's path. RPRE conducted a shadow flicker assessment having regard to the *Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria* (Department of Planning and Community Development, 2012), which recommends a maximum shadow flicker duration of 30 hours per year.

RPRE's assessment concluded that no non-associated residences would experience over 30 hours of shadow flicker per year. The Department has incorporated this limit in the recommended conditions.

Blade glint (reflection of sunlight off the turbine) could also have temporary effects at a given location, depending on the orientation of the blades and nacelle in relation to the sun. While there are no guidelines for blade glint, the 2012 Victorian guidelines recommend that blades are finished with a surface treatment of low reflectivity to ensure that glint is minimised.

The Department is satisfied that blade glint could be effectively managed through appropriate turbine treatments, such as the use of low sheen and matte finishes, to ensure negligible impacts, and has recommended a condition accordingly.

Obstacle Lighting

Under the National Airports Safeguarding Framework, Guideline D – Managing the Risk to Aviation Safety of Wind Turbine Installations (Wind Farms) / Wind Monitoring Towers, National Airports Safeguarding Advisory Group (NASAG), 2012 (NASAG guidelines) CASA is required to be notified if a proposed wind turbine or wind monitoring tower is greater than 150 m in height or infringes on the Obstacle Limitation Surfaces of an aerodrome. CASA may determine, and subsequently advise a proponent and relevant planning authorities, whether obstacle lighting is required.

If such lighting is required, the guidelines recommend that to minimise visual impacts "obstacle lights may be partially shielded, provided it does not compromise their operational effectiveness. Where obstacle lighting is provided, lights should operate at night, and at times of reduced visibility. All obstacle lights on a wind farm should be turned on simultaneously and off simultaneously."

RPRE undertook an assessment of the need to install obstacle lighting for the project, which concluded that it is not necessary as the project is not considered a hazard to aircraft safety. Nevertheless, RPRE's assessment did assess the potential visual impacts of obstacle lighting if it were required to be installed, and found that it would be unlikely to result in any significant increase in visual impacts beyond those already assessed for the project.

CASA agreed with RPRE's assessment that the project is not considered a hazard to aviation safety, as it is not located in the vicinity of any certified or registered aerodromes, and as such does not require obstacle lighting.

Notwithstanding, the Department has recommended conditions requiring RPRE to consult with CASA about this matter, and ensure that if obstacle lighting is required to be installed for any reason at a later date, it is installed in accordance with CASA requirements and in a manner that minimises any adverse visual impacts.

Conclusion

While the Department is satisfied that the project would not fundamentally change the broader landscape characteristics of the area, it considers that the turbines in the North Western and Intermediate precincts of the project would impact the visual amenity of Rye Park village, which is comprised of approximately 30 non-associated residences, and a relatively large number of surrounding non-associated residences.

The nature and extent of the visual impacts, combined with the potential cumulative impacts of the proposed Bango Wind Farm, would effectively transform the current rural character of the landscape in those areas. Accordingly, the Department considers that this draws into question the suitability of those portions of the project for a wind farm of this scale, and has recommended that the turbines in the North Western and the Intermediate precincts be removed.

In contrast to the turbines in the North Western and Intermediate precincts, the residual visual impacts of the turbines in the Northern, North Eastern, Central and Southern precincts are comparatively low, noting that RPRE has reached agreement with the most significantly impacted residences in proximity to the Northern precinct.

To minimise and manage the remaining residual visual and lighting impacts as far as practicable, the Department has recommended conditions requiring RPRE to:

- offer acquisition to the landowner of non-associated residence R38 linked to Turbine Nos. 62, 67, 71 76, 78 and 141, and the landowner of Lot 75 DP 754136 linked to Turbine Nos. 146, 147, 148 and 149;
- reach agreement with the landowner of non-associated residence R56, predicted to experience moderate/high visual impacts. If RPRE is not able to secure such an agreement, it would not be allowed to construct Turbine No. 145;
- offer visual impact mitigation measures, such as landscaping and/or vegetation screening, to all non-associated residences within 4 km of any approved wind turbine;
- implement all reasonable and feasible measures to minimise the impacts of the visual appearance of the development;
- implement all reasonable and feasible measures to minimise the off-site lighting impacts of the development; and
- ensure that shadow flicker associated with wind turbines does not exceed 30 hours per annum at any non-associated residence.

5.2 Noise

RPRE commissioned a number of noise impact assessments throughout the assessment period, including:

- Environmental Noise Assessment, SLR Consulting, August 2013;
- Environmental Noise Assessment, Sonus, February 2016; and
- Bango Wind Farm and Rye Park Wind Farm Cumulative Environmental Noise Assessment, Sonus, April 2016.

These assessments were all prepared in accordance with South Australia's *Environmental Noise Guidelines: Wind Farms (2003)* (SA Guidelines) which adopt criteria of 35 dBA or the ambient background noise plus 5 dBA, which is consistent with the current *NSW Wind Energy: Noise Assessment Bulletin.*

A number of public submissions raised concerns about potential adverse noise impacts from the project. As noted in Section 4.5, the submission from the Boorowa District Landscape Guardians included a peer review of RPRE's noise assessment by The Acoustic Group Pty Ltd. The Acoustic Group Pty Ltd's report primarily focused on the adequacy of the noise assessment against the requirements in the SA Guidelines.

As both the Department and the EPA are satisfied that assessment adequately addresses these requirements, the report did not raise any issues that would materially change the findings of the noise assessment.

Wind Turbines

Noise monitoring was undertaken from 8 June 2012 to 22 August 2012 at 20 locations to determine background noise levels.

Background noise levels were found to be relatively quiet, as expected for receivers in a rural environment isolated from other extraneous noise sources (e.g. traffic noise). The monitoring results were used to assign background noise levels for all receivers within 2 km of a proposed turbine (see Table 11).

The noise assessment modelled the Vestas V112 3MW model with an 80 m hub height to provide a representative noise impact. The predicted noise levels were found to be within the noise criteria established under the SA Guidelines, of background plus 5 dB for all integer wind speeds, at all non-associated residences (see Table 11).

Table 11: Comparison of	f predicted noise levels with noise criteria at non-associated residences
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	5		Pr	edicte	ed no	oise le	evel a	nd cr	iterio	n (dE	B(A)) a	at hul	b heig	ıht in	teger	wina	l spee	eds	
ė	id atic	6 m	ı/s	71	n/s	8	m/s	9	m/s	10	m/s	11	m/s	12	? <i>m/</i> s	13	3 <i>m/</i> s	14	m/s
Residenc	Backgroun monitoring loc	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction												
R01	R02	35	32	36	35	37	37	39	39	41	40	43	40	46	39	50	39	53	39
R06	R06	35	27	35	30	35	32	35	34	37	35	38	35	40	34	42	34	43	33
R07	R06	35	26	35	29	35	31	35	33	37	34	38	34	40	33	42	33	43	33
R08	R06	35	25	35	27	35	30	35	31	37	33	38	32	40	32	42	32	43	31
R09	R06	35	24	35	27	35	29	35	31	37	32	38	32	40	31	42	31	43	31
R10	R06	35	23	35	26	35	28	35	30	37	31	38	31	40	30	42	30	43	29
R11	R13	35	30	35	32	35	35	37	37	39	38	41	38	44	37	47	37	50	36
R17	R19	36	27	36	30	37	32	38	34	39	35	40	35	42	34	44	34	46	34
R19	R19	36	29	36	32	37	34	38	36	39	37	40	37	42	36	44	36	46	36
R20	R19	36	27	36	30	37	32	38	34	39	35	40	35	42	34	44	34	46	34
R22	R19	36	27	36	30	37	32	38	34	39	35	40	35	42	34	44	34	46	33
R26	R25	35	26	35	29	35	31	35	33	35	34	35	34	35	33	37	33	40	33
R29	R25	35	26	35	28	35	31	35	32	35	34	35	33	35	32	37	32	40	32
R38	R36	35	27	35	30	35	32	35	34	35	35	35	35	35	34	35	34	38	34
R40	R44	35	23	35	26	35	28	35	30	35	31	37	31	40	30	42	30	45	30
R45	R46	35	28	35	30	35	33	35	35	37	36	40	36	42	35	46	35	49	34
R47	R49	35	28	35	31	35	33	35	35	36	36	38	36	40	35	41	35	43	35
R48	R49	35	26	35	29	35	31	35	33	36	34	38	34	40	33	41	33	43	33
R50	R51	35	27	35	30	35	32	35	34	37	35	39	35	41	34	43	34	45	34
R53	R51	35	25	35	28	35	30	35	32	37	33	39	33	41	32	43	32	45	31
R56	R56	35	29	35	31	35	34	36	35	38	37	40	36	41	36	43	36	45	35
R63	R60	37	24	38	26	39	29	41	30	42	32	44	31	45	30	47	30	47	30
R65	R44	35	27	35	30	35	32	35	34	35	35	37	35	40	34	42	34	45	34
R170	R46	35	24	35	26	35	28	35	31	35	33	37	34	40	33	42	33	46	33
R324	R51	35	25	35	27	35	30	35	32	37	33	39	33	41	32	43	32	45	31

The Department's experience is that compliance with noise criteria can be achieved at 1.2 to 1.5 km. As the project has been designed with the nearest non-associated residence (R19) located 1.61 km from the nearest turbine, the results of the modelling are consistent with the Department's expectations about noise impacts.

Both the EPA and the Department are satisfied that both the noise criteria and the predicted noise levels have been correctly calculated for the project, and the EPA has indicated that it would be able to issue an EPL for the project subject to appropriate noise limits.

As stated previously, RPRE also undertook a cumulative noise assessment for the project, taking into account the proposed Bango Wind Farm. This noise assessment modelled the Vestas V112 3MW model with an 80 m hub height for the Rye Park Wind Farm, and the GE 3.4-130 model with an 120 m hub height for the Bango Wind Farm.

The assessment took a conservative approach (resulting in a potential overestimate of cumulative noise levels), and predicted the noise levels based on the highest sound power level produced by the modelled turbines for each project. This assumes that a residence located between the two projects would be downwind from both projects at the same time, which would be highly unlikely to occur in reality. The conservative cumulative effect is determined based on how much the noise from one project increases the predicted noise from the other project, and vice versa.

If the noise from one project is at the limit of 35 dB(A), then the second project would need to contribute 25 dB(A) or more to increase the predicted noise from that project. Based on this assumption, the cumulative noise assessment produced a 35 dB(A) and 25 dB(A) noise contour for both the Rye Park and Bango Wind Farms.

The cumulative noise assessment predicted that the 25 dB(A) contour for the Bango Wind Farm would not cross the 35 dB(A) contour for the Rye Park Wind Farm, and as such, concluded that the predicted noise levels for the project would not be influenced by the predicted noise from the proposed Bango Wind Farm.

The Department is satisfied that the noise generated by the project would be able to comfortably comply with the applicable operational noise criteria at all non-associated residences, both on its own and taking into account any cumulative impacts from the proposed Bango Wind Farm.

The Department notes that the final noise assessment predictions, and ultimately the noise generated by operation of the project, would be subject to the final turbine selection and layout. Should RPRE select more efficient wind turbines than those modelled in the EA, this would further reduce the typical noise levels generated by the wind turbines. RPRE has proposed to verify the EA noise assessment predictions following selection of the final wind turbine model and final layout design.

In order to protect the amenity of surrounding residents, the Department has recommended conditions requiring RPRE to:

- comply with noise limits at non-associated residences surrounding the project for noise generated by the operation of both the wind turbines and ancillary infrastructure;
- comply with a range of standard noise conditions, including implementing all reasonable and feasible measures to minimise the noise impacts of the project; and
- undertake noise monitoring following commencement of operation of the wind turbines to determine compliance with the noise limits.

Low Frequency Noise

Potential health impacts from low frequency noise (noise in the frequency range below 200 Hz) and infrasound (a subset of low frequency noise in the frequency range below 20 Hz) were identified as concerns in a number of community submissions.

The noise assessments indicate that the aerodynamic noise from a wind turbine is not dominant in the low frequency range and is generally in the mid-frequency (200 Hz to 1,000 Hz) and predict that low frequency noise from the project would be no greater than 50 dB(C) at all non-associated residences.

By way of comparison, this level is well below the low frequency noise limits considered acceptable in the Department's *Wind Energy Framework (2016)*, which recommend a more detailed low-frequency noise assessment if measured noise levels are repeatedly greater than 65dB(C) during the daytime or 60dB(C) during the night time.

Notwithstanding, to ensure surrounding residents are protected from any potential impact from low frequency noise, the Department has recommended conditions such that if the presence of excessive low frequency noise from the wind farm is repeatedly greater than 65 dB(C) during the daytime or 60 dB(C) during the night time (for more than 10% of the 24 hour assessment period) at any relevant receiver, a 5 dB(A) penalty would be added to the measured noise level for the project.

The EPA has advised the Department that it is satisfied with this approach.

In regards to infrasound, the Department acknowledges the community's concern regarding potential health effects from wind farms. However, the Department is guided by the literature reviews undertaken by the NHMRC that uses a robust evidence-based approach, supported by NSW Health, regarding human health effects from wind farms.

In 2015, the NHMRC concluded that, "there is no direct evidence that exposure to wind farm noise affects physical or mental health". More specifically, they stated that, "while exposure to environmental noise is associated with health effects, these effects occur at much higher levels of noise than are likely to be perceived by people living in close proximity to wind farms in Australia".

The Department will continue to monitor contemporary scientific research outcomes to ensure its position reflects robust evidence on any health effects, including any advice releases from the National Wind Farm Commissioner and the Independent Scientific Committee.

Further, the Department notes that the noise assessment found the project would not generate excessive levels of low frequency noise or infrasound, and consequently considers the health risks of the project to be negligible.

Construction Noise and Vibration

The noise assessment indicates that construction noise associated with the project would be well below the 'highly noise affected' criterion (i.e. 75 dBA) in the EPA's *Interim Construction Noise Guideline (2009)* for all non-associated residences for construction activities during standard hours (i.e. 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday).

Up to 22 non-associated residences may be subject to temporary noise between 6 to 12 dBA above the 'noise affected criterion' (i.e. 40 dBA) primarily during the construction of turbine foundations, but this exceedance would be temporary (one to two weeks) and be confined to the daytime only.

Two concrete batching plants are proposed (see Figures 2 and 3). The closest non-associated residence (R11) is located approximately 1.2 km from the nearest concrete batching plant. The predicted noise levels were found to comply with the applicable criteria at all non-associated residences for the concrete batching plants.

RPRE has committed to implementing a number of standard measures to minimise construction noise from the project (including fixed noise sources such as the rock crushing and concrete batching plants), which may include construction of temporary acoustic barriers and use of proprietary enclosures around machines.

Notwithstanding, the Department has recommended conditions requiring RPRE to implement all reasonable and feasible measures to minimise construction noise in accordance with the best practice requirements outlined in the EPA's *Interim Construction Noise Guideline (2009)*, or its latest version. Examples of reasonable and feasible measures could include the construction of temporary acoustic barriers, the use of proprietary enclosures around machines, the use of silencers, the substitution of alternative construction processes and the fitting of broadband reversing signals.

As such, the Department considers that the proposed construction activities are unlikely to result in significant adverse impacts during daytime hours and has recommended conditions restricting construction works to standard hours (i.e. 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday) with no work on Sundays or NSW public holidays.

However, the Department acknowledges that there may be some instances where construction activities may be required to be undertaken outside of these hours (such as emergency works or other works that are inaudible at any non-associated residence) and has recommended conditions allowing for these activities to be undertaken in accordance with these pre-conditions.

Importantly, construction noise would also be regulated by the EPA under the EPL for the project, and the EPA has recommended a number of conditions to manage construction noise impacts from the project, which the Department has incorporated into the recommended conditions.

The noise assessments also considered vibration impacts from construction with reference to *Assessing Vibration: A Technical Guideline* (DECC, 2006). The assessments found that typically the distances required to achieve the construction vibration criteria provided in the Guideline between the source of vibration and the receiver are in the order of 20 m to 100 m. The assessment noted that vibration from construction activities was unlikely to be detectable to humans at a distance of 100 m.

Given the proposed construction activities would be well over 100 m from the closest residence (i.e. associated residence R2, located 615 m away) the noise assessment concluded that the project construction activities would comply with the relevant construction vibration criteria.

Notwithstanding, the Department has recommended conditions requiring RPRE to implement best management practice to minimise construction vibration generated by the project.

Traffic Noise

Potential traffic noise impacts from increased project-related traffic were assessed against the *Environmental Criteria for Road Traffic Noise*².

The predicted construction traffic noise levels indicate that at some residences the increase in traffic noise is greater than 2 dB, however, the predicted levels would comply with the criteria of 55 dBA at a typical setback distance of 50 m.

A handful of non-associated residences located in Boorowa, Rye Park village, Jerrawa and along Lachlan Valley Way and Boorowa Rye Park Road, are located less than 50 m from the roadside. As such, they would be subject to construction traffic noise levels above the criterion of 55 dBA.

The EPA acknowledged that any traffic noise impacts would be generally limited to the construction period and occur principally during the daytime, and is therefore satisfied that these impacts could be adequately managed through the implementation of measures contained in the *Interim Construction Noise Guidelines* (DECCW, 2009).

In accordance with the general principles of dealing with temporary construction noise impacts, RPRE proposes to apply a range of mitigation measures to reduce construction-related traffic noise including scheduling of construction traffic deliveries, vehicle maintenance, restricting construction traffic to daytime operation hours and notification of local residences in the event of night-time deliveries.

The Department is satisfied that RPRE's proposed mitigation measures would be sufficient to minimise traffic noise impacts from the project. Notwithstanding, the Department has recommended conditions requiring RPRE to implement best management practice to minimise road traffic noise as part of a Traffic Management Plan for the project.

Ancillary Infrastructure

The noise assessments also considered potential noise generation from the proposed substations and the overhead 330 kV transmission line.

The predicted levels indicate that the noise generated by the substations would be well below the *NSW Industrial Noise Policy* intrusiveness criteria at all non-associated residences, and would most likely be inaudible at all non-associated residences at all times.

In regards to transmission lines, corona noise (conductor induced noise under wet conditions) and aeolian noise (vortex shedding from the lines under specific wind conditions) are typically only an issue for transmission lines rated 345 kV and above. Given the proposed transmission line is below this voltage and the nearest residence (R68) is approximately 200 m from the proposed 330 kV transmission line alignment, the Department accepts that any noise impacts would be negligible. Notwithstanding, RPRE has committed to incorporating standard noise control measures into the design of the transmission line.

² This policy has since been replaced by the NSW *Road Noise Policy*.

5.3 Biodiversity

The project site and surrounds is characterised by cleared farmland mostly derived from Box Gum Woodland on the lower slopes and flats with Inland Scribbly Gum Dry Forest vegetation on the steeper sheltered slopes. Remnant stands of the original vegetation remain as paddock trees or larger scattered patches of woodland along roadsides and on the lower slopes of the ridges, with more extensive forested areas on the ridge tops.

As such, the site includes habitat for some threatened species and EEC, which would potentially be impacted by the project through direct habitat loss because of the clearing of vegetation, and bird and bat strike during operation of the wind turbines.

RPRE has undertaken a number of ecological assessments to assess the project's biodiversity impacts, including:

- Biodiversity Assessment, NGH Environmental, January 2014;
- Habitat Assessment for the Striped Legless Lizard and Golden Sun Moth, NGH Environmental, September 2014;
- Targeted Surveys for the Crimson Spider Orchid, NGH Environmental, February 2015;
- Biodiversity Assessment Addendum, NGH Environmental, December 2015; and
- Biodiversity Offset Strategy, NGH Environmental, December 2015.

Both OEH and Departmental representatives visited the site on a number of occasions to validate the findings of these assessments.

RPRE has also undertaken field validation of additional infrastructure areas and a hollow bearing tree survey and assessment, which are attachments to the Biodiversity Assessment Addendum prepared by NGH Environmental in December 2015.

The assessments undertaken following the original Biodiversity Assessment prepared by NGH Environmental in January 2014 were undertaken in response to concerns raised by OEH about the potential adverse impacts on the Superb Parrot (*Polytelis swainsonii*), Golden Sun Moth ((*Synemon plana*), Striped Legless Lizard (*Delma impar*), Box Gum Woodland EEC, hollow-bearing trees and remnant roadside vegetation located along the proposed over-dimensional and heavy vehicle transport route.

The NSW Government's policies in relation to biodiversity impact assessment and offsetting have changed during the assessment of this project, including changes to the classification of native vegetation condition and the introduction of new procedures. RPRE's most recent assessment reflects these changes and the estimated offset credit requirements have been calculated in accordance with the NSW Biodiversity Offsets Policy for Major Projects using the Framework for Biodiversity Assessment (FBA) credit calculator.

A number of public submissions raised concerns about potential adverse impacts on biodiversity from the project. As noted in Section 4.5, the submission from the Boorowa District Landscape Guardians included a peer review of RPRE's biodiversity assessment by Australian Wildlife Services (AWS). The AWS report primarily focused on the adequacy of the assessment in regards to its assessment of the impacts on koalas and their habitat. While OEH raised concerns about the biodiversity impacts of the project, both OEH and the Department are satisfied that the assessment adequately addresses the requirements of the *NSW Biodiversity Offsets Policy for Major Projects*. As such, the AWS report did not raise any issues that would materially change the findings of the biodiversity assessment.

Avoidance and Mitigation

The ecological assessments are based on a number of measures to avoid and/or mitigate impacts, including:

- designing the project (including the over-dimensional and heavy vehicle transport routes) to avoid disturbance of EECs, threatened species and woodland areas, including roadside vegetation, as far as practicable;
- committing to undertake micro-siting of wind turbines during the detailed design stage of the project to further avoid impacts on ecological resources and ecologically sensitive areas, as far as practicable; and
- locating ancillary infrastructure outside of ecologically sensitive areas, where practicable.

Based on the findings of the ecological assessments and concerns raised by OEH, RPRE revised the project layout, revised the over-dimensional and heavy vehicle transport routes, rationalised the site access points and identified a development corridor to minimise the environmental impacts of the project, including biodiversity. Refer to Figures 2 and 3 for the location of the development corridor. The revised over-dimensional and heavy vehicle transport route is discussed further in Section 5.4.

Vegetation Community Impacts

With the removal of the turbines in the North Western and Intermediate precincts, the disturbance area of the project would be reduced to 254 ha, including 50.2 ha of Box Gum Woodland. Table 12 provides a summary of the estimated calculated impact area for the project, by infrastructure type.

Infrastructure	Quantity	Width (m)	Length (m)	Impact (ha)
Turbine footing	84	20	20	3.4
Crane hardstand	84	25	45	9.5
New access tracks (permanent formed width)	-	12	103,400	113.2
Existing access tracks (widening)	-	2	15,390	3.0
New access tracks for transmission connectivity (33 kV)	-	4	5,681	2.2
New access tracks for transmission connectivity (330 kV)	-	4	18,610	6.3
Underground reticulation (outside of access tracks)	-	12	5,227	5.8
Transmission power lines (33 kV)	-	30	694	2.0
Transmission power lines (330 kV)	-	60	12,510	73.0
Connection substation (330 kV)	1	200	200	4.0
Collection substations (22 kV or 33 kV/330 kV)	3	100	100	3.0
Operational and maintenance facilities	2	100	100	2.0
Concrete batch plant	2	100	100	2.0
Construction compound	3	-	-	23.6
Total				254

Table 12: Impacts of the project

Figure 17 provides a map of the vegetation type and condition across the whole project site and Table 13 provides a summary of the estimated impacts of the project on each vegetation type.

Table 1	3: Vege	etation co	ommunity	impacts
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Veretetion ture	Conservation	n Significance ³	Impost (ba)
vegetation type	TSC Act ⁴	EPBC Act ⁵	impact (na)
Acacia scrub	-	-	1.3
Argyle Apple Forest	-	-	0.4
Box Gum Woodland	EEC	CEEC	24.9
Box Gum Woodland Derived Grassland	EEC	CEEC	25.3
Brittle Gum Forest	-	-	2.8
Scribbly Gum Forest	-	-	84.5
Sifton Bush Shrubland	-	-	28.8
Native Pasture	-	-	70.0
Planted Native Vegetation	-	-	0.2
Exotic	-	-	15.8
Total EEC			50.2
Total			254

The calculated impact area for the project includes roadside vegetation that would be required to be removed to facilitate the transport of over-dimensional and heavy vehicles to the project site via site access point 4 on Flakney Creek Road (see Section 5.4 and Figure 19). RPRE has indicated that this site access point is required to access the ancillary infrastructure in the Central and Intermediate precincts of the project (including the 330 kV transmission line) and cannot be avoided. The remainder of the over-dimensional and heavy vehicle transport routes are along wide roads with sufficient vegetation clearance, and would only require minor lopping of over-hanging vegetation branches.

³ EEC – Endangered Ecological Community; CEEC – Critically Endangered Ecological Community

⁴ TSC Act – NSW Threatened Species Conservation Act 1995

⁵ EPBC Act – Commonwealth Environment Protection Biodiversity Conservation Act 1999



Figure 17: Vegetation type across project site and potential offset site



Flora Impacts

Three (3) threatened flora species listed under the TSC Act have the potential to be present at the project site based on potential or known habitat and the results of online database searches. These threatened species and their conservation significance are listed in Table **14**.

Table 14: Threatened flora	species with	potential to occur	on the project site
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Species	Conservation Significance TSC Act
Yass Daisy (Ammobium craspedioides)	Vulnerable
Tarengo Leek Orchid (Prasophyllum petilum) Endangered
Crimson Spider Orchid (Caladenia concolor)	Endangered

Targeted surveys were undertaken as part of the ecological assessments to confirm the presence of the three threatened species on the project site. No threatened flora species were recorded during the surveys.

However, the surveys identified three areas within the project site where there is potential for the Crimson Spider Orchid to occur. The biodiversity assessment recommended that repeat surveys be conducted in these three areas in late September to early October prior to the commencement of construction to confirm the assumption that the Crimson Spider Orchid is unlikely to be impacted by the project.

The biodiversity assessment includes tests of significance for all of the species listed in Table 15, as well as Box Gum Woodland EEC, against the criteria in Section 5A of the EP&A Act and the NSW *Threatened Species Assessment Guidelines: The Assessment of Significance*. The tests of significance concluded that the project is unlikely to result in any significant impacts on the abundance, range and distribution of the EEC and other threatened species.

Notwithstanding, the impacts on Box Gum Woodland EEC would need to be offset in accordance with the FBA (see below).

Fauna Impacts

The project has the potential to impact fauna in a number of ways, particularly through direct habitat loss because of the clearing of vegetation, and bird and bat strike during operation of the wind turbines.

Fourty-two (42) threatened or migratory fauna species listed under either the TSC Act or *Fisheries Management Act 1994* (FM Act) have the potential to be present at the project site based on available habitat, known ecological requirements, local distribution records and the results of online database searches.

This includes the following two species, which were identified as occurring within or in close proximity to the project site following the submission of the EA:

- Southern Pygmy Perch (*Nannoperca australis*), a fish species listed as endangered under the FM Act known to occur within Blakney Creek and Pudman Creek; and
- Yellow-spotted Tree Frog (*Litoria castanea*), an amphibian species listed as critically endangered under the TSC Act known to occur within Blakney Creek.

Targeted surveys were undertaken as part of the ecological assessments to confirm the presence of the 42 threatened species on the project site.

The surveys identified that only potential habitat for three threatened species would be directly impacted by the project. These species, their conservation significance and the area of potential habitat are listed in Table 15.

Species	Conservation Significance TSC Act	Impacts on habitat (ha)
Golden Sun Moth (Synemon plana)	Endangered	66.94
Striped Legless Lizard (Delma impar)	Vulnerable	39.04
Superb Parrot (Polytelis swainsonii)	Vulnerable	10.20

Table 15: Threatened fauna species impacts

While potential habitat for the Southern Pygmy Perch and Yellow-spotted Tree Frog would not be directly impacted by the project, the main risks are from indirect impacts on their habitat as a result of construction in and adjacent to the waterways in which they are known to occur, which could result in sedimentation or pollution downstream. In particular, the project transport route involves:

- one proposed creek crossing of Blakney Creek;
- two proposed creek crossings of Urumwalla Creek, a tributary of Blakney Creek; and
- a number of proposed creek crossings of tributaries of Pudman Creek.

RPRE has committed to consulting with DPI with regard to the design of these creek crossings, obtaining any necessary permits required under the FM Act to undertake works within these waterways, and implementing strict erosion, sedimentation and spill containment controls to prevent the pollution of these and all waterways in the vicinity of the project site.

In addition, the ecological assessments identified that a large number of hollow-bearing trees occur within the study area, with 893 within the project disturbance area. Tree hollows are used for shelter and as breeding sites for a wide range of fauna species, including gliders, owls, birds and bats.

RPRE has proposed to avoid siting the wind turbines and other infrastructure in proximity to hollow-bearing trees as far as practicable during micro-siting (i.e. detailed design) of the project. The impacts of clearing hollow-bearing trees and associated threatened species habitat would be offset, as described below.

Biodiversity Offset

The FBA does not require offsets for vegetation that is not identified as an EEC unless it contains threatened species habitat. As such, offsets are not required for the impacts on Acacia Scrub, Argyle Apple Forest, Brittle Gum Forest, Native Pasture, Sifton Bush Shrubland, Planted Native Vegetation and Exotic Vegetation, as quantified in Table 13.

Scribbly Gum Forest is identified as containing habitat for a number of threatened woodland bird species, and as such, requires an offset in accordance with the FBA.

While RPRE has not proposed specific land-based offsets for the project, it has identified 7 potential offset sites within or adjacent to the project area to demonstrate that it can meet the estimated credit requirements to compensate for the loss of native vegetation and habitat to be cleared for the entire project (including the turbines in the North Western and Intermediate precincts).

The potential offset sites identified by RPRE are shown on Figure 16 and comprise a total of 1,419.7 ha.

Table 16 summarises the estimated biodiversity credit and offset requirements under the FBA for the project as a whole and the areas of land available in the 7 potential offset sites.

EEC/species	Credits required	Area of land required (ha)	Area of land available in potential offset sites (ha)
Box Gum Woodland	3,043	327.2	520.8
Scribbly Gum Forest	6,686	718.9	738.3
Golden Sun Moth habitat	5,154	1,116	564.9
Striped Legless Lizard habitat	390	163	397.2
Superb Parrot habitat	184	170	564.9

Table 16: Summary of biodiversity offset requirements

Both OEH and the Department are satisfied that the offset credit requirements have been correctly calculated using the FBA, noting that these credits would need to be re-calculated once the final layout design of the project is known in order to confirm the final number and class of biodiversity credits to be retired.

The Department notes that with the removal of the North Western and Intermediate precincts, and with further avoidance measures during detailed design, the number and class of credits that would need to be retired is likely to be less that the worst-case calculations presented in Table 16.

Nonetheless, RPRE has undertaken an assessment of the ability for the potential offset sites to meet the estimated credit requirements for the entire project in accordance with the NSW Biodiversity Offsets Policy for Major Projects (see Table 16).

Rye Park Wind Farm

Except for Golden Sun Moth habitat, this assessment shows that the proposed offset sites would comfortably meet the offsetting requirements of OEH's policy, including providing 4,384 hollow-bearing trees.

The shortfall in Golden Sun Moth credits would require an additional 551.1 ha of suitable habitat to be secured. To address this shortfall, RPRE has committed to undertaking further surveys and is confident that suitable offset sites are available either within the project site boundaries or on land immediately adjacent to the site owned by associated landowners.

Even if this is not the case, the Department considers that suitable Golden Sun Moth offset sites are available in the region. This is based on the fact there are a number of species records within the region, and one of the key management sites established by OEH for the Golden Sun Moth as part of its *Saving Our Species* program is located directly to the west of the project site in the Hilltops and Upper Lachlan Council LGAs. This management site is for the most part located on private land and is over 140,000 ha in area, and even a small portion of this land would provide a suitable offset for the project.

Given the above, the Department considers that the majority of credits would be able to be successfully retired using land within or adjacent to the project area, with sufficient land in the region to retire any shortfall of required species credits for the Golden Sun Moth.

The Department also notes that *NSW Biodiversity Offsets Policy for Major Projects* allows for the retirement of biodiversity offset credits to be achieved by a number of mechanisms (not just through land-based offsets), namely:

- acquiring or retiring credits under the biobanking scheme in the TSC Act;
- making payments into an offset fund that has been developed by the NSW Government; or
- providing supplementary measures.

The Department has therefore not locked in the potential land-based offsets identified by RPRE, but has recommended conditions requiring RPRE to:

- confirm the number and class of biodiversity credits required to be retired prior to the commencement of construction; and
- retire the required biodiversity offset credits in accordance with the NSW Biodiversity Offsets Policy for Major Projects within 2 years of the commencement of construction.

This approach also provides an incentive to RPRE to avoid and minimise impacts on biodiversity values through the detailed design process to limit the offset liability for the project.

With the retirement of the required biodiversity offset credits, both the Department and OEH are satisfied that the project could be undertaken in a manner that improves or at least maintains the biodiversity values of the locality over the medium to long term.

Bird and Bat Strike

To assess potential bird and bat strike impacts, the ecological assessment includes a risk assessment, which involved bird utilisation surveys, to identify which species would be most at risk of blade strike. The risk assessment factored in conservation status, flight character, distribution across the project site, and if the species is migratory. Those species that would be at risk of strike are provided in Table 17.

'At risk' flight heights (i.e. within the rotor swept area) were identified as being between 27 m and 157 m AHD. The majority of the species listed in Table 17 were observed flying within the tree canopy or below 20 m on most occasions.

Notwithstanding, the EA predicted that mortality rates would likely be 0.71 birds and 0.55 bats per turbine per year (or approximately 77 bird strikes and 60 bat strikes per year for the 109 wind turbines proposed for the project).

The Department notes that monitoring data from operational wind farms in the Southern Tablelands⁶ indicates that mortality rates vary widely, ranging from about 0.1 to 2.0 bird/bat strikes per turbine per year, and averaging approximately 1.0 bird/bat strikes per turbine per year. This monitoring data also indicates that the vast majority of affected species are commonly occurring, with only around 5% of mortalities comprising threatened species.

⁶ Including the Gullen Range, Capital 1 and Woodlawn Wind Farms.

Whilst caution should be adopted in applying monitoring data from one site or region to another site or region (as evidenced by the wide range in mortality rates identified in monitoring data), the Department accepts that RPRE's estimate of bird and bat strike is consistent with data from other wind farms in the region.

Table 17: Bird and bat species considered at risk of blade strik

Species	Conservation Significance	
	TSC Act	EPBC Act
Bird		
Barking Owl (Ninox connivens)	Vulnerable	-
Painted Honeyeater (Grantiella picta)	Vulnerable	Vulnerable
Powerful Owl (Ninox strenua)	Vulnerable	-
Regent Honeyeater (Anthochaera phrygia)	Critically Endangered	Critically Endangered
Superb Parrot (Polytelis swainsonii)	Vulnerable	Vulnerable
Swift Parrot (Lathamus discolor)	Endangered	Critically Endangered
White-throated Needletail (Hirundapus caudacutus)	-	-
Australian Magpie (Cracticus tibicen)	-	-
Australian Raven (Corvus coronides)	-	-
Crimson Rosella (Platycercus elegans)	-	-
Eastern Spinebill (Acanthorhynchus tenuirostris)	-	-
Galah (Eolophus roseicapilla)	-	-
Noisy Friarbird (Philemon corniculatus)	-	-
Pied Currawong (Strepera graculina)	-	-
Rainbow Bee-eater (Merops ornatus)	-	-
Bat		
Eastern Bentwing Bat (Miniopterus schreibersii oceanensis)	Vulnerable	-
Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris)	Vulnerable	-
White-striped Freetail Bat (Tadarida australis)	-	-
Gould's Wattled Bat (Chalinolobus gouldii)	-	-

RPRE is proposing a number of mitigation measures to avoid or minimise bird and bat strike, including:

- avoiding the installation of obstacle lighting (which attract insects and bats that feed on them) and/or selecting lighting that minimises the attraction of insects;
- intensive carcass searching;
- increasing the cut-in speed of turbines;
- shutting down turbines during certain times of year; and
- preparing and implementing a Bird and Bat Monitoring Program.

The Department considers that RPRE has provided a suitably robust assessment of the potential risks of the project on bird and bat species from blade strike, and recognises that management techniques would assist in reducing impacts.

To ensure the potential impacts are appropriately monitored, minimised and managed, the Department has recommended conditions requiring RPRE to:

- collect at least 12 months' worth of baseline data on threatened and 'at risk' bird and bat species and populations in the locality that could be affected by the project;
- describe the measures that would be implemented on site to minimise bird and bat strike during operation of the development;
- establish trigger levels for further investigation of the potential impacts of the project on particular bird or bat species or populations; and
- implement an adaptive management program to reduce mortality and enhance local species and populations in the locality.

With the implementation of these measures, the Department considers that the project would not pose a significant or unacceptable risk to bird and bat species or populations from blade strike.

Conclusion

The project site includes habitat for some threatened species and EEC, which would be impacted by the project. The Department is satisfied that despite this disturbance, the project would not result in any significant impacts on threatened species or EECs, and would not pose a significant or unacceptable level of risk to bird and bat species or populations in the vicinity of the proposed turbines.

Rye Park Wind Farm

The Department is satisfied that RPRE has designed the project to minimise impacts on these biodiversity values, and impacts would be able to be further minimised through micro-siting during the detailed design stage of the project, and through a range of mitigation and offsetting measures.

In this regard, the Department has recommended conditions requiring RPRE to:

- ensure that no more than 50.2 ha of Box Gum Woodland EEC, including Box Gum Woodland derived grassland, is cleared for the development;
- minimise the impacts to the Crimson Spider Orchid, Southern Pygmy Perch, Golden Sun Moth and Superb Parrot;
- minimise the impacts on hollow-bearing trees, termite mounds, and threatened bird and bat species;
- if micro-siting turbines, ensure that the revised location of the turbine is at least 50 m from existing hollow-bearing trees, or where the proposed turbine location is already within 50 m of existing hollowbearing trees, the revised location of the turbine is not moved any closer to the existing hollow-bearing trees;
- prepare and implement a detailed Biodiversity Management Plan and a Bird and Bat Adaptive Management Plan; and
- confirm the number and class of biodiversity credits required to be retired prior to the commencement of construction, and retire the applicable biodiversity offset credits in accordance with the NSW Biodiversity Offsets Policy for Major Projects within 2 years of the commencement of construction.

With the implementation of all of these measures, both the Department and OEH are satisfied that the project could be undertaken in a manner that improves or at least maintains the biodiversity values of the locality over the medium to long term.

5.4 Traffic and Transport

Introduction

The key traffic and transport related impacts of the project relate to the construction phase of the development due to the volume of traffic likely to be generated and the size of the components that need to be transported to the site.

Construction of the project involves the delivery of plant, equipment and materials including the movement of over-dimensional and heavy vehicles, which has the potential to impact on the local and regional traffic network.

In response to a number of submissions received from the local community and the Councils regarding the transport route proposed in the EA, RPRE revised the proposed over-dimensional and heavy vehicle transport route to avoid passing through the outskirts of Yass, Cooks Hill Road and most of Blakney Creek Road.

RPRE undertook a Traffic and Transport Assessment of the revised transport route with input from Cardno in April 2016, which it included in its RTS.

Following exhibition of the RTS, RPRE further revised the proposed over-dimensional and heavy vehicle transport route in response to a number of concerns raised by the local community, the Councils and OEH to avoid Banks Street, Cemetery Drive, Cook Streets, Dirthole Creek Road, High Rock Road and Lagoon Creek Road. The final proposed over-dimensional and heavy vehicle transport route is shown in Figures 18 and 19.

Transport Routes and Road Upgrades

It is likely that the infrastructure components required for the project would be manufactured overseas and delivered to Port Kembla. They would be transported to the project site from Port Kembla via the State road network as shown on Figure 18.

If infrastructure components are manufactured in Australia, they would be delivered via a similar route, depending on the manufacturing site location and their dimensions.

Once near Yass on the Hume Highway, the over-dimensional and heavy vehicle transport route separates into two alternative routes, one for the southern portion of the project site and one for the northern portion of the project site, as shown on Figure 19.

Rye Park Wind Farm

The southern portion of the project site would be accessed by over-dimensional and heavy vehicle traffic off the Hume Highway east of Yass via Jerrawa Road, Coolalie Road and Bush's Road. The northern portion of the project site would be accessed off the Hume Highway west of Yass via Lachlan Valley Way and Boorowa. Once off Lachlan Valley Way in Boorowa, the over-dimensional and heavy vehicle route enters the local Council road network and heads east towards Rye Park village on Boorowa Rye Park Road.

RPRE originally proposed 13 site access points for the project, but those have been rationalised down to 8 as shown on Figure 19. The on-site access tracks would traverse associated residences properties and provide access to various parts of the site.

Light vehicle traffic associated with the construction of the project would likely travel to the project site from Yass via Cooks Hill Road. The state of Cooks Hill Road varies across its length, however, portions of it are unsealed, are in poor condition and would be need to be upgraded to cater for the increased volume of light vehicle traffic associated with the project.

The road upgrades required along the local road network to facilitate both the over-dimensional and heavy vehicles and the increased volume of light vehicle traffic on Cooks Hill Road associated with the construction of the project are summarised in Table 18.

Both the Department and RPRE have undertaken extensive consultation with the local Councils on the proposed transport routes and road upgrades throughout the assessment of the project.

RPRE has agreed to upgrade specific road sections as listed in Table 18 to the satisfaction of RMS and the Councils, and in accordance with a detailed Traffic Management Plan, to the following design standards:

- where unsealed roads are to be sealed, they would be upgraded with a 200 mm road base topped with double spray seal to 7 m, within a 8.5 formation width; and
- where unsealed roads are to remain unsealed, they would be widened to a minimum of 6 m, maximum of 8 m, with 100 mm of pavement on the existing sheeted road.

All of the Councils and RMS have confirmed that they are satisfied with the proposed design standards and road upgrades.

Traffic Impacts

Construction related traffic impacts would be limited to the construction period of 18 months, including a shorter period of transport using over-dimensional vehicles (worst-case delivery period up to nine months).

The transport assessment identified the over-dimensional and heavy vehicle transport requirements, including the vehicle type and the number that would be required to transport all wind turbine and infrastructure components to the project site. The estimated over-dimensional and vehicle transport movements during construction are shown in Table 19.

The volume of construction traffic would be spread over the construction period, but on a daily basis the frequency of vehicle movements would vary depending on the construction activities occurring at the time. Deliveries of long loads, such as the wind turbines blades, may involve up to 6 over-dimensional vehicles per day. Pouring concrete for a turbine foundation would involve around 50 one-way truck movements per day.

RPRE gave an estimate of predicted daily traffic volumes, based on the estimates provided in Table 19 and an 18 month construction period with 22 working days per month. These include:

- 152 one-way heavy vehicle trips per working day; and
- 400 one-way light vehicle trips per working day.

Based in this traffic generation, the transport assessment concluded that the level of service along the road networks (including intersections) would only change marginally with the contribution of a conservative estimate of the (maximum peak) project-generated construction traffic.

As such, the increased traffic generated by the project is not expected to create significant impacts on the capacity of the road network or the performance of intersections, with consideration for the limited duration and volume of the traffic generated by the project. Of greater significance, however, is the potential impact of over-dimensional vehicles on the road network.



Figure 18: Main road network - transport route



Figure 19: Local road network - transport route and site access points

Table 18: Proposed road upgrades

Road/ Intersection	Start – End	Length (km)	Upgrade
Coolalie Road	Jerrawa Road to Bushs Road	6.9	Upgrade as necessary to proposed sealed standard.
Jerrawa Road	Hume Highway to Coolalie Road	4.3	Upgrade and re-align as necessary to proposed sealed standard.
Bushs Road	Coolalie Road to site access point 6	1.44	Upgrade and re-align as necessary to proposed unsealed standard.
Trucking Yard Road	Lachlan Valley Way to Dillon Street	0.66	Widen and strengthen pavement as necessary to proposed sealed standard. Widen causeway as required.
Dillon Street	Trucking Yard Road to Long Street	0.99	Widen and strengthen pavement as necessary to proposed sealed standard.
Long Street	Dillon Street to Boorowa Rye Park Road	1.1	Widen and strengthen pavement as required to proposed sealed standard.
Boorowa Rye Park Road	Long Street to Yass Street	19.4	Widen and strengthen pavement as necessary to proposed sealed standard. Upgrade bridge over Dirthole Creek as required.
Grassy Creek Road	Yass Street to Maryvale Road	9.7	Widen and strengthen pavement as necessary to proposed sealed standard. Upgrade large culvert over Pudman Creek.
Maryvale Road	Rye Park Rugby Road to site access point 3	13.5	Widen and upgrade as necessary to proposed unsealed standard.
Rye Park Dalton Road	Dirthole Creek Road to site access point 13	23.9	Upgrade as necessary to proposed sealed or unsealed standard, based on current standard of road section. Upgrade bridges over Pudman Creek, Flakney Creek and Blakney Creek as necessary.
Flakney Creek Road	Rye Park Dalton Road to site access point 4	1.4	Upgrade as necessary, including shoulder improvements at intersection. Upgrade creek crossing.
Yass Street / Gunning Road	Grassy Creek Road to Dirthole Creek Road	1.9	Upgrade as necessary to proposed sealed standard.
Cooks Hill Road	Faulder Avenue to Rye Park Dalton Road	18.3	Upgrade 2.6 km unsealed section within Upper Lachlan Council to proposed sealed standard. Upgrade remainder of road as necessary.
Dillon Street / Long Street Intersection	-	-	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Long Street / Boorowa Rye Park Road Intersection	-	-	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Boorowa Rye Park Road / Grassy Creek Road Intersection	-	-	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Grassy Creek Road / Maryvale Road Intersection	-	-	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.
Yass Street / Boorowa Rye Park Road Intersection	-	-	Upgrade as necessary within road reserve to allow access for over-dimensional vehicles.

Table 19: Traffic generation summary

Vehicle type	Total estimated one way trips
Mobile crane	16
20 tonne tanker	6,948
28 tonne tanker	1,620
Heavy rigid vehicle	520
Six axle articulated	3,736
32 tonne truck and dog	15,270
Low loader	38
Extendable trailer/dolly	1,962
TOTAL	30,110

Over-dimensional and Heavy Vehicle Traffic Impacts

Submissions raised a number of concerns relating to road safety and construction traffic impacts on local residents, particularly associated with over-dimensional and heavy vehicles on local roads and within Rye Park village. School bus routes are in place along the Hume Highway and pass through Yass, Boorowa and Rye Park village, and there is a school located in Rye Park village on the corner of Yass Street and Kershaw Street.

It is important to note that RPRE investigated alternative routes for over-dimensional and heavy vehicles in order to avoid passing through Rye Park village, including Dirthole Creek Road and Lagoon Creek Road. However, no suitable routes were identified that would not require significant roadside vegetation removal, road re-alignment and impact a number of non-associated residences.

RPRE has committed to minimising project related traffic during school bus travel hours, in consultation with the local schools, as part of a Traffic Management Plan.

The Department considers that the proposed transport routes as outlined above are suitable for the typical transport loads associated with the construction of a wind farm with minimal impacts to the existing public roads, subject to the identified road upgrades.

Additionally, the Department is satisfied that the proposed transport routes could be upgraded to facilitate the transport of wind turbine components to the site, noting that the final road upgrade works would be subject to further detailed assessment and design prior to the implementation of these works. RPRE has committed to preparing road dilapidation surveys and repairing any damage resulting from the construction traffic.

Conclusion

With suitable road upgrades, regular road maintenance, and the implementation of a detailed Traffic Management Plan, the Department is satisfied that the project would not result in unacceptable impacts on the road network capacity, efficiency or safety of the road network.

To ensure this occurs, the Department has recommended conditions requiring RPRE to:

- undertake all necessary road upgrades for the project to the satisfaction of the relevant roads authority prior to the commencement of construction;
- undertake dilapidation surveys of the relevant transport routes prior to construction and decommissioning, and repairing any damage resulting from construction traffic;
- prepare a detailed Traffic Management Plan in consultation with the relevant roads authorities, that includes provisions for:
 - temporary traffic controls, including detours and signage;
 - notifying the local community about project-related traffic impacts;
 - minimising potential for conflict with rail services, stock movements and school buses in consultation with local schools;
 - responding to any emergency repair or maintenance requirements during construction and/or decommissioning;
 - a traffic management system for managing over-dimensional vehicles; and
 - a driver's code of conduct that addresses travelling speeds and procedures to ensure that drivers implement safe driving practices, particularly if using local roads through Boorowa, Jerrawa, Rye Park and Yass.

5.5 Other Issues

The Department's consideration of other issues is summarised in Table 20.

Table 20: Other issues

Issue	Consideration	Recommendation
Heritage	 The EA includes an Archaeological and Heritage Assessment in accordance with the applicable guidelines, including consultation with the local Aboriginal community. The assessment identified 35 Aboriginal heritage sites within the project site that would potentially be directly impacted by the project. The majority of these sites were assessed as having low local scientific significance. However, seven of these sites were assessed as having moderate local scientific significance (SU17/L1, SU17/L2, SU27/L1, SU30/L1, SU30/L2, SU30/L3 and SU33/L3). The assessment recommended impacts to three of these sites be avoided (SU17/L1, SU17/L2, SU30/L3 and SU33/L3). The assessment recommended impacts to the remaining four of these sites (SU30/L1, SU30/L2, SU30/L3 and SU33/L3) be minimised and a program of sub-surface excavation be undertaken at these sites survey locales as a form of impact mitigation to offset overall development impacts. RPRE has committed to avoiding impacts to sites SU17/L1, SU17/L2 and SU27/L1, minimising impacts to and undertaking a program of subsurface excavation at the survey locales of sites SU30/L1, SU30/L2, SU30/L3, SU30/L3, and SU33/L3). 	 The Department has recommended conditions reque Aboriginal heritage sites (SU17/L1, SU17/L2 and SU the four identified Aboriginal heritage sites (SU30/L) impacts to the remainder of the Aboriginal heritage s As such, the Department is satisfied that the project Aboriginal heritage values of the locality. Notwithstanding, to ensure that heritage impacts are has recommended conditions requiring RPRE to Management Plan in consultation with OEH and release would require a description of measures to be impler protecting Aboriginal heritage items outside the minimising and managing the impacts of the disturbance area, including: test excavations and salvage (if required) a in Appendix 5 of the recommended condition a strategy for the long term management o during the test excavation or salvage works a contingency plan and reporting procedure if:
Aviation safety	 The project is located 70 km north-northwest from Canberra airport and 80 km to the west of Goulburn airport. Seventeen (17) private airstrips are located within 10 km of their nearest wind turbine, which have historically been used for aerial agriculture. RPRE undertook an Aviation Impact Assessment in January 2014 and an Aeroplane Landing Area Assessment in October 2015. The assessments conclude that: obstacle lighting is not necessary as the project is not considered a hazard to aircraft safety; no Obstacle Limitation Surfaces (OLS) or Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) would be penetrated; four IFR routes (W762, W478, W836 and W872) will require increased Lowest Safe Altitudes; the two uncertified aerodromes located within 30nm (55.6 km) of the project (Crookwell and Gundaroo) would not be impacted by the project; and several private airstrips in close proximity to the project warranted further consideration. Airservices Australia agrees with the conclusions of the assessments and confirmed that there would be no adverse impact on aviation communications, navigation and surveillance equipment from the project. CASA agreed with the conclusions of the assessments and noted that the LSALT could be increased by 100 – 200 feet in height on the four impacted IFR routes to ensure aircraft in transit along these routes maintain a safe separation from any terrain or obstacle. In regard to obstacle lighting, as discussed in Section 5.1, CASA also agreed that the project and require obstacle lighting. The Department of Defence did not raise any particular concerns about the project, and requested that the details of wind turbines and monitoring masts be included in the RAAF's national database for tall structures. As stated above, the assessments indicate that the project an earial fertiliser application on land in the immediate area surrounding the wind	 To ensure that hazards are appropriately managed, of the relevant aviation authorities, the Department provide the relevant authorities (including CASA, Airs the wind turbines and associated infrastructure. The Department has also recommended that if obsta at a later date, it is installed in accordance with CAS, adverse visual impacts.

uiring RPRE to avoid impacts to the three identified SU27/L1), undertake test excavations and salvage at L1, SU30/L2, SU30/L3 and SU33/L3), and minimise sites within the project site.

ct is unlikely to result in a significant impact on the

e still minimised as far as practicable, the Department o prepare and implement an Aboriginal Heritage evant Aboriginal stakeholders for the project. The plan emented for:

e project disturbance area;

ne development on Aboriginal heritage within the

at the Aboriginal heritage items identified in Table 3 ions, where impacts cannot be avoided; and of any Aboriginal heritage items or material collected

of any Aboriginal heritage items or material collected s;

oved disturbance area are damaged; items are found; or

age inductions prior to carrying out any development ese inductions; and

ers during the implementation of the plan.

, and in accordance with the standard requirements of has recommended conditions requiring RPRE to reservices Australia and RAAF) with the final details of

acle lighting is required to be installed for any reason SA requirements and in a manner that minimises any

Issue	Consideration	Recommendation
Bushfire safety	 A number of submissions regarding the impact of the project on aerial bushfire fighting were received from the public. However, the NSW Rural Fire Service (RFS) did not raise any concerns about the project's impacts on aerial bushfire fighting. The Department also notes that in its <i>Wind Farms and Aerial</i> <i>Firefighting Information Sheet</i>, the RFS states that the presence of a wind farm would not stop it from fighting a fire and it would deal with wind farms in the same way it deals with other potential hazards such as powerlines, radiocommunication towers, mountains or valleys. 	 The Department has recommended conditions require ensure that the development provides for asset profor Bushfire Protection 2006 (or equivalent) and is develop procedures to manage potential fires on assist the RFS and emergency services if there is
	 Given the concerns raised in the community, the Department also met with senior officials from the RFS in November 2016, who confirmed the advice in the organisation's information sheet in regard to wind farms. 	
	 RPRE has committed to a number of mitigation measures including the preparation of a Bushfire Management Plan in consultation with the RFS and NSW Fire Brigade. 	
	 Given the above, the Department is satisfied that the bushfire risks associated with the project are not significant and can be effectively managed subject to implementation of the proposed mitigation measures. 	
Electric and magnetic fields	 Like other electricity generating infrastructure, Electric and Magnetic Fields (EMFs) would be generated by the electrical components of the project including wind turbines, transmission lines and substations. It is noted that EMFs also result from natural sources such as the Earth's magnetic field and lightning. 	No specific conditions required.
	 A number of submissions regarding the health impacts of the project from EMF were received from the public. 	
	 The main sources from the project would be the electrical equipment within the turbine structures, the substation, interconnecting underground cables and overhead transmission lines. 	
	 RPRE has implemented the principles of prudent avoidance by locating the transmission power lines as far as practical from residences. 	
	 The EA includes an assessment of EMF, which indicates that the levels of EMF would be significantly lower than the current internationally acceptable level for human health. 	
	 The Department is satisfied the project is not likely to have any significant EMF-related impacts. 	
Radiocommunications	 Electromagnetic signals transmitted for radio communication systems (such as radio, televisions, mobile phones and mobile/fixed radio transmitters) function most efficiently where a clear line of sight exists between the transmitting and receiving locations. Wind farms and other infrastructure have the potential to cause interference with this line of site. 	 To ensure that radio communications services ar conditions requiring RPRE to 'make good' any disrupt result of the development. The Department notes that this approach has
	 RPRE undertook a Telecommunications and Aviation Navigation Services Assessment in 2012 as part of its EA. The Assessment included consultation with telecommunications licence holders and service providers and concludes that the project would have minimal effect on telecommunications services in the area. 	telecommunications services associated with other
	 The Department consulted with telecommunications licence holders and services providers during the exhibition of the RTS and is not aware of any additional infrastructure in the area that would alter the conclusion of the 2012 assessment. 	
Agriculture	• The site of the project is dominated by agricultural land uses, in particular sheep and cattle grazing.	The Department has recommended conditions requ
	 Given the relatively small disturbance footprint of the project components, the Department is satisfied that farming and wind farm activities are compatible land uses and can co-exist in the locality. This has been demonstrated at several operating wind farms in NSW. 	that makes it available for agricultural production foll
	 The Department notes that the project would provide an additional source of income for the landowners of the associated properties, whose land would be directly affected by the project. 	
Mineral resources	 There are currently five mineral exploration licenses within the project site. The wind farm would not preclude exploration from occurring within the entire project site, only in proximity to wind turbines and electrical infrastructure, which is only a small percentage of the exploration site area. As the wind farm would be decommissioned after completion of its working life, the land in the project site would not be sterilised in the long term. 	 The Department has recommended conditions decommissioned and removed to a standard that wo
	 RPRE has consulted with the exploration licence holders and has committed to continue to liaise with them prior to and during the life of the project. 	
	• The Department is satisfied the project is not likely to have significant impacts on mining exploration.	

iring RPRE to: rotection in accordance with the NSW RFS's *Planning* s suitably equipped to respond to any fires on site; site, in consultation with the RFS; and s a fire in the vicinity of the project site.

re maintained, the Department has recommended uption to radio communications services caused as a

been effective in addressing interference with wind farms in NSW.

uiring the project site be rehabilitated to a standard llowing decommissioning.

s requiring all above ground infrastructure be ould not preclude future mineral exploration.

Issue	Consideration	Recommendation
Property values	 A number of submissions from the public and from the Councils raised concerns about potential adverse impacts on property values in the area. The Department notes that property values are influenced by a number of factors. In 2009, the NSW Valuer-General released a report on the impacts of wind farms on land values in Australia. The report was based on primary investigations and analysis of previous studies, and concluded that the majority of wind farms in Australia appear to have no quantifiable effect on land values. In 2016, OEH commissioned Urbis to undertake an investigation into the potential impact of wind farm developments in NSW. The study was based on sales data and traditional valuation sales analysis techniques, and similar to the NSW Valuer-General's report, concluded that wind farms are unlikely to have a measurable negative impact on surrounding land values in rural areas. Further, the Department notes that as SSD for electricity generating works, the project is permissible with consent under applicable planning instruments, and the assessment demonstrates that the project would be able to comply with applicable amenity criteria established by the NSW Government for wind farm developments. The Department considers that there is no clear evidence that wind farms reduce property values, and that with the significant reduction in the scale of the development in this case, the project would not result in any significant or widespread reduction in land values in the areas surrounding the wind farm. 	No specific conditions required.
Community enhancement	 In their submissions, Hilltops Council, Yass Valley Council and Upper Lachlan Council questioned what mechanisms would be in place for funding of community infrastructure. However, the project is unlikely to result in significant additional demand on community services and infrastructure (excluding roads) given the relatively low level of local employment generated once it is operational. RPRE has committed to contributing towards a community benefit fund to support community groups, programmes and activities in the locality. This funding would comprise \$2,500 per wind turbine built per annum, indexed to CPI from the September 2010 quarter with a proportion (not less than 20%) allocated to local education assistance. The project would provide about \$210,000 of funding per annum with the removal of the turbines in the North Western and Intermediate precincts. The funding would be administered via a planning agreement established under Section 93F of the EP&A Act with each of the three Councils, and would be proportionate to the number of wind turbines in each LGA. While road upgrades and related infrastructure to support the project are not included in the VPAs, the Department has directly conditioned these matters, as discussed in Section 5.4. 	 The Department has recommended that RPRE be Councils prior to construction, in accordance with: Section 93F of the EP&A Act; and the terms of its offer.
Blasting and vibration	 The blast assessment concluded that if blasts were required during construction, the project would comply with the applicable amenity and structural damage criteria at all surrounding private residential receivers. Furthermore, the assessment concluded that the project would not pose a perceptible source of vibration impacts during construction. 	 To appropriately manage any blasting activities recommended conditions requiring RPRE to: manage blasting operations to comply with <i>Environment Council Technical Basis for G Overpressure and Ground Vibration</i> at any resi only carry out blasting on site between 9 am a pm on Saturday, in accordance with the blastin
Water use	 The project has the potential to impact on the availability of local water resources for agricultural and potable water supplies, such as Lake Burrinjuck and the Yass Dam. A number of submissions raised concerns regarding the uncertainty of the water sources for the project. The amount of water required for the construction of the wind farm is estimated to be around 900 ML. This includes water for the construction of concrete foundations for the wind turbines, control buildings and substations as well as for dust suppression and in case of fire. RPRE is proposing to source the water required for construction primarily from Yass Dam, or Burrinjuck Dam as an alternative, and store it in on-site tanks. DPI – Water has no raised any concerns with obtaining water from these sources. The amount of water required during the operation of the wind farm is estimated to be less than 1 ML per annum. RPRE is proposing to source the water required for operation from on-site tanks collecting rainwater runoff from any permanent structures and offsite sources if necessary. Groundwater on the project site would not be used as a source for construction or operational requirements. Whilst the project would involve some rock anchoring at depth (up to 20 m below ground surface level) and potentially some blasting, the activities are unlikely to result in any significant impacts to groundwater are intercepted during construction. RPRE has committed to consulting further with DPI – Water if any significant volumes of groundwater are intercepted during construction. The Department and DPI – Water are satisfied that the project's water use is unlikely to have any significant impact on water supply and demand in the region. However, DPI – Water noted that any water sourced for the project is required to be appropriately licensed, like any other water user. 	The Department has recommended conditions req for the project and that it obtains any necessary lice <i>Act 2000.</i>

be required to enter into a VPA with each of the three

and vibration from the project, the Department has

h the criteria in the *Australian and New Zealand Guidelines to Minimise Annoyance Due to Blasting* sidence on privately-owned land; and

and 5 pm Monday to Friday and between 8 am and 1 ng guidelines.

quiring RPRE to ensure it has adequate water supplies ences under the *Water Act 1912* or *Water Management*

loovo	Consideration	Decommondation
Issue Riparian areas and erosion risk	 Consideration The project involves a number of water crossings for internal access roads and cabling. The landscape within the project site is generally steep with granite rock outcrops and soils that have high erosion potential. In response to community concerns, the Department and the EPA met with local landowners in regard to erosion and sedimentation risks. While the Department acknowledges that the site has high erosion potential, there is no evidence that the site is materially different to other sites in the Southern Highlands and South West Slopes where these issues have been effectively managed during the construction of major infrastructure projects and other wind farms using standard best practice soil and erosions management techniques described in a range of NSW Government guidelines. Neither the EPA nor DPI-Water have raised any concerns about this issue, and the Department considers that with the implementation of best practice control measures, any risks can be adequately managed The Department also notes that it is a strict liability offence to pollute any waters off the site under the <i>Protection of the Environment Operations Act 1997.</i> 	 Recommendation The Department has recommended conditions required to comply with Section 120 of the Protection of the undertake activities in accordance with applied Stormwater: Soils and Construction and DPI's Generative Policy and Guidelines for Fish Friendly Waterver Road? Fish Passage Requirements for Waterver Road?
Decommissioning and rehabilitation	 Some submissions raised concerns about decommissioning of wind turbines and associated infrastructure after the operational life of the project. The Department has developed standard conditions for wind farms to cover this stage of the project life cycle, including clear decommissioning triggers and rehabilitation objectives (see opposite). With the implementation of these measures, the Department considers that turbines would be suitably decommissioned, either at the end of the project life or if they are not operating for more than a year, and the site appropriately rehabilitated to a standard that would allow the ongoing productive use of the land 	 To ensure that redundant infrastructure is removed bepartment has recommended conditions requiring dismantle any individual turbine that ceases opermonths after that 12 month period; decommission wind turbines (and associated is operations; progressively rehabilitate the site, and minimise comply with a number of rehabilitation object infrastructure, restoring rural land capability and site is maintained in a safe, stable and non-pollowing site is maintained in a safe.

quiring RPRE to : e Environment Operations Act 1997; and licable guidelines including OEH's Managing Urban Guidelines for Controlled Activities on Waterfront Land, rway Crossings and Why Do Fish Need to Cross the way Crossings.

oved and the areas rehabilitated appropriately, the g RPRE to:

erating for more than 12 consecutive months within 18

infrastructure) within 18 months of the cessation of

e the total disturbance area exposed at any time; and ctives, including removing redundant above-ground d vegetation, ensuring public safety and ensuring the luting condition.

6. **RECOMMENDED CONDITIONS**

The Department has prepared draft recommended conditions of consent for the project (see Appendix G). These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the project;
- ensure standards and performance measures for acceptable environmental performance;
- ensure regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

In particular, the Department has recommended that the North Western and Intermediate precincts not be allowed to proceed due to visual impacts on Rye Park village, including the approximately 30 residences within it, and the relatively large number of non-associated residents in the vicinity of these turbines. The Department has also recommended the owners of two properties be granted voluntary acquisition rights, and a further turbine not be allowed to proceed unless agreement can be reached with the affected landowner.

The recommended conditions use a risk-based approach that focuses on performance-based outcomes. This reflects current government policy and the fact that wind farms require relatively limited ongoing environmental management once the turbines have been commissioned.

In line with this approach, the Department has:

- set strict criteria for noise, blasting and shadow flicker;
- set strict limits for clearing EECs;
- recommended operating conditions to minimise noise, biodiversity, air quality, and water impacts; and
- consolidated the number of management plans to the following:
 - o Traffic Management Plan;
 - o Heritage Management Plan;
 - o Biodiversity Management Plan; and
 - o Bird and Bat Adaptive Management Plan.

Additionally, given concerns raised about micro-siting on other wind farm projects in NSW, the Department considers that to protect the interests of all stakeholders it is appropriate to provide further specificity in the conditions to guide the limits of micro-siting.

Accordingly, the Department has recommended conditions allowing RPRE to micro-site wind turbines and ancillary infrastructure without further approval provided:

- they remain within the development corridor as shown in Figures 2 and 3;
- no wind turbine is moved more than 250 m from its approved location;
- wind turbine numbers 11, 12, 38, 48, 56, 80, 83, 84, 85, 102, 125, 143, 144, 149 and 150 are microsited to minimise (and if possible avoid) impacts on high conservation value vegetation, including hollow-bearing trees;
- the revised location of a wind turbine is at least 50 m from existing hollow-bearing trees; or where the proposed turbine location is already within 50 m of existing hollow-bearing trees, the revised location of the turbine is not moved any closer to the existing hollow-bearing trees; and
- the revised location of the wind turbine and/or ancillary infrastructure would not result in any noncompliance with the conditions of this consent.

The recommended conditions also require RPRE to provide detailed final layout plans to the Department prior to construction.

With these measures in place, the Department believes this is to be an adequate mechanism for providing greater flexibility for the siting of turbines during detailed design without resulting in any material changes to the impacts of the project.

Other key recommended conditions include:

- visual mitigation additional visual impact mitigation for non-associated residences within 4 km;
- biodiversity offsets retire biodiversity credits in accordance with the NSW Biodiversity Offsets Policy for Major Projects;
- roads requiring the over-dimensional and heavy vehicle transport routes and other key local roads to be upgraded prior to construction;
- community contributions formalising community contributions of over \$200,000 a year (plus CPI) through a VPA with each the three Councils; and
- *decommissioning and rehabilitation* requiring the wind turbines to be removed and the site rehabilitated to a good condition.

7. CONCLUSION

The Department has assessed the development application, EA, submissions, RTS and additional information provided by RPRE in accordance with the requirements of the EP&A Act. The Department has also considered the independent peer review of the project's visual assessment.

Overall, the Department considers the majority of the site to be suitable for the project, as it is in a region with significant wind resources, has good access to the state's electricity transmission infrastructure, is a permissible use on the land, and residual environmental impacts can be suitably managed to meet contemporary standards.

The Department acknowledges the strong community opposition from local landowners and special interest groups to the project. However, with the removal of turbines in the North Western and Intermediate precincts, the Department considers that the project achieves a reasonable balance between maximising the use of the site's wind resources and minimising the potential impacts on the local community and the environment.

The operation of the project would also not compromise the long term use of the land for agricultural purposes and it encourages the proper development of natural resources. With the retirement of the biodiversity credits, the project is able to be undertaken in a manner that would improve or at least maintain the biodiversity values of the locality over the medium to long term, and would not significantly impact threatened species and ecological communities of the locality.

To address the residual impacts of the project, the Department has recommended detailed conditions to ensure these impacts are effectively minimised and/or offset. These conditions use a risk-based approach that focuses on performance-based outcomes. This reflects current government policy, and the fact that wind farms require relatively limited ongoing environmental management once the turbines have been commissioned.

Importantly, while the removal of the turbines in the North Western and Intermediate precincts would reduce the number of turbines to 84, the project would still provide an installed capacity of up to 300 MW, which would facilitate the development of the state's renewable energy resources, and is consistent with the NSW Government's vision for a secure, reliable, affordable and clean energy future for NSW.

In addition, the project would have flow-on benefits to the local community through job creation, capital investment, and RPRE's proposed community funding contributions.

Given these benefits can be achieved without causing any significant adverse impacts, the Department considers the project is approvable, subject to strict conditions.

8. **RECOMMENDATION**

It is recommended that the Planning Assessment Commission, as delegate of the Minister:

- considers the findings and recommendations of this report;
- determines the application under Section 89E; and
- signs the attached Development Consent (Appendix G).

ina 3/3/17. Mike Young

Director **Resource Assessments**

Oldto 3/3/17

David Kitto Executive Director Resource Assessments and Business Systems