CROOKWELL 2 WIND FARM

ACCESS TRACK AND CABLING RE-ALIGNMENT

NATIVE VEGETATION ASSESSMENT

Crookwell Development Pty Ltd

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May 2017

Report No. 8172 (10.1)

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1. EXECUTIVE SUMMARY

Development consent was originally granted in June 2009 for the Crookwell 2 Wind Farm with up to 46 wind turbines and associated infrastructure (DA 176-8-2004-i) – a wind farm located across a 2,088 hectare area centred 14km south-east of Crookwell township in the Southern Tablelands of New South Wales. In 2008, approval was sought (Mod-1) to modify the development consent by substituting larger turbines for those previously approved, relocating 20 of the 46 turbines and providing an alternate access road via Woodhouselee Road. This modification to the development consent was subsequently approved in July 2009. Given subsequent further developments in wind turbine technology, Crookwell Development Pty Ltd — the proponent for the Crookwell 2 Wind Farm — now seek approval to modify the Mod-1 development consent by further increasing the size of the proposed wind turbines. The revised proposal (Mod-2) also includes a reduction in the total number of turbines from 46 to 32, along with re-alignment of the access tracks and cabling to service the remaining turbines.

As part of the approval process for the proposed Mod-2, the Office of Environment and Heritage (OEH) requested in a letter to Crookwell Development Pty Ltd dated 14 November 2016 that an updated native vegetation assessment be undertaken within the modified infrastructure areas, as depicted in Figure 1 and 2, and referred to herein as the 'study area'. Crookwell Development Pty Ltd commissioned Brett Lane & Associates Pty Ltd to undertake this assessment in February 2017.

Consistent with the findings of the URS (2004a;b) and Biosis (2009) site assessments, this current assessment found that very little native vegetation occurred in the study area. Due to a long history of livestock grazing and other agricultural activities, the vast majority of the study area supported improved pasture, which was dominated by introduced pasture species and common weeds of the region.

Only two very small vegetation units were recorded which could be identified as coherent native vegetation types, these being *Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands* (Unit 10) and *Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands* (Unit 16). All other vegetation units comprised highly degraded treeless *Improved Pasture* and *Gully Reedland/Sedgeland*, which were entirely or heavily dominated by introduced species.

A total of 12 scattered indigenous 'paddock' trees were recorded during the field assessment. A number planted tree rows were also recorded in the study area.

None of the vegetation in the study area met the descriptions of any threatened communities. Vegetation Unit 10 comprised elements of the TSC Act-listed Tablelands Snow Gum Grassy Woodland community but is unlikely to classify as that community.

No flora species listed under the EPBC Act and TSC Act are considered likely to occur in the study area due to a lack of suitable habitat.

Scattered paddock trees in the Improved Pasture or Gully Reedland/Sedgeland vegetation units should be avoided where practical, as these indigenous trees do have value for biodiversity, particularly owing to their rarity in the study area. The OEH may require compensation for removal of any of these trees.

Vegetation Unit 16 (Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands) should be avoided where practical, as OEH will likely require compensation for any impacts on this unit. According to the current wind farm layout, this unit should be easily avoidable.

OEH's response to the Modification to Consent (provided as Appendix 1 to this report) requires an assessment of significance for any Tablelands Snow Gum Grassy Woodland community indentified in the study area, impacts on which may subsequently require a Species Impact Statement (SIS). Provided it can be demonstrated that Vegetation Unit 10 will be avoided and protected, there will be no need for a Species Impact Statement (SIS) in relation to the [potential] Tablelands Snow Gum Grassy Woodland community.

It is recommended that Vegetation Unit 10 (Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands) be avoided by re-routing the access track around this vegetation and through improved pasture.

Provided that the mitigation measures outlined in BL&A's Mod-2 supplementary ecological impact assessment (BL&A 2016a) and the Turbine Micrositing Management Plan (BL&A 2016b) are implemented, this assessment should satisfy OEH's concerns in their response to the Modification to Consent.

2. INTRODUCTION

Development consent was originally granted in June 2009 for the Crookwell 2 Wind Farm with up to 46 wind turbines and associated infrastructure (DA 176-8-2004-i) – a wind farm located across a 2,088 hectare area centred 14km south-east of Crookwell township in the Southern Tablelands of New South Wales. In 2008, approval was sought (Mod-1) to modify the development consent by substituting larger turbines for those previously approved, relocating 20 of the 46 turbines and providing an alternate access road via Woodhouselee Road. This modification to the development consent was subsequently approved in July 2009. Given subsequent further developments in wind turbine technology, Crookwell Development Pty Ltd — the proponent for the Crookwell 2 Wind Farm — now seek approval to modify the Mod-1 development consent by further increasing the size of the proposed wind turbines. The revised proposal (Mod-2) also includes a reduction in the total number of turbines from 46 to 32, along with re-alignment of the access tracks and cabling to service the remaining turbines.

As part of the approval process for the proposed Mod-2, the Office of Environment and Heritage (OEH) requested in a letter to Crookwell Development Pty Ltd dated 14 November 2016 that an updated native vegetation assessment be undertaken within the modified infrastructure areas, as depicted in Figure 1 and 2, and referred to herein as the 'study area'. Crookwell Development Pty Ltd commissioned Brett Lane & Associates Pty Ltd to undertake this assessment in February 2017.

Crookwell Development Pty Ltd commissioned Brett Lane & Associates Pty Ltd to undertake this assessment in February 2017, which involved:

- Review of the conditions of consent for approval of the wind farm and existing information on the flora, fauna and native vegetation of the area;
- A site survey involving:
    - Characterisation and mapping of native vegetation in a 100 metre corridor along the proposed re-aligned access tracks and cabling.
    - Where significant vegetation exists within 50 metres of turbines or access tracks or cabling, detailed mapping of that vegetation was undertaken out to 250 metres from the access track or cabling.

This report is divided into the following sections:

Section 3 details the methods and sources of information used for this assessment.

Section 4 provides the results of the investigation, documenting the extent and condition of native vegetation in the study area.

Section 5 discusses the implications of the findings for the Mod-2 proposal, provides mitigation recommendations and a conclusion on the assessment.

This investigation was undertaken by a team from Brett Lane & Associates Pty Ltd, comprising Brett Macdonald (Senior Ecologist) and Alan Brennan (Senior Ecologist and Project Manager).

3. ASSESSMENT METHODS

3.1. Literature review

The literature review for this assessment focused on previous native vegetation investigations within and surrounding the study area, undertaken by URS Australia Pty Ltd (URS) in 2004 and Biosis Research Pty Ltd (Biosis) in 2009, as well as two desktop assessments undertaken by Brett Lane and Associates Pty Ltd (BL&A) in 2016. The reports for these assessments are listed below.

- A Survey and Impact Assessment of the Terrestrial Flora and Fauna of the Proposed Crookwell 2 Wind Farm (URS 2004a);
- Crookwell 2 Wind Farm: Environmental Impact Statement: Volume 1 Main Report, Volume 2 Appendices and Volume 2A Appendices (URS 2004b);
- Crookwell 2 Wind Farm – Modifications to DA-176-8-2004-I Ecological Assessment (Biosis Research 2009);
- Crookwell 2 Wind Farm – Turbine Micrositing Biodiversity Management Plan, Report No. 8172 (6.0) (BL&A 2016a); and
- Crookwell 2 Wind Farm: Supplementary Ecological Impact Assessment of Proposed Modifications (Mod-2) (BL&A 2016b).

The EPBC Act Protected Matters Search Tool (PMST) (DoEE 2017) and the BioNet Atlas of NSW Wildlife (OEH 2017) were also accessed to determine whether any additional endangered ecological communities or flora species had been listed since the URS and Biosis Research assessments were undertaken.

3.2. Field survey methods

3.2.1. Native vegetation assessment

The native vegetation assessment was undertaken over three days from 6th to 8th February 2017, within the study area (Figure 1 & 2). The methodology employed for the assessment was consistent with the OEH's threatened species field survey methods (OEH 2013) and the Biobanking Assessment Methodology (DECC 2008).

Stratification

Vegetation community stratification was based on recent aerial photography and ground-thruthing via systematic traverses of the study area on foot. Vegetation in the study area was stratified by OEH Biometric Vegetation type.

Vegetation classification and condition

Existing information regarding native vegetation classification within the Lachlan Catchment Management Authority (CMA) was sourced from various databases incorporated in BioMetric 2.0, a tool that supports the Biobanking Assessment Methodology (DECC 2008). This tool works alongside separate tools for assessing threatened species, soils, water quality, salinity and invasive native scrub.

Native vegetation in New South Wales is classified using three hierarchical levels:

- Formations – Broad classification of vegetation (e.g. Rainforest, Grassland, Grassy Woodland).

- Classes – Detailed classification of vegetation based on geographical range and indicative species (e.g. Northern Warm Temperate Rainforest, Western Slopes Grassland, New England Grassy Woodlands).
- Types – Further classification of vegetation classes based on the dominant canopy species, characteristic mid- and understorey species and landscape position (e.g. Norton's Box - Red Box - White Box grassy open forest of the southern section of the NSW South Western Slopes Bioregion).

Vegetation formations and classes are outlined in Keith (2006). Information on vegetation types was sourced from the BioMetric Vegetation Type tool.

During the site inspection, existing vegetation was classified to type and mapped (using aerial photograph interpretation and ground-truthing) within the study area as per the criteria outlined in the Biobanking Assessment Methodology (DECC 2008).

Highly modified vegetation which could not be classified to type, based on a lack of representative native species, was ascribed arbitrary type names, such as 'improved pasture' and 'gully reedland/sedgeland'.

Each vegetation type was further stratified by vegetation condition into discreet, relatively homogeneous vegetation units as per the following condition criteria:

- **Good**: Native floral species diversity and structural characteristics similar to pre-European equivalent (near benchmark state). Relative to benchmark: native flora diversity is high; native overstorey cover, mid-storey cover and ground cover are relatively intact; hollow-bearing trees and fallen logs are present near benchmark values; weed cover is low.
- **Moderate**: Native floral species diversity and structural characteristics differ from pre-European equivalent (benchmark state) due to disturbance where some components have been degraded or lost. Relative to benchmark: native flora diversity is moderate; native overstorey cover intact, though native mid-storey cover and/or ground cover are degraded (outside benchmark limits) or largely absent; hollow-bearing trees and fallen logs maybe present; weed cover is moderate to high.
- **Poor**: Significantly modified vegetation, where most components differ markedly from pre-European equivalent (benchmark state) due to disturbance where most components have been degraded or lost. Relative to benchmark: native flora diversity is low to moderate; native overstorey cover partially intact, and native mid-storey cover and/or ground cover are highly degraded (well outside benchmark limits) or absent; hollow-bearing trees and fallen logs maybe present; weed cover is generally high.
- **Low Condition**: Highly modified vegetation, where very little remains of the pre-European equivalent (benchmark state) and the vegetation meets the Low Condition threshold criteria (DECC 2008), as presented in Table 1 below.

Note: 'Benchmark' refers to vegetation condition benchmarks for individual vegetation types, which are quantitative measures that describe the range of variability in condition in vegetation which is largely unaltered from it assumed pre-European state.

Table 1: Definitions of native vegetation in low condition (DECC 2008)

A. Native woody vegetation is in low condition if:
The over-storey percent foliage cover is <25% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type
AND
<50% of groundcover vegetation is indigenous species, or >90% of the area is ploughed or fallow, or ≥90% of the groundcover vegetation is regrowth but not protected regrowth.
B. Native grassland, wetland or herbfield is in low condition if:
<50% of groundcover vegetation is indigenous species, or >90% of the area is ploughed or fallow, or ≥90% of the groundcover vegetation is regrowth but not protected regrowth.
Notes:
Only patches of vegetation >0.25ha are assessed separately (as distinct zones) from surrounding vegetation (e.g. a patch of vegetation with benchmark over-storey cover that is <0.25ha is not assessed separately from surrounding vegetation with sparser over-storey cover).
The over-storey is assessed using one of the methods in Appendix 4.
The groundcover is assessed using a method consistent with the NV Regulation or the method detailed in Appendix 4. The percentage of groundcover vegetation means the percentage of cover that is indigenous species, not percentage of species that are indigenous species.

3.2.2. Tree surveying

The locations of all scattered indigenous paddock trees in the study area were mapped using a handheld GPS.

3.2.3. Threatened ecological communities

The presence of threatened ecological communities in the study area was assessed against the relevant National and State descriptions and selection criterion, provided by the Federal Department of the Environment and Energy (DoEE) and the OEH.

3.2.4. Threatened flora species

During the vegetation assessment, emphasis was placed on identifying suitable habitat for listed threatened flora species, rather than exhaustive searches for such. Sites in the study area found to support habitat for listed threatened flora species were mapped. Mapping was undertaken through a combination of aerial photograph interpretation and ground-truthing using a hand held GPS (accurate to approximately five metres).

Incidental records of listed threatened flora species within vegetation types and landforms were made whilst conducting the field assessment. Specimens requiring identification using laboratory techniques were collected.

4. ASSESSMENT RESULTS

4.1. Literature review

4.1.1. Existing reporting

The results of the URS (2004a;b) and Biosis (2009) investigations revealed that the Mod-1 layout of the wind farm would not impact any native vegetation communities or listed endangered ecological communities or flora species, as none of these values were recorded in the proposed impact area of the wind farm.

Vegetation within the Crookwell 2 Wind Farm site was assessed by Biosis (for the Mod-1 development) in 2008 and was documented in Biosis (2009), which took into consideration the previous assessment undertaken by URS in 2004. Biosis determined that the large majority of the site supported exotic grassland (improved pasture), with small patches of the following vegetation communities mapped within and adjacent to the wind farm site:

- Frost Hollow Grassy Woodland;
- Tableland Basalt Forest;
- Tableland Grassy Box-Gum Woodland;
- Tableland Hills Grassy Woodland; and
- Western Tablelands Dry Forest.

URS (2004a) also identified several paddock trees and windrows within the proposed wind farm site.

The initial assessment (URS 2004a) found that *Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory* (EPBC Act) and *White Box – Yellow Box – Blakely's Red Gum Woodland* (TSC Act, now also listed under the EPBC Act) occurred within the study area, but that these communities did not occur within areas proposed for development. Biosis (2009) found that no endangered ecological communities occurred within the wind farm site.

4.1.2. Listed endangered ecological communities or flora species database searches

The EPBC Act Protected Matters Search Tool (PMST) (DoEE 2017) was accessed on the 2nd February 2017 and the search region comprised a 10 kilometre buffer centred on the counterpoint of the study area (coordinates: -34.55105 149.58417).

The BioNet Atlas of NSW Wildlife (OEH 2017) was accessed on the 2nd February 2017 and the search region comprised the Upper Lachlan Local Government Area.

The results of these database searches were that 61 EPBC Act and TSC Act listed threatened flora species and eight EPBC Act and TSC Act listed threatened ecological communities had the potential to occur in the database search region due to existing records or habitat modelling. A consolidated list of EPBC Act and TSC Act listed threatened ecological communities is provided in Table 2 and a consolidated of EPBC Act and TSC Act listed threatened flora species is provided in Table 3.

Table 2: Consolidated results of the EPBC Act PMST and BioNet Atlas of NSW Wildlife database searches for threatened ecological communities (2/2/2017)

Community Name (TSC Act)	Community Name (EPBC Act)	NSW status	Comm. status	Records
Coolac-Tumut Serpentinite Shrubby Woodland in the NSW South Western Slopes and South Eastern Highlands Bioregions	NA	E3		K
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	NA	E3		K
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E3	E	K
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Alpine Sphagnum Bogs and Associated Fens	E3	E	K
NA	Natural Temperate Grassland of the South Eastern Highlands (current community name) Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory (original community name)		CE	K

Community Name (TSC Act)	Community Name (EPBC Act)	NSW status	Comm. status	Records
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	NA	E3		K
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions	NA	E3		K
White Box Yellow Box Blakely's Red Gum Woodland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	E3	CE	K

NSW status (TSC Act): E3 = Endangered; Comm status (EPBC Act): E = Endangered, CE = Critically Endangered; Records: K = Known to occur in search region

Table 3: Consolidated results of the EPBC Act PMST and BioNet Atlas of NSW Wildlife database searches for threatened flora species (2/2/2017)

Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records
3728	*Acacia bynoeana*	Bynoe's Wattle	E1	V	1
3741	*Acacia clunies-rossiae*	Kanangra Wattle	V		K
3776	*Acacia flocktoniae*	Flockton Wattle	V	V	K
1264	*Ammobium craspedioides*	Yass Daisy	V	V	24
4739	*Amphibromus fluitans*	Floating Swamp Wallaby-grass	V	V	2
1200	*Astrotricha crassifolia*	Thick-leaf Star-hair	V	V	K
10388	*Austrostipa wakoolica*	A spear-grass	E1	E	P
10608	*Baloskion longipes*	Dense Cord-rush	V	V	K
5738	*Boronia deanei*	Deane's Boronia	V	V	K
13783	*Bossiaea fragrans*		E4		K
2785	*Bossiaea oligosperma*	Few-seeded Bossiaea	V	V	K
7501	*Caesia parviflora var. minor*	Small Pale Grass-lily	E1		P
6800	*Caladenia arenaria*	Sand-hill Spider Orchid	E1	E	P
9523	*Caladenia concolor*	Crimson Spider Orchid	E1	V	K
1341	*Calotis glandulosa*	Mauve Burr-daisy	V	V	K

Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records
10902	*Carex klaphakei*	Klaphake's Sedge	E1		K
14618	*Commersonia prostrata*	Dwarf Kerrawang	E1	E	6
9987	*Cullen parvum*	Small Scurf-pea	E1		K
10323	*Dillwynia glaucula*	Michelago Parrot-pea	E1		K
4439	*Diuris aequalis*	Buttercup Doubletail	E1	V	36
4457	*Diuris tricolor*	Pine Donkey Orchid	V		K
5905	*Dodonaea procumbens*	Creeping Hop-bush	V	V	K
4038	*Eucalyptus aggregata*	Black Gum	V	V	39
4119	*Eucalyptus macarthurii*	Paddys River Box, Camden Woollybutt	E1	E	K
9519	*Eucalyptus parvula*	Small-leaved Gum	E1	V	K
4163	*Eucalyptus pulverulenta*	Silver-leafed Gum	V	V	K
9520	*Eucalyptus robertsonii subsp. hemisphaerica*	Robertson's Peppermint	V	V	K
9166	*Euphrasia collina subsp. muelleri*	Mueller's Eyebright	E1	E	K
5961	*Euphrasia scabra*	Rough Eyebright	E1		K
8305	*Grevillea iaspicula*	Wee Jasper Grevillea	E4	E	K
9482	*Grevillea wilkinsonii*	Tumut Grevillea	E1	E	K
10802	*Hakea dohertyi*	Kowmung Hakea	E1	E	K
4206	*Kunzea cambagei*	Cambage Kunzea	V	V	12
1822	*Lepidium hyssopifolium*	Aromatic Peppercress	E1	E	2
9071	*Leucochrysum albicans var. tricolor*	Hoary Sunray		E	78
8290	*Monotoca rotundifolia*	Trailing Monotoca	E1		K
14194	*Pelargonium sp. (G.W. Carr 10345)*	Omeo Storksbill	E1	E	K
5450	*Persoonia acerosa*	Needle Geebung	V	V	K
10585	*Philotheca ericifolia*			V	K
8140	*Pilularia novae-hollandiae*	Austral Pillwort	E1		P
5576	*Pomaderris cotoneaster*	Cotoneaster Pomaderris	E1	E	K
9856	*Pomaderris delicata*	Delicate Pomaderris	E4		K
5588	*Pomaderris pallida*	Pale Pomaderris	V	V	K
9478	*Prasophyllum petilum*	Tarengo Leek Orchid	E1	E	K
	Prasophyllum sp. Wybong (C.Phelps ORG 5269)	a leek-orchid		CE	P
11243	*Pultenaea humilis*	Dwarf Bush-pea	V		K
1644	*Rutidosis leiolepis*	Monaro Golden Daisy	V	V	K
1645	*Rutidosis leptorrhynchoides*	Button Wrinklewort	E1	E	K
7097	*Senecio garlandii*	Woolly Ragwort	V		K

Species Code	Scientific Name	Common Name	NSW status	Comm. status	Records
11633	*Senecio macrocarpus*			V	K
11441	*Solanum amourense*		E1		K
3056	*Swainsona recta*	Small Purple-pea	E1	E	K
8538	*Swainsona sericea*	Silky Swainson-pea	V		1
5871	*Thesium australe*	Austral Toadflax	V	V	P
7434	*Trachymene scapigera*	Mountain Trachymene	E1	E	K
14712	*Veronica blakelyi*		V		K
9473	*Westringia kydrensis*	Kydra Westringia	E1	E	K
2235	*Wilsonia rotundifolia*	Round-leafed Wilsonia	E1		K
11378	*Xerochrysum palustre*	Swamp Everlasting		V	K
8304	*Zieria adenophora*	Araluen Zieria	E4	E	P
9529	*Zieria citriodora*	Lemon Zieria	E1	V	K

NSW status (TSC Act): E1 = Endangered, E4 = Critically Endangered; Comm status (EPBC Act): CE = Critically Endangered, E = Endangered, V = Vulnerable; Records: K = Known to occur in search region, P = Predicted to occur in search region

4.2. Native vegetation assessment

Consistent with the findings of the URS (2004a;b) and Biosis (2009) site assessments, this current assessment found that very little native vegetation occurred in the study area. Due to a long history of livestock grazing and other agricultural activities, the vast majority of the study area supported improved pasture, which was dominated by introduced pasture species and common agricultural and environmental weeds of the region.

A total of 25 vegetation units were identified in the study area. A description of the vegetation comprising these units is provided in Table 5 below, on a unit-by-unit basis. The location of the vegetation units in the study area is presented in Figure 1 and 2. Only two very small vegetation units were recorded which could be identified as coherent native vegetation types, these being *Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands* (Unit 10) and *Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands* (Unit 16). All other vegetation units comprised highly degraded treeless *Improved Pasture* and *Gully Reedland/Sedgeland*, which were entirely or heavily dominated by introduced species, though most units supported a minor element of common and widespread native grass species, such as wallaby grasses *Rytidosperma* spp. and spear grasses *Austrostipa* spp. Treed units were limited to two very small areas, units 10 and 16 and these were also in very poor condition.

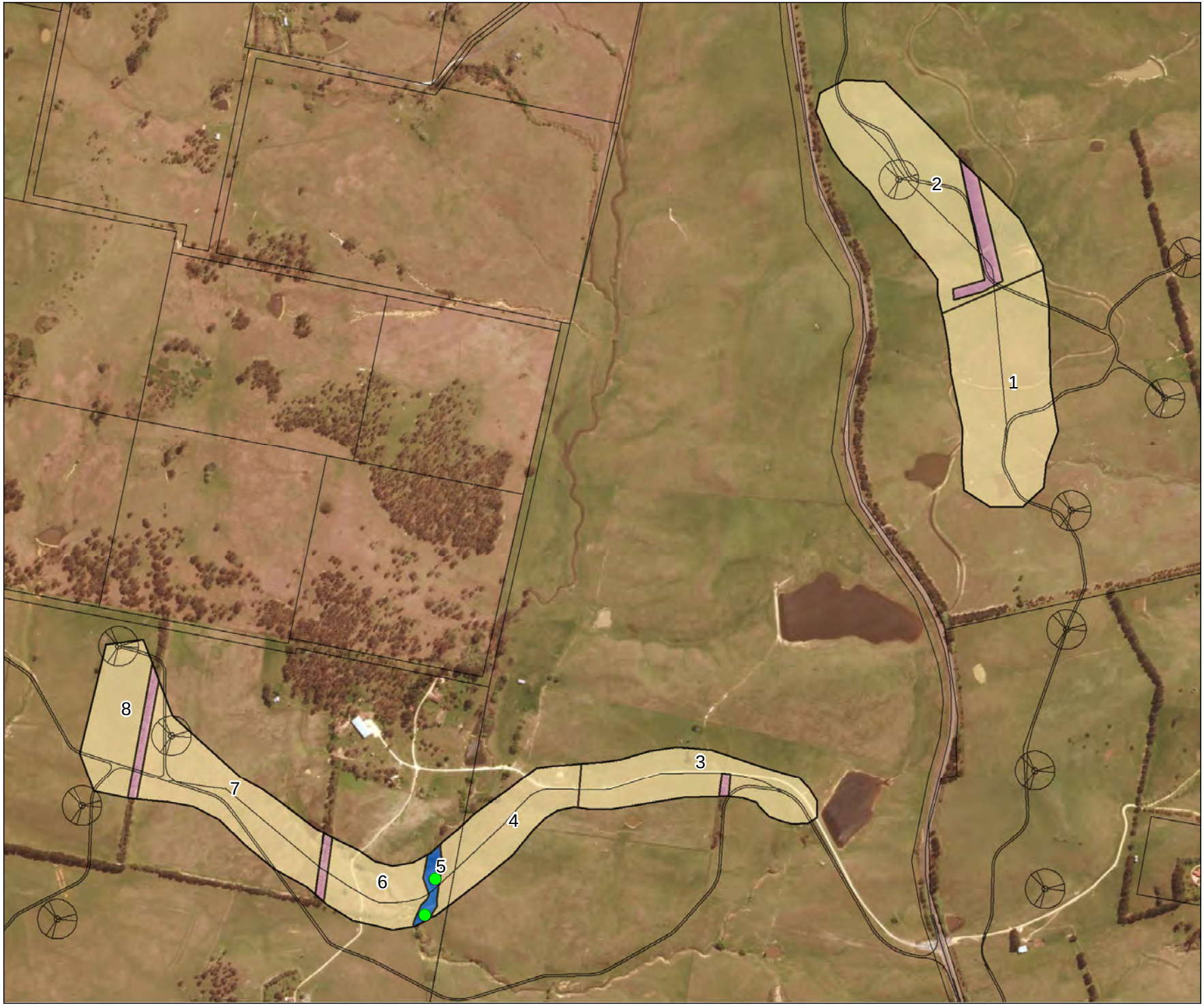

Figure 1: Investigation areas and native vegetation zones

Project: Crookwell 2 Windfarm
Client: Crookwell Development Pty Ltd
Date: 3/05/2017

Legend

- Development layout
- Scattered trees (avoid if possible)

Community

- Gully Reedland/Sedgeland
- Improved pasture
- Planted non indigenous trees

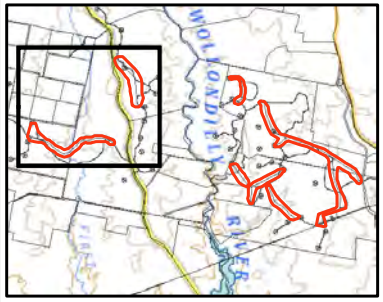

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Figure 2: Investigation areas and native vegetation zones

Project: Crookwell 2 Windfarm
Client: Crookwell Development Pty Ltd
Date: 3/05/2017

Legend

- Development layout
- Scattered trees (avoid if
- TEC - Tablelands Snow Gum Grassy Woodland (avoid if possible)

Community

- Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands
- Gully Reedland/Sedgeland
- Improved pasture
- Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands
- Planted non indigenous trees

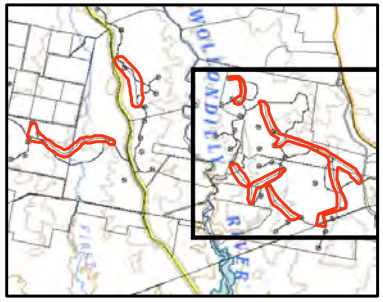

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Table 4: Description of vegetation units and implications / recommendations

Vegetation unit	Vegetation type	Description	^Vegetation condition	Listed communities or habitat for listed species	Offset requirements	Avoidance recommendations
1	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris (*Phalaris aquatica*), *Soft Brome (*Bromus hordeaceus*), *hairgrass *(Aira* spp.), bent *(Agrostis* spp.) and various broad-leaf weeds. Indigenous species were spear grass *(Austrostipa* spp.), wallaby grass *(Rytidosperma* spp.), Weeping Grass (*Microlaena stipoides*) and wheat grass *(Anthosachne* spp.), Indigenous species cover approximately 15% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
2	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *Soft Brome, *barley grass *(Hordeum* spp.), *Sheep Sorrell (*Acetosella vulgaris*) and *Saffron Thistle (*Carthamus lanatus*). Indigenous species were spear grass, wallaby grass, and wheat grass, Indigenous species cover approximately 5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
3,4	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue (Vulpia spp.), *rye grass *(Lolium* spp.), *hairgrass, *bent and *thistle (*Cirsium* spp.). Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately 5-10% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
5	Gully reedland/sedgeland	Drainage riparian area dominated by introduced pasture grasses with a minor element of common indigenous grass species. Two very large indigenous trees present along drainage line. More common species were *Phalaris, *feather grass *(Pennisetum* spp.) and *bent. Indigenous species were a scattering of Red-leg Grass (*Bothriochloa macra*) and wallaby grass, Indigenous species cover approximately 5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Avoid impacts on two large eucalypts if practical (see Figure 1 for tree locations)
6	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses. Recently ploughed and sown to pasture. More common species were *Phalaris, *fescue and *bent. No indigenous species observed.	Low Condition	Nil	Nil - vegetation in low condition	Nil
7	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue (Vulpia spp.) and *rye grass. Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately <1% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil

Vegetation unit	Vegetation type	Description	^Vegetation condition	Listed communities or habitat for listed species	Offset requirements	Avoidance recommendations
8	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *hairgrass, *bent and *Saffron Thistle. Indigenous species were spear grass, Weeping Grass and wallaby grass, Indigenous species cover approximately 10% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
9	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *rye grass, *hairgrass, *bent and *Saffron Thistle. Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately 5-10% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
10	Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands	Occurred on basalt ridgeline and slope. Numerous indigenous trees in patch, vast majority were Snow Gum (*Eucalyptus pauciflora* subsp. *pauciflora).*Overall Snow Gum canopy cover was <5%. Understorey dominated by introduced shrubs, such as Sweet Briar (*Rosa rubiginosa*) and Hawthorn (*Crataegus monogyna*), with a thin scattering of indigenous Silver Wattle (*Acacia Meansii*). Ground layer dominated by introduced species, such as *Phalaris, *fescue, *rye grass, *Sheep Sorrell and *Saffron Thistle. Indigenous species were spear grass, wallaby grass, Weeping Grass and a scattering of Native Raspberry (*Rubus parvifolius*) and geranium *(Geranium* spp.). Indigenous understorey species cover approximately 5-10% overall.	Low Condition	Loosely qualifies as TEC: *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western slopes bioregions* (Tablelands Snow Gum Grassy Woodland)	Unlikely, vegetation in low condition	Avoid entire patch if possible (see Figure 2), as possible implications regarding impacts on TEC
11	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *rye grass, *hairgrass, *Saffron Thistle and *Catsear (*Hypochaeris radicata*). Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately 5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
12	Gully reedland/sedgeland	Drainage riparian area dominated by introduced species with a minor element of common indigenous graminoid species. More common species were *Phalaris, *Tall Fescue (*Festuca arundinacea*) and *cress *(Rorippa* spp.). Indigenous species were Cumbungi (*Typha* spp.), Schoenoplectus *(Schoenoplectus* spp.) and spike sedge (Eleocharis spp.), Indigenous species cover approximately 5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
13,14	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *hairgrass, and *Soft Brome. Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately 5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil

Vegetation unit	Vegetation type	Description	^Vegetation condition	Listed communities or habitat for listed species	Offset requirements	Avoidance recommendations
15,17	Improved pasture	A total of 6 indigenous scattered trees present (sum for both zones). Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *hairgrass and occasional broad-leaf weeds. Indigenous species were spear grass and wallaby grass, Indigenous species cover approximately 10% overall.	Low Condition	Nil	Nil - vegetation in low condition	Avoid impacts on scattered indigenous trees if practical (see Figure 2 for tree locations)
16	Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	Small stand of indigenous Brittle Gum over understorey composed entirely of introduced *Phalaris.	Poor	Nil	Likely requires offsetting if impacted on, as not in Low Condition owing to canopy cover	Avoid impacts on patch if practical
18	Improved pasture	Indigenous trees absent. Improved pasture, entirely composed of introduced pasture grasses. More common species were *fescue, *rye grass, *hairgrass and other introduced annual grasses. No indigenous species were recorded.	Low Condition	Nil	Nil - vegetation in low condition	Nil
19,22,23	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *Phalaris, *fescue, *hairgrass, *bent and *Saffron Thistle. Indigenous species were wallaby grass, Indigenous species cover approximately <5% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
20	Gully reedland/sedgeland	Drainage riparian area dominated by introduced species with a minor element of common indigenous graminoid species. More common species were *Phalaris, *feather grass, *Tall Fescue and *cress. Indigenous species were Cumbungi (*Typha* spp.), Schoenoplectus, rush *(Juncus* spp.) and spike sedge (Eleocharis spp.), Indigenous species cover approximately 20-30% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
21,24	Improved pasture	Indigenous trees absent. Improved pasture dominated by introduced pasture grasses with a minor element of common indigenous grass species. More common species were *fescue, *hairgrass, *bent and *Saffron Thistle. Indigenous species were wallaby grass, spear grass and wheat grass, Indigenous species cover approximately 10-15% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil
25	Gully reedland/sedgeland	Drainage riparian area dominated by introduced species with a minor element of common indigenous graminoid species. More common species were *Phalaris, *feather grass, *Tall Fescue and *cress. Indigenous species were Schoenoplectus and rush. Indigenous species cover approximately 15-20% overall.	Low Condition	Nil	Nil - vegetation in low condition	Nil

* = Introduced species; ^ = Vegetation condition according to criteria in Section 3.2.1 above.

4.3. Tree surveying

A total of 12 scattered indigenous 'paddock' trees were recorded during the field assessment. These were all eucalypts and would have comprised the canopy layer of the former woodlands and forests of the area. Their locations in the study area are presented in Figure 1 and 2. None of these eucalypts were listed threatened species and while some were hollow bearing, they were considered of little value to hollow dependant fauna, owing to their isolation from treed areas.

A number planted tree rows were also recorded in the study area. These comprised introduced pines and Cyprus as well as indigenous and non-indigenous eucalypts and wattles.

4.4. Threatened ecological communities

Analysis of the current database searches revealed that since the most recent documented database searches were undertaken by Biosis in 2009, an additional listed threatened ecological community had the potential to occur in the study area. This was *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western slopes bioregions* (Tablelands Snow Gum Grassy Woodland), listed as endangered under the TSC Act.

Vegetation Unit 10 comprised elements of the Tablelands Snow Gum Grassy Woodland community, i.e. position in landscape and the presence of one of the key eucalypt species — Snow Gum. It was however in a highly degraded state and was considered to be in Low Condition, according the community condition criteria in Section 3.2.1 above. It is therefore considered unlikely that the vegetation comprising Unit 10 qualifies as the Tablelands Snow Gum Grassy Woodland community. However, as there are no published qualifying criteria thresholds for this community, it cannot be ruled out as qualifying as the community.

None of the vegetation in the study area met the descriptions of any of the other threatened communities listed in Table 2.

4.5. Threatened flora species

All of the 61 flora species listed under the EPBC Act and TSC Act in Table 4 are considered unlikely to occur in the study area due to a lack of suitable habitat.

5. IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

Removal or disturbance to any of the Improved Pasture or Gully Reedland/Sedgeland vegetation units to facilitate construction of the wind farm should be of little consequence, as the OEH are unlikely to require any compensation (offsetting) for such removal, given that these vegetation units are in Low Condition and of little value for biodiversity. As such, there are no recommendations for avoiding this vegetation, other than demonstrating appropriate consideration for minimising impacts on the watercourses affected (where Gully Reedland/Sedgeland units occur).

Scattered paddock trees in the Improved Pasture or Gully Reedland/Sedgeland vegetation units should be avoided where practical, as these indigenous trees do have value for biodiversity, particularly owing to their rarity in the study area. The OEH may require compensation for removal of any of these trees.

Vegetation Unit 16 (Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands) should be avoided where practical, as OEH will likely require compensation for any impacts on this unit. According to the current wind farm layout, this unit should be easily avoidable.

Vegetation Unit 10 (Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands) should also be avoided where practical, as the OEH may consider any impacts on this unit as an issue requiring further consideration, given its affinity with the threatened Tablelands Snow Gum Grassy Woodland community. As a requirement of this investigation, an area of approximately 250 metres from the proposed infrastructure at this location was investigated and the vegetation within mapped and characterised (see Figure 2). This additional area supported Improved Pasture in Low Condition, providing ample scope for avoiding Vegetation Unit 10.

OEH's response to the Modification to Consent (provided as Appendix 1 to this report) requires an assessment of significance for any Tablelands Snow Gum Grassy Woodland community identified in the study area, impacts on which may subsequently require a Species Impact Statement (SIS). Provided it can be demonstrated that Vegetation Unit 10 will be avoided and protected, there will be no need for such a requirement in relation to the [potential] Tablelands Snow Gum Grassy Woodland community.

It is recommended that Vegetation Unit 10 (Snow Gum - Candle Bark grassland/woodland of the South Eastern Highlands) be avoided by re-routing the access track around this vegetation and through improved pasture.

Provided that the mitigation measures outlined in BL&A's Mod-2 supplementary ecological impact assessment (BL&A 2016a) and the Turbine Micrositing Management Plan (BL&A 2016b) are implemented, this assessment should satisfy OEH's concerns in their response to the Modification to Consent.

6. REFERENCES

Biosis Research (2009), *Crookwell 2 Wind Farm – Modifications to DA-176-8-2004-I Ecological Assessment*, prepared for Robert Luxmoore Pty Ltd on behalf of Union Fenosa Wind Australia Pty Ltd by Biosis Research, January 2009.

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URS 2004a, *A Survey and Impact Assessment of the Terrestrial Flora and Fauna of the Proposed Crookwell 2 Wind Farm*, prepared for Wind Farm Joint Venture by URS, July 2004.

URS 2004b, *Crookwell 2 Wind Farm: Environmental Impact Statement*: Volume 1 Main Report, Volume 2 Appendices and Volume 2A Appendices", July 2004.

Appendix 1: OEH's response to the Modification to Consent for Crookwell 2 Wind Farm (dated 14/11/2016)

NSW GOVERNMENT | Office of Environment & Heritage

DOC16/507736-17

Resource Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001
Attention: Elle Donnelley elle.donnelley@planning.nsw.gov.au

Dear Ms Donnelley

Crookwell 2 Wind Farm – DA 176-8-2004-I – Modification to consent

Thank you for providing the Office of Environment and Heritage (OEH) with the opportunity to provide comment on the above mentioned modification application, received by OEH on 7 October 2016. I note that the application is seeking to reduce the number of turbines from 46 to 33, increase the blade tip height from 128 to up to 160 metres, increase the turbine rotor diameter from 96 to up to 130 metres, the inclusion of a 50 metre siting allowance, and changes to lighting and telecommunications infrastructure. OEH understands that this will result in the total wind farm RSA increasing by 32% with a lower minimum RSA height of 30m.

OEH has reviewed the modification application, in particular the Environmental Assessment, and has concerns about the following;

- The increased impact of the modification on bird and bat strike and no site specific assessment of the risks to both birds and bats located on the site from the RSA increase.
- The lack of current assessments of significance based on the proposed modifications.
- OEH prefers that micro-siting does not occur as it is preferable for the proponent to identify all site constraints in the planning phase, and considers that the micro-siting has the potential to increase the impacts on biodiversity values. We don't consider that these have been adequately addressed in the Micro-siting Biodiversity Management Plan, in particular the assessment of appropriate buffer distances from vegetation and raptor nests.
- There have been no on site biodiversity surveys since 2004 for fauna (which were undertaken during a prolonged drought) and since 2009 for vegetation.
- There is reference to the lower minimum RSA height of 28m in the Executive Summary of the Supplementary Ecological Impact Assessment (Supplementary EIA).
- The Bird and Bat Adaptive Management Program (BBAMP) should be prepared and implemented before construction starts, and should include 12 months of pre-construction surveys.
- It is unclear which paddock trees will be removed, and why they need to be removed.

Insufficient information has also been provided to be able to assess the impact of the modification on Aboriginal Cultural Heritage. Before we can provide comments we require:

- A map showing the location of the remaining turbines, cabling, lay down areas and access tracks in relation to the known archaeological sites.

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- Clarification as to whether archaeological sites were actually impacted under previous permits.
- Commencement of a new process of Aboriginal consultation.
- Development of an Aboriginal Heritage Management Plan (AHMP) prior to construction.

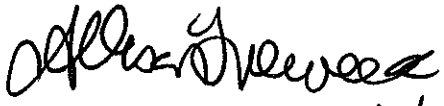
Given the above concerns, OEH recommends that the proponent provide further information as set out below;

1. Carry out s5A assessments of significance (7 part tests rather than the outdated 8 part tests) for each species listed in Attachment B, that take into consideration the increase by 32% of the total wind farm RSA), the increase in the footprint of individual turbines, as well as the impact from the proposed microsite allowance of 100m diameter.
2. A Bird and Bat Risk Assessment detailing potential impacts on all at risk birds and bats should be carried out which including the impact on raptors.
3. Clarify that the lower minimum RSA height is 30m, not 28m.
4. The BBAMP should be prepared in consultation with OEH, implemented prior to construction and include at least 12 months of pre development surveys.
5. Provide justification as to why micro-siting needs to occur rather than detailed assessments as part of the MOD application. The Micro-siting Biodiversity Management Plan should include information on how buffer distances will be calculated in accordance with the Natural England Technical Information Note TIN051.
6. Provide justification for the removal of paddock trees and a map showing where they are located. OEH considers that given the lack of trees on the site it should be possible to site the turbines away from any paddock trees.
7. Consultation with OEH on the preparation of the Construction and Operation Fauna and Flora Management Plans.

Further information on our concerns and recommendations in relation to Aboriginal Cultural Heritage is detailed in Attachment A and Biodiversity in Attachment B.

If you would like to discuss the above comments further, please contact Lyndal Walters on 02 6229 7157 in relation to biodiversity matters and Sarah Robertson on 02 6229 7088 in relation to Aboriginal cultural heritage matters.

Yours sincerely



ALLISON TREWEEK 14/11/16
Senior Team Leader, Planning - South East
Regional Operations Group
OFFICE OF ENVIRONMENT AND HERITAGE

Attachment A – Aboriginal cultural heritage matters for Crookwell 2 wind farm

The location of laydown areas, cabling and access tracks have not been mapped in relation to archaeological sites. We cannot assess the impact of a 50m micro-siting radius and change in laydown design on Aboriginal cultural heritage without seeing this information mapped. To avoid confusion, please only include the remaining turbine locations on this map.

Consents to harm (#2339, #2440 and AHIP # 1122895) have previously been issued for the archaeological sites that have been identified to occur within a 50m radius of the proposed MOD-2 turbine locations. However, these sites are still listed as valid on AHIMS (table 1 below). It must be clarified whether the sites were actually impacted under these permits. Until it can be demonstrated otherwise, we must assume that these sites have not been impacted. However, if it is established that they have been harmed then Aboriginal Site Impact Recording Forms (ASIRFs) must be submitted to AHIMS. If the sites have not been impacted then they must be avoided.

AHIMS #	Site name	Validity status
51-6-0217	PJ 29	Valid
51-6-0218	PJ 10	Valid
51-6-0229	PJ 21	Valid
51-6-0323	PJ 28	Valid
51-6-0325	PJ 30	Valid
51-6-0328	PJ 33	Valid
51-6-0329	PJ 34	Valid
51-6-0330	PJ 35	Valid
51-6-0331	PJ 36	Valid
51-6-0332	PJ 37	Valid
51-6-0333	PJ 39	Valid
51-6-0334	PJ 40	Valid
51-6-0338	PJ 44	Valid
51-6-0340	PJ 46	Valid
51-6-0343	PJ 49	Valid
51-6-0682	PJ 54	Valid
51-6-0683	PJ 55	Valid

Table 1: Valid sites on AHIMS that have been identified to occur within 50m of MOD-2.

We advise that you recommence consultation with relevant Aboriginal knowledge holders since to the best of our knowledge, they have not been consulted with since 2011. Also, an Aboriginal Heritage Management Plan (AHMP) must be developed in consultation with Aboriginal knowledge holders and OEH as recommended by Biosis in 2004 to determine how best to manage and mitigate impacts to Aboriginal cultural heritage and develop an unexpected finds procedure. These strategies must be developed prior to construction. The Plan must be informed by the results of previous archaeological surveys and test excavations. In addition, the location of all archaeological sites must be mapped with clear labels and boundaries of each site defined with a polygon.

We support the recommendation of Bowen Heritage that where vehicle access track locations are to be modified from their originally proposed route or the Mod-1 route, further archaeological investigation in the form of desk top study and field survey investigation will be required.

Appendix B – Biodiversity matters for Crookwell 2 wind farm

Supplementary Ecological Impact Assessment (EIA) of MOD 2

OEH notes that the Supplementary EIA is a desk top study only. However, given the age of the previous surveys we are concerned that a desk top assessment is not sufficient to determine the full impact of the proposed changes on the current biodiversity values of the site. These changes include;

- RSA from 7235m2 (MOD 1) to 13,267m2
- maximum height of 130m
- minimum RSA height of 30m

The EIA is relying on survey data that is up to 12 years old with fauna being last surveyed in 2004 and vegetation surveyed in 2004 and again 2009.

As there is such a long period from the last surveys and that the fauna surveys were done during an extended drought period, OEH considers that these surveys should not be solely relied upon to determine impacts from the modification proposal, and does not agree with the conclusion in the Supplementary EIA that field work was not necessary due to the lack of significant flora and fauna issues for the project As a result of several years of normal and above normal rain, Pejar dam is now at capacity this will have a significant influence on the bird and bat fauna utilising the site and has not been taken into consideration.

Assessment of Significance

OEH notes that there have been changes to the assessment of significance from the original consent in 2005 from an 8 part test to a 7 part test under section 5A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It is not satisfactory to have a table showing the differences between the 7 and 8 part tests. OEH considers that new assessments should be undertaken which take into consideration the following;

- the increase by 32% of the total wind farm RSA,
- the increase in the footprint of individual turbines, as well as
- the impact from the proposed microsite allowance of 100m diameter.

The proponent should also note that an additional Endangered Ecological Community (EEC) was listed in 2011. The EEC is *Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions* (Tablelands Snow Gum Grassy Woodland). As Figure 11-2 dated 21 July 2004 shows Manna gum snow gum woodland on site, it is likely that this vegetation type constitutes the EEC and an assessment of significance should be completed.

OEH considers that assessments of significance should be completed for the following threatened species and EECs;

- Regent Honeyeater
- Diamond Firetail
- Speckled warbler
- Hooded robin
- Brown treecreeper
- Gang gang cockatoo
- Swift parrot
- Grey-headed flying fox
- Yellow bellied sheathtail bat
- Large-eared pied bat

- Eastern falsistrelle
- Eastern bent-wing bat
- Eastern greater long-eared bat
- Greater broad-nose bat
- White Box Yellow Box Blakely's Red Gum Woodland
- Tablelands Snow Gum Grassy Woodland

Bird and Bat Risk Assessment
OEH notes that initial re-siting of turbines provides a better long term result for the project and is ultimately a cheaper alternative than having turbine shut down periods.

The supplementary EIA states that this modification has the potential to increase impacts on raptors and bats, particularly the wedge-tailed eagle, as the they more often fly at and above upper RSA height and are known to be vulnerable to collision with operating wind turbines. All 'at risk' raptors are significant due to the importance of high order predators in the ecosystem.

In addition, the previous fauna surveys were undertaken during a prolonged drought period and as such it is likely that now there will be greater numbers of birds such as pelicans and swans, which will be using water bodies in the area such as Pejar Dam.

A detailed Bird and Bat Risk Assessment should be completed to assess the collision risks that result from an increase in the total RSA of the site. This document should include;

1. Information on wind farm operation impacts on birds and bats including site factors
2. Risks associated with habitat resources on the site such as vegetation, waterways including Pejar Dam, migration corridors
3. Turbine parameter risks including total rotor swept area (RSA) and RSA height
4. Turbine layout risks including spatial arrangements of turbines
5. Species risk assessment including risk methodology and species specific risk assessment results
6. Recommendations and conclusions considering landscape position and proximity to vegetation communities.

This risk assessment can help inform the location and frequency of surveys and monitoring for the BBAMP.

BBAMP
OEH notes that there is a Bird and Bat Adaptive Management Plan (BBAMP) required by the previous conditions of consent (condition 83 2005 consent).

OEH considers that to complement this condition, at least 12 months of baseline surveys should be undertaken prior to construction, and that the BBAMP should be prepared in consultation with OEH. This is reflective of current OEH recommendations for any new wind farms and OEH is happy to work with the proponent to develop the BBAMP. The proponent should note that OEH is currently drafting a guideline for BBAMP development.

This is particularly important as there will be an increase in the risk of bird and bat strike due to the changes to the size of the RSA as outlined in the EIA, page 2 of the supplementary EIA specifically states that 'any net increase in the extent of the RSA may result in an increase in bats exposed to a risk of fatal collision with the rotating turbines".

In addition, the BBAMP should address the proposed changes to the lighting and should be considered in line with current best practice for reducing the impact on birds and bats.

Turbine Micro-siting Biodiversity Management Plan (TMBMP)
The proponent should provide justification why micro-siting is necessary, particularly as it wasn't considered for the original consent or MOD 1. The document *Wind Energy: Assessment Policy Draft for Consultation August 2016* advises that micro-siting can be allowed for, provided it does not materially increase environmental impacts. It also suggests that micro-siting may be considered if a development envelope is used to site turbines in, and that if this format is proposed the proponent must assess the effect in the EIS.

Although there has been a reduction in the number of wind turbines, the turbines that remain have a greater total RSA. This means that the larger blades are closer to tree canopies and habitat. The risk of injury and death to threatened species still exists, and there may be an increased risk to some species.

The full potential impact of a micro-siting allowance should be considered using the assessments of significance, the Bird and Bat Risk Assessment and the overall impacts on biodiversity values of the site. This would include considering location proximity to trees, in particular hollow bearing trees, and raptor nests. The proponent should detail these considerations on a map which also shows the MOD 1 turbine locations, the 100m radius around each and then the impact of the turbine placement within each of those radii.

The TMBMP should reference the Natural England Technical Information Note TIN051, and consider locations of raptor nests and threatened species in those calculations.

Other management plans
OEH notes that the original conditions of consent require both Construction Flora and Fauna Management Sub Plan and an Operation Flora and Fauna Management Plan, and requests that we are consulted in the preparation of these plans.