

30 November 2018



Mike Young  
Director of Resource Assessments  
Department of Planning and Environment  
Sydney NSW 2000

Dear Mr Young,

**Re: Crudine Ridge Wind Farm – Section 4.55 Modification**

Crudine Ridge Wind Farm (the **Project**) has been approved as a State significant development in accordance with section 89E of the *Environmental Planning and Assessment Act 1979* (the **EP&A Act**) (as it then was). Approval for the Project (SSD-6697) was issued on 10 May 2016 (**Development Consent**), permitting the construction and operation of up to 77 wind turbine generators (**WTGs**). The Project commenced construction on 2 August 2018.

CWP Renewables Pty Ltd, on behalf of CRWF Nominees Pty Ltd (the **Proponent**), has prepared this application to modify the Development Consent under section 4.55(1A) of the EP&A Act (the **Modification**). The purpose of the Modification is twofold:

1. A reduction in the number of WTGs and ancillary infrastructure; and
2. Incorporation of a revised road design for Aarons Pass Road (**APR**) (**Revised Design**).

The proposed modifications are summarised in the accompanying sections of this letter and associated appendices.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'E Mounsey', written in a cursive style.

**Edward Mounsey**  
Chief Operating Officer  
CWP Renewables Pty Ltd

Crudine Ridge Wind Farm  
**Application for Modification**  
Environmental Assessment



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## 1. Introduction & Background

Crudine Ridge Wind Farm (the Project) is an approved wind farm under-construction approximately 45 km south of Mudgee in NSW within the Mid-Western Regional Council (MWRC) and Bathurst Regional Council (BRC) areas. The Project commenced development in 2011 following site identification in 2008 and subsequent on-site wind monitoring assessments. The initial Project Environmental Impact Statement (EIS) lodged in 2013 included a Project design comprising 106 wind turbine generators (WTGs) of up to 160 m in tip height to accommodate the breadth of WTG capacities that were available in the market at that time.

CWP Renewables Pty Ltd, on behalf of CRWF Nominees Pty Ltd (the Proponent), has prepared this application to modify the Development Consent under section 4.55(1A) of the EP&A Act (the Modification). The application for Modification has been prepared in accordance with the *Draft Environmental Impact Assessment Guidance Series: Modifying and Approved Project* (DPE 2017).

### 1.1 SSD Consent

State Significant Development Consent (SSD-6697) was issued on 10 May 2016 for the construction and operation of up to 77 WTGs. The Development Consent stipulates that no WTGs may be greater than 160 m in height in schedule 2 condition 6. The EIS prepared for the Project evaluated WTGs up to 160 m to tip and noted that final WTG selection would be undertaken following Project approval under competitive tender. The 77 approved WTGs are shown in Figure 1.

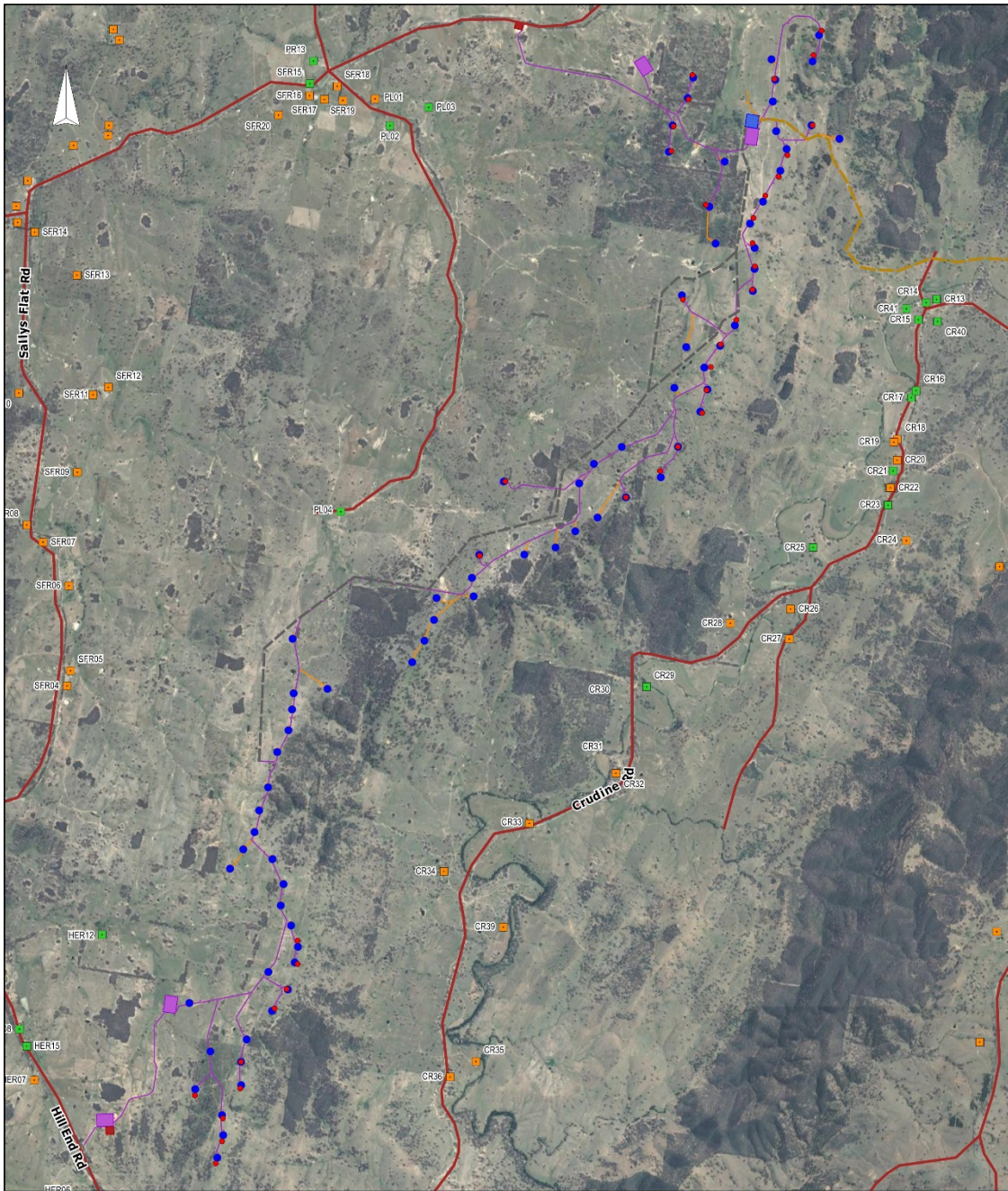
Significant improvements in WTG technology have occurred since the initial Project assessment and the EIS documentation was submitted. WTG technology has evolved towards longer blade lengths and taller towers to increase generation and therefore electrical production. The increase in electricity production results in a lower levelized cost of energy and assists the NSW Government to meet the objectives of the *NSW Renewable Energy Action Plan* (2013) and the NSW 2021 Plan of reaching a renewable energy target of 20 % by 2020.

As such, construction commenced on 2 August 2018, comprising a Project of 37 WTGs, each with a generating capacity of 3.63 MW, a 91.5 m hub height and 137 m diameter rotor, and a total height of 160 m (from ground to blade tip). The WTGs are therefore in accordance with the Development Consent, and generally in accordance with the EIS, as required in schedule 2, condition 2. Consequently, and for the purposes of section 4.55 of the EP&A Act, the Project is substantially the same Project and the Modification is to be assessed as a Type 2 Modification.

### 1.2 EPBC Act Approval

EPBC Act Approval (EPBC 2011/6206) was issued on 4 April 2017 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) permitting up to 37 WTGs to be constructed within 57 of the 77 WTG locations approved under the Development Consent. The 37 WTGs which are planned to be constructed are shown in Figure 1.

Figure 1: Approved 77 WTG layout and the micro-sited 37 WTG layout to be constructed



LEGEND		COMPANY	
● 37 WTG Micro-sited Layout	— Internal Overhead Transmission Line	CRWF NOMINEES PTY LTD	
● 77 WTG Approved Layout	— External Overhead Transmission Line		
— Micro-sited Layout - Internal Roads	■ Collector Substation Options	TITLE	
— Approved Layout - Internal Roads	■ Site Compound Options	FIGURE 1: 77 & 37 WTG OVERVIEW	
■ Non-involved Residence	■ Rock Crushing & Batching Plant Options	DATE	SCALE
■ Involved Residence		21 NOV 2018	1:55000
SCALE BAR		DWG NO	REV
0 ————— 4 km		CRU297	A
		CHECKED BY	VER
		M BRANSON	1
		SHEET	SIZE
		1 OF 1	A3
		JOB NO	
		080401	

## **1.1 Pre-construction Requirements**

The Project entered a pre-construction phase in early 2018 in which the pre-construction minor works were undertaken including geo-technical study, land survey and further environmental surveys. The pre-construction conditions of the Development Consent and EPBC Act Approval were addressed in consultation with the relevant authorities. Management plans were prepared and approved by the NSW Department of Planning and Environment (DPE) and final layout plans and notifications were sent to the relevant authorities and stakeholders.

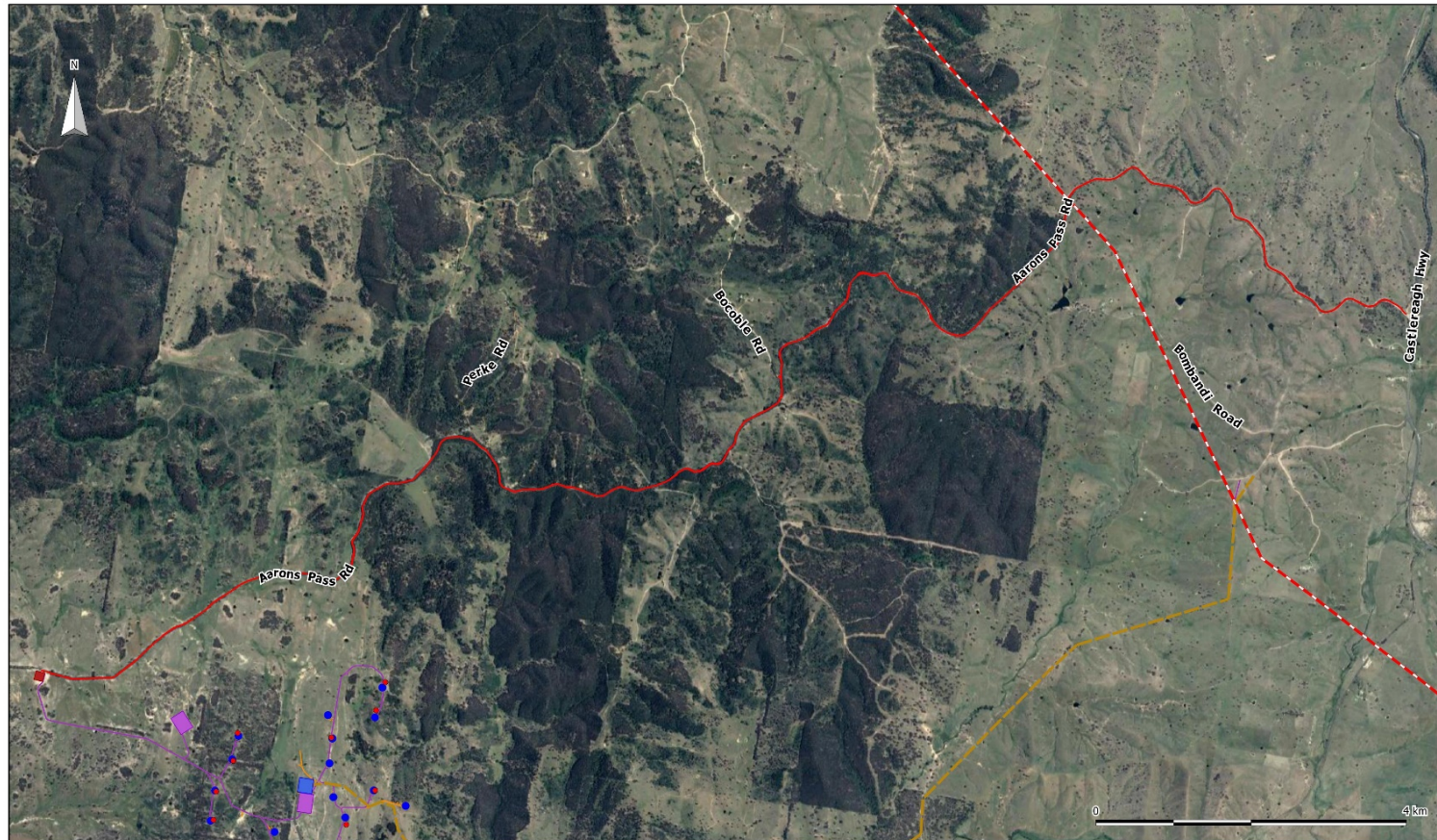
Notably, with regard to this Modification, the Traffic Management Plan (TMP) involved consultation with both MWRC and BRC, as well as the NSW Roads and Maritime Service (RMS), and incorporated a supplementary OSOM transport route (the Southern Route) to avoid passage through Gulgong and Mudgee, therefore minimising impacts to residents and urban Council roads.

The TMP also included detailed design for a rural Council road (APR) to better accommodate delivery of OSOM components associated with the Project (the Improved Design). APR is shown in Figure 2. The approved TMP (Section 5.1.1) outlines the steps CRWF Nominees Pty Ltd (the Proponent) took in developing the Improved Design in consultation with MWRC. In July 2018, the Project contractors obtained section 138 (s138) approval from MWRC for works to APR, and subsequently commenced works in accordance with the approved TMP and s138 approval on 2 August 2018.

Construction works have commenced on APR in accordance with Appendix 6 of the Development Consent and the s138. These works are expected to be completed in early 2019.



Figure 2: Aarons Pass Road



LEGEND

- 37 WTG Micro-sited Layout
- 77 WTG Approved Layout
- Micro-sited Layout - Internal Roads
- Approved Layout - Internal Roads
- Internal Overhead Transmission Line
- External Overhead Transmission Line
- 132 kV Transmission Line
- Collector Substation Options
- Site Compound Options
- Rock Crushing & Batching Plant Options
- Proposed APR Upgrade

COMPANY		<b>CRWF NOMINEES PTY LTD</b>			
TITLE					
<b>FIGURE 2: AARONS PASS ROAD</b>					
DATE	SCALE	DWG NO	REV	VER	
21 NOV 2018	1:49000	CRU298	A	1	
DRAWN BY	CHECKED BY	SHEET	JOB NO	SIZE	
B KRONENBERG	M BRANSON	1 OF 1	080401	A3	

## **1.2 OSOM Transport Options**

### **1.2.1 Traffic and Transport Assessment**

The EIS included a Traffic and Transport Assessment undertaken by Samsa Consulting (2012) which evaluated over-size over-mass (OSOM) transport options for the Project. A range of OSOM access routes were evaluated based on the existing road conditions, the equipment specifications available in the market at the time, and the predicted number of OSOM movements for 106 WTGs. The EIS identified two site entrances and two major transport options (northern and southern).

The preferred northern site access route identified in the EIS was from Castlereagh Highway, Hill End Road, Windeyer Road, Pyramul Road, turning left into Aarons Pass Road. The preferred southern access route identified in the EIS was via Bathurst travelling north on Turondale Road, turning left onto Hill End Road to the southern site entrance. Following the public exhibition of the EIS a number of submissions were received on the preferred OSOM transport routes, including community members in the Pyramul area, and a submission from MWRC in relation to the northern site access option along Hill End Road, Windeyer Road and Pyramul Road.

A further Transport Assessment was undertaken (Samsa 2013) for the PPR to address the submissions, including evaluation of two access routes through Mudgee using Castlereagh Highway and local roads, before travelling south on Castlereagh Highway and turning right onto Aarons Pass Road to the northern site entrance. Although APR was not the initial preferred access route to site, the Proponent heard the concerns the community raised in relation to traffic and transport along the access route and adjusted the proposed transport route to utilise APR for all OSOM transport. The Proponent engaged Downer to undertake a Route Survey and Upgrade Assessment (Downer 2013), as well as a Passing Bay Assessment for APR which was assessed for ecological and heritage values along the route.

The assessments undertaken at the time of the study used the specifications of OSOM components and equipment available in the market at the time. As a result, the Development Consent permits all OSOM equipment to be transported to the site via the northern site entrance, using Castlereagh Highway and Aarons Pass Road.

### **1.2.2 Improved Design**

Following the Development Consent the Proponent engaged with MWRC over approximately 18 months to develop the scope and costing for the APR upgrades and it was initially intended that MWRC would undertake the roadworks. At a meeting between MWRC and the Proponent on 4 May 2017, it was concluded that the table of requirements in Appendix 6 of the Development Consent was inadequate for MWRC to accurately scope and cost the roadworks and a detailed design was required. Appendix 6 was used as a minimum set of requirements for the roadworks scope and the foundation for a detailed civil design package created in accordance with the Austroads Standards to MWRC satisfaction.

As the Project progressed towards financing in 2017 a detailed survey and design process commenced to generate a detailed 2D design to accommodate the OSOM equipment specifications being offered in the market. The design and functional specifications were targeted at addressing the key community concerns of road safety (by improving visibility, corner easing and passing opportunities), dust minimisation (by procuring gravel of higher grade than is currently being used along APR), and

traffic minimisation by procuring gravel and water from the wind farm site, and reducing the number of WTGs and therefore OSOM traffic movements along APR. This “Improved Design” developed in consultation with MWRC incorporated the upgrades required in Appendix 6 of the Development Consent including improvements to the culverts and drainage structures.

### **1.2.3 Traffic Management Plan**

In parallel with the workstream above the Proponent engaged with MWRC, BRC and NSW Roads and Maritime Services (RMS) to develop the TMP in accordance with schedule 3, condition 32.

Through this engagement the Proponent worked with the roads authorities to identify a supplementary OSOM transport route which would reduce traffic impacts associated with passage of OSOM vehicles through Gulgong and Mudgee. The route involved transport entirely along state roads from the Port of Newcastle via M1 and the Great Western Highway to the intersection of Castlereagh Highway and APR. The intention of this change was to minimise impacts to residents and urban Council roads along the northern route as a community mitigation measure, in response to ongoing feedback from MWRC and the community. In accordance with schedule 3, condition 32 of the Development Consent, the Proponent secured the agreement of the applicable roads authority for use of the Southern Route for OSOM transport.

A number of iterations of the TMP were developed to incorporate comments and feedback from the applicable road authorities to ensure that all requirements were addressed. The TMP which included the Improved Design as well as the Southern Route was subsequently approved by DPE on 15 December 2017.

### **1.2.4 Detailed Design**

Following selection of the WTG to be installed for the Project, and once the component specifications and engineered transport requirements were available, further detailed design of APR was undertaken to generate a 3D model of the design. Some route constraints were identified along APR for longer blades due to the turning radius and vertical clearance requirements identified by the Project contractor for the WTG blades.

Three options were identified in a route study to address the OSOM constraints:

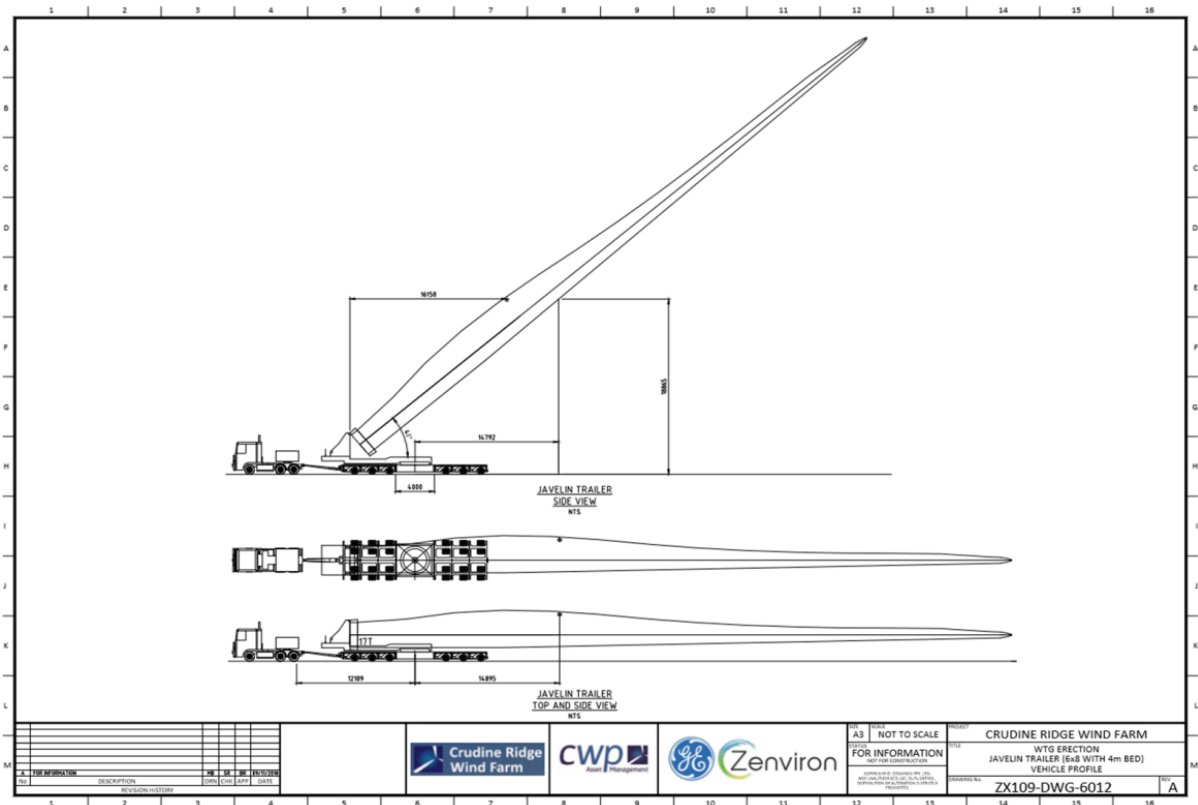
1. Use of a “Javelin Trailer” to transport blades along APR which would be accommodated within the permitted clearance limits of the Development Consent, but would require trimming of overhead vegetation along the route;
2. Use of an “Extendable Trailer” for blades which would require additional road upgrades including corner easing and crest works to accommodate blade overhang; and
3. Use of the original preferred route identified in the EIS involving Hill End Road, Windeyer Road and Pyramul Road.

Due to the community consultation undertaken throughout the EIS and PPR process, and the agreements reached with the applicable road authorities in relation to use of the Southern Route for OSOM transport, Option 3 above was not investigated further. Options 1 and 2 are considered further below.

### 1.2.5 Javelin Trailer Option

The Javelin Trailer option would involve the attachment of the blade to a specialised articulated trailer towed by a prime mover, as depicted in Image 1. The blade can be raised, lowered and manoeuvred to enable the blade to avoid contact with obstacles along a complex route. Javelin trailers are typically adopted for very complex terrain including steep switchbacks or highly constrained topography and require unimpeded overhead clearance in areas of restricted lateral movement.

**Image 1: Example of a Javelin Trailer**



The Javelin Trailer option would enable the WTG blades to be transported to the northern site entrance along Aarons Pass Road within the permitted vegetation clearance limits. However due to the vertical clearance requirements, trimming of vegetation along the length and breadth of the existing roadway would be required. Although trimming of vegetation is identified as a requirement in the EIS and PPR, the extent of overhead trimming is expected to be greater than that required for the Extendable Trailer option.

The Javelin Trailer is also considered to be a significantly slower transport option for APR which would increase traffic congestion and delays to the small number of road users on APR. This option would add to the traffic delays along APR and complicate the delivery process requiring additional traffic controls to be put in place, as well as logistical complications for turbine delivery and erection. For these reasons the Javelin Trailer option is considered to be less preferred than the Extendable Trailer option which is described below.



### 1.2.6 Extendable Trailer Option

The Extendable Trailer option involves standard blade transport trailers with a series of articulated rear axles which enable transport of long loads through tight and complex road networks. These trailers are used as standard in the Australian wind farm construction industry, as depicted in Image 2.

**Image 2: Example of an Extendable Trailer in use at Sapphire Wind Farm**



The Extendable Trailer option would involve use of a single trailer for each blade from the Port of Newcastle to the northern site entrance. This option was selected as the preferred OSOM transport option as it would involve fewer logistical complications causing less traffic and transport impacts for the local community, would be a faster vehicle traversing APR and would require substantially less trimming of overhead vegetation along the length of APR. The option would require an area of 5.05 ha of native vegetation clearing along APR, additional to the 1.54 ha of clearing identified within the PPR. This option has been used as the basis of the Revised Design discussed in Section 2, as assessed in the technical reports and summarised in Section 4.

## 2. Modification Application

The purpose of the Modification is twofold:

1. A reduction in the number of WTGs and ancillary infrastructure; and
2. Incorporation of a revised road design for APR.

A description of each of these aspects is provided below, and further considered in Section 4.

### 2.1 Reduction in WTGs

The proposed removal of WTGs and ancillary infrastructure is to provide certainty to stakeholders regarding the extent of the Project, including those in the community whom are affected by the development. In addition to the removal of WTGs, the associated hardstands, foundations, access tracks and cabling would be removed, as well as the Project switching station which will be embedded within the approved Project substation footprint. The reduction in WTGs and ancillary infrastructure would have an overall reduction in impacts to biodiversity, heritage, visual, noise (construction and operational) and traffic impacts compared to those assessed in the EIS and PPR.

This change would align the Development Consent with the EPBC Act Approval and limit the Proponent to install no more than 37 WTGs under both approval instruments. EPBC Act Approval was granted on 4 April 2017 for up to 37 WTGs which may installed at a selection of 57 locations. This change would see a reduction of 40 WTGs and 20 possible selection locations from the approved Project. Furthermore, it provides assurance to those affected by the Project that the Proponent is not planning to increase the number of approved WTGs by amending the EPBC Act Approval alone.

Appendix B provides the WTG centre-point coordinates for the approved 77 locations, identifying the 37 WTG locations to be installed under the Development Consent and the 40 which would be removed by the Modification. The 37 approved WTGs will be constructed within the micro-siting restrictions identified in schedule 2, condition 7 of the Development Consent. The two layouts are identified in Figure 1.

### 2.2 APR Revised Design

This Modification seeks to amend the clearing restriction along APR to facilitate the safe delivery of OSOM components to the Project site using the Revised Design, which has been prepared in accordance with the process described in the approved TMP. Roadworks required for the Revised Design (the Works) involve adjustments to the horizontal and vertical alignment, localised widening, and installation of culvert and drainage structures. The works will enhance visibility, increase safe passing opportunities, improve the overall road alignment and condition, and provide a safer roadway for all users during Project construction and beyond.

The Revised Design will require an additional area of 5.05 ha of native vegetation clearing along APR, beyond the 1.54 ha stated within the PPR. Key impact assessments have been undertaken for this clearing with mapping presented in the Biodiversity Development Assessment Report (BDAR; Appendix H), as summarised in Section 4. Despite the increase in localised impacts, total impacts to vegetation clearing will be reduced by approximately 31 ha under this Modification.

The works to deliver the Revised Design (the Works) will include detailed pre-clearance surveys and demarcation of biodiversity values in accordance with the procedures in the approved Biodiversity Management Plan (BMP). Once the pre-clearance works are completed, the first stage of the Works would involve design-specified vegetation clearance and pruning overseen by a qualified arborist. The second stage would see the commencement of cut and fill bulk earthworks and drainage installation in accordance with the Revised Design. The third stage would involve base course placement with material transported from the new quarry facility (Glenroy Quarry) located on APR for re-sheeting to improve the road base and surface gravel.

The material available from the Glenroy Quarry (as tested to date) has exceeded expected strength requirements with a low reactivity to moisture. The gravel has been sourced according to requirements of the functional specifications agreed with MWRC and will provide a higher-grade road base than the existing material used by MWRC on APR. This low reactivity and high strength provides resistance to wetting and drying cycles, increasing the longevity of the pavement material providing a benefit to MWRC operations and the immediate community. Importantly this material is expected to generate less dust than the existing road base used on APR and will therefore address one of the key concerns raised by the community during the consultation activities detailed in Section 3.

Completion of the Works for the Revised Design is not required until the blade transport is scheduled in mid-2019. The Works are anticipated to take between 8-12 weeks and would be scheduled and staged in consultation with MWRC as the applicable roads authority.

### **2.3 Key Considerations**

There are a number of important considerations which have been made in the development of this Modification by the Proponent in order to minimise the impacts of the proposed changes.

1. The reduction in WTG and ancillary infrastructure substantially reduces the vegetation clearing and other impacts associated with the development. The EIS identified 104.9 ha of clearing whereas the revised wind farm layout would reduce this impact by approximately 31 ha, after consideration of the localised 5.05 ha increased clearing along APR due to the Revised Design.
2. The Proponent commits to establish further environmental offsets to compensate for unavoidable impacts to the Revised Design. This is additional to the 674 ha biodiversity offset which was designed to offset both permanent and temporary impacts of the 106 WTG layout, as outlined in the Development Consent and the Biodiversity Offset Strategy, and shown in Appendix A.
3. Overall, the Modification is expected to reduce key impacts associated with the Project, in particular: visual, noise (construction and operational), biodiversity, heritage and traffic impacts as described in Section 4 and the associated appendices.
4. The Proponent has undertaken extensive and detailed consultation with key stakeholders and the community regarding design works for APR. This includes consultation with MWRC over approximately 18 months prior to the TMP being approved, a number of presentations to Council, direct landowner and neighbour consultation, as well as forums such as the Project CCC.

These considerations have been fundamental to the development of the proposed Modification to ensure that the Project can continue to deliver a net gain to the local community.

## 2.4 Project Benefits

The project expects to employ up to 240 people during the construction period with a large portion of the workforce being engaged from the local area. Although the project is still early in the construction phase of the 45 employees who are currently engaged on the project, 24 are from the local area. The Proponent is publicly advertising for a number of positions which they hope to fill with local people. To date \$3 million of contracts have been awarded to local businesses, which along with 45 employees now based in the Mudgee region contributing to the local economy through accommodation and retail spend.

Although the Project commenced construction in August, economic flow-on effects are already evident with business ramping up activity and increasing employment. These business are onboarding staff and purchasing equipment to support the Project activity. One local earthworks company employing local people as plant operators, truck drivers and administrative support has employed an additional 15 local employees full-time and committed to purchasing a number of machines (in excess of \$1.5 million spent in the local region) to cater with the increased long-term demands of the undertaking.

The Project provides an important function in diversifying the local economy which is largely dependent on the agricultural and mining industries, making the economy more robust, and providing greater opportunities for local suppliers and contractors. Feedback has been received from accommodation providers, hospitality businesses and transport providers looking to secure further ongoing work with many concerned about any slow down in activity. The project will be releasing further tenders for contracts in the near future for a range of companies through the Industry Capability Network.

In addition to the direct and indirect economic benefits, the Project will contribute over \$168,000 annually to the community funds established with MWRC and BRC, upon the commencement of Project operations. The Proponent finalised the Voluntary Planning Agreements with the two councils in August 2017, requiring that \$1,250 (indexed) for each MW installed in the government area, is contributed annually to the funds for the life of Project operations. These funds will provide significant boost to regional funding for community projects and grants administered by the councils in the local region.

## 2.5 Land Tenure

The amendment to reduce the number of WTGs and ancillary infrastructure does not result in a change to the land tenure associated with the wind farm infrastructure. This is largely owing to the removal of approved infrastructure within the existing development footprint, as opposed to an addition of any new infrastructure in the wind farm itself.

The Revised Design will involve nine (9) freehold properties and Crown Land adjacent to APR. Associated land tenure details are provided in Table 2.1. All required land use agreements are in place expressly permitting road upgrade works on the required lots, demonstrating the extensive and detailed consultation and engagement process undertaken with APR landowners between 2016 and 2018.

**Table 2.1: Land tenure associated with the Revised Design**

Tenure	Lot	DP
Freehold	9	246645
Freehold	140	756909
Freehold	144	756909
Freehold	154	756909
Freehold	155	756909
Freehold	1	246645
Freehold	8	246645
Freehold	1	1154792
Freehold	4	563144
Freehold	143	756909
Freehold	1	1101182
Freehold	134	756909
Crown Land	51	1160463
Crown Land	101	1063263

### 3. Community Consultation

Community consultation for the Project commenced in 2011 when the Project was first publicly announced. Since that time there has been ongoing direct landowner consultation, extensive community liaison, Council and government agency interface, establishment of Voluntary Planning Agreements with both MWRC and BRC, as well as twelve meetings of the Community Consultative Committee (CCC).

Consultation in relation to the Project design being proposed in this Modification has been undertaken using the following means:

- Meetings with MWRC and BRC to discuss the Improved Design, the Revised Design, road dilapidation and maintenance procedures;
- Presentation to MWRC Councillors and public gallery at MWRC General Meetings;
- Direct contact with affected landowners and adjacent landowners along APR;
- Meetings and letters of notification of commencement to all residences within 4 km of a WTG, as well as those listed a high, moderate and low impact residences;
- Twelve CCC meetings including quarterly meetings since 2017;
- Release of tender packages to local business and service providers; and
- Advertising in the local media.

#### 3.1 Consultation Regarding Reduction in WTGs

The Proponent has been in direct discussions with landowners affected by the development since the Project was publicly announced in 2011. A number of iterations and revisions to the Project design have been made over the years, notably the removal of 29 WTGs (a reduction from 106 to 77 WTGs) to address potential visual impacts to neighbouring residences. This change was made a result of consultation and feedback and review of the impact assessment results presented in the EIS.

Following the Development Consent, the Proponent undertook a campaign of correspondence with local landowners including meeting with high and moderate impact residences, as well as letters, correspondence and some meetings with low impact residences and those within 4 km of the Project. Feedback during this consultation focused on providing mitigations in accordance with the Development Consent, and in the case of high impact residences, the option of Neighbour Agreements was discussed. It became clear to the Proponent that some residences were more sensitive to Project impacts than others, and that further changes to the Project design may appease concerns more than relying on mitigations alone.

Through the EPBC Act Approval process the Proponent engaged further with neighbouring landowners as well as government agencies and developed a Project layout which would further reduce the number of WTGs to be installed for the Project. As a result, 40 WTGs which were approved under the Development Consent were removed, a further reduction of more than 50 %. The reduction in impacts would substantially reduce visual impacts to a number of sensitive residences, including some listed as high, moderate and low. The reduction from 77 WTGs to 37 WTGs would also see a substantial reduction in biodiversity, heritage, noise (construction and operational) and transport impacts.



These changes have been communicated to all landowners listed in Tables 1 and 2 of the Development Consent, including providing plans of the Project, notifications of commencement and advising landowners of their entitlements under the Development Consent. The reduction in WTGs was identified as a positive step toward mitigation by some members of the community which were genuinely affected by the development. Nonetheless, concern has been raised by some members in the community that the Proponent may seek to increase the number of WTGs approved under the EPBC Act Approval. This Modification is designed to provide certainty to the community that an increase is not being sought.

### **3.2 Consultation Regarding APR Design**

As APR is a Council-owned road the Development Consent requires upgrades to be undertaken to the satisfaction of MWRC, with a TMP to be prepared in consultation with MWRC, to the satisfaction of the Secretary.

The Improved Design was developed following a series of meetings with MWRC over approximately 18 months and it was initially intended that MWRC would undertake the Works. At a meeting between MWRC and the Proponent on 4 May 2017, it was concluded that the table of requirements in Appendix 6 of the Development Consent was inadequate for MWRC to accurately scope and cost the works and a detailed design was required. For this reason, Appendix 6 was considered the minimum set of requirements and the foundation from which a detailed civil design package should be created in accordance with the Austroads Standards.

A detailed survey and design process generated a design to address the key community concern of road safety by improving visibility, corner easing and passing opportunities during Project construction. This Improved Design incorporated improvements to the culverts and drainage structures required in Appendix 6 of the Development Consent. The TMP and s138 were developed to address the requirements of MWRC and concerns raised by the community during the extensive consultation campaign detailed below.

In parallel with this work stream, direct engagement with local landowners commenced in 2016 to discuss the road design, potential impacts and licensing arrangements. This process of engagement was iterative, and a number of refinements were made to avoid impacts and refine the design in response to landowner concerns, tenure and impact minimisation. All affected landowners were contacted to discuss the design and the Project construction activities, including a number of site visits to identify any key concerns. Road safety, dust, noise and traffic impacts were the key concerns raised during consultation, all of which were addressed in the TMP approved by DPE in December 2017.

Throughout the road design process, CCC meetings involved regular discussion of the upgrades to be undertaken along APR. The key issues regularly raised during these meetings were similar to those encountered in the direct consultation: road safety, dust, traffic and biodiversity impacts. Minutes of each CCC meeting demonstrating this consultation, as well as the presentations given to the CCC at each meeting are available on the Project website: [www.crudineridgewindfarm.com.au/community](http://www.crudineridgewindfarm.com.au/community). Presentations given to the CCC throughout this process are also included in Appendix C to this Modification. Development of the APR design package involved detailed consideration of the matters raised in consultation with the community.



In May 2017 the CCC meeting involved discussion of transport along APR including concerns raised regarding environmental values and dust management. Advice was provided to the CCC that the Proponent was working with a specialist road engineer and haulage provider to develop a detailed design for the Council roads in consultation with MWRC. The CCC meeting was informed that the design was being developed to manage transport and roadworks to minimise impact to environmental values of the roadway and that the BMP and TMP would include mitigation measures to minimise impacts in accordance with the Development Consent.

During the CCC meeting in September 2017 the Proponent advised the committee that an alternate route was being considered for component transport to minimise impacts to local communities. As a result of Council and community feedback, the Proponent was seeking an alternative route (the Southern Route) so that blades would not have to be transported through Mudgee and Gulgong, thereby minimising disruption to the community. Following lengthy consultation with RMS Assessments Team and the Great Western Highway Project Group an alternate route was identified: from Newcastle via the M1 freeway, Great Western Highway over the Blue Mountains, the Castlereagh Highway up to Aarons Pass Road. A dry run was undertaken by the transport company in June 2017 which included pilot vehicles and police escorts to confirm the viability of the Southern Route. Over length equipment under 5.1 m in height would travel via the Southern Route, with other equipment travelling via the Northern Route. The proponent committed to make the TMP available to the CCC once approved by DPE.

During the December 2017 CCC meeting, the Proponent advised the committee that Project construction was expected to commence in Q2 2018, and an early works contract had been signed to deliver long-lead time items, such as road design and geotechnical study. Tasks completed at that stage which were discussed with the CCC included survey works along Aarons Pass Road including pegs and ribbons marking chainage, fence boundaries, cadastral boundaries, reference points, identification of vegetation and other features. These tasks were undertaken to assist design works to be undertaken by Council. A detailed design package was being prepared based on road safety discussions in consultation with MWRC Works Department to confirm the final road alignment and passing bays required to maintain public safety. The proponent worked with MWRC to ensure that environmental impacts were kept within the consented limits, while incorporating necessary safety requirements as dictated by MWRC.

The discussion with the CCC in December 2017 continued to include the following points which were detailed in the CCC minutes available via the Project website:

- *Currently doing detailed design of Aarons Pass Road and Bombandi Road in accordance with the Development Consent;*
- *In October/November a cadastral survey and further environmental surveys were undertaken to inform the design work;*
- *The roads upgrades will be delivered by MWRC Works Department under contract to the Project (Note, delivery of works changed at a later date following ongoing consultation with Council);*
- *Road works to take 8-12 weeks, depending on how Council stage it;*
- *Traffic Management Plans are being developed in consultation with Council based on the agreed program for the upgrades;*

- *Blades and hubs will be delivered from the Newcastle Port via the Southern route (Great Western Highway, Castlereagh Highway and Aarons Pass Road);*
- *There will be up to 6 to 10 minute delays for motorists, however, truck movements will be in the early hours of the morning (4.30am to 6am) to avoid impacting residents and motorists; and,*
- *Towers will be delivered via the Golden Highway following the approved northern route.*

Additional land survey, environmental due diligence and design was undertaken in parallel with the development of the TMP and BMP, including consideration of community concerns brought to Council regarding vegetation on APR. Mitigation and management measures were developed to address the outcomes of consultation and environmental survey, and enforced in the TMP and BMP to ensure they were carried through to Project construction. The BMP and the TMP, including the Southern Route, were approved by DPE on 15 December 2017 and the documents were uploaded to the Project website, with the CCC then notified in early January 2018.

Draft Functional Specifications were provided to Council for review on January 8, 2018. Prior to finalisation of the works package, a review of environmental matters along APR was undertaken by the Proponent guided by the BMP. It was deemed that works were consistent with the Development Consent and generally in accordance with the EIS, and the tender package was formally issued to MWRC on January 29, 2018. In early February 2018, Council advised that they were satisfied with the development of the design package, but would not be tendering on the works due to existing workload. On 1 March 2018, a letter was prepared formalising the road upgrade and dilapidation agreements reached between the parties. Approval of the Roads Authority was provided under Section 138 of the Roads Act 1993 by MWRC in July of 2018, prior to the commencement of works along APR.

In April 2017 a detailed presentation was provided to the CCC, which included the following update on Aarons Pass Road Works (included in Appendix C):

- *The Project approval requires upgrades to be undertaken to Aarons Pass Road and Bombandi Road.*
  - *CWP has been engaged with MWRC for over twelve months in relation to the scope and design of the works program to ensure that it meets the needs of Council, the community and the Project.*
  - *Detailed design has been prepared to address the design criteria required for project transport:*
    - *Supersedes the original concept plans prepared during the Environmental Assessment.*
    - *Improves the safety of Aarons Pass Road, particularly in relation to blind corners and crests.*
    - *Avoids and minimises impacts to threatened species and endangered ecological communities.*
    - *Was provided to MWRC Works Dept. for review and for costing.*
    - *MWRC has advised us to tender the works for the road upgrades which is currently in progress.*
- *MWRC Works Dept. supervise and audit the works to ensure they meets council standards.*

- *The revised 3D design has been approved as a component of the Traffic Management Plan which was endorsed by both Mid-Western and Bathurst Regional Councils, and approved by the Department of Planning and Environment in December 2017.*
- *The Development Consent requires that the Project upgrade Aarons Pass Road to the satisfaction of MWRC.*
- *CWP engaged the experienced wind farm civil design team, iCubed, to design the road upgrades with multiple aims:*
  - *Improving safety of the road during project construction*
  - *Avoiding impacts to threatened species and endangered ecological communities*
  - *MWRC standards and project transport requirements.*
- *MWRC has reviewed and confirmed that the plans are to MWRC satisfaction.*
- *The approved Biodiversity Management Plan has guided the procedures to ensure that impacts to biodiversity are minimised and are within the limits of the Development Consent.*
  - *Additional biodiversity survey of Aarons Pass Road was undertaken and threatened species locations were identified by cadastral survey.*
  - *Detailed design of the road was prepared to ensure avoidance of threatened species.*
  - *Vegetation clearance will be within the limits permitted in the Development Consent.*
- *The Project impacts will be offset with the establishment of the 674ha Stewardship Site in Hill End.*

In June 2018 letters of notification were sent to all landowners directly affected by roadworks along APR, advising them that the works were expected to commence in the coming weeks. Direct consultation was also undertaken including phone calls and property visits to explain the works proposed to be undertaken on and adjacent to the landowners' land. On 22 August 2018, letters of notification were also sent to all landowners listed in Table 1 and Table 2 of Schedule 3 of the Development Consent, to notify them of the construction commencement date and their visual mitigation entitlements under Schedule 4, Condition 1 of the Development Consent.

Since the commencement of construction, a site-based team was established which has been in ongoing communication with the community affected by the APR works. A dedicated local community engagement officer has been recruited to liaise with the community and ensure effective communication of the Project developments. The Proponent has also been working with MWRC and the Mudgee Guardian to ensure project updates are relayed effectively to the community. The Project website continues to be updated with news and construction updates.

At the CCC Meeting in October 2018 the Proponent advised the committee that following the commencement of works along APR, a complaint had been lodged with the Department. The proponent ceased works on the road following receipt of the complaint to investigate the issue. Following provision of a formal response, DPE had advised that the Proponent had not breached the consent. The Proponent advised the CCC that the design was being evaluated and that works were intended to commence again once the design was resolved.

A TMP has been prepared by the contractor for the construction works along APR, which includes communication protocols to ensure the final design is notified to the community, including those most affected by the works. This involves issuing final drawings issued to MWRC for publishing on the Council's website, including location of waiting and passing bays. A letterbox drop will also be

conducted for local residences displaying the waiting bays and traffic control requirements along APR. Implementation of the TMP in close consultation with MWRC and the local community will ensure that disruption to local traffic is minimised as far as practical during the Revised Design.

## 4. Impact Assessment

A preliminary risk assessment was undertaken across all technical aspects of the development to ensure that the proposed Modification would be technically feasible. The risk assessment was used to inform the Project design as well as the commissioning of technical studies to evaluate potential impacts of the proposal. A summary of the risk assessment provided in Table 4.1 and further discussion of each technical area is provided in Sections 4.1 to 4.5. The technical studies which informed the impact assessment are provided as appendices.

**Table 4.1: Modification Technical Feasibility Assessment**

Technical Assessment	Key element(s) of the Modification	Consideration of change in impact	Summary of findings / recommendations
Landscape and Visual	Reduced WTG numbers Removal of vegetation along APR	<p>Proposed impacts have been considered by landscape and visual impact consultants Moir Landscape Architects and Eco Logical Australia. A comparative assessment is provided in Appendix E.</p> <p>The removal of vegetation along APR as a result of the revised design has been considered in a line-of-site assessment to neighboring residences with 4 km of APR to determine if any visual impacts will result from the increase in vegetation removal.</p>	<p>The comparative assessment between the approved WTG layout and the Modification layout indicates that the visual impacts remain largely unchanged through much of the Project area, though the number of turbines visible has decreased markedly south of Prices Lane. WTG visibility has decreased for areas immediately adjacent to the removed WTGs south of Prices Lane, along and to the west along Sally’s Flat Road, and to the west and southwest of Pyramul Road. Small and scattered increases to the ZVI have occurred along the northern and southern ends of Crudine Road as a result of the micro-sited layout.</p> <p>The line-of-site assessment for vegetation clearing along APR has determined that the most uninhibited views of APR are for residences immediately west and northwest of Carcalgong, and south of Aarons Pass. The central region of APR, near Carcalgong, exhibits the greatest potential for increased resident visibility of the road following vegetation removal as a result of the revised APR design, however as this region is heavily vegetated it is considered that any impacts will be minimal.</p>

Noise	WTG model sound power profile and WTG reduction	Proposed impacts have been considered by noise consultants Sonus Pty Ltd. A supplementary environmental noise assessment is provided in Appendix F.	The supplementary noise assessment has determined that the revised WTG layout is compliant with noise requirements outlined within the conditions of consent.
Biodiversity	Reduction in WTGs and ancillary infrastructure. Impacts of the revised design on vegetation and habitat along Aarons Pass Road for OSOM transport.	The reduction in WTGs and ancillary infrastructure will result in a reduction in biodiversity impacts across the Project. The Revised Design will involve impacts to vegetation, as well as potential impacts to hollow dependent fauna such as Powerful Owl, Barking Owl, Mask Owl, Gang-gang Cockatoo, Glossy Black Cockatoo, Eastern Pygmy-possum, Brush-tailed Phascogale and Squirrel Glider which have been considered by ELA. Additionally loss of habitat for Koala and Bush Stone-curlew has also been considered and reviewed. Proposed impacts to <i>Acacia meiantha</i> and <i>Pomaderris reperta</i> have been investigated and a BDAR has been produced which details impacts and mitigation measures in place. A Biodiversity Development Assessment Report is provided in Appendix H.	The Modification has been designed to ensure that on-ground impacts are reduced and this has been achieved by realigning access areas and reducing the overall footprint along APR to avoid areas of EEC, CEEC and threatened species. Particularly the avoidance of <i>Acacia meiantha</i> and <i>Pomaderris reperta</i> . The current modification will impact 59 individual <i>A. meiantha</i> of which some will be removed and translocated to a safe area to be defined in the BMP. Similarly the impact on <i>P. reperta</i> has been reduced with only one individual within the impact zone. This individual will be translocated if it cannot be avoided through further detailed design. Potential Koala habitat was assessed in accordance with the State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) and the ‘EPBC Act referral guidelines for the vulnerable Koala’ (Department of the Environment [DoE], 2014). The impact area was not determined to be either potential or core Koala habitat under in accordance with SEPP 44. The assessment included in the BDAR (Appendix H) concluded that impacts to koala from the proposed road upgrade will not be significant, therefore, no further assessment under the EPBC Act was required.
Cultural Heritage	Reduction in WTGs and ancillary infrastructure. Increased disturbance associated with APR.	Proposed impacts have been considered by archaeological consultants NSW Archaeology Pty Ltd (NSWA) in relation to increased disturbance along Aarons Pass Road (Appendix I)	The approved Project site was originally assessed by NSW in 2012. The reduction in WTGs has resulted in less disturbance to known sites within the Project area. Salvage exercises in line with the Aboriginal Heritage Management Plan have been undertaken within the impact footprint and the remaining unsalvaged sites will remain in situ as they will no longer be impacted by the reduced WTG footprint. NSWA undertook an assessment along APR. During a surface survey of the existing road and proposed impact area, no Aboriginal or European heritage sites were recorded. NSW

			concluded that the heritage potential of APR and its immediate area was low.
Traffic and Transport	Reduced Development Footprint Increased disturbance along APR	Proposed impacts have been considered with reference to the approved Traffic Management Plan for the Project (Bitzios Consulting 2017).	The reduction in WTGs and revised design of APR have been considered within the Modification as being negligible during the construction and operational phases of the Project. The traffic and road network will see reduced vehicles during both the construction and operational phase of the project, as the reduction in WTGs will see a shorter construction period and less OSOM vehicles accessing the Project Area.



## 4.1 Visual Impact Assessment

### 4.1.1 Reduced WTG Layout

A landscape and visual impact assessment (LVIA) for the approved Project was undertaken by Moir Landscape Architecture (Moir) to address the Director-General's Requirements (DGRs) relating to the assessment of visual impacts of the Project upon potentially affect residences surrounding the Project area. The assessment (Moir 2012) was prepared to assess two planning options, including 106 WTGs and 77 WTGs.

This Modification addresses a reduction in the number of WTG from 77 WTGs to 37 WTGs, based on the micro-sited layout to be constructed. A comparative assessment for the Modified Project has been undertaken, comparing the 77 approved WTG layout to the 37 WTG layout which will be constructed in accordance with the Development Consent and the EPBC Act Approval. The micro-sited layout has largely removed WTGs present in the mid-section of the Project, east and northeast of Sally's Flat Road, south of Prices Lane, with thinning of WTGs across the remainder of the Project (Figure 3). WTGs have been micro-sited within the limits of the Development Consent.

The LVIA prepared by Moir (2012) within the EIS has been revised and updated by Moir (2018) to assess the comparative impacts between the 77 WTG and 37 WTG layouts, and to ensure compliance with the Development Consent based on the WTGs selected to be installed. This included comparisons of the Zone of Visual Influence (ZVI) and an analysis of how the proposed Modification would impact visual receptors when compared to the approved Project. A summary of the comparative assessment findings is presented here and the full Moir report is provided in Appendix E. A separate analysis has been undertaken with the support of ELA to assess the impact of the Revised Design for APR and how it would influence visibility of WTGs and APR itself from nearby residences (See Section 4.1.2).

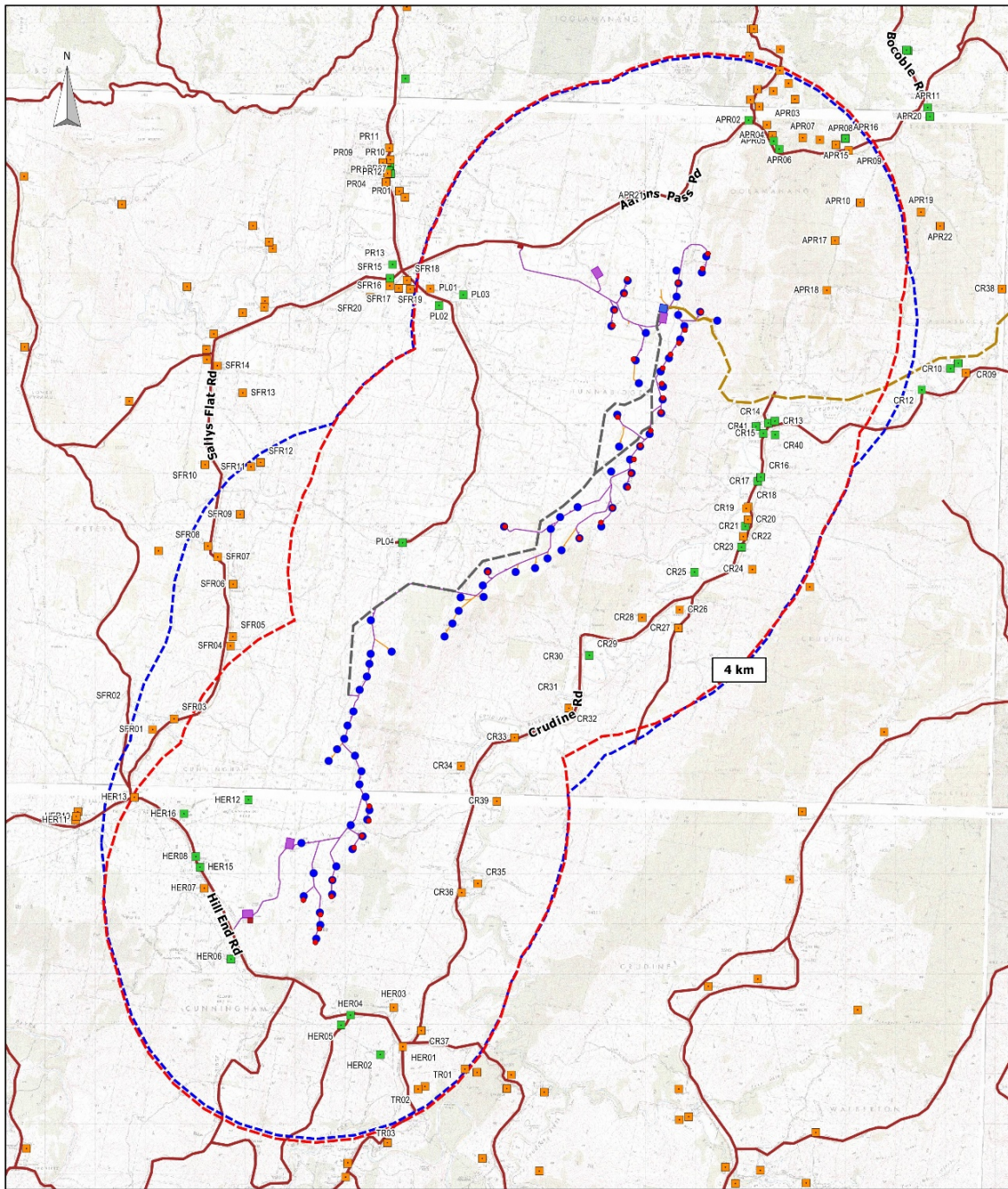
A comparative ZVI is provided to demonstrate the change in visibility between the 77 WTG and 37 WTG layouts in Figure 4. Figures 5 and 6 include a ZVI for the 77 WTG layout and 37 WTG layout respectively, using the same colour gradient to demonstrate the change in theoretical visibility in each part of the landscape between the approved and micro-sited layouts. These maps represent the 'worst case scenario' regarding the extent of areas with visibility of the WTGs, without consideration of screening by vegetation, buildings or other structures.

The results of the revised ZVI mapping show that overall visibility of the Project remains unchanged through much of the Project area, there are some reductions in the landscape south and west of Prices Lane. The number of WTGs visible has reduced across the board for nearly all residences as a result of the reduction in WTGs to be installed. This change is most notable in areas immediately adjacent to the removed WTGs south of Prices Lane, along and to the west of Sally's Flat Road, and to the west and southwest of Pyramul Road.

Moir assessed potential visual impacts to residences along individual roads in the study area associated with the number of WTGs visible, the distance to the nearest visible WTG, and potential screening of views by vegetation and buildings. The visual impact upon residences located along Pyramul Road are expected to be very low due to increased distances to the WTGs in their revised locations and potential screening by topography, buildings and vegetation. Residences along Sally's Flat Road have reduced impacts due to reduced number of WTGs visible, though a number of the

northern cluster of WTGs will be visible in the distance. The majority of residences along APR have a northerly aspect and do not have visibility of the Project. Decreased visual impact is expected for the southern portions of Crudine and Hill End Roads. Slight to minimal change in visual impact is expected for the northern and southern portions of Crudine and Hill End Roads, and Prices Lane due to micro-siting within the Development Consent. There remains significant potential for screening by vegetation to many of these areas, as was assessed in the original LVIA (Moir 2012).

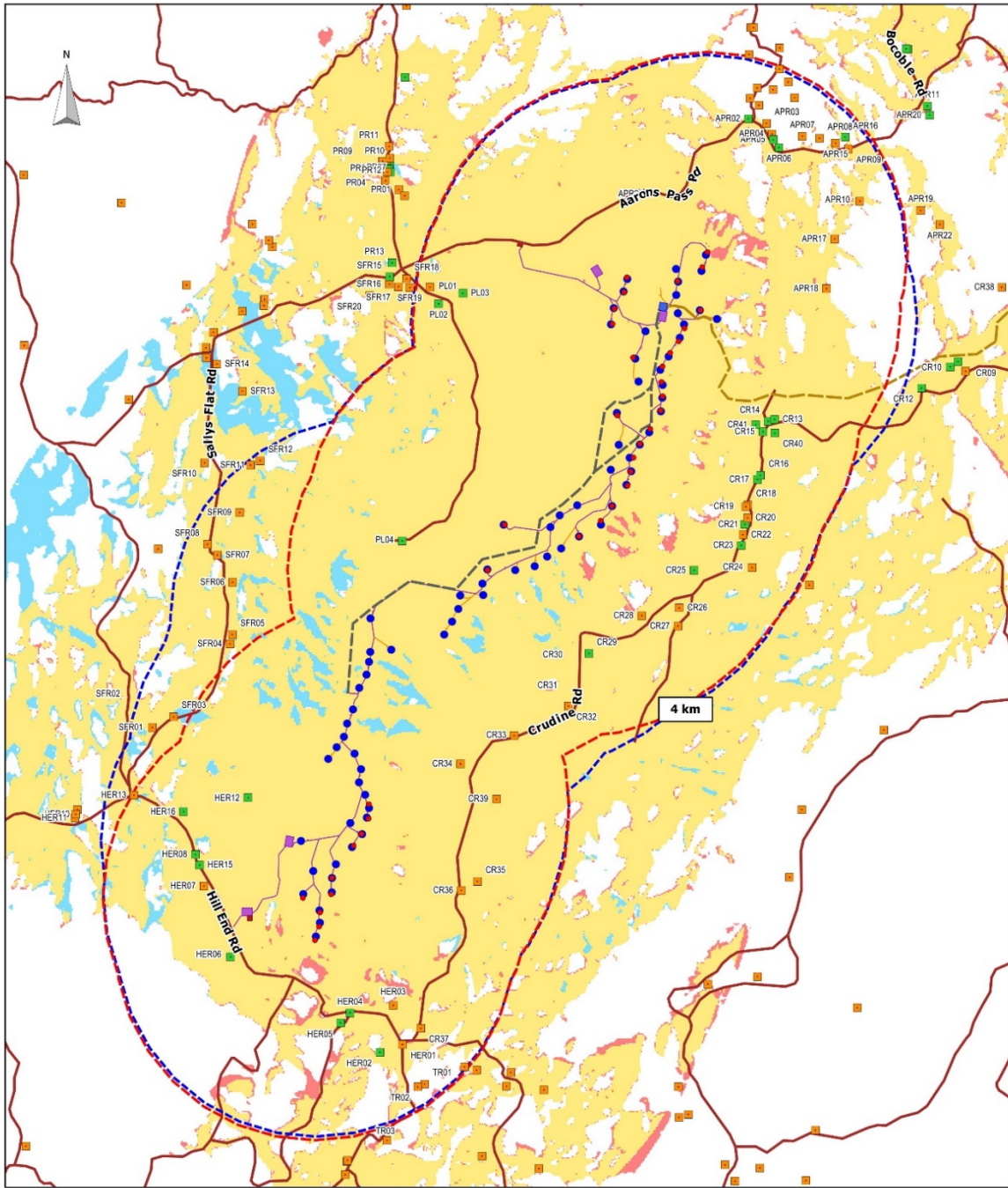
Figure 3: Project Overview showing 77 WTG and 37 WTG Layouts



LEGEND		COMPANY				
● 37 WTG Micro-sited Layout	— Internal Overhead Transmission Line	CRWF NOMINEES PTY LTD				
● 77 WTG Approved Layout	— External Overhead Transmission Line					
— Micro-sited Layout - Internal Roads	■ Secondary Collector Substation	TITLE				
— Approved Layout - Internal Roads	■ Site Compound Options	FIGURE 3: 77 & 37 WTG OVERVIEW				
■ Involved Residence	■ Rock Crushing & Batching Plant Options	DATE	SCALE	DWG NO	REV	VER
■ Non-involved Residence		21 NOV 2018	1:75000	CRU299	A	1
SCALE BAR		DRAWN BY	CHECKED BY	SHEET	JOB NO	SIZE
0 ————— 5 km		B KRONENBERG	M BRANSON	1 OF 1	080401	A3

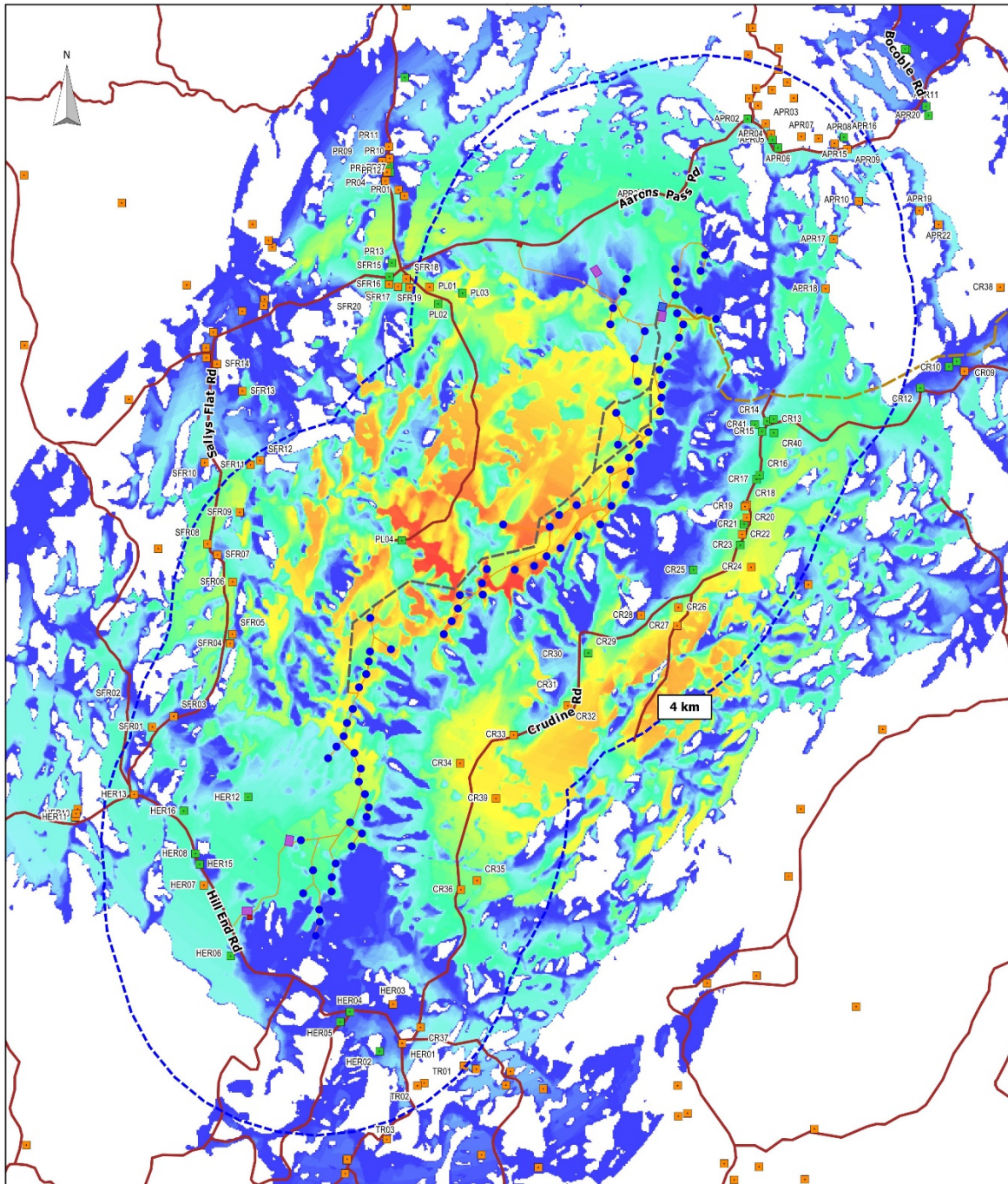


Figure 4: Comparative ZVI showing theoretical visibility of the Approved and Micro-sited Layouts



LEGEND		COMPANY				
● 37 WTG Micro-sited Layout	■ Involved Residence	CRWF NOMINEES PTY LTD				
● 77 WTG Approved Layout	■ Non-involved Residence					
— Micro-sited Layout - Internal Roads	— Internal Overhead Transmission Line					
— Approved Layout - Internal Roads	— External Overhead Transmission Line	TITLE				
■ GE 37 WTG Visible	— 132 kV Transmission Line	COMPARATIVE ZVI				
■ Approved 77WTG Visible	■ Rock Crushing & Batching Plant Options					
■ Both Layouts Visible	■ Secondary Collector Substation	DATE	SCALE	DWG NO	REV	VER
	■ Site Compound Options	06 NOV 2018	1:75000	CRU292	A	1
SCALE BAR		DRAWN BY	CHECKED BY	SHEET	JOB NO	SIZE
0 ————— 5 km		B KRONENBERG	M BRANSON	1 OF 1	080401	A3

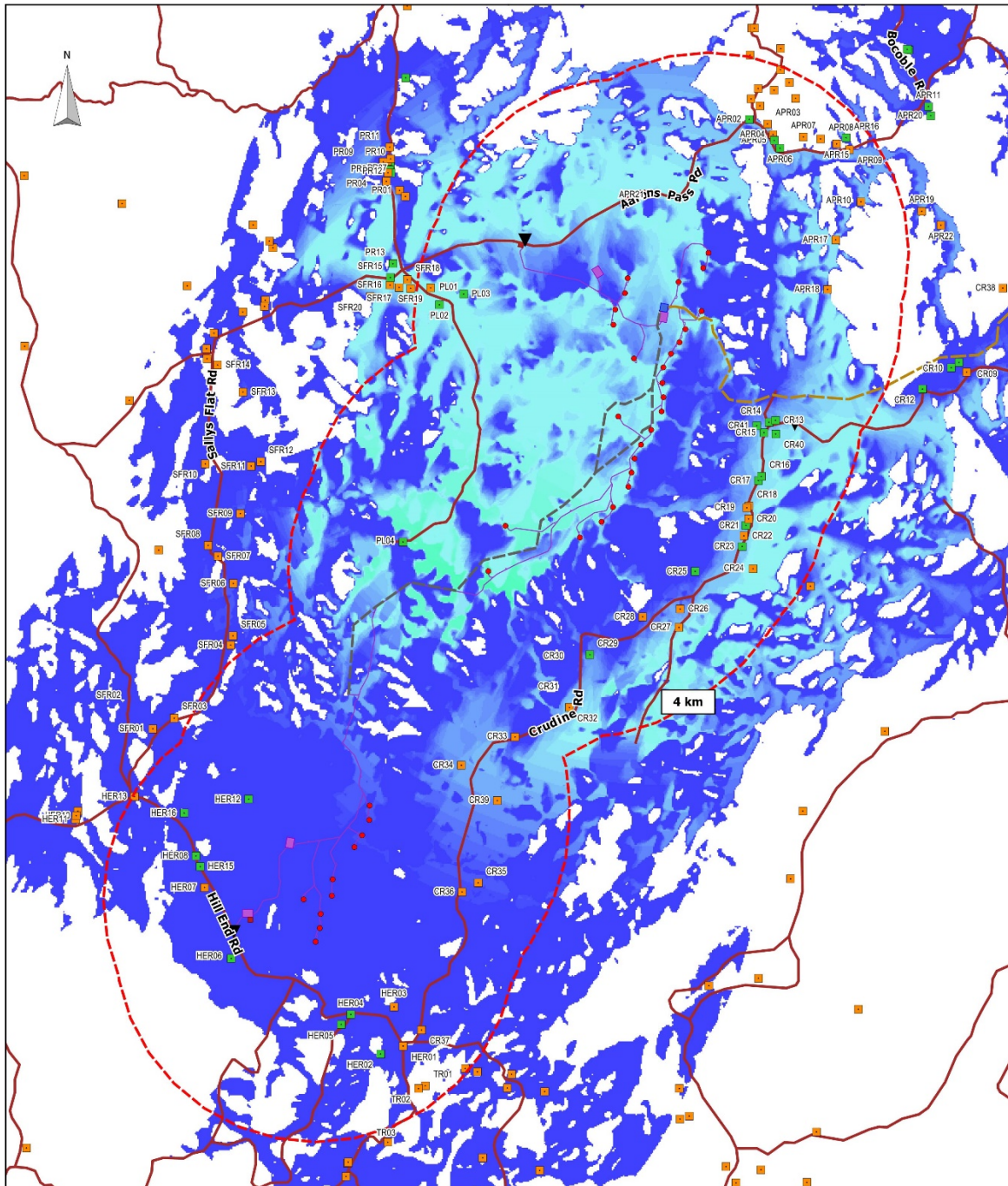
Figure 5: ZVI showing theoretical visibility of the Approved 77WTG Project



LEGEND		COMPANY	
● 77 WTG Approved Layout	■ Involved Residence	CRUDINE RIDGE WIND FARM PTY LTD	
— Approved Layout - Internal Roads	■ Non-involved Residence	CWP Renewables	
<b>Turbines Visible (77 Layout)</b>	— Internal Overhead Transmission Line	TITLE	
■ Up to 13	— External Overhead Transmission Line	77 WTG LAYOUT ZVI	
■ 26	— 132 kV Transmission Line	DATE	SCALE
■ 39	■ Rock Crushing & Batching Plant Options	06 NOV 2018	1:75000
■ 52	■ Secondary Collector Substation	DWG NO	REV
■ 65	■ Site Compound Options	CRU294	A
■ 77		VER	1
SCALE BAR		DRAWN BY	CHECKED BY
0 ————— 5 km		B KRONENBERG	M BRANSON
		SHEET	JOB NO
		1 OF 1	080401
		SIZE	A3



Figure 6: ZVI showing theoretical visibility of the Micro-sited 37WTG layout



LEGEND		COMPANY				
<ul style="list-style-type: none"> <li><span style="color: red;">●</span> 37 WTG Micro-sited Layout</li> <li><span style="color: grey;">—</span> Micro-sited Layout - Internal Roads</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">■</span> Involved Residence</li> <li><span style="color: orange;">■</span> Non-involved Residence</li> </ul>	<b>CRWF NOMINEES PTY LTD</b>				
<b>Turbines Visible (37 Layout)</b> <ul style="list-style-type: none"> <li><span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Up to 13</li> <li><span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> 26</li> <li><span style="background-color: cyan; width: 15px; height: 10px; display: inline-block;"></span> 37</li> </ul>						
<ul style="list-style-type: none"> <li><span style="color: grey;">—</span> Internal Overhead Transmission Line</li> <li><span style="color: yellow;">—</span> External Overhead Transmission Line</li> <li><span style="color: red;">- - -</span> 132 kV Transmission Line</li> <li><span style="background-color: red; width: 15px; height: 10px; display: inline-block;"></span> Rock Crushing &amp; Batching Plant Options</li> <li><span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Secondary Collector Substation</li> <li><span style="background-color: purple; width: 15px; height: 10px; display: inline-block;"></span> Site Compound Options</li> </ul>		<b>37 WTG LAYOUT ZVI</b>				
SCALE BAR 		DATE 06 NOV 2018	SCALE 1:75000	DWG NO CRU293	REV A	VER 1
		DRAWN BY B KRONENBERG	CHECKED BY M BRANSON	SHEET 1 OF 1	JOB NO 080401	SIZE A3

#### **4.1.2 APR Revised Design**

The Revised Design involves clearing of vegetation along APR which currently has potential to screen views from residences to the WTGs and to the road itself. To evaluate the potential impacts of this change the Proponent engaged ELA to undertake a desktop assessment of residences which may experience increased visibility to WTGs or APR itself as a result of the removal of vegetation along APR. This was carried out through ZVI assessments of the proposed 37 WTG layout and the APR Revised Design, and Line of Sight (LOS) assessment between residences and these features.

##### ***Visibility of APR***

A ZVI of APR is shown in Figure 7. The scale identifies the length of road visible (based on sight to 10 m markers along the road) from locations within the surrounding landscape. This is based on the influence of topography only and does not consider potential screening by vegetation or other buildings. The greatest visibility of APR occurs from ridgelines northeast of Carcalgong and either side of the Castlereagh Highway, south of Aarons Pass. However, there are relatively few residences on these ridgelines. Visibility of APR is restricted for most residences on the basis of topography alone, and the area is heavily vegetated which further decreases the likelihood of changes in visibility.

Existing and potentially impacted vegetation was mapped as part of concurrent assessments for the Modification. This vegetation was assessed by ELA ecologists as predominantly comprising Red Stringybark – Red Box – Long-leaved Box – Inland Scribbly Gum tussock grass shrub low open forest on hills in the southern part of the NSW South Western Slopes Bioregion and Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion, with typical tree height of 15-20m.

To ascertain the potential for increased road visibility following vegetation removal, a LOS analysis was undertaken using a block 15 m barrier in the location of mapped trees. A LOS was constructed between each residence and 50 m road markers. It is recognised that this will overestimate the screening potential of trees, as some viewpoints may have partial visibility through, or under the canopy. It is also recognised that the screening of vegetation in this analysis may be overestimated by the extent of the mapped vegetation as opposed to the natural extent of vegetation which extends beyond the mapped area. However, the objective of this analysis was to ascertain a conservative estimate of the relative increase in visibility (i.e. the extent of road visible) caused by the Revised Design for residences within 4 km of the works area.

The results of the analysis are shown in Figure 8. LOS greater than 4 km have been excluded from the display. Based on the existing roadside vegetation, the most uninhibited views of APR are for residences immediately west and northwest of Carcalgong, and south of Aarons Pass. The central region of APR, near Carcalgong, exhibits the greatest potential for increased visibility of the road following vegetation removal as a result of the Revised Design.



Figure 7: Aarons Pass Road Zone of Visual Influence (ZVI)

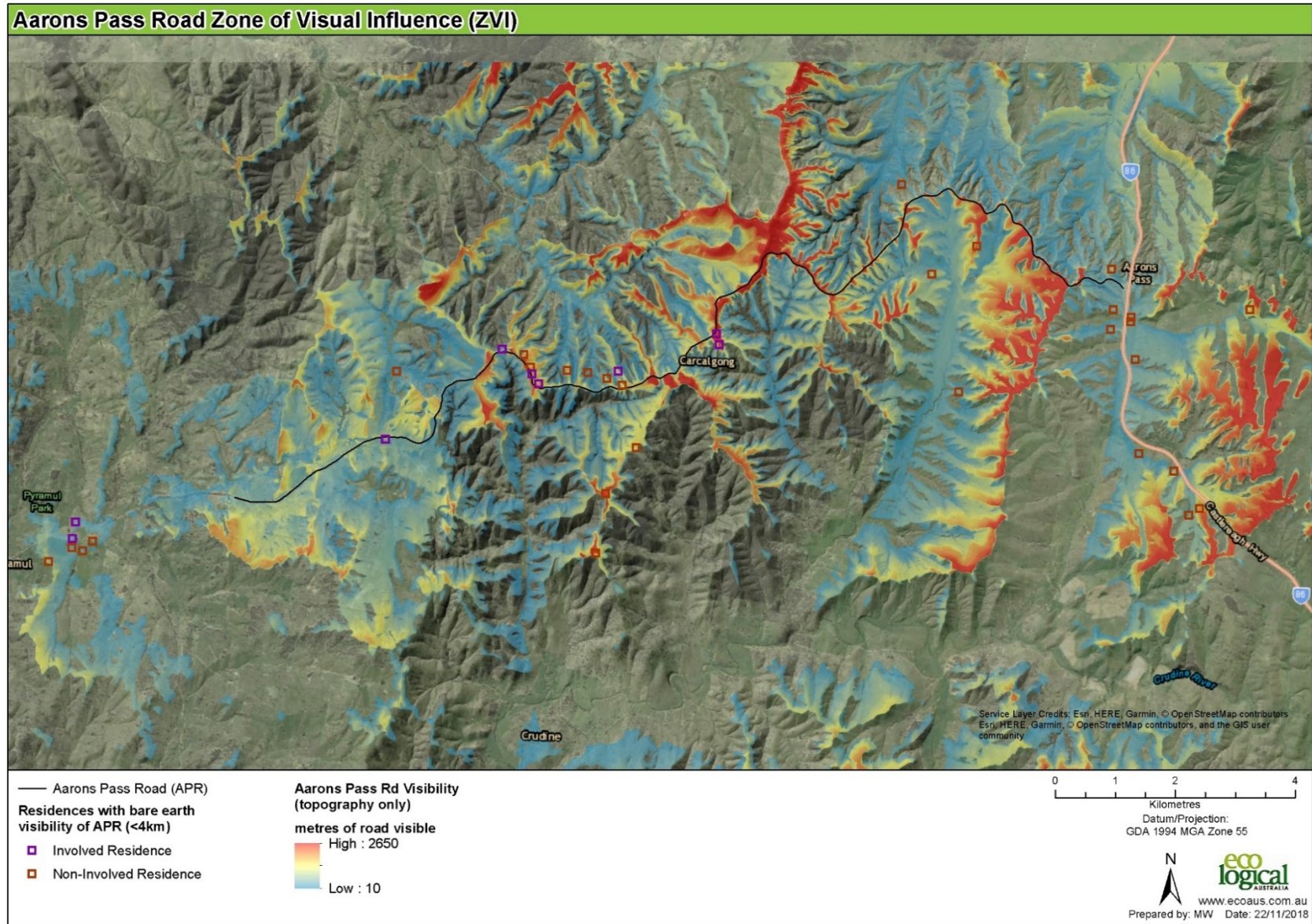
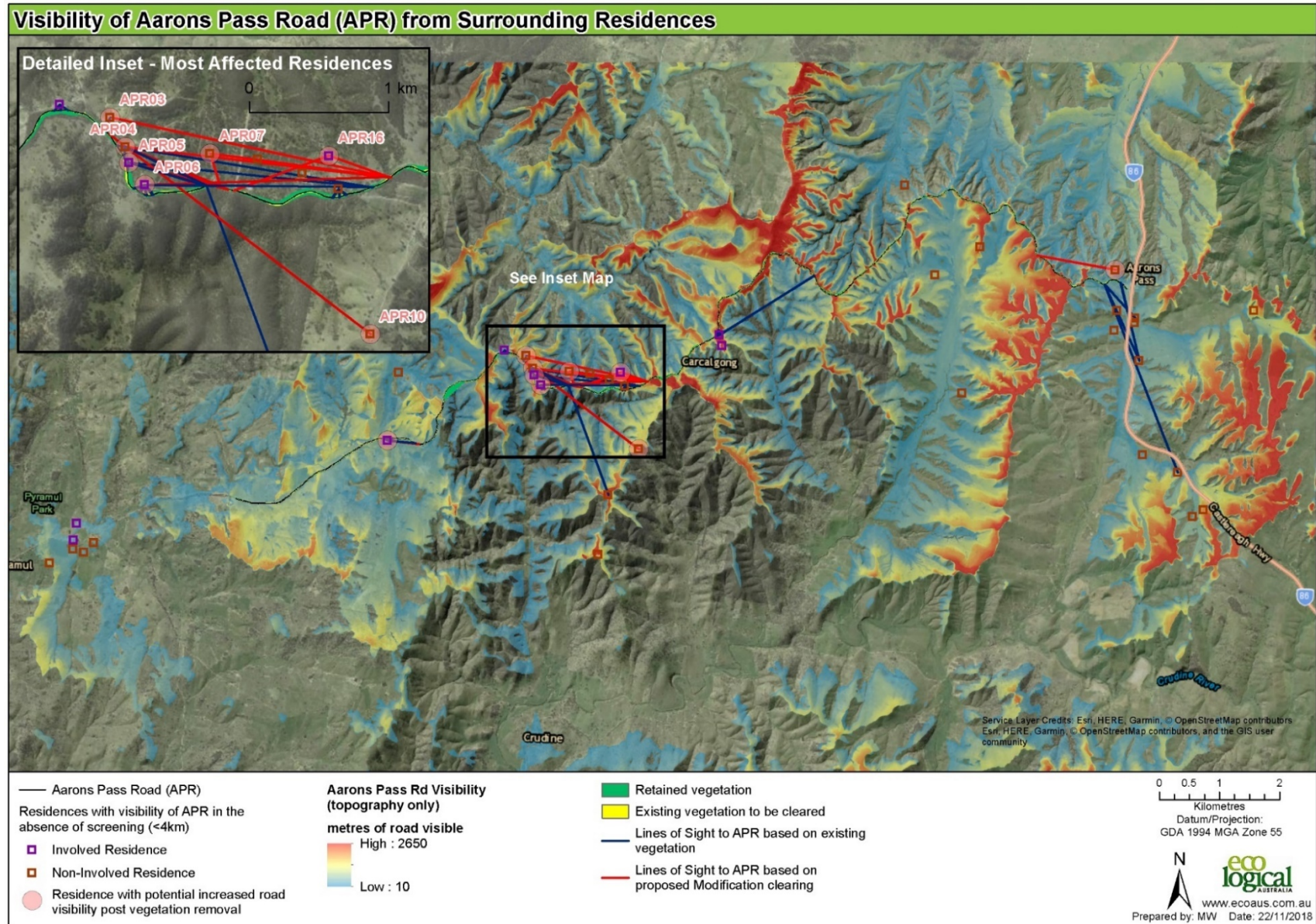




Figure 8: Line of Sight assessment of Aarons Pass Road from surrounding residences accounting for existing and retained vegetation



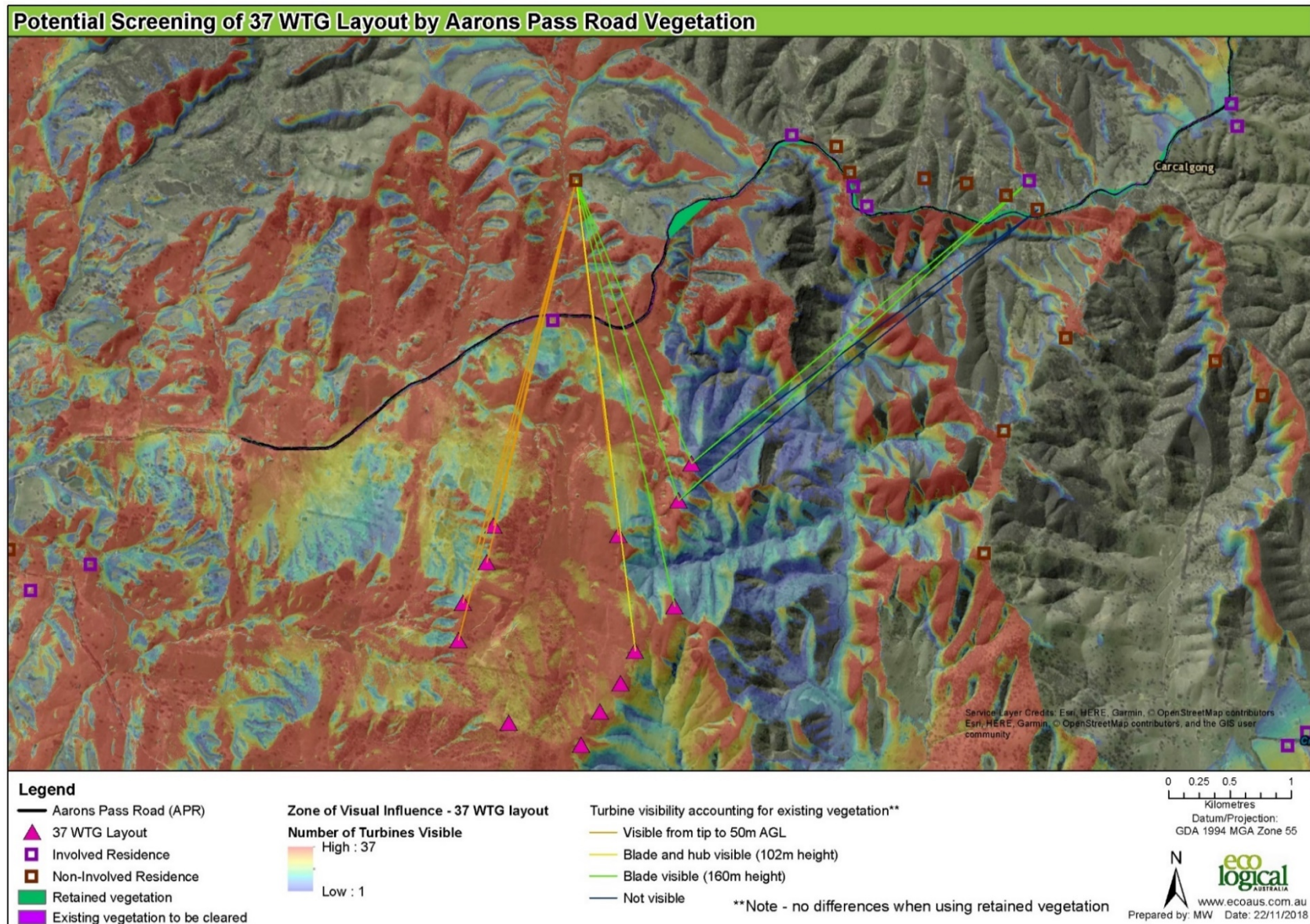
### **Visibility of the Wind Farm**

ZVI analysis indicates that few residences north of APR have potential views to the 37 WTG layout (Figure 6) and only four residences have sight lines to WTGs of less than 4km. Visibility is generally of higher parts of the WTGs, with only 50% of the sightlines visible below 50 m. There is no visibility of the ground surface at any of the WTGs. The impact of vegetation removal was tested for WTG heights of 0 m, 50 m, 102 m (hub height), and 160 m (blade tip) and no differences in visibility were identified for any of these residences.

It is further noted that the area around APR is densely vegetated and the proposed vegetation removal is restricted to the area immediately within and adjacent to the existing road corridor. It is therefore concluded that the removal of vegetation along APR for the Revised Design would not alter the visibility of WTGs from any of the residences. However, residences within 4 km of the nearest WTG would remain entitled to request visual mitigation in accordance with the Development Consent.



Figure 9: Zone of Visual Influence and Line of Sight assessment of WTG visibility (37 WTG layout) north of Aarons Pass Road.



## 4.2 Noise Impact Assessment

In summary, the previous and new supplementary environmental noise assessments have identified that the Project will continue to comply with the existing conditions of the Development Consent following the grant of consent to the Modification such that no changes are required to the conditions of consent relating to noise.

An environmental noise assessment for the approved Project was undertaken by Sonus Pty Ltd (Sonus 2012) to address the Director-General's Requirements (DGRs) relating to operational noise and construction noise and vibration of the Project. The assessment (Sonus 2012) was prepared to evaluate two planning options, including 106 Acciona AW77 WTGs and 77 Siemens SWT2.3-101 WTGs. The assessment concluded that the noise from both layouts considered would meet the relevant noise requirements at all identified noise receivers within the vicinity of the Project.

The operational noise predicted from the Project was assessed against the South Australian *Environmental Noise Wind Farm Guidelines 2003*, which compares the predicted noise levels from the Project against criteria developed from the background noise levels measured within the Project area, and the NSW Department of Planning and Infrastructure *Draft NSW Planning Guidelines for Wind Farms*, which considers background noise levels when separated into daytime and night-time periods. At the time of assessment, the worst case scenario (highest noise level WTG available at the time) for each layout of the Project were assessed, with both planning options considered to achieve the relevant guidelines at all dwellings, and achieve the daytime and night-time split criteria with the implementation of noise mitigation strategies.

The construction noise predicted from the Project was assessed against the NSW Department of Environment and Climate Change (DECC) *Interim Construction Noise Guideline 2009*. The predicted noise during construction for the Project was assessed as a worst case scenario, assuming all equipment is onsite and is operating simultaneously onsite for each construction stage of the Project. Based on the results of the construction noise assessment and in accordance with the guidelines stated above, a dwelling located between 1,650 m and 2,400 m from the construction activity may be 'noise affected' but not 'highly noise affected.' The Proponent therefore should apply all feasible and reasonable work practices to meet the noise affected level (which may include engineering measures such as 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, or administrative measures such as inspections, scheduling and providing training to establish a noise minimisation culture for the works), and should inform residents of the proposed construction works.

The Development Consent included conditions for noise generation from operation of the WTGs. Schedule 3, condition 11 of the Development Consent stipulates that the noise generated by the operation of WTGs should not exceed the relevant criteria (Table 4.2) at any non-associated residence. Schedule 3, condition 12 stipulates that noise generated by the operation of ancillary infrastructure does not exceed 35 dB(A)  $L_{Aeq(15 \text{ minutes})}$  at any non-associated residence.

**Table 4.2: Noise Criteria (Development Consent SSD-6697)**

Residence No.	Criteria (dB(A)) with Reference to Hub Height Wind Speed (m/s)													
	3	4	5	6	7	8	9	10	11	12	13	14	15	16
APR2, 3, 4, 5, 6, 7, 8, 9, 10, CR15	35	35	35	35	35	36	38	39	41	42	44	46	48	48
CR16, 18, 19, 20, 21, 24	35	35	35	35	35	35	36	37	38	40	42	44	47	47
CR26, 27, 28	35	35	35	35	35	35	35	35	36	38	41	43	45	45
CR32, 33, 34, 35, 36	35	35	35	35	35	35	37	40	42	45	47	50	52	55
CR37, HER3, 4, TR1, 2, 3, 4, 5, 6	35	35	35	35	35	35	35	36	38	39	40	41	41	41
HER10, 11, 13	35	35	35	35	37	39	41	43	45	46	46	46	46	46
PL1, 2, PR1, 3, 4, 9, 10, 11, SFR1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19	35	35	35	35	35	37	39	41	43	44	46	46	46	46
All other non-associated residences	The higher of 35 dB(A) or the existing background noise level ( $L_{A90(10 \text{ minute})}$ ) plus 5 dB(A)													

Since the Development Consent was granted, the Project has undergone various modifications to the layout and WTG model, and as such, a Supplementary Environmental Noise Assessment (Appendix F) was prepared by Sonus Pty Ltd (Sonus 2018a) for the revised configuration, to assess the 37 GE 3.6-137 WTGs, as well as the Project substation. This assessment (Sonus 2018a) summarised the predicted noise from the micro-sites layout and compares the predicted noise levels during operation of the wind farm against the operational noise criteria approved under the Development Consent.

Noise predictions within Sonus 2018a were modelled using the sound power levels specified by the WTG manufacturer (*GE Renewable Energy, Technical Documentation, Wind Turbine Generator Systems 3.6-137 - 50/60 Hz, Product Acoustic Specifications, Normal Operation according to IEC Incl. Octave and 1/3rd Octave Band Spectra*), which are summarised in Table 4.3 below. The sound power level for the 160 MVA transformer to be used in the substation has been based on the derived sound power levels for transformers from the *Australian/New Zealand Standard AS/NZS60076.10:2009, Power transformers - Determination of sound levels (IEC 60076-10, Ed. 1(2001) MOD)*.

**Table 4.3: WTG model overall sound power level**

Hub Height Wind Speed (m/s)	4	5	6	7	8	9	10	11	12	13	14 to cut out
Overall Sound Power Level dB(A)	92.5	94.5	98.5	101.9	104.8	106	106	106	106	106	106

The results of the modelling undertaken for the proposed Modification (refer to Appendix F) predicted that noise levels at all non-associated receivers located within 8 km of a WTG will not exceed any of the criteria listed in Condition 11 and will be no greater than 35 dB(A) at any receiver, therefore meeting the requirements of schedule 3, condition 11 of the Development Consent. Furthermore, the highest noise level predicted from the ancillary infrastructure at non-associated residences is predicted to be less than 15 dB(A), therefore meeting the requirements of schedule 3, condition 12 of the Development Consent.

The construction noise assessment in the original environmental noise assessment (Sonus 2012) are still considered to be relevant, and in fact conservative for the construction works being undertaken as part of the reduced Project layout and the Revised Design of APR. Works to be undertaken during each phase of construction for the Project are considered to reflect those assessed within Sonus 2012. Whilst there is additional clearing associated with Revised Design of APR, noise emitting machinery and construction operating hours will not change to that previously assessed within the environmental noise assessment.

A Noise Compliance Test Plan (Sonus 2018b; Appendix G) has been developed which provides the proposed procedure for determination of compliance with the Project approval Conditions, which are consistent with the *New South Wales Wind Energy: Noise Assessment Bulletin* (DPE 2016) for State significant wind energy development (the Bulletin). The procedure has been designed to overcome the inherent difficulty of measuring noise from a wind farm in the presence of noise (often higher in level) from sources such as wind in trees and insects. This is achieved by measuring the noise in the near field and at intermediate distances and using the measured level and character to assist in isolating the noise contribution of the wind farm. Prior to the operation of the wind farm, background noise monitoring will be conducted at four locations (subject to permission being granted) in accordance with the Bulletin and Schedule 3, Condition 11 of the Development Consent. Given the above results of the supplementary environmental noise assessment, no amendments to the Condition of Consent are required relating to noise for the Project (Table 4.4).

**Table 4.4: Approval Conditions: Operational Noise Criteria**

Ref	Condition	Proposed Amendments
3.6	<b>Construction &amp; Decommissioning</b> The Applicant shall implement all reasonable and feasible measures to minimise the construction or decommissioning noise of the development, including any associated traffic noise.	Nil.
3.7	<b>Construction &amp; Decommissioning</b> The Applicant shall ensure that the noise generated by any construction or decommissioning activities is managed in accordance with the best practice requirements outlined in the Interim Construction Noise Guideline (DECC, 2009), or its latest version.	Nil
3.8	<b>Construction &amp; Decommissioning</b> Unless the Secretary agrees otherwise, the Applicant shall only undertake construction or decommissioning activities between: (a) 7 am to 6 pm Monday to Friday; (b) 8 am to 1 pm Saturdays; and (c) at no time on Sundays and NSW public holidays. The following construction activities may be undertaken outside these hours without the approval of the Secretary: <ul style="list-style-type: none"> <li>• activities that are inaudible at non-associated residences;</li> <li>• the delivery of materials as requested by the NSW Police Force or other authorities for safety reasons; or</li> <li>• emergency work to avoid the loss of life, property and/or material harm to the environment.</li> </ul>	Nil
3.9	<b>Construction &amp; Decommissioning</b>	Nil

	The Applicant shall only carry out blasting on site between 9 am and 5 pm Monday to Friday and between 8 am and 1 pm on Saturday. No blasting is allowed on Sundays or public holidays.	
3.10	<p><b>Construction &amp; Decommissioning</b></p> <p>The Applicant shall ensure that any blasting carried out during the construction of the development does not exceed the criteria in Table 3. See Table 3: Blasting criteria</p>	Nil
3.11	<p><b>Operational Noise Criteria – WTGs</b></p> <p>The Applicant shall ensure that the noise generated by the operation of WTGs does not exceed the relevant criteria in Table 4 at any non-associated residence See Table 4-2: Noise Criteria dB(A)</p> <p>Noise generated by the operation of the WTGs is to be measured in accordance with the relevant requirements of the South Australian Environment Protection Authority’s Wind Farms – Environmental Noise Guidelines 2009 (or its latest version), as modified by the provisions in Appendix 4. If this guideline is replaced by an equivalent NSW guideline, then the noise generated is to be measured in accordance with the requirements in the NSW guideline.</p>	Nil
3.12	<p><b>Operational Noise Criteria – Ancillary Infrastructure</b></p> <p>The Applicant shall ensure that the noise generated by the operation of ancillary infrastructure does not exceed 35 dB(A) LAeq(15 minute) at any non-associated residence.</p> <p>Noise generated by the development is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy (or its equivalent) as modified by the provisions in Appendix 4.</p>	Nil
3.13	<p><b>Noise Monitoring</b></p> <p>Within 3 months of the commencement of operations, the Applicant shall:</p> <p>(a) undertake noise monitoring to determine whether the development is complying with the relevant conditions of this consent; and</p> <p>(b) submit a copy of the monitoring results to the Department and the EPA.</p>	Nil
3.14	<p><b>Noise Monitoring</b></p> <p>The Applicant shall undertake further noise monitoring of the development if required by the Secretary.</p>	Nil



### 4.3 Biodiversity Impact Assessment

A biodiversity impact assessment has been undertaken to assess impacts upon ecology associated with the proposed Modification. The assessment considers the changes to impacts associated with the reduction in the number of WTGs and ancillary infrastructure, as well as additional vegetation and habitat removal required for the Revised Design of APR. The assessment below was prepared on the basis of the BDAR which is included as Appendix H.

#### 4.3.1 Background

An ecological assessment (EA) for the Project was prepared by ELA in 2011 in accordance with the requirements under Part 3A of the EP&A Act and included an assessment of the potential impacts of the proposal in accordance with the DGRs pursuant to Section 75U(f) of the EP&A Act. The EA was developed in accordance with NSW and Commonwealth legislation and policy current at the time. Two documents referred to below form the basis of the EA:

- *Crudine Ridge Wind Farm Part 3A Ecological Assessment* (ELA 2012); and
- *Addendum - Crudine Ridge Wind Farm Part 3A Ecological Assessment* (ELA 2013).

ELA 2012 formed the basis of the exhibited EIS, and ELA 2013 was prepared to address changes made in the Response to Submission and PPR, including adopting use of APR for OSOM vehicle transport. Together these documents (the EA) provide the basis of the biodiversity assessment within the EIS which informed the conditions of approval within the Development Consent.

The EA was prepared to assess two potential WTG layouts; one including 106 WTGs and the second 77 WTGs, together with ancillary infrastructure and the external overhead powerline as described in the EIS. A Biobanking Assessment Methodology (BAM) assessment was undertaken for the Project to inform the quantum of offsets required to meet a 'maintain or improve' outcome in accordance with the DGRs and the Office of Environment and Heritage (OEH) *Interim policy on Biodiversity Offsets for Part 3A and Major Projects* (OEH 2011). The calculations were made upon a worst-case scenario of all 106 WTGs and ancillary infrastructure being impacted. The biodiversity offset site "S2", now known as "Glen Maye", was identified and subsequently enforced as a requirement under the Development Consent (see Appendix A).

#### 4.3.2 Existing Environment

Four Central West Catchment Management Authority (CMA) Revised Biometric Vegetation Types (RBVTs) were mapped in the EA throughout the study area and project site, and include:

- CW117: Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands (BPBGRS)
- CW176: Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest of the NSW South Western Slopes Bioregion (RSSGRBLLB)
- CW206: Wet tussock grasslands of cold air drainage areas of the tablelands (WTG)
- CW209: White Box – Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (WBBRGYB)

A total of 244 species of vascular plants were recorded across the Study Area. Of these 161 (66 %) were native and 83 (34 %) were exotic species. One endangered flora species (under both the TSC Act (now repealed and replaced by the BC Act) and EPBC Act), *Swainsona recta*, was recorded in September and October 2011 within WBBRGYB (wooded areas).

A total of 136 fauna species (including six introduced species) were recorded across the Study Area, including five amphibian species, 93 bird species, 27 mammal species (including 13 microbat species) and 11 reptile species. The Study Area supports a diverse range of fauna habitat types within the woodland and grassland communities, including tussock grasses, farm dams, creeks, rocky outcrops, fallen timber, stags, leaf litter, hollow-bearing trees, defoliating bark, winter-flowering eucalypts and koala feed trees. However, because the Study Area has seen significant historical clearing, habitat suitable for threatened flora and fauna species was only present in discrete locations and aspects.

The sections below provide a summary of impacts identified within the EA for the Project, as approved by the Development Consent.

#### **4.3.3 Approved Project Impacts**

The EA evaluated the worst-case scenario for direct and indirect impacts upon ecology within the study area. The estimated impacts to vegetation within the EIS were identified in Table 19 of ELA 2012 and included assessment of the two layout options. The impacts to APR and the northern site access point were then considered within the PPR, within Table 3 of ELA 2013. Importantly, these two assessments evaluated both temporary and permanent impacts, and ELA 2013 adopted a conservative measure of the Layout Option A (106 WTGs) for use in the offset calculations. Table 4.5 below identifies the overall vegetation clearance limits identified within the EIS and PPR, which forms the basis of the clearance limits within the Development Consent.

**Table 4.5 Native vegetation impacts approved under the Development Consent<sup>1</sup>**

BIOMETRIC VEGETATION TYPE	CONDITION	NSW Status	Cwth Status	EIS	PPR	Overall Project
Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion (Benson 290)	DNG			89.9	0.17	90.07
Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion (Benson 290)	Woodland			6.6	1.2	7.80
<b>Sub-total</b>				<b>96.5</b>	<b>1.37</b>	<b>97.87</b>
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282)	Low/Pasture			0.3	0	0.3
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282)	DNG	EEC		2.4	0.01	2.41 <sup>2</sup>
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282)	Woodland	EEC	CEEC	3.0	0.28	3.28 <sup>3</sup>
<b>Sub-total</b>				<b>5.7</b>	<b>0.29</b>	<b>5.99</b>
Broad-leaved Peppermint-Brittle Gum - Red Stringybark dry open forest on the southeastern highlands	Moderate to Good/Pasture			1.2	0	1.2
Wet tussock grasslands of cold air drainage areas of the tablelands	Moderate to Good			0.14	0	0.14
<b>Total</b>				<b>103.54</b>	<b>1.66</b>	<b>104.9</b>

<sup>1</sup> This table does not include impacts to disturbed terrain and exotic pasture described in the EA.

<sup>2</sup> Contributes to the Box Gum Woodland EEC clearance limit in the Development Consent, when combined with the row below.

<sup>3</sup> Commonwealth-listed Box Gum Woodland TEC clearance limit referred to in the EPBC Act Approval.

#### **4.3.4 Biodiversity Management Plan**

As required under schedule 3, condition 22 of the Development Consent, a BMP was prepared for the Project prior to the commencement of construction, in consultation with the Office of Environment and Heritage (OEH), to the satisfaction of the Secretary. The BMP was approved by DPE on 15 December 2017 and is available on the Project website.

The BMP was prepared based on the potential impacts of all approved Project infrastructure. Avoidance through design is the primary measure adopted to reduce impacts of the Project on biodiversity at the Project site. The BMP also describes the measures that will be implemented to manage and mitigate unavoidable impacts associated with the construction of the Project, once the final detailed design is prepared.

The actions to minimise approved clearing are provided within section 4.1 of the BMP, namely that as part of the detailed design process the EPC Contractor will: Provide detailed civil and electrical designs for all infrastructure, including the clearance limits required during construction.

Prior to the commencement of construction on 2 August 2018, implementation of the BMP commenced with the following procedures undertaken prior to the start of clearing works along APR:

- Preparation of detailed civil designs for the works, including identifying the clearance limits required during construction.
- Preparation of a Risk Management Plan which sets environmental objectives and targets.
- Identification of clearance boundaries digitally and in mapping.
- Inductions for all staff working on the site, including Aarons Pass Road.
- Pre-clearance procedures as identified in Section 4.2 of the BMP.
- Survey and marking of threatened species along Aarons Pass Road in accordance with section 4.3 of the BMP.
- Impact Minimisation procedures identified in Section 4.4 of the BMP.
- Vegetation Clearance protocols within Section 4.5 of the BMP.

The BMP will continue to be used as a key guidance document throughout all aspects of construction and operation of the Project.

#### **4.3.5 Biodiversity Offset Strategy**

The EA determined the offsets required for the approved biodiversity impacts which cannot be avoided or mitigated, based on the 106 WTG layout in the EIS. The offset was calculated in accordance with the OEHs *Interim policy on Biodiversity Offsets for Part 3A and Major Projects* (OEH 2011). The Development Consent (schedule 3, condition 20) requires that the Proponent implement the Biodiversity Offset Strategy (BOS) described in the EIS as shown in Appendix A of this Modification:

*The Applicant shall implement the biodiversity offset strategy described in the EA, summarised in*

*Table 4.6 (below) and shown conceptually in the figure in Appendix 5, to the satisfaction of the Secretary.*

**Table 4.6: Summary of the Biodiversity Offset Strategy**

<b>Area</b>	<b>Offset Type</b>	<b>Size hectares (ha)</b>
Biodiversity Offset Area	Existing vegetation to be enhanced and protected	674

The offset property has been purchased by the Proponent for the purpose of establishing the offset site and site investigations are underway to commence registration of the property as an offset site. A Biodiversity Offset Strategy has been prepared and submitted to DPE for approval in accordance with the Development Consent, pending response from the DPE.

In 2017 a revised BOS was prepared (ELA 2017) on the basis of the 57 WTG locations which were approved under the EPBC Act approval. The assessment was endorsed by OEH and identified that:

- The approved project, including the APR addendum, would require 4,373 ecosystem credits, equivalent to an offset area of approximately 470 ha.
- A reduction in the number of WTGs would require fewer credits, and on the basis of 57 WTG locations being constructed, 3,314 ecosystem credits or approximately 356 ha of offset would be required.
- Yellow-bellied Sheath-tail Bat is no longer considered a species credit species.
- Regent Honeyeater is now considered a species credit species and 69 credits or approximately 10 ha of habitat would be required at the offset site.
- The proposed offset area covers an area of 674 ha which was estimated to provide 8,090 ecosystem credits which is far in excess of the required credits for the Project impacts, even under the most conservative assessment.

The biodiversity offset strategy therefore provides a significant net gain for biodiversity in the Project area and would leave a lasting legacy for biodiversity values in a highly degraded and heavily cleared agricultural landscape.

Condition 1 of the EPBC Approval (2011-6206) requires the following:

1. *To minimise the impacts of the action on protected matters, the approval holder must:*
  - a. *Implement administrative conditions 1, 4, 6, 7, 8; environmental conditions 19 (b)(c) – 24, 41, 42 of the approval under the NSW EP&A Act, as per Development Consent SSD-6697 dated 10 May 2016, where they relate to monitoring, managing, mitigating, avoiding, offsetting, recording or reporting on, impacts to protected matters.*

As offsets are defined under Condition 20 of SSD-6697, federal requirement for offsets are therefore been addressed through implementation and compliance with the biodiversity offset strategy in accordance with the Development Consent.

#### **4.3.6 Reduction in WTGs**

The removal of 40 WTGs and ancillary infrastructure from the approved layout will see a material reduction in biodiversity impacts associated with the Project. This substantial change in project design will result in a reduction of approximately 31 ha of native vegetation clearing across the Project site, despite the increase in impacts along APR. Additionally, there may be further savings as the detailed

design of the civil and electrical infrastructure progresses and rationalisation of the layout is undertaken prior to construction. Table 4.7 shows the predicted vegetation impacts associated with the various project components based on the latest civil and electrical design layouts. It is noted that the detailed design work is not complete and therefore the values in Table 4.7 are subject to change. However, the figures demonstrate that there will be a significant reduction in on-ground impacts to vegetation and habitat as a result of the alignment of the Development Consent and EPBC Act Approval.

**Table 4.7: Summary of Vegetation Impacts**

BIOMETRIC VEGETATION TYPE	CONDITION	NSW Status	Cwth Status	Project approval			Modification				Delta
				Wind Farm and Transmission Line	Aarons Pass Road and Northern Site Entrance	Project Total	Wind Farm	Transmission Line	Aarons Pass Road	Project Total	
Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion (Benson 290)	DNG			89.90	0.17	<b>90.07</b>	53.55	4.46	0.00	<b>58.01</b>	-32.06
Red Stringybark - Scribbly Gum - Red Box - Long-leaved Box shrub - tussock grass open forest the NSW South Western Slopes Bioregion (Benson 290)	Woodland			6.60	1.20	<b>7.80</b>	4.21	0.36	5.64	<b>10.21</b>	2.41
<b>Sub-total</b>				<b>96.50</b>	<b>1.37</b>	<b>97.87</b>	<b>57.76</b>	<b>4.82</b>	<b>5.64</b>	<b>68.22</b>	<b>-29.65</b>
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282) *	Low Pasture			0.30	0.00	<b>0.30</b>	0.00	0.10	0.00	<b>0.10</b>	-0.20
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282)	DNG	EEC		2.40	0.01	<b>2.41</b>	0.09	1.58	0.00	<b>1.67</b>	-0.74
White Box - Blakely's Red Gum - Yellow Box grassy woodland of the NSW South Western Slopes Bioregion (Benson 282)	Woodland	EEC	CEEC	3.00	0.28	<b>3.28</b>	0.08	2.20	0.95	<b>3.23</b>	-0.05
<b>Sub-total</b>				<b>5.70</b>	<b>0.29</b>	<b>5.99</b>	<b>0.17</b>	<b>3.88</b>	<b>0.95</b>	<b>5.00</b>	<b>-0.99</b>
Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands	Moderate to Good/ Pasture			1.20	0.00	<b>1.20</b>	0.97	0.00	0.00	<b>0.97</b>	-0.23
Wet tussock grasslands of cold air drainage areas of the tablelands	Moderate to Good			0.14	0.00	<b>0.14</b>	0.08	0.00	0.00	<b>0.08</b>	-0.06
<b>Total</b>				<b>103.54</b>	<b>1.66</b>	<b>105.20</b>	<b>58.90</b>	<b>8.69</b>	<b>6.59</b>	<b>74.18</b>	<b>-31.02</b>

As identified in Section 1, it is important to note that the construction of a maximum of only 37 WTG means that the alignment of the consents and adoption of the Revised Design, will achieve a reduction in the total approved clearing set out in the EIS. However, regardless of this outcome, the Proponent does not propose to reduce the existing 674 ha biodiversity offset in response to the reduced total area of clearing. Rather, the Proponent proposes to provide an additional environmental offset for the new clearing associated with the Revised Design. This will add to the existing 674 ha environmental offset that the Proponent has secured for the Project, as shown in Appendix A. This approach demonstrates the Proponent's strong environmental and social governance values and a commitment to ensuring that a net gain in biodiversity benefit is generated by the Project.

Subject to approval of the Modification, the BOS would be revised in consultation with OEH to identify and secure the additional biodiversity credits, offset site, or other measures required to offset the impacts of the APR Revised Design impacts described in Section 4.3.7.

#### **4.3.7 APR Revised Design**

The PPR identifies that the clearing of 1.54 ha of native vegetation was proposed along APR for the approved Project, including 0.28 ha of EEC. The iterative road design process identified in Section 2.2, informed by the detailed consultation described in Section 3, involves an increase in impact to vegetation and habitat along APR. These impacts are due to the revised road alignment, temporary disturbance areas associated with civil works required for the road construction, and the swept path of OSOM components being transported along the road which will require pruning of vegetation to allow safe passage of the equipment.

Field surveys were undertaken during the period 17 – 21 September 2018, and the 5 and 6 November 2018, in addition to the surveys completed by ELA (2013). The surveys identified approximately 6.59 ha of native vegetation to be cleared for the Works within the current road design, including 0.95 ha which meets the listing criteria for Endangered Ecological Communities (EEC) under the BC Act and 0.32 ha which meets the listing criteria for Critically Endangered Ecological Communities (CEEC) under the EPBC Act, located towards the western end of the Works. The 6.59 ha of native vegetation clearing is approximately comprised of 4.97 ha of permanent clearing for the construction of the road, 1.06 ha of temporary disturbance for civil works, and 0.44 ha of structural clearing and pruning in the blade swept path to allow for transportation of the WTG blades. An additional area of 0.12 ha has been cleared at the eastern end of the Works in association with the commencement of road construction. This area was not subject to plots in this study, but was mapped by ELA (2013) within the PPR and is considered to have been the same as the surrounding vegetation, resulting in a total of 6.59 ha of native vegetation to be cleared for the Works.

Given the like-for-like vegetation communities present along the road alignment, it is considered that the approved 1.54 ha of native vegetation can be directly exchanged for the same area within the works to be undertaken along APR. Therefore, the proposed change in impact due to the Revised Design is an additional area of native vegetation clearing of approximately 5.05 ha, as shown in Table 4.8: Vegetation communities to be impacted by the Works



**Table 4.8: Vegetation communities to be impacted by the Works**

PCT	Works impact area					Less approved disturbance (SSD-6697)	Impact area subject to this EIA
	Impact Area New Road	Temporary Impact Area Construction	Blade area	Cleared to date	Total Works impact area		
277	0.79	0.15	0.01	-	<b>0.95</b>	0.28	<b>0.67</b>
290	4.18	0.91	0.43	0.12	<b>5.64</b>	1.26	<b>4.38</b>
<b>Total</b>	<b>4.97</b>	<b>1.06</b>	<b>0.44</b>	<b>0.12</b>	<b>6.59</b>	<b>1.54</b>	<b>5.05</b>

A Biodiversity Development Assessment Report (BDAR) has been prepared for the APR Revised Design, which assesses the impact upon an additional 5.05 ha beyond the approved 1.54 ha already approved to be impacted along APR. The BDAR is included as Appendix H.

As a conservative measure, the BDAR considered total removal of the vegetation within all categories of disturbance proposed (permanent clearing, temporary disturbance and the blade swept path). The 5.05 ha assessed in the BDAR was assigned to two Plant Community Types (PCT):

1. PCT 277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion (0.67 ha)
2. PCT 290 - Red Stringybark – Red Box – Long-leaved Box – Inland Scribbly Gum tussock grass shrub low open forest on hills in the southern part of the NSW South Western Slopes Bioregion (4.38 ha).

The entire area of PCT 277 (0.67 ha) meets the criteria for EEC listed under the BC Act, with smaller patches totalling 0.32 ha meeting the CEEC listing criteria under the EPBC Act:

- White Box Yellow Box Blakely's Red Gum Woodland (listed as EEC under the BC Act)
- White Box Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (listed as CEEC under the EPBC Act).

Nine threatened flora species were identified from the data audit as known, likely or having the potential to occur within the Works area, with two of these identified and confirmed during the field survey. *Acacia meiantha*, listed as Endangered under both the BC Act and EPBC Act was identified, along with *Pomaderris reperta* (Denman Pomaderris), which is listed as Critically Endangered under the BC Act and EPBC Act. *Acacia meiantha* occurs throughout a 1.5 km section of the Works area, whilst the Denman Pomaderris is confined to a single corner of the Works, covering approximately 70 m. These species are also considered within the BMP approved by DPE on 15 December 2017. 59 individual *A. meiantha* have been identified for removal as part of the Works. Three *P. reperta* individuals are within the blade swept path of the road upgrade, and will not be directly impacted by vegetation clearing. Only one individual *P. reperta* will be impacted by the development.

Twenty-five threatened fauna species were identified from the data audit as known, likely or having the potential to occur within the Works area, with three of these identified and confirmed during the field survey. *Artamus cyanopterus cyanopterus* (Dusky Woodswallow), *Daphoenositta chrysoptera* (Varied Sittella) and *Petroica boodang* (Scarlet Robin) were identified, all are listed as Vulnerable under

the BC Act and identified as ecosystem credit species within the BAMC. Threatened fauna habitat was assessed, comprising mainly 150 individual hollow-bearing trees to be removed for the Works. Ten threatened species credit species (derived from BAMC) was presumed to occupy the extent of Aarons Pass Road and will be impacted by the Works. These species include the Bush stone curlew, Gang Gang Cockatoo, Glossy Black Cockatoo, Eastern Pygmy Possum, Squirrel Glider, Brush tailed Phascogale, Powerful Owl, Barking Owl, Masked Owl and Koala.

Potential Koala habitat was assessed in accordance with the State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44). The impact area was not determined to be either potential or core Koala habitat under SEPP 44, due to the lack of confirmed breeding females, recent sightings and low number of historical records. There have been only five registered historical records of Koalas being found within 10 km of Aarons Pass Road between 1980 to 2011 (OEH 2018). Vegetation surveys identified only three individual key feed trees, *Eucalyptus albens* (White Box), which did not meet the 15 % threshold test to constitute potential habitat. There are however, secondary feed trees on site, *E. melliodora*, *E. polyanthemos*, and *E. bridgesiana* (DIPNR 2004) and it is possible that Koalas move through the area. Further assessment using the ‘EPBC Act referral guidelines for the vulnerable Koala’ (Department of the Environment [DoE], 2014) was undertaken. The Koala is considered as a species with the potential to occur in the impact area, in low numbers. Application of the Koala habitat assessment tool from the proposed impact area was undertaken, resulting in a score of 5/10. A score of five or greater means that an assessment of significance is required. The assessment included in the BDAR (Appendix H) concluded that impacts to Koala from the proposed road upgrade will not be significant, therefore, no further assessment under the EPBC Act was required.

For vegetation zone 1 – PCT 277 Intact, the BAM Credit Calculator (BAMC) generated a vegetation integrity score of 56.5. Nine ecosystem credits are required to offset the removal of 0.32 ha for vegetation zone 1. For vegetation zone 2 – PCT 277 Degraded, the BAMC generated a vegetation integrity score of 40.4. Seven ecosystem credits are required to offset the removal of 0.4 ha for vegetation zone 2). For vegetation zone 3 – PCT 290 Intact, the BAMC generated a vegetation integrity score of 69.3. 47 ecosystem credits are required to offset the removal of 1.6 ha of vegetation zone 3. For vegetation zone 4 – PCT 290 Degraded, the BAMC generated a vegetation integrity score of 61.76 ecosystem credits are required to offset the removal of 2.8 ha for vegetation zone 4.

Additionally, a total of five species credits are required to offset the impact on *Acacia meiantha*, and one species credit is required to offset the impact on *Pomaderris reperta*. Fauna surveys were not conducted so due to the presence of suitable habitat on site, ten species of fauna were presumed to be present. 156 species credits are required to offset each of the Bush Stone-curlew, the Squirrel Glider, and Koala which were considered to occur across the entire development site, and 154 species credits each are required to offset the impacts on Gang-gang cockatoo, Glossy Black-Cockatoo, Eastern Pygmy-possum, Barking Owl, Powerful Owl, Masked Owl and the Brush-tailed Phascogale which have been assumed to occurred across the development site containing hollow bearing trees.

Serious and Irreversible Impacts (SAII) values were considered as part of the assessment. These values include the ‘White Box Yellow Box Blakely’s Red Gum Woodland’ and threatened flora species *Acacia meiantha* and *Pomaderris reperta*. which are also listed as candidate SAII. Given the small population of *P. reperta* (1 individual to be impacted) and *A. meiantha* (59 individuals to be impacted) it is considered unlikely that SAII will occur. Impacts to these species will mitigated by evaluating detailed

design options to avoid individuals in the first instance. Where avoidance is not possible, the Proponent has committed to undertake amendments to the BMP to incorporate management strategies for pruning and/or relocation of *P. reperta* and *A. meiantha* in consultation with a qualified botanist and OEH. Management measures may include translocating affected individuals and propagation via cuttings collected from site to mitigate the impacts of any clearance works on these threatened flora.

Six Matters of National Environmental Significance (MNES) were identified as potentially adversely affected by the proposed works. An assessment of the Commonwealth Significant Impact Criteria (Commonwealth of Australia 2013) was applied to each of the six threatened species listed under the EPBC Act, including Koala, four bird species: Regent Honeyeater, Painted Honeyeater, Swift Parrot and two endangered flora species, *Pomaderris reperta* and *Acacia meiantha*. The assessment concluded that the Project would not have a significant impact (refer to Appendix H).

#### 4.3.8 Summary

The Modification would result in an overall reduction of 31 ha of impacts to vegetation and fauna habitat. The Works for the Revised Design would result in non-significant impacts to biodiversity values through removal of native vegetation, threatened flora species and threatened species habitat. All impacts to MNES and BC Act listed entities have been avoided as far as practicable and all impacts have been assessed in accordance with Commonwealth guidelines. Mitigation strategies have been put into place to manage potential impacts to MNES and BC Act listed entities. The development footprint has been modified, reduced and access routes have been altered to avoid impacts to EEC, CEEC and critical habitat for listed species. Additionally, the removal of vegetation will be avoided where possible by vegetation trimming rather than removal. Minimisation of impacts will be achieved through implementation of the mitigation and management measures described within the approved Project BMP.

Table 4.9 below demonstrates that the proposed disturbance to the Box Gum Woodland EEC will be within the approved limits identified in the Development Consent and EPBC Act Approval.

**Table 4.9: Box Gum Woodland Impact Summary**

	<b>Development Consent</b>	<b>EPBC Act Approval</b>
Approval limit	5.7 ha	3.28 ha
Anticipated total clearing	4.9 ha	3.22 ha
Compliance with approval?	<b>Yes</b>	<b>Yes</b>

Given the above, few amendments to the Development Consent are required, which are shown in

Table 4.10.

**Table 4.10: Approval Conditions: Flora and Fauna Impacts**

Ref	Condition	Proposed amendments
3.19	<p><b>Operating Conditions</b></p> <p>The Applicant shall:</p> <p>(a) ensure that no more than 5.7 hectares of Box Gum Woodland EEC is cleared for the development, unless the Secretary agrees otherwise;</p> <p>(b) implement all reasonable and feasible measures to:</p> <ul style="list-style-type: none"> <li>• minimise any impacts on the Small-Purple Pea (<i>Swainsona recta</i>);</li> <li>• minimise impacts on threatened bird and bat populations;</li> <li>• minimise the approved clearing of native woodland vegetation and fauna habitat; and</li> </ul> <p>(c) if micro-siting WTGs, ensure that the revised location of the turbine is at least 30 metres from any existing hollow-bearing trees, and where reasonable and feasible, 50 metres from any existing hollow-bearing tree, unless the Secretary agrees otherwise.</p> <p>Note: In considering a request for micro-siting of WTGs within 30 m of existing hollow-bearing trees, the Secretary will consider safety concerns, the constructability of the turbine, and/or whether the micro-siting would materially increase biodiversity impacts.</p>	<p>Nil</p>
3.20	<p><b>Biodiversity Offset Strategy</b></p> <p>The Applicant shall implement the biodiversity offset strategy described in the EA, summarised in Table 5 and shown conceptually in the figure in Appendix 5, to the satisfaction of the Secretary.</p> <p>See Table 5: Summary of the biodiversity offset strategy</p>	<p>Change in Table 5 of the Development Consent to incorporate the additional offsets required for the impacts along APR. Should align with the results of the BDAR (Appendix H).</p>
3.21	<p><b>Biodiversity Offset Strategy</b></p> <p>Within 12 months of the commencement of construction, unless the Secretary agrees otherwise, the Applicant shall make suitable arrangements to provide appropriate long-term security for the biodiversity offset area to the satisfaction of the Secretary. These arrangements must provide for the conservation of the offset area in perpetuity.</p>	<p>Nil</p>
3.22	<p><b>Biodiversity Management Plan</b></p> <p>Prior to the commencement of construction, the Applicant shall prepare a Biodiversity Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with OEH and DoE; and</p> <p>(b) include a:</p> <ul style="list-style-type: none"> <li>• description of the measures that would be implemented for: <ul style="list-style-type: none"> <li>- minimising the amount of clearing within the approved development footprint as far as practicable, including clearing associated with the widening of Aarons Pass Road;</li> <li>- managing potential indirect impacts on threatened plant species, including the Small-Purple Pea (<i>Swainsona recta</i>);</li> </ul> </li> </ul>	<p>Nil</p>

Ref	Condition	Proposed amendments
	<ul style="list-style-type: none"> <li>- rehabilitating and revegetating temporary disturbance areas;</li> <li>- protecting vegetation and fauna habitat outside the approved disturbance area;</li> <li>- maximising the salvage of resources within the approved disturbance area (including approved disturbance associated with road upgrade works on Aarons Pass Road) – including vegetative and soil resources – for beneficial reuse (including fauna habitat enhancement) on the site and/or in the biodiversity offset area;</li> <li>- collecting and propagating seed (where relevant);</li> <li>- minimising impacts on tree hollows as far as practicable;</li> <li>- minimising the impacts on fauna on site, including undertaking pre-clearance surveys;</li> <li>- controlling weeds and feral pests;</li> <li>- controlling erosion;</li> <li>- controlling access; and</li> <li>- bushfire management;</li> <li>• Biodiversity Offset Management Plan for implementing the biodiversity offset strategy, including detailed performance and completion criteria, unless the offset area is secured via a biobanking agreement under the TSC Act;</li> <li>• Bird and Bat Adaptive Management Plan, that includes:               <ul style="list-style-type: none"> <li>- baseline data on bird and bat populations in the locality that could potentially be affected by the development, particularly ‘at risk’ species and threatened species;</li> <li>- a detailed description of the measures that would be implemented on site for minimising bird and bat strike during operation of the development, including:                   <ul style="list-style-type: none"> <li>o minimising the availability of raptor perches;</li> <li>o prompt carcass removal;</li> <li>o controlling pests;</li> <li>o using best practice methods for bat deterrence, including managing potential lighting impacts;</li> <li>o adaptive management of WTGs to reduce mortality;</li> </ul> </li> </ul> </li> <li>(c) include a detailed program to monitor and report on the performance of these measures over time, including annual reporting of bird and bat strike monitoring or as otherwise directed by the Secretary.</li> </ul>	
3.23	<p>Biodiversity Management Plan</p> <p>Following approval, the Applicant must implement the measures described in the Biodiversity Management Plan.</p>	Nil
3.24	<p>Conservation Bond</p> <p>If the offset area is not secured by a biobanking agreement under the TSC Act, then within 3 months of the approval of the Biodiversity Management Plan, unless the Secretary agrees otherwise, the Applicant shall lodge a Conservation Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Offset Management Plan.</p>	Nil

Ref	Condition	Proposed amendments
	<p>The sum of the bond shall be determined by:</p> <p>(a) calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and</p> <p>(b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Secretary.</p> <p>If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Offset Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.</p> <p>If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Offset Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works.</p> <p>Note: The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.</p>	



#### 4.4 Heritage Impact Assessment

In summary, the proposed Modification will result in the Project having reduced impact on Aboriginal and European heritage across the heritage sites and no changes to the Development Consent conditions will be required to accommodate the Modification.

NSW Archaeology Pty Ltd (NSWA) (Dibden 2012) assessed the heritage values (European and Aboriginal) present within the study area during the Heritage Impact Assessment (HIA) undertaken for the Project in 2012. The study area surveyed encompassed the footprints of both original layout options, including 106 WTGs and 77 WTGs, and ancillary infrastructures. Additional studies have been undertaken post-completion of the original HIA (Dibden, 2012) and include:

- *New South Wales Archaeology (Dibden), 2013. Aaron's Pass Road – Heavy Haulage Route Upgrade for the Proposed Crudine Ridge Wind Farm European and Aboriginal Cultural Heritage Assessment Report.*
- *New South Wales Archaeology (Dibden), 2018a. Crudine Ridge Wind Farm – Heritage Addendum Report. Letter prepared for CWP Renewables.*
- *New South Wales Archaeology (Dibden), 2018b. Crudine Ridge Wind Farm – Aaron's Pass Road. Letter prepared for CWP Renewables.*

Dibden 2013 evaluated the heritage values of APR including detailed site investigations for passing bays and road alignments proposed in the PPR. Dibden (2018a) undertook further site investigations within the wind farm and transmission line area with Registered Aboriginal Parties to address some field survey gaps in the EIS to ensure that the heritage dataset was complete prior to the commencement of construction.

The results of all field surveys and impact assessments undertaken for the Project have identified a total of 85 Aboriginal heritage sites and nine (9) European heritage structures. The complete artefactual assemblage within the study area was dominated by tuff artefacts. All sites were highly disturbed by erosion, likely due to historical and recent agricultural activities. Several sites (SU3/L5, SU12/L2, and SU13/L3; Dibden 2012:77, 127, 133) were identified as having some potential to contain subsurface Potential Archaeological Deposits (PADs) and may be representative of occupation events.

The spatial patterning of the Aboriginal heritage sites was concluded to be unfocused and characteristic of general 'background scatter' across the landscape, the result of artefact deposition from hunting activities and general mobility rather than sustained inhabitation (Dibden 2012:31). A tendency for some sites to be located on the eastern side of the plateau and associated with springs was noted (SU2/L1, SU7/L3, SU7/L4, and SU13/2; Dibden 2012:47) and previously recorded (Flood 1980:158-159, Lance and Koettig 1986:26-32; Hall 1992:62) and may indicate a deliberate preference for locations for longer-term occupation events.

European heritage structures identified were associated with sheep management and indicative of the agricultural history of the area. All structures were likely of late nineteenth or broadly twentieth century date, with two (CRWF SU3 Sheep yards and loading ramp and CRWF SU6 Sheep crutching yards and fold) potentially still being in use (Dibden 2012:154-167).

None of the heritage sites identified during heritage assessments, either Aboriginal or European, were considered to warrant further investigation or recording on a heritage database (Dibden 2012:2-3). No European heritage structures were within the construction impact area of the Project.

Surveys undertaken for the road improvement works along APR identified the area as being of low heritage potential (NSWA 2013) with no heritage constraints identified. Further analysis and consideration of the proposed road improvement works addressed within this Modification (NSWA 2018) continued to define the road corridor as being of low heritage potential. Therefore, there are no heritage constraints present in areas proposed as part of the Modification for disturbance along APR.

An Aboriginal Heritage Management Plan (AHMP) has been developed for the approved project in consultation with OEH and DP&E to ensure compliance with conditions 26 and 27 of Development Consent SSD-6697 (Table 4.11). Where possible, the Project seeks to avoid and minimise impacts to ground surfaces containing heritage items, to ensure as little impact as possible to Aboriginal objects in the development corridor. The AHMP sets out the practical measures that may be taken to protect and conserve Aboriginal objects in the development corridor. Where impacts are unavoidable, the AHMP describes the appropriate impact mitigation required which entails salvage (artefact collection from the ground surface) before construction impacts.

The AHMP will continue to be implemented during construction and operation of the modified project.

Prior to the commencement of construction, heritage salvage works were undertaken within the footprint of the approved project was undertaken in August 2018, in accordance with the AHMP. The salvage program aimed to collect many of the Aboriginal heritage sites which would likely be affected by activities in the proposed area of approved impact. In accordance with the AHMP, sites were identified during detailed design, avoided where possible and fenced where required to prevent inadvertent impacts. Where sites could not be avoided, they were salvaged and recorded in accordance with the procedures in the AHMP. Sites not salvaged during the exercise were outside of the revised footprint of the Project and will therefore remain unimpacted, allowing for their cultural heritage significance to be conserved in situ. The detailed design work undertaken prior to commencement of construction enabled the conservation of several in situ Aboriginal heritage sites and all European heritage sites identified within the HIA.

**Table 4.11: Approval Conditions: Heritage Impacts**

Ref	Condition	Proposed amendments
3.25	<p><b>Protection of Aboriginal Heritage Items</b>                      The Applicant shall ensure that the development does not cause direct or indirect impact on any Aboriginal heritage items located outside the approved disturbance area.</p>	Nil
3.26	<p><b>Aboriginal Heritage Management Plan</b>                      Prior to commencement of construction, the Applicant shall prepare an Aboriginal Heritage Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <ol style="list-style-type: none"> <li>a) Be prepared in consultation with OEH and Aboriginal stakeholders; and</li> <li>b) Include a description of the measures that would be implemented for:                             <ul style="list-style-type: none"> <li>• minimising ground disturbance within the Project area during construction and decommissioning works;</li> <li>• managing impacts to Aboriginal heritage items within the Project disturbance area;</li> <li>• managing the discovery of human remains or previously unidentified Aboriginal heritage items on site; and</li> <li>• ensuring workers onsite receive suitable heritage inductions prior to carrying out any development on site, and that suitable records are kept of these inductions.</li> </ul> </li> </ol>	<p>The reduced WTG footprint will further reduce disturbance, and therefore impacts upon cultural heritage.</p> <p>No changes are required to be made to the approved Aboriginal Heritage Management Plan.</p>
3.27	<p>Following approval, the Applicant must implement the measures described in the Aboriginal Heritage Management Plan.</p>	Nil.

## 4.5 Traffic and Transport

A Traffic and Transport Assessment was undertaken by Samsa Consulting in 2012 which evaluated transport for up to 106 WTGs and ancillary infrastructure to the Project site. A range of access routes were evaluated based on the road conditions and equipment specifications at that time, including OSOM access to the site making use of Windeyer Road and Pyramul Road.

A further Transport Assessment was undertaken (Samsa 2013) for the PPR which addressed alternate access routes including use of Aarons Pass Road from Castlereagh Highway as the primary access point for the Project. The route was selected in response to community concerns raised by members of the Pyramul area and MWRC regarding OSOM transport from Mudgee along Windeyer Road to the Project entrance. In response to the community concerns, the Proponent engaged Downer to undertake a Route Survey and Upgrade Assessment (Downer 2013), as well as a Passing Bay Assessment for APR which was assessed for ecological and heritage values based on the assumptions regarding WTG component specifications available on the market at the time.

Although APR was not the preferred access route to site, the Proponent understood the concerns the community raised in relation to traffic and transport along the access route and adjusted the proposed transport route to focus on APR accordingly.

As a result, the project was approved on the basis of all OSOM equipment being transported to the site via the northern site entrance, using Castlereagh Highway and APR, unless the applicable roads authority approves otherwise. The Development Consent also required that a TMP be prepared in consultation with the relevant road authorities.

The TMP (Bitzios Consulting 2017) was prepared in accordance with the requirements of the Development Consent (schedule 3 condition 33). Notably, with regard to this Modification, the TMP involved consultation with both MWRC and BRC as well as the NSW RMS and incorporated an agreed supplementary OSOM transport route, primarily to avoid traffic impacts associated with passage of longer vehicles through Gulgong and Mudgee. The intention of this changes was to minimise impacts to residents and urban Council roads along the transport route as a community mitigation measure. The TMP was subsequently approved by DPE on 15 December 2017.

Schedule 3, condition 28 of the Development Consent also identified that upgrades are required to be made to APR. APR is required to be maintained during the construction period and rehabilitated to the state of the pre-dilapidation report at completion of construction, at the Project's expense. These arrangements are in accordance with schedule 3 condition 30 of the Development Consent, the protocols agreed with MWRC in the TMP and are enforced under the s138 approval issued by MWRC in August 2018.

The TMP also included an agreed Improved Design for APR to better accommodate delivery of OSOM components associated with the Project. The Revised Design of APR included in this Modification, is a revision to the Improved Design included in the approved TMP for which s138 approval was granted.

The Revised Design requires 6.59 ha of native vegetation clearing along APR, representing a 5.05 ha increase in the amount of native vegetation clearing required compared to the approved EIS (1.54 ha), although still representing a reduction overall in the clearing approved under the Development Consent. These impacts are addressed in Section 4.3 above.

Traffic and transport outcomes associated with the proposed Modification are:

- An overall reduction in project construction traffic volumes associated with the aligning of the Commonwealth and State approvals; and
- Revised design and updated swept path analysis for OSOM vehicles, resulting in increased forecast clearing of vegetation.

#### **4.5.1 Reduced construction traffic volumes**

Construction traffic volumes for the EIS were estimated by Samsa Consulting (2012) based on construction of 77 WTGs over an estimated period of 18 months to 2 years. Traffic types assessed were comprised of:

- Articulated semi-trailers (extendible and regular trailer sizes), heavy duty low loaders, dolly / jinker arrangements and a variety of high power prime movers – for transporting initial establishment equipment, materials and WTG components;
- Tipper trucks – to bring stone for the access tracks and to remove soil;
- Bulldozers – for road works on-site;
- Concrete agitators – to transport concrete from the batching plant for use on-site;
- Cranes – one small mobile crane (up to 100 tonne) for assembly of WTGs on the ground and a larger mobile crane (up to 600 – 1,000 tonne, or alternatively a 300-400 tonne crawler crane) for the erection of the WTG; and
- Conventional 4WD vehicles and sedans – use by on-site personnel.

Traffic generation predictions used by Samsa Consulting for each Access Route in the EIS ranged from a moderate (up to an additional 61 vehicles per day) scenario to a conservative (up to an additional 193 vehicles per day) scenario. While the moderate scenario was considered likely to apply for the majority of the construction period, the conservative scenario assumes that peak construction staff numbers shall coincide with other peak traffic generating activities such as concrete pours, access road construction and WTG component delivery.

It was concluded that construction activities, including the addition of heavy vehicles and construction staff vehicles, would not significantly reduce existing Levels of Service associated with identified access roads and that peak traffic requirements could be absorbed with appropriate road infrastructure upgrades and construction traffic management. Operational traffic volumes were considered to represent a negligible change over the existing conditions.

As WTGs are constructed using modular components assembled in a sequential manner, the reduced number of WTGs will directly reduce the number of OSOM components to be transported to site by more than half, due to the removal of 40 WTGs. Additionally, the reduction in WTG units will result in a significantly shortened construction period, estimated to be less than half as long as initially estimated and approved in the EIS. Further, the Proponent has arranged to procure materials including gravel, aggregate and water, from local sources within or close to the Project area, which have been approved separately under the relevant planning instruments by the relevant council. This approach was identified within the EIS as a mitigation measure to further reduce traffic, dust, noise and other community impacts that have otherwise been approved.

These changes will result in a reduction of construction related impacts including the duration and magnitude of construction traffic associated with the Project, directly reducing the following potential impacts identified in the EIS:

- Traffic noise and delays
- Vehicle collisions (with stock or due to obstruction by long loads) or loss of control
- Dust from unsealed roads, and
- Road surface deterioration, particularly during wet weather.

The proposed Modification will also reduce operational traffic impacts, however, these are considered to be insignificant under either approval scenario. Based on the anticipated reduction in traffic impacts associated with this Modification, previously identified mitigation measures remain applicable, where relevant, to the Modified Project.

#### **4.5.2 Revised design to Aarons Pass Road**

APR is a rural unsealed road running primarily east-west, connecting with the Castlereagh Highway to the east and Pyramul Road, Sally's Flat Road and Prices Lane to the west. The road surface of APR on the approach to the intersections with Castlereagh Highway and Pyramul Road is sealed for approximately 90 m, the remainder of the road sections are unsealed. APR provides access to properties in the Aarons Pass and Carcalgong areas. The road alignment is mostly composed of curves and turns with undulations, primarily following the ridgeline. Road sections vary between one and two car widths.

APR is identified as the approved access route in the TMP and the Development Consent. The entrance to the site is approximately 20 kilometres along APR west of the Castlereagh Highway. APR requires upgrades to support OSOM vehicles, including improvements to the capacity, width and capability along the route. Design and construction attributes for the Revised Design are provided in Section 2.2 of this document. The Revised Design is based on an updated swept path analysis for OSOM vehicles and will improve traffic conditions and safety on APR relative to the existing design.

The works required for the Revised Design along APR will be undertaken during the early construction phase of the Project and are generally in accordance with the construction requirements outlined in the EIS and TMP. This shall include corner easing, culverts, drainage structures and passing bays designed in accordance with Austroads Standards and MWRC specifications.

Additional clearing required for construction of the Revised Design of APR shall be undertaken in a manner consistent with the existing approval. As such, there will be no additional impact in relation to traffic conditions on APR. Potential impacts associated with the additional clearing on other environmental factors are considered elsewhere in this document.

The Revised Design is considered to be generally consistent with the approved upgrades to APR, with relatively minor design changes being made to improve vehicle movement and safety as required. As such, construction impacts associated with the Revised Design remain generally consistent with those identified within the approved TMP. Accordingly, previously identified traffic management measures and mitigation measures remain valid to this Modification.



Of significance to this assessment are new quarry facilities that have been established off APR which will provide the source of aggregate for re-sheeting of APR. The use of locally quarried aggregate will reduce transport distances, thus reducing construction traffic impacts associated with the upgrades to APR. Furthermore, the local aggregate is characterised by low reactivity to moisture and high strengths, likely providing improved resistance to wetting and drying cycles, reduced dust generation and improved longevity compared with existing road conditions.

Overall, and in the longer term, the Modification is likely to lead to reduced traffic impacts due to the reduced duration of project construction activities, and hence, compressed road upgrades work program, as well as improved road conditions and potentially reduced ongoing maintenance requirements due to re-sheeting. The TMP identifies reduced traffic movements anticipated with the reduction in WTG components and ancillary infrastructure, and the traffic controls and mitigation measures will continue to be used throughout construction and operations to manage the traffic impacts on other road users in consultation with the relevant roads authority.

It is considered that traffic and road network impacts associated with this Modification would be negligible during the operational phase. Traffic impacts will remain consistent with the existing approval conditions (Table 4.12).

**Table 4.12: Approval Conditions: Traffic and Transport Impacts**

Ref	Condition	Proposed amendments
3.28	<p><b>Road Upgrades – Aarons Pass Road</b></p> <p>Prior to the commencement of construction (other than pre-construction minor works), the Applicant shall:</p> <p>(a) undertake the road upgrades and other traffic management measures (including the construction of passing bays) identified in Appendix 6 to the satisfaction of MWRC;</p> <p>(b) upgrade the existing intersection between Aarons Pass Road and the Castlereagh Highway to the satisfaction of the RMS; and</p> <p>(c) construct the new intersection between Aarons Pass Road and the northern site access road to the satisfaction of MWRC. The intersection design must include:</p> <ul style="list-style-type: none"> <li>• a widened shoulder prior to the intersection to assist turning vehicles; and/or</li> <li>• a widened intersection to facilitate the flow of entering traffic off the road; and/or</li> <li>• placing site entrance gates back from the road so that they do not create a hold point for entering vehicles prior to their egress from Aarons Pass Road.</li> </ul>	<p>Revised Design and an additional surface disturbance of 5.03 ha</p> <p>Limited concurrent Construction to be permitted, where approved by the Secretary.</p>
3.29	<p><b>Road Upgrades – Bombandi Road</b></p> <p>Prior to the commencement of construction on the switching station site, the Applicant shall:</p> <p>(a) undertake the road upgrades and other traffic management measures identified in Appendix 6 to the satisfaction of MWRC; and</p> <p>(b) upgrade the existing intersection between Bombandi Road and the Castlereagh Highway to the satisfaction of the RMS.</p>	<p>Nil</p>
3.30	<p><b>Road Maintenance</b></p>	<p>Nil</p>

	<p>The Applicant shall:</p> <p>(a) prepare a pre-dilapidation survey of the transport route prior to the commencement of any construction or decommissioning works other than pre-construction minor works;</p> <p>(b) prepare a post-dilapidation survey of the transport route within 1 month of the completion of construction or decommissioning works other than pre-construction minor works, or other timing as may be agreed by the applicable roads authority; and</p> <p>(c) rehabilitate and/or make good any project-related damage identified in the post-dilapidation survey within 2 months of the completion of survey, or other timing as may be agreed by the relevant roads authority, to the satisfaction of the relevant roads authority.</p> <p>If the construction and/or decommissioning of the development is to be staged, the obligations in this condition apply to each stage of construction and/or decommissioning.</p> <p>If there is a dispute about the scope of any remedial works or the implementation of the works, then either party may refer the matter to the Secretary for resolution</p>	
3.31	<p><b>Unformed Crown Roads</b></p> <p>The Applicant shall ensure the future use of any unformed Crown road reserve is not compromised by the development.</p>	Nil
3.32	<p><b>Restriction on Transport Routes</b></p> <p>The Applicant shall ensure that all:</p> <p>(a) OSOM vehicle access to and from the site is via the northern route using Castlereagh Highway and Aarons Pass Road;</p> <p>(b) OSOM vehicle access through Mudgee is via:</p> <ul style="list-style-type: none"> <li>• Route 1 (using Castlereagh Highway, Market Street, Douro Street and Horatio Street), for vehicles up to 50 metres length; or</li> <li>• Route 2 (using Castlereagh Highway, Market Street, Cox Street, Short Street, Lawson Street, Mortimer Street, Burrundulla Avenue and Horatio Street), for vehicles more than 50 metres length;</li> </ul> <p>(c) other heavy vehicle access to and from the site is via:</p> <ul style="list-style-type: none"> <li>• the northern route using Castlereagh Highway and Aarons Pass Road; or</li> <li>• the southern route using Hill End Road and the Ilford-Sofala Road or Sofala Road; or</li> <li>• the minor access routes using Bombandi Road and/or Crudine Road,</li> </ul> <p>unless the applicable roads authority approves otherwise.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> <li>• <i>The Applicant is required to obtain relevant permits under the Heavy Vehicle National Law (NSW) for the use of OSOM vehicles on the road network.</i></li> <li>• <i>Identified OSOM vehicle access routes through Mudgee are shown in Appendix 7.</i></li> </ul>	Nil
3.33	<p><b>Traffic Management</b></p>	Nil

	<p>Prior to the commencement of construction, the Applicant shall prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with RMS and the Councils, and include:</p> <p>(a) details of all transport routes and traffic types to be used for development-related traffic;</p> <p>(b) a protocol for undertaking dilapidation surveys to assess the:</p> <ul style="list-style-type: none"> <li>• existing condition of the transport route/s prior to construction or decommissioning works; and</li> <li>• condition of the transport route/s following construction or decommissioning works;</li> </ul> <p>(c) a protocol for the repair of any roads identified in the dilapidation surveys to have been damaged during construction or decommissioning works;</p> <p>(d) details of the measures that would be implemented to minimise traffic safety issues and disruption to local users of the transport route/s during construction or decommissioning works, including:</p> <ul style="list-style-type: none"> <li>• temporary traffic controls, including detours and signage;</li> <li>• notifying the local community about project-related traffic impacts;</li> <li>• minimising potential for conflict with school buses and rail services, including avoiding heavy vehicle transport through Mudgee between the hours of 7 am and 10 am and 2 pm and 4.30 pm Monday to Friday, as far as practicable;</li> <li>• undertaking monitoring and maintenance on Aarons Pass Road;</li> <li>• responding to any emergency repair or maintenance requirements; and</li> <li>• a traffic management system for managing OSOM vehicles; and</li> </ul> <p>(e) a drivers code of conduct that addresses:</p> <ul style="list-style-type: none"> <li>• travelling speeds;</li> <li>• procedures to ensure that drivers adhere to the designated transport routes; and</li> <li>• procedures to ensure that drivers implement safe driving practices, particularly if using local roads through Mudgee.</li> </ul> <p>If the construction and/or decommissioning of the development is to be staged, the obligations in this condition apply to each stage of construction and/or decommissioning.</p>	
3.34	<p><b>Traffic Management</b></p> <p>Following approval, the Applicant must implement the measures described in the Traffic Management Plan.</p>	Nil

## 5. Evaluation and Conclusion

The application for Modification comprises two key elements which have been assessed in the technical reports and Impact Assessment section of this document:

1. A reduction in the number of WTGs and ancillary infrastructure; and
2. Incorporation of a revised road design for APR.

The reduction in WTGs is expected to provide a marked improvement in visual amenity for most residences surrounding the Project. This is particularly true for those residences to the west of the Project in the Sallys Flat area where a large number of the WTGs have been removed, and distances between residences and WTGs have increased. Improvements in visual amenity will also be experienced by a number of the residences listed as high, moderate and low in the Development Consent. The Works to facilitate the Revised Design would alter the visibility of the road from some selected viewpoints, however this is considered to be a negligible impact given that there is dense vegetation surrounding much of the roadway and the receptors in the region.

The reduction in WTGs will decrease the construction and operational noise for surrounding receptors, and the Project is forecast to meet the criteria within the Development Consent.

The reduction in WTGs will result in a net decrease in impacts to vegetation and habitat of approximately 31 ha. This substantial decrease is despite the localised increase of 5.05 ha of permanent and temporary impacts for the Revised Design. This reduction has been achieved not only through the removal of WTGs, but also the associated infrastructure including hardstands, roads and cabling, switching station and implementation of the detailed design measures described in the approved BMP. Further detailed design of the road is required to avoid impacts to threatened flora species along APR, including by adopting trimming as opposed to removal where possible. In the event that the individuals which have been assessed in the BDAR can not be avoided, the impacts will be mitigated through trimming and/or translocation in accordance with protocols to be defined in the Project BMP in consultation with OEH.

The proposed Modification would result in the Project having reduced impact on Aboriginal and European heritage across the heritage sites with the implementation of the measures already described within the Project AHMP. The changes will also result in a reduction of construction related impacts including the duration and magnitude of construction traffic associated with the Project, directly reducing traffic noise and delays, collision risks, dust impacts and road degradation. Based on the anticipated reduction in traffic impacts associated with this Modification, previously identified mitigation measures remain applicable, where relevant, to the Modified Project.

The Proponent respectfully requests that the approval authority consider this application for Modification on its merits and make a determination in consideration of the existing Development Consent and approved management plans.

## 6. References

Bitzios Consulting, 2017, Crudine Ridge Wind Farm Traffic Management Plan, prepared for CWP Renewables

Department of Planning and Environment (2016) New South Wales Wind Energy: Noise Assessment Bulletin

Downer, 2013, Crudine Ridge Wind Farm Route Survey and Upgrade Assessment, report prepared for CWP Renewables

Eco Logical Australia (ELA), 2012, Crudine Ridge Wind Farm Part 3A Ecological Assessment, report prepared for CWP Renewables

Eco Logical Australia (ELA), 2013, Addendum - Crudine Ridge Wind Farm Part 3A Ecological Assessment, report prepared for CWP Renewables

Eco Logical Australia (ELA), 2017, Revised Crudine Ridge Wind Farm Biodiversity Offset Strategy , report prepared for CWP Renewables

New South Wales Archaeology (Dibden), 2012, Crudine Ridge Wind Farm European and Aboriginal Cultural Heritage Assessment Report.

New South Wales Archaeology (Dibden), 2013, Aaron's Pass Road – Heavy Haulage Route Upgrade for the Proposed Crudine Ridge Wind Farm European and Aboriginal Cultural Heritage Assessment Report.

New South Wales Archaeology (Dibden), 2018a, Crudine Ridge Wind Farm – Heritage Addendum Report. Letter prepared for CWP Renewables.

New South Wales Archaeology (Dibden), 2018b, Crudine Ridge Wind Farm – Aaron's Pass Road. Letter prepared for CWP Renewables.

Samsa Consulting, 2012, Crudine Ridge Wind Farm Project Transport Assessment, report prepared for CWP Renewables

Samsa Consulting, 2013, Crudine Ridge Wind Farm Project Preferred Project Report Transport Assessment, report prepared for CWP Renewables

Sonus, 2012, Crudine Ridge Wind Farm Noise and Vibration Impact Assessment, report prepared for CWP Renewables

Sonus, 2018a, Crudine Ridge Wind Farm Supplementary Environmental Noise Assessment, report prepared for CWP Renewables

Sonus, 2018b, Crudine Ridge Wind Farm Noise Compliance Test Plan, report prepared for CWP Renewables