

Relocation of the 132 kV transmission line spanning from existing 132 kV line to substation (south)

Figure 11

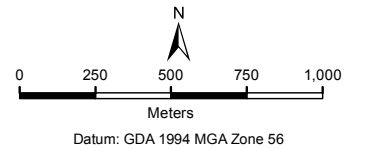
Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

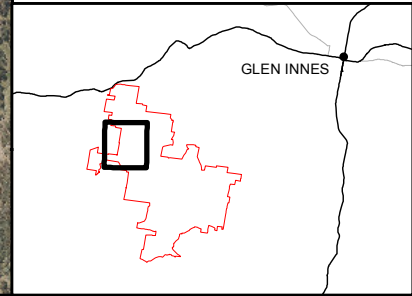
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

- ◆ WRWF Mast
- Minor road
- Watercourse
- Overhead Line - Layout 66 (Modified)
- Electrical Reticulation - Layout 66 (modified)
- Facility - Layout 66 (Modified)
- Overhead Line Buffer - Layout 66 (Modified)
- Substation - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Footprint - Layout 66 (Modified)
- WRWF Mast - 60m Buffer
- Site Perimeter



Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd.



359000

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Alternative Access Track between Turbines 7 and 10

Figure 12

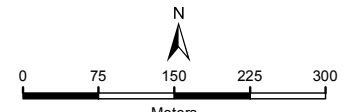
Project: White Rock Wind Farm

Client: Goldwind Australia

Compiled by: DL Date: 4/12/2015

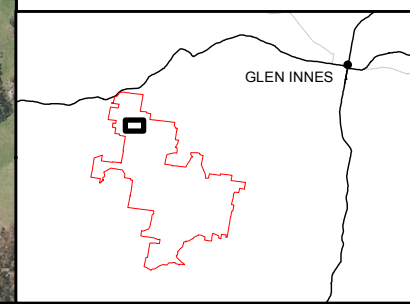
Approved by: — Date: 4/12/2015

- ◆ Layout 66 Turbine Location
 - Overhead Line - Layout 66 (Modified)
 - Electrical Retiulation - Layout 66 (modified)
 - Footprint - Layout 66 (FFMP)
 - Footprint - Layout 66 (Modified)
 - Overhead Line Buffer - Layout 66 (Modified)
 - Hardstand - Layout 66 (Modified)
 - Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
 - Scattered Vegetation
 - Yellow Box - Blakely's Red Gum Woodland
 - Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- Drainage Feature
 - Gully
 - Hollow Bearing Tree
 - Hollow Log
 - Log Pile
 - Rocky Outcrop
 - Stag



Datum: GDA 1994 MGA Zone 56

Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd.





Alternative Access Track in vicinity of Turbine 40

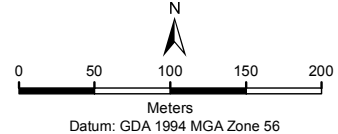
Figure 13

Project:
White Rock Wind Farm

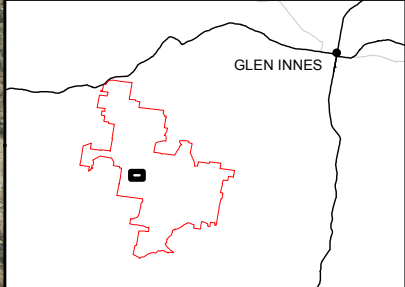
Client:
Goldwind Australia

Compiled by: DL	Date: 4/12/2015
Approved by: —	Date: 4/12/2015

- ◆ Layout 66 Turbine Location
 - Watercourse
 - Electrical Reticulation - Layout 66 (modified)
 - Footprint - Layout 66 (FFMP)
 - Footprint - Layout 66 (Modified)
 - Hardstand - Layout 66 (Modified)
 - Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
 - Scattered Vegetation
 - Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- Habitat Tree
 - Hollow Bearing Tree
 - Hollow Log
 - Log Pile
 - Rocky Outcrop



Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd. **RPS**





Replacement of 0.5 km section of 33 kV Transmission Line with 33kV Underground Cable between Turbines 57 and 59

Figure 14

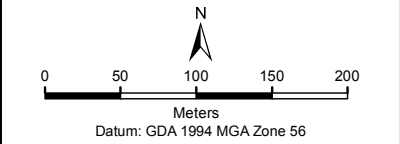
Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

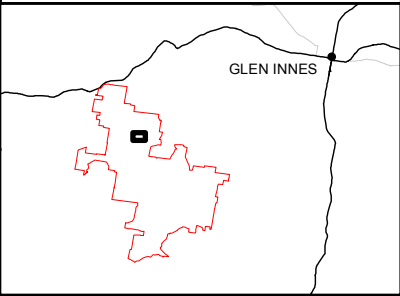
Compiled by: **DL** Date: **4/12/2015**

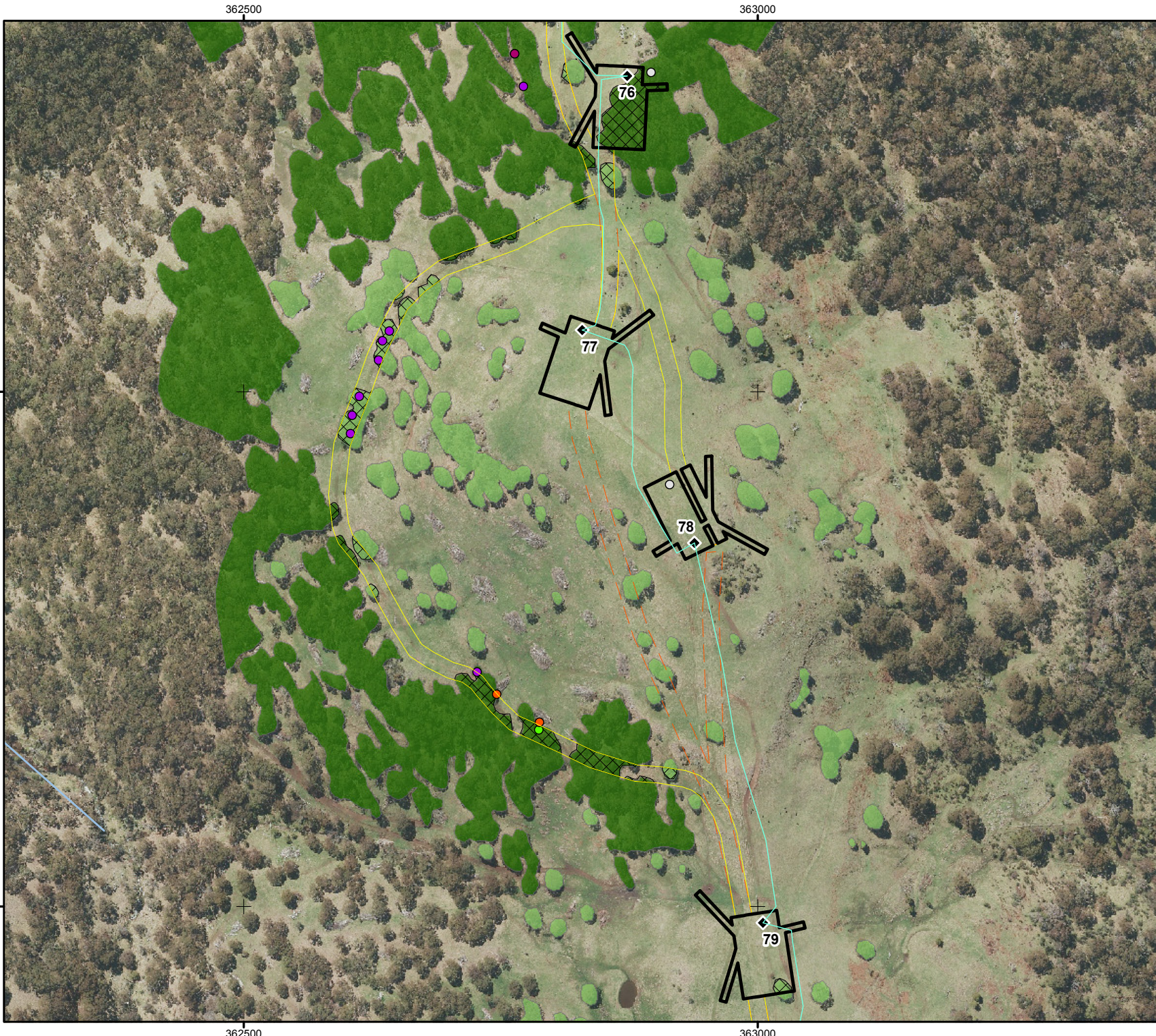
Approved by: **—** Date: **4/12/2015**

- ◆ WRWF Mast
- ◆ Layout 66 Turbine Location
- Electrical Reticulation - Layout 66 (modified)
- 33kV Overhead Line
- 33kV Overhead Line Buffer
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- WRWF Mast - 60m Buffer
- Hardstand - Layout 66 (Modified)
- Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
- Scattered Vegetation
- ▨ Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- Nest
- Stag



Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd. **RPS**





Alternative Access Track between Turbine 76 and 79

Figure 15

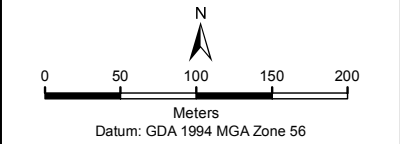
Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

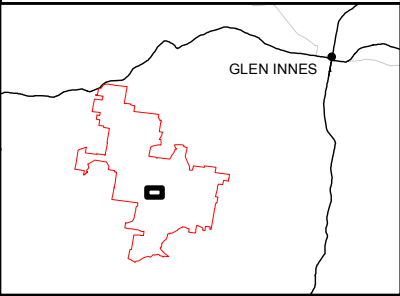
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

- ◆ Layout 66 Turbine Location
- Watercourse
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
- Scattered Vegetation
- Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- <all other values>
- Habitat Tree
- Hollow Bearing Tree
- Log Pile
- Strwnn Rock



Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd.



1.4 Updated Vegetation Mapping

Additional field surveys were conducted in October 2015 for portions of the project area to provide a refined ground-truthed vegetation map, and to allow for updated vegetation impact calculations. These areas include:

- Area 8 – Inclusion of native vegetation impacts from Ilparran Road to Turbine 51 (**Figure 9**);
- Area 12 – Inclusion of vegetation impacts for the replacement of 0.5 km section of 33 kV Transmission Line with 33 kV Underground Cable between Turbines 57 and 59 (**Figures 14**);
- Area 14 – Inclusion of vegetation impacts for two permanent masts and four temporary masts (**Figures 16 and 17**); and
- Area 15 – Inclusion of vegetation impacts associated with the 33 kV overhead line connection between Turbines 35 and 62 (**Figure 18**).

1.5 Methods

A field assessment was conducted between the 13th and 15th October 2015, which aimed to verify the type and extent of native vegetation present within the modification footprints, location of additional ancillary facilities and to update vegetation mapping in certain areas. The methods utilised for this assessment were consistent with those employed for the initial Native Vegetation Impact Review (RPS, 2015a).

The field assessment aimed to verify the type and extent of native vegetation present within the modification footprint and unmapped areas by conducting a rapid assessment at each vegetation patch intersected. The rapid assessment included a description of the condition, composition, structure and extent of native vegetation. Data collected included dominant species for each strata, the height and estimated projected canopy cover of each stratum, and the percentage of native species at each patch. This information was utilised to develop a refined vegetation map and flora species list for the project area.

As part of the Ecological Assessment (RPS, 2011a) conducted for the Project Approval, the potential for vegetation communities within the project area which constitute Endangered Ecological Communities (EECs) as listed within the NSW *Threatened Species Act 1992* (TSC Act), and Threatened Ecological Communities (TECs) under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were assessed. These assessments were reviewed for the modification areas.

Threatened flora species assessments were conducted as part of the Ecological Assessment (RPS, 2011a) and complemented by a series of mapping events during 2015 that have complemented and improved vegetation mapping of the project area. The most recent survey in October 2015 targeted areas of potential modifications to the Stage 1 layout and locations of additional ancillary facilities at Ilparran Road and Kelley's Road. The field survey identified habitat features in close proximity (30 m) to the modification areas. This included recording hollow-bearing trees (HBT), hollow logs, large stockpiles of felled timber and rocky outcrops or boulder strewn areas.

It is recognised that this assessment relied upon the existing Ecological Assessment Report (RPS, 2011a and b) prepared for the Project as a baseline assessment and series of mapping events during 2015. This assessment provides supplementary data collected to revise and improve existing information. As indicated in the Native Vegetation Impact Review (RPS, 2015a), limitations apply to these ecological assessments. However, considerable field assessments were carried out in 2011 and 2015 and the mapping is considered to be reliable for the purpose of the modification application.

Survey of habitat features (including hollow-bearing trees) has been concentrated within the disturbance footprint (including a 30 m buffer area). Survey of habitat features beyond the disturbance footprint is limited.

Any future micro siting processes will allow the identification of any additional key fauna habitat features for retention.

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Updated Vegetation Mapping for Permanent and Temporary Masts (WEST)

Figure 16

Project: White Rock Wind Farm

Client: Goldwind Australia

Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

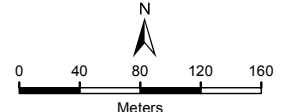
- ◆ WRWF Mast
- ◆ Layout 66 Turbine Location
- Overhead Line - Layout 66 (Modified)
- Electrical Reticulation - Layout 66 (modified)
- Overhead Line Buffer - Layout 66 (Modified)
- Facility - Layout 66 (Modified)
- Footprint - Layout 66 (Modified)
- WRWF Mast - 60m Buffer
- Hardstand - Layout 66 (Modified)
- Site Perimeter

Vegetation Communities

- Ribbon Gum - Mountain Gum Woodland
- Scattered Vegetation

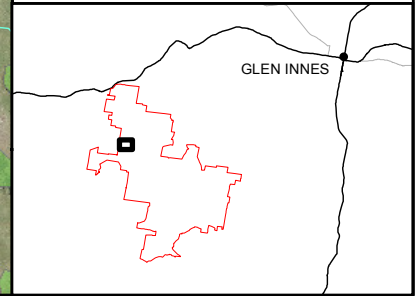
Habitat Features

- Dead Stag
- Drainage Feature
- Hollow Bearing Tree
- Hollow Bearing Tree And Log
- Hollow Bearing Tree And Nest
- Hollow Log
- Log Pile
- Rocky Outcrop
- Rocky Outcrop And Fallen Tree
- Rocky Outcrop And Woodpile
- Scattered Habitat Trees
- Scattered Rocks
- Small Flowing Spring



Datum: GDA 1994 MGA Zone 56

Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd. **RPS**



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361500

362000



Updated Vegetation Mapping for Permanent and Temporary Masts (EAST)

Figure 17

Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

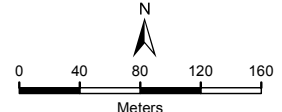
Compiled by: **DL** Date: **4/12/2015**

Approved by: **—** Date: **4/12/2015**

- ◆ WRWF Mast
- ◆ Layout 66 Turbine Location
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (Modified)
- WRWF Mast - 60m Buffer
- Hardstand - Layout 66 (Modified)
- Site Perimeter

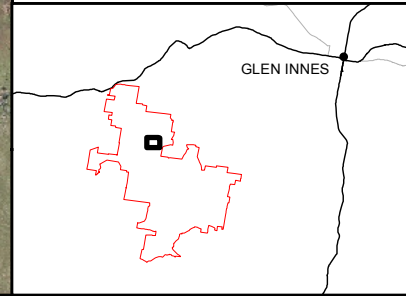
Vegetation Communities

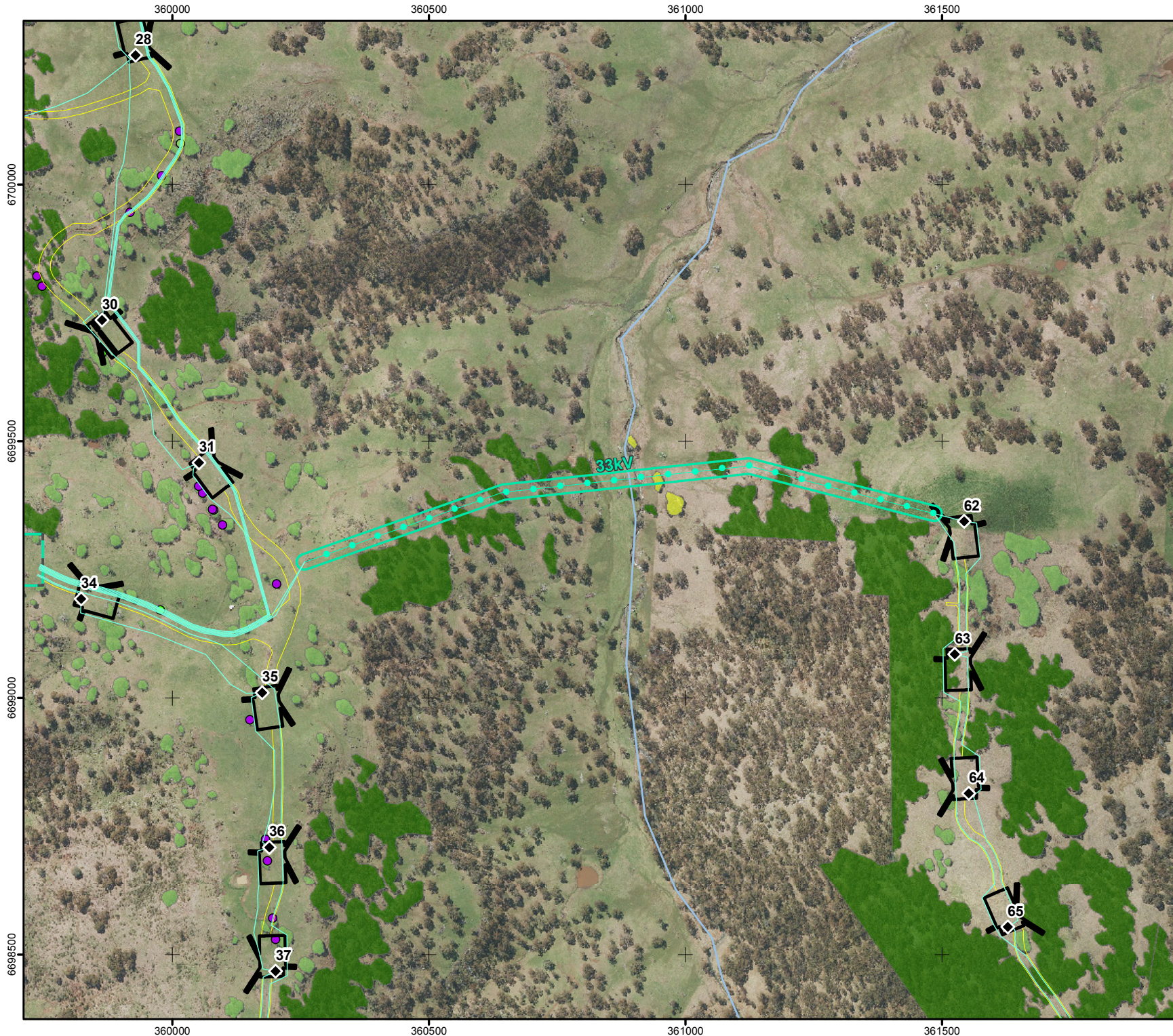
- Ribbon Gum - Mountain Gum Woodland
- Scattered Vegetation



Datum: GDA 1994 MGA Zone 56

Source: Base topographic data: StreetPro © 2012 Pitney Bowes Software Pty Ltd.



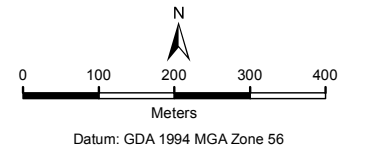


**Updated Vegetation Mapping
for 33 kV Overhead line
between Turbines 35 and 62**

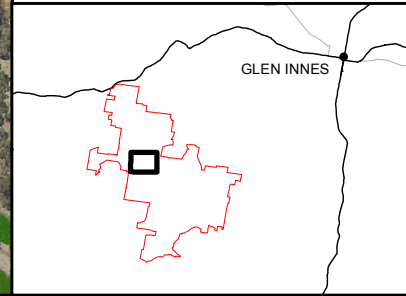
Figure 18

Project:		White Rock Wind Farm	
Client:		Goldwind Australia	
Compiled by:	DL	Date:	4/12/2015
Approved by:	—	Date:	4/12/2015

- ◆ Layout 66 Turbine Location
 - Watercourse
 - Overhead Line - Layout 66 (Modified)
 - Electrical Reticulation - Layout 66 (modified)
 - Overhead Line Buffer - Layout 66 (Modified)
 - Substation - Layout 66 (Modified)
 - Hardstand - Layout 66 (Modified)
 - Footprint - Layout 66 (Modified)
 - Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
 - Scattered Vegetation
 - Yellow Box - Blakely's Red Gum Woodland
- Habitat Features**
- Habitat Tree
 - Hollow Bearing Tree
 - Stag



Source: Base topographic data: StreetPro ©
2012 Pitney Bowes Software Pty Ltd.



2.0 Field Survey Results and Comparison Calculations

2.1 Vegetation Communities

The October 2015 field survey did not identify the presence of any new vegetation communities within the project area, however, additional flora species were recorded. As outlined in the Native Vegetation Impact Review (RPS, 2015a), four vegetation communities occur within the project area, which are consistent with those communities verified throughout this report, namely:

- Yellow Box – Blakely's Red Gum Woodland;
- Ribbon Gum – Mountain Gum Woodland;
- Scattered Native Vegetation; and
- Pasture Grasses.

The extent of Yellow Box – Blakely's Red Gum Woodland, Ribbon Gum – Mountain Gum Woodland, and Scattered Native Vegetation in relation to the disturbance footprint are indicated on **Figures 1 to 18**.

2.1.1 Yellow Box – Blakely's Red Gum Woodland

The Yellow Box – Blakely's Red Gum Woodland vegetation community is limited to the lower lying portions of the disturbance footprint. While this community has been previously identified within the project area, it was not previously recorded within the disturbance footprint. Mapping during 2015 has updated vegetation mapping and identified there will be some impact on this community. As a result, project planning has sought to avoid and/or minimise those impacts where possible.

This vegetation community is dominated by Yellow Box (*Eucalyptus melliodora*), with Rough-barked Apple (*Angophora floribunda*) and Blakely's Red Gum (*Eucalyptus blakelyi*) also occasionally occurring. Due to historical disturbances to this community, it largely exists as remnant patches of canopy trees only, with limited or no mid stratum present. The understorey is generally dominated by exotic pasture grasses and weeds, with limited native grasses, herbs or forbs present.

Portions of this community are in slightly better condition where lighter grazing occurs, with some native ground covers occurring. This community intergrades with Ribbon Gum – Mountain Gum Woodland at higher elevations, with the presence of Rough-barked Apple (*Angophora floribunda*) often occurring at the ecotones of the two communities.

It is noted that the presence of Yellow Box required further investigation, as it can indicate the presence of a TSC Act Endangered Ecological Community (EEC), namely White Box Yellow Box Blakely's Red Gum Woodland, and an EPBC Act Threatened Ecological Community (TEC), namely White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. These assessments have been conducted for the relevant disturbance areas, outlined in **Section 2.2** and **Section 2.3**.

2.1.2 Ribbon Gum – Mountain Gum Woodland

This vegetation community occurs extensively throughout the project area. This community has been previously identified as the dominant community within the disturbance footprint, and has an approved disturbance limit of 22 ha.

The canopy of this community is dominated by Ribbon Gum (*Eucalyptus viminalis*), Mountain Gum (*Eucalyptus dalrympleana* subsp. *Heptantha*), Rough-barked Apple (*Angophora floribunda*), and Silver Top

Stringybark (*Eucalyptus laevopinea*). Black Sallee (*Eucalyptus stellulata*) also occasionally occurs within the canopy. Within the highest elevations of this community, Snow Gum (*Eucalyptus pauciflora*) commonly occurs as a dominant species. The mid-storey of this community is sparse, and comprises species such as Native Cherry (*Exocarpus cupressiformis*), Silver Wattle (*Acacia dealbata*), and Kurrajong (*Brachychiton populneus*). A low shrub layer is dominated by Blackthorn (*Bursaria spinosa*).

The ground cover of this community is generally dominated by exotic pasture grasses, and weed species, with isolated areas that are dominated by native grasses, herbs and forbs. Where native grasses occur, they include Tussock Grass (*Poa sieberiana*), Blady Grass (*Imperata cylindrica*), Kangaroo Grass (*Themeda triandra*), and Wheat Grass (*Elymus scaber*). Where native herbs and forbs occur, they include Kidney Weed (*Dichondra repens*), Common Woodruff (*Galium odoratum*), Many-flowered Mat-rush (*Lomandra multiflora*), and Bracken Fern (*Pteridium esculentim*).

This community is commensurate with the TSC Act listed EEC Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland, which is characterised by a 20 – 30 m canopy dominated by species that include Ribbon Gum, Mountain Gum, Snow Gum, or Black Sallee. This EEC, in an undisturbed state, has a sparse mid-storey and understory that comprises small trees and shrubs, over a dense to very dense native grassy layer. In some locations, where native grasses dominate and the canopy has been cleared, this EEC can persist as native grassland.

The Ribbon Gum – Mountain Gum community within the disturbance footprint is consistent with the TSC Act EEC Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland, to the extent indicated on **Figures 1 to 18**. The pasture throughout the project area is largely dominated by introduced pasture species and weeds, with limited native grasses represented. The areas that are void of canopy species are therefore not commensurate with this EEC as a result of the domination by exotic grass species.

2.1.3 Scattered Native Vegetation

Much of the project area comprises scattered canopy trees and shrubs over introduced exotic pasture grasses. These areas are resultant of historical and current grazing of cattle and sheep. These areas lack the structure and composition to be considered a woodland community, and primarily comprise isolated trees over introduced pastures.

Where scattered native vegetation is mapped on **Figures 1 to 18**, it comprises species such as Ribbon Gum, Mountain Gum, Kurrajong, Blackthorn, or Silver Top Stringybark. These areas are not considered to constitute an EEC because species composition, structure, and the presence of introduced exotic pasture grasses are not commensurate with a recognised vegetation community, but do comprise native vegetation that should be avoided where possible.

2.1.4 Exotic Grasslands

Large portions of the project area are currently utilised for cattle and sheep grazing, which has resulted in extensive areas of improved pasture. Weed infestations are common within this community. These areas are not considered to be native vegetation communities.

Areas of introduced pasture grasses have not been considered as native vegetation where the percentage of native species is less than 50 %. Exotic grasslands are not considered to be native vegetation.

2.2 Assessment Areas

The following sections provide the results for the field survey for each assessment area relating to either potential modifications, including additional ancillary facilities (Ilparran Road and Kelley's Road), or the locations of existing ancillary facilities at the Gwydir Highway, and the impact calculations associated with the modifications.

Area 1 – Assessment of northern construction compound and laydown area and alternative access track between the Gwydir Highway and Turbine 1

The field assessment determined that the project impacts within this assessment area are located entirely within exotic pasture grasses (**Figures 1 and 2**). No additional habitat features were recorded within the modification area.

It is anticipated that the modifications and location of ancillary facilities would result in the removal of pasture grasses only.

Area 2 – Alternative Access Track to Turbine 19

The field assessment determined that the alternative access route is located entirely within exotic pasture grasses (**Figure 3**). No Additional habitat features were recorded within the assessed area. The alternative access route crosses an area of rock outcrop below a natural spring and drainage will be needed to avoid ponding of waters released from the spring.

It is anticipated that the modification application would result in the removal of pasture grasses only and will require drainage to maintain the uninhibited water emerging from the natural spring.

Area 3 – Inclusion of an additional batch plant near Turbine 20

The batch plant has been located within a cleared area adjacent to a large shed and water tanks to the east and an area of Ribbon Gum woodland to the south (**Figure 4**). No additional habitat features were recorded in this area.

The batch plant will result in the removal of grazed pasture grasses only.

Area 4 - Alternative access tracks to Turbine 29 and from Turbines 28 to 30

The field assessment determined that the alternative access routes are located within grazed pastures, and areas of Scattered Native Vegetation, with small areas intersecting Ribbon Gum – Mountain Gum Woodland (**Figure 5**). Five hollow-bearing trees occur within/adjacent to the alternative access track.

The alternative access routes would result in the removal of approximately 0.40 ha of Scattered Native Vegetation, and approximately 0.36 ha of Ribbon Gum – Mountain Gum Woodland, and result in the removal of up to seven hollow-bearing trees.

Area 5 - Alternative access track to Turbines 54, 55 and 56

The field assessment determined that the alternative access route comprises largely grazed pasture grasses, adjacent to areas of Ribbon Gum - Mountain Gum Woodland (**Figure 6**). No additional habitat features were recorded in this area.

It is anticipated that the alternative access route would result in the removal of approximately 0.01 ha of Ribbon Gum – Mountain Gum Woodland, which is otherwise considered largely avoidable.

Area 6 – Alternative access track from Kelley's Road to Turbine 110

The field assessment determined that the alternative access route comprises grazed areas, planted wind rows, and limited areas of Ribbon Gum – Mountain Gum Woodland (**Figure 7**). Five additional hollow-bearing trees were recorded adjacent to the alternative access track, however it is not anticipated that removal would be required.

It is anticipated that the alternative access track would result in the removal of approximately 0.04 ha of Ribbon Gum – Mountain Gum Woodland, and approximately 0.012 ha of Scattered Native Vegetation.

Area 7 – Alternative access track from Kelley's Road to Turbine 83 and southern construction compound, O&M building and laydown area

The field assessment determined that the alternative access route and construction compound and laydown areas comprise largely grazed areas, adjacent to areas of Ribbon Gum - Mountain Gum – Woodland (**Figure 8**). Habitat features were recorded adjacent to the alternative access track, with one habitat tree requiring removal.

It is anticipated that the alternative access track, construction compound and laydown areas would result in the removal of approximately 0.05 ha of Ribbon Gum – Mountain Gum Woodland, and approximately 0.01 ha of Scattered Native Vegetation. One additional habitat feature would require removal.

Area 8 – Alternative access track between Ilparran Road and Turbine 51, eastern construction compound and laydown area

The field assessment determined that the modified entry point, access route and additional ancillary facilities are largely located along an existing farm access track, surrounded by pasture grasses, and occasional Scattered Native Vegetation, as well as a small area of Yellow Box Woodland, described in **Section 3.2 (Figure 9)**. Habitat features were recorded adjacent to the alternative access track, but not within the disturbance footprint.

It is not anticipated that the alternative access route would result in the removal of Yellow Box Woodland. The potential for impacts to Yellow Box Woodland are discussed further in **Section 2.3**

Area 9 – Relocation of the 132 kV transmission line spanning from existing 132kV line to substation

The field assessment determined that the modified transmission line is dominated by Ribbon Gum – Mountain Gum Woodland, with Scattered Native Vegetation and Yellow Box – Blakely's Red Gum Woodland also recorded (**Figures 10 and 11**).

Where the Yellow Box – Blakely's Red Gum Woodland occurs, it is in scattered patches that largely comprise canopy vegetation only. The canopy is dominated by Yellow Box (*Eucalyptus melliodora*), with occasional Rough-barked Apple (*Angophora floribunda*) and Blakely's Red Gum (*Eucalyptus blakelyi*). There is limited to no mid-statum present. The understory has been disturbed due to grazing, primarily by goats, resulting in areas of bare ground. Dominant species are pasture grasses and introduced species.

As identified in the previous Ecological Assessment (RPS, 2011) and the Native Vegetation Impact Review (RPS, 2015), the presence of Yellow Box required further investigation, as it can indicate the presence of a TSC Act Endangered Ecological Community, and an EPBC Act Threatened Ecological Community. Further assessment is provided below.

The modified 132 kV transmission alignment would result in the removal of approximately 5.43 ha of Ribbon Gum – Mountain Gum Woodland, approximately 0.30 ha of Scattered Native Vegetation, and approximately

1.04 ha of Yellow Box – Blakely's Red Gum Woodland. Several hollow-bearing trees, log piles, and rocky areas also occur along the transmission easement. The modified 132 kV line has reduced impacts on native vegetation.

TSC Act EEC

The TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland is characterised by the presence of White Box (*Eucalyptus albens*), Yellow Box, or Blakely's Red Gum, with grasses and herbaceous species present in the ground layer. In some instances, this community can also lack a canopy, with only tussock grasses and herbaceous species present.

The community within the transmission line easement is consistent with the TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland, to the extent that the characteristic canopy species are present.

EPBC Act TEC

The EPBC Act listed White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands is characterised by the presence (or the previous presence) of White Box, Yellow Box, or Blakely's Red Gum, with an understorey that comprises at least 50% native perennial ground covers.

This community within the transmission line easement is not consistent with the EPBC Act listed White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands, due to the lack of native understorey.

Area 10 – Alternative Access Track Between Turbines 9 and 10

The field assessment determined that the alternative access route comprises largely grazed areas with limited scattered native vegetation (**Figure 12**). Habitat features were recorded adjacent to the revised access track, but not within the disturbance footprint.

It is anticipated that the alternative access track route would result in the removal of approximately 0.05 ha of Scattered Native Vegetation.

Area 11 – Alternative Access Track in vicinity of Turbine 40

The field assessment determined that the alternative access track alignment is dominated by Ribbon Gum – Mountain Gum Woodland (**Figure 13**). Habitat features also occur within and adjacent to the modified footprint.

It is anticipated that the alternative access track alignment would result in the removal of approximately 0.44 ha of Ribbon Gum – Mountain Gum Woodland. Five habitat features require removal, which is a reduction in comparison to the approved layout.

Area 12 – Replacement of 0.5km section of 33 kV Transmission Line with 33kV Underground Cable between Turbines 57 and 59

This modification seeks to replace a 33 kV transmission line with a clearance width of 30m, with an underground connection with a width of 5 m. The field assessment determined that the modification area comprises Ribbon Gum – Mountain Gum Woodland (**Figure 14**). Habitat features were recorded adjacent to the underground cable route, but are unlikely to require removal.

The modified electrical reticulation would result in the removal of approximately 0.20 ha of Ribbon Gum – Mountain Gum Woodland.

Area 13 – Alternative Access Tracks between Turbine 76 and 79

The field assessment determined that the modification area intersects Ribbon Gum – Mountain Gum Woodland, as well as small areas of Scattered Native Vegetation (**Figure 15**). Habitat features also occur within and adjacent to the modified footprint.

It is anticipated that the alternative access routes would result in the removal of approximately 0.21 ha of Scattered Native Vegetation and approximately 0.28 ha of Ribbon Gum – Mountain Gum Woodland.

2.3 Updated Vegetation Mapping

The following sections provide the results for the field surveys for updated areas of mapped vegetation, including the extent and classification of the Yellow Box – Blakely's Red Gum Woodland, and impact calculations associated with each area.

Area 8 - Inclusion of Native Vegetation Impacts from Ilparran Road and Turbine 51, including eastern construction compound and laydown area

The field assessment included ground-truthing vegetation communities between Ilparran Road and Turbine 51 (**Figure 9**). The field assessment determined that extensive areas of Yellow Box Woodland occur, with occasional areas of Ribbon Gum – Mountain Gum Woodland also present.

Where the Yellow Box woodland occurs, it is dominated by a canopy of Yellow Box, with occasional Rough-barked Apple also occurring. The average canopy height is 13 – 16 m, with a cover of approximately 55 % across the patch. An extremely sparse shrub layer occurs, comprising Sweet Bursaria (*Bursaria spinosa*) and Sticky Hop-bush (*Dodonaea viscosa*), with a cover of less than 5 %.

The ground layer comprises areas that have been heavily grazed in places, leaving areas of bare ground, as well as areas dominated by native species such as Fine-leaved Tussock Grass (*Poa sieberiana*), Rough Speargrass (*Austrostipa scabra*), and Blady Grass (*Imperata cylindrica*). A range of herbs and forbs also occur, including Common Buttercup (*Ranunculus lappaceus*), Tufted Bluebell (*Wahlenbergia communis*), and *Brachyscome* sp.

As identified in the previous Ecological Assessment (RPS, 2011) and the Native Vegetation Impact Review (RPS, 2015), the presence of Yellow Box required further investigation to identify the presence of a TSC Act EEC and an EPBC Act TEC. Further assessment is provided below.

The inclusion of this vegetation mapping would result in the removal of approximately 0.18 ha of Ribbon Gum – Mountain Gum Woodland, and approximately 0.109 ha of Yellow Box Woodland utilising the approved layout. The modified layout has been designed to avoid impacts to Yellow Box Woodland. No additional fauna habitat features were recorded in this area.

TSC Act EEC

The TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland is characterised by the presence of White Box (*Eucalyptus albens*), Yellow Box, or Blakely's Red Gum, with grasses and herbaceous species present in the ground layer. In some instances, this community can also lack a canopy, with only tussock grasses and herbaceous species present.

The community within Area 8 is consistent with the TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland, to the extent that the characteristic canopy species are present.

EPBC Act TEC

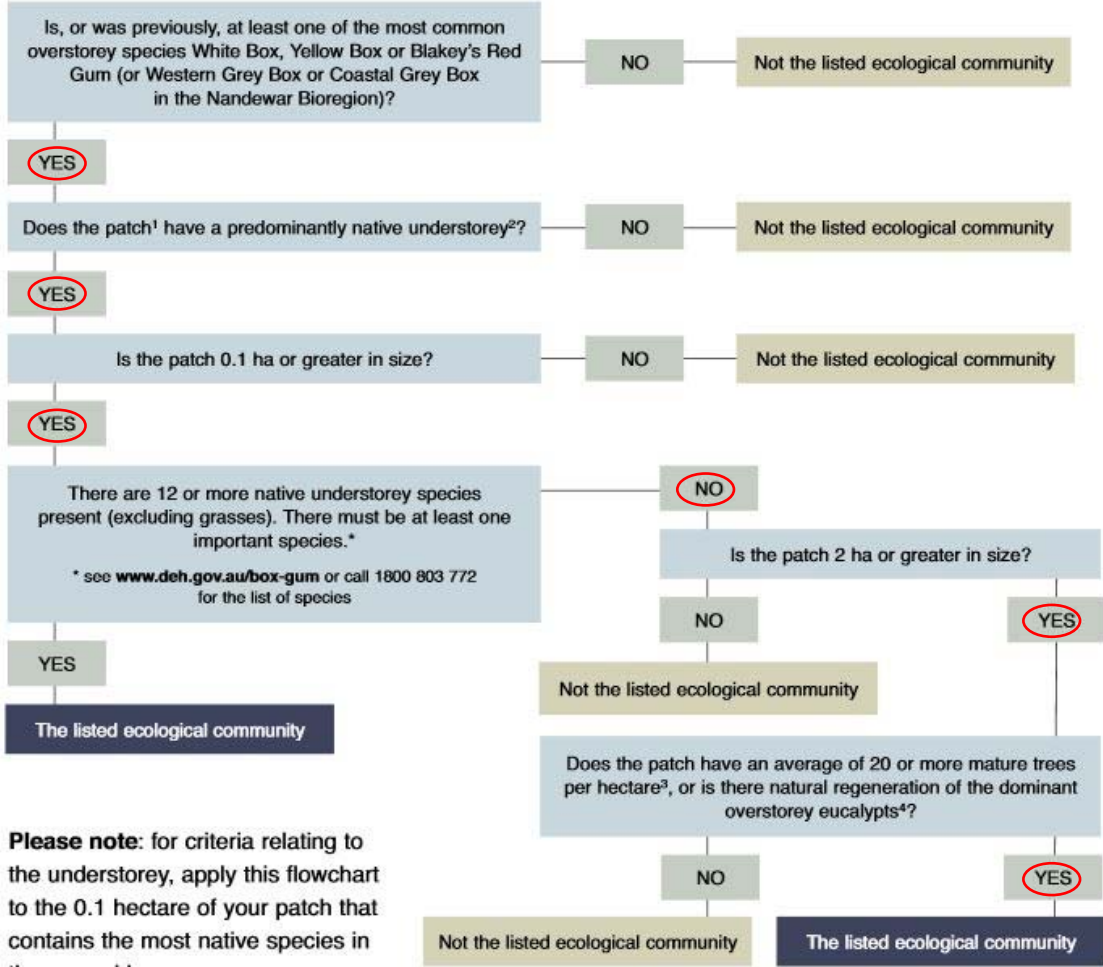
The EPBC Act listed White Box Yellow Box Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands is characterised by the presence (or the previous presence) of White Box, Yellow Box, or Blakely's Red Gum, with an understorey that comprises at least 50% native perennial ground covers. Unlike other areas of the Yellow Box – Blakely's Red Gum identified throughout the project area, this patch of vegetation has a predominantly native understorey, and requires further assessment against the EPBC Act listing criteria for this TEC. **Figure 19** provides an overview of the listing criteria for the TEC, while **Table 1** provides an assessment against the criteria.

The assessment has been conducted against the patch indicated on **Figure 9**. A patch is defined as a continuous area of the community that contains five or more trees, where no tree is greater than 75 m from another tree, or the area over which the understorey is predominantly native.

The assessment determined that the community within Area 8 is consistent with the EPBC Act White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands.

Table 1: EPBC Act White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands Assessment

Criteria	Assessment
Is, or was previously, at least of one of the most common overstorey species White Box, Yellow Box or Blakely's Red Gum?	Yes. Yellow Box is the most common overstorey species within Area 8.
Does the Patch have a predominately native ground layer where at least 50 % of the perennial vegetation cover is made up of native species?	Yes. At least 50 % of the perennial vegetation cover is made up of native species within 0.1 ha areas with the highest species diversity. While portions of the patch do comprise areas that have been heavily grazed and are dominated by introduced species, across the patch, native perennial vegetation comprises at least 50 % of native species.
Are there 12 or more native understorey species present, excluding grasses?	No. The understorey is dominated by grasses, with occasional herbs and forbs also occurring. Assessment within 0.1 ha areas with the highest species diversity did not record 12 native understorey herb or forb species.
Is that patch 2 ha or greater in size?	Yes. The patch is over 2 ha. The patch assessed is approximately 18 ha.
Does the patch have an average of 20 or more mature trees per hectare, or is there natural regeneration of the dominant overstorey eucalypts?	Yes. While there are not 20 or more mature trees per hectare (where trees have a circumference of at least 125 cm), there is evidence of natural regeneration (i.e. where trees have a circumference of at least 15 cm) as well as mature trees at low densities.



¹ Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is and is not, included within any individual patch. The patch is the larger of:

- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m²) or greater.

² A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

³ Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

⁴ Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

Figure 19: EPBC Act White Box – Yellow Box – Blakely’s Red Gum Grassy Woodlands and Derived Native Grasslands Listing Criteria

Area 12 - Replacement of 0.5km section of 33 kV Transmission Line with 33kV Underground Cable between Turbines 57 and 59

For the underground electrical reticulation that runs from near Turbine 57 to Turbine 59 at a width of 5 m, which was included in the approved layout as a 33 kV overhead line (**Figure 14**). The electrical reticulation between Turbine 57 and 59 would result in the removal of approximately 0.28ha of Ribbon Gum – Mountain Gum Woodland.

Area 14 - Inclusion of vegetation mapping for two permanent and four temporary mast locations

The field assessment ground-truthed the ecological values of two permanent and four temporary mast locations (**Figures 16 and 17**). The permanent mast located in proximity to Turbines 59 and 60 has been located within an area of pasture grasses.

The permanent mast located in proximity to Turbines 20 and 25 is located within an area of Ribbon Gum – Mountain Gum Woodland. Clearance of vegetation within these areas has been assessed as 100 % of the impact area, to prevent damage from branches and fallen trees. It is anticipated that the removal of approximately 0.38 ha of Ribbon Gum – Mountain Gum Woodland would be required. Two hollow-bearing trees and a large log pile may also require removal.

The temporary masts are to be located on the approximate positions of Turbines 20, 25, 59, and 60. Vegetation clearance within these areas has been estimated at 50 % of the impact area, as it is likely that selective clearing would be required. It is estimated that the temporary masts will result in the removal of approximately 0.54 ha of Ribbon Gum – Mountain Gum Woodland, and approximately 0.02 ha of Scattered Native Vegetation. As the temporary masts are located at turbine sites, some of the clearing may have been needed for the turbine installation.

Area 15 – Inclusion of native vegetation impacts associated with the 33 kV overhead line connection between Turbines 35 and 62

The field assessment ground-truthed vegetation communities and habitat features located along 1.3 km of the 33 kV overhead line connection, spanning from near Turbine 35 to Turbine 62 and requiring a vegetation clearance width of 30 m (**Figure 18**). The field assessment determined that the dominant vegetation community in these areas is Ribbon Gum – Mountain Gum Woodland.

The transmission line connection would result in the removal of approximately 0.38 ha of Ribbon Gum – Mountain Gum Woodland, approximately 0.04 ha of Scattered Native Vegetation, and approximately 0.03 ha Yellow Box Woodland. No additional fauna habitat features were recorded in this area. Habitat features included fallen hollow logs only.

Within the 33 kV connection, areas of Yellow Box Woodland were recorded. Where this community occurs, it is dominated by a canopy of Yellow Box (*Eucalyptus melliodora*), with occasional Rough-barked Apple (*Angophora floribunda*) also occurring. The average canopy height is 14 m, with a cover of approximately 60 %. No shrub layer is present. The ground layer has been disturbed by extensive grazing from cattle and wild goats. The understorey is dominated by pasture species. A range of herbs and forbs also occur in low densities

As outlined in **Section 2.2**, the presence of Yellow Box required further investigation to determine the presence of a TSC Act Endangered Ecological Community, and an EPBC Act Threatened Ecological Community. Assessment against the TSC Act and EPBC Act listing criteria is provided below.

TSC Act EEC

The TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland is characterised by the presence of White Box (*Eucalyptus albens*), Yellow Box, or Blakely's Red Gum, with grasses and herbaceous species present in the ground layer. In some instances, this community can also lack a canopy, with only tussock grasses and herbaceous species present.

The community within the southern transmission line corridor is consistent with the TSC Act EEC White Box Yellow Box Blakely's Red Gum Woodland, to the extent that the characteristic canopy species are present.

EPBC Act TEC

The EPBC Act listed White Box – Yellow Box – Blakey's Red Gum Grassy Woodlands and Derived Native Grasslands is characterised by the presence (or the previous presence) of White Box, Yellow Box, or Blakely's Red Gum, with an understorey that comprises at least 50% native perennial ground covers.

The understorey within the small patches of Yellow Box Woodland identified within the southern transmission line corridor is dominated by introduced pasture species. Therefore, these areas of Yellow Box Woodland are not consistent with the EPBC Act TEC criteria.

3.0 Impact Assessment

3.1 Modification Application

The assessed changes in impacts arising from the modified Project and results are summarised in **Table 2**. This includes proposed modifications, proposed additional ancillary facilities (Ilparran Road and Kelley's Road) and existing ancillary facilities at the Gwydir Highway (which do not form part of the modification application).

Table 2: Approximate Change in Impacts of Native Vegetation for WRWF Approved and Modified Layouts

Native Vegetation Type	Impact of approved layout (ha)	Impact of modified layout (ha)	Impact difference (approved minus modified layout) (ha)
Yellow Box Gum Woodland	2.090	1.189	-0.901
Ribbon Gum-Mountain Gum	19.849	18.675	-1.174
Scattered Native Vegetation	5.276	5.208	-0.068
Total	27.215	25.072	-2.143

In summary, there is a net reduction in impact on native vegetation for the modified Project relative to the approved WRWF Project of approximately 2.143 ha. This involves reduced impact for both Yellow Box Gum Woodland EEC and Ribbon Gum – Mountain Gum EEC of approximately 0.901 ha and 1.174 ha respectively.

A comparison against the approved access tracks and 132 kV line route and the proposed modifications in relation to the impact on vegetation communities, is included in **Table 3**. To provide further clarity on the expected differences in impact to vegetation communities resulting from the modified layout, **Table 4** provides a comparison for each area.

Table 3: Comparison of Approved Access Tracks and Alternative Access Tracks (approximate)

Infrastructure	Yellow Box Woodland (ha)	Ribbon Gum / Mountain Gum Woodland (ha)	Scattered Native Vegetation (ha)	Total Native Vegetation Impacted (ha)
Compliant Access Tracks and Laydown Areas	0.29	6.319	2.732	9.341
Modification Application Access Tracks and Laydown Areas	0.095	6.403	3.003	9.501
Comparison	-0.195	+0.084	+0.271	+0.16

Table Note: The footprint above is based on the variable widths of 14-22 m, which is also inclusive of electrical reticulation in parts. The footprint has included the access from Ilparran Road to Turbine 51. The modification application footprint also includes changes that are considered compliant.

Table 4: Comparison of Impacts for each Modification Area (approximate)

Area	Layout	Yellow Box Woodland (ha)	Ribbon Gum / Mountain Gum Woodland (ha)	Scattered Native Vegetation (ha)	Habitat Features
Area 1	Approved	0	0	0.03	1
	Modified	0	0	0	0
Comparison		=	=	-0.03	-1
Area 2	Approved	0	0	0	0
	Modified	0	0	0	0
Comparison		=	=	=	=
Area 3	Approved	n/a	n/a	n/a	0
	Modified	0	0	0	0
Comparison		=	=	=	=
Area 4	Approved	0	0.46	0.18	2
	Modified	0	0.36	0.40	7
Comparison		=	-0.09	+0.22	+5
Area 5	Approved	0	0.08	0	0
	Modified	0	0.01	0	0
Comparison		=	-0.07	=	=
Area 6	Approved	0	0.07	0.07	0
	Modified	0	0.04	0.12	0
Comparison		=	-0.03	+0.06	=
Area 7	Approved	0	0.03	0.39	0
	Modified	0	0.05	0.01	1
Comparison		=	+0.03	-0.37	1
Area 8	Approved	0.21	0.05	0	0
	Modified	0	0	0	0
Comparison		-0.16	-0.05	=	=
Area 10	Approved	0	0	0.08	0
	Modified	0	0	0.05	0
Comparison		=	=	-0.03	=
Area 11	Approved	0	0.33	0.07	8
	Modified	0	0.44	0	5
Comparison		=	+0.11	-0.07	-3
Area 12	Approved	0	0.86	0	0
	Modified	0	0.20	0	0
Comparison		=	-0.66	=	=
Area 13	Approved	0	0.00	0.10	0
	Modified	0	0.28	0.21	8
Comparison		=	+0.28	+0.11	+8

Additionally, the modification application seeks to vary the location of the 132 kV transmission line to greater than 100 m from the approved layout over about 1.26km. A comparison of the approved 132 kV transmission

line and the modified 132 kV transmission line in relation to the impact on vegetation communities is included in **Table 5**.

The transmission line impact is based on a disturbance width of 45 m. Assumptions have been made as to the extent of vegetation clearing that will be required, taking in to consideration the areas where lines are expected to span vegetation, as indicated on **Figures 10 and 11**. Access tracks required for the transmission line easement are yet to be designed and have not been considered as part of this assessment but may include access along the line route, existing farm tracks, and use of wind farm access tracks.

Table 5: Comparison of Compliant 132 kV Transmission Line and Modified Transmission Line route (approximate)

Infrastructure	Yellow Box Woodland (ha)	Ribbon Gum / Mountain Gum Woodland (ha)	Scattered Native Vegetation (ha)	Total Native Vegetation Impacted (ha)
Approved 132 kV transmission line	1.745	6.447	0.386	8.578
Modification Application 132 kV transmission line	1.039	5.429	0.299	6.767
Comparison	-0.706	-1.018	-0.087	-1.811

3.1.1 Associated Impacts

The disturbance footprint for the alternative access tracks would result in an increased impact to Ribbon Gum – Mountain Gum Woodland (an increase of approximately 0.084 ha), and Scattered Native Vegetation (an increase of approximately 0.27 ha), but would result in reducing the impact to Yellow Box Woodland by approximately 0.195 ha. It is recommended that the Environmental Work Method Statements for the access tracks seek all reasonable and feasible means to locate the tracks to minimise these impacts.

The revised location for the batch plant does not require the disturbance of any native vegetation. The proposed modified access may also require the removal of an additional four hollow-bearing trees.

The proposed modifications to the transmission line easements would result in reduced impacts to all vegetation communities.

The proposed modifications would not result in exceeding the clearing limit of Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland Bioregion EEC on site.

3.1.2 Proposed Mitigation Measures

It is noted that the modified layout would result in a minor decrease in vegetation disturbance. However, there is scope to reduce the estimated impacts by mitigation measures outlined in the Project Flora and Fauna Management Plan (FFMP; RPS 2015) provided as part of the Project Construction Environmental Management Plan (CEMP; ERM 2015) to reduce and minimise impacts to ecological values within the Stage 1 project area, as far as possible.

Specific mitigation measures to minimise impacts to native vegetation include selective clearing along the edges of access tracks, where the full width of the access track can be minimised. A reduction in width of the access track between turbines 28, 29, and 30 would assist with reducing vegetation impacts.

To further ameliorate direct impacts to local fauna populations, measures such as directional clearing under the presence of a fauna spotter will be implemented. Pre-construction identification of clearing areas will

occur to ensure that adjacent vegetation is adequately protected throughout clearing activities. Hollows from hollow-bearing trees will be re-located into areas of vegetation to be retained, along with hollow logs.

Indirect impacts to areas of vegetation to be retained will be managed through the implementation of the CEMP and FFMP. The CEMP includes specific management actions to ameliorate impacts associated with dust and water quality, which have the potential to result in indirect impacts to ecological values on site.

3.2 Updated Vegetation Mapping

As part of the site assessment, areas were ground-truthed to allow for updated vegetation calculations. Key areas within the project area which were subject to updated mapping are:

- The access track impacts from Ilparran Road to Turbine 51 (resulting in the removal of approximately 0.18 ha of Ribbon Gum – Mountain Gum Woodland and approximately 0.109 ha of Yellow Box Woodland, based on the approved layout). The modified layout has been designed to avoid impacts to Yellow Box Woodland, and has resulted in no significant impact to EPBC Act listed Yellow Box Woodland;
- The assessment of permanent meteorological masts (resulting in the removal of approximately 0.38 ha of Ribbon Gum - Mountain Gum Woodland), and temporary masts (resulting in the removal of approximately 0.54 ha of Ribbon Gum – Mountain Gum Woodland, and 0.02 ha of Scattered Native Vegetation based on 50 % removal of the impact area);
- A 33 kV Transmission line connection from Turbine 35 and 62 with a width of 30 m. The transmission line connection would result in the removal of approximately 0.38 ha of Ribbon Gum – Mountain Gum Woodland, 0.04 ha of Scattered Native Vegetation, and approximately 0.03 ha Yellow Box Woodland. Micro siting may reduce these impacts further; and
- Replacement of 33 kV transmission line with 33 kV underground electrical reticulation between Turbine 57 and 59 with a width of 5 m. The electrical reticulation would result in the removal of approximately 0.28 ha of Ribbon Gum – Mountain Gum Woodland.

Updated calculations for the approved Project layout are included in **Table 6**, while updated calculations for the proposed modified layout are included in **Table 7**.

Table 6: Updated Calculations for DA Compliant Footprint (approximate)

Infrastructure	Yellow Box Woodland (ha)	Ribbon Gum / Mountain Gum Woodland (ha)	Scattered Native Vegetation (ha)	Total Native Vegetation Impacted (ha)
Ancillary Facilities (All)	0.014	0.025	0.342	0.382
Substation	-	-	0.041	0.041
Electrical Reticulation	0.001	0.633	0.334	0.968
Access Track (14 – 22 m)	0.290	6.319	2.732	9.341
Turbines (footings, hardstand, and rotor blades)	-	3.271	1.338	4.609
Masts (permanent and temporary)	-	1.906	0.056	1.962
132 kV Lines (8 km)	1.745	6.447	0.386	8.578
33 kV Lines	0.039	1.249	0.047	1.335
Total	2.090	19.849	5.276	27.215

Table 7: Updated Calculations for Modification Application Footprint (approximate)

Infrastructure	Yellow Box Woodland (ha)	Ribbon Gum / Mountain Gum Woodland (ha)	Scattered Native Vegetation (ha)	Total Native Vegetation Impacted (ha)
Ancillary Facilities (All)	-	0.002	-	0.002
Substation	-	-	0.041	0.041
Electrical Reticulation	0.015	1.214	0.506	1.735
Access Track (14 – 22 m)	0.095	6.403	3.003	9.502
Turbines (footings, hardstand, and rotor blades)	-	3.336	1.274	4.610
Masts (permanent and temporary)	-	1.906	0.056	1.962
132 kV Lines (8 km)	1.039	5.429	0.299	6.767
33 kV Lines	0.039	0.385	0.029	0.454
Total	1.189	18.675	5.208	25.072

3.2.1 Associated Impacts

The revised mapping has allowed for updated vegetation impact calculations to be provided, as outlined in **Tables 4 and 5**. The Project Approval (Condition C1) states that “the proponent shall:

- (a) Minimise the clearing of native vegetation on site; and
- (b) Not clear more than 22 hectares of the Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland Bioregion EEC on site”.

The updated vegetation impacts would not result in exceeding the clearing limits for Ribbon Gum – Mountain Gum Woodland.

The updated vegetation mapping would result in the removal of approximately 1.189 ha of Yellow Box EEC under the TSC Act, which has not been previously identified (based on the modified layout), or approximately 2.09 ha of Yellow Box EEC (based on the approved layout).

Impacts to EPBC Act Yellow Box Woodland

Under the MNES Significant Impact Assessment Guidelines (Version 1.1, 2013) an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community’s survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;

- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - » assisting invasive species, that are harmful to the listed ecological community, to become established, or
 - » causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

Given that disturbance to an EPBC Act TEC may occur if the approved layout were to be utilised, an assessment of the potential impacts to the Yellow Box Woodland has been conducted against the significant impact assessment criteria, as outlined below. The assessment determined that a significant impact upon the patch of TEC is unlikely, based on the potential clearance of approximately 0.109 ha of TEC trees for the approved layout. No impact to the EPBC Act Yellow Box Woodland is expected if the modified layout is utilised. There will be some impact on the understorey from the construction of access tracks in either case, but these tracks will not result in the removal of mature trees.

- **Reduce the extent of an ecological community**

The approved Project will result in the removal of up to approximately 0.109 ha of Yellow Box woodland mature trees, which would result in reducing the identified patch of this community by just over 1 %. This is not considered a significant impact on the extent of this TEC. Further, following the completion of this Project, rehabilitation will occur to re-instate disturbed areas, for example track edges and trenching works, to a pre-disturbed condition or better.

Under the modified layout, no impact is proposed on Yellow Box woodland mature trees, though there will be some impact from the construction of access tracks between the stands of trees.

- **Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines**

The approved Project would result in the removal of up to approximately 0.109 ha of Yellow Box woodland trees for the construction of the access track from Ilparran Road. Within the eastern extent of the patch, the approved access track has been located along an existing farm track, with works required to widen the existing track only.

While the western extent of the proposed access track has not been located along an existing track, it has been located largely to avoid areas of canopy vegetation, and will adjoin an existing farm track near Turbine 51.

It is not anticipated that the construction of the access track will result in significant fragmentation of this TEC, given that works will largely require upgrading and extending an existing farm track. Careful siting of this access track under the modified route will avoid impact on the Yellow Box Woodland mature trees.

- **Adversely affect habitat critical to the survival of an ecological community**

Habitat critical to the survival of a TEC refers to areas that are necessary for long-term maintenance of a community (including species essential to the survival of a community, such as pollinators), to maintain genetic diversity and long term evolutionary development, or for the recovery of a community. Such habitat includes habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.

A recovery plan has been prepared for this TEC (Department of Environment, Climate Change and Water NSW, 2010), which does not identify specific areas that are critical to the survival of this TEC, but states that all areas should be considered critical due to the currently highly fragmented and degraded state of this community.

The objectives of the recovery plan include achieving no net loss in extent and condition of this TEC, and increasing protection of sites with high recovery potential. While it is noted that the approved Project will result in the removal of approximately 0.109 ha (just over 1 % of the patch identified), disturbance areas will be re-instated to pre-disturbance condition or better. Given that this site is actively grazed, it is not considered to have extremely high recovery potential. It is considered unlikely that the removal of approximately 0.109 ha (or just over 1 % of the patch identified) will adversely impact habitat critical to the survival of this TEC.

- **Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns**

The Project is unlikely to modify or destroy abiotic factors required for the survival of this TEC. No substantial alteration of abiotic factors is likely to be caused by the Project. Where there is the potential to impact or modify abiotic factors, such as water quality or air quality, impacts will be appropriately managed through the implementation of the CEMP (ERM 2015) and associated sub-plans.

- **Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting**

The Project is unlikely to result in a substantial change on the species composition of this TEC. Limited vegetation clearing will be required (up to approximately 0.109 ha of trees for the approved layout, zero impact on trees under the modified layout), which would largely result in the clearing of ground covers only. No ongoing works would be required as part of the Project that would result in the loss of functionality of the patch of TEC.

- **Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:**

- » **assisting invasive species, that are harmful to the listed ecological community, to become established**

The Project will not result in the establishment of invasive species. The FFMP (RPS 2015) includes weed management measures to ensure that noxious species are monitored and managed within the disturbance footprint. It is considered unlikely that invasive fauna species would be introduced as a result of the Project.

- » **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community**

Weed management will be conducted within the disturbance footprint as required to ensure that invasive species are effectively controlled. This would be similar to weed management practices already conducted within the project area. It is considered unlikely that weed management actions will kill or inhibit the growth of species that form part of this EEC.

- **Interfere with the recovery of an ecological community.**

The Project is unlikely to interfere with the recovery of this TEC. The approved Project would result in the removal of up to approximately 0.109 ha of this TEC, which is just over 1 % of the overall patch identified. It is not anticipated that the construction of an access track (largely along an existing farm track) would interfere with the recovery of a TEC, given that the patch is currently subject to farming practices. The use of the modified layout would result in no removal of the TEC with some impact on the understorey between patches of trees.

3.2.2 Proposed Mitigation Measures

The updated vegetation mapping has allowed for an updated assessment of potential ecological impacts associated with the Project.

The updated impact calculations confirm that the Project will not result in the removal of more than the approved clearing limit of Ribbon Gum – Mountain Gum Woodland.

The updated vegetation mapping has also identified that the removal of Yellow Box Woodland will be required, which is not subject to an approved clearing limit.

As per the Project Approval requirements, the impacts to native vegetation and fauna populations will be managed through the implementation of mitigation measures outlined in the Project FFMP (RPS 2015) provided as part of the CEMP (ERM 2015). These mitigation measures have been identified to reduce and minimise impacts to ecological values within the project area as far as possible. The FFMP also outlines rehabilitation actions to re-instate disturbed areas to pre-disturbance condition or better. These mitigation measures are considered appropriate for minimising impacts to Yellow Box Woodland.

Specific measures to be implemented within Yellow Box Woodland include:

- The minimisation of access track widths wherever possible, to reduce the clearing footprint to as small as practical;
- Trimming or pruning overhanging Yellow Box rather than the removal of trees;
- Clear identification of disturbance areas to reduce the potential for over-clearing;
- Re-locating any habitat features to areas of Yellow Box Woodland to be retained; and
- Rehabilitation of disturbance areas as soon as practical following completion of works.

In addition to the above mitigation measures, a Biodiversity Offsets Package is being prepared for the Project. This will include developing suitable offsets for the disturbance of the Yellow Box Woodland EEC.

4.0 Conclusion

RPS was commissioned to prepare this Native Vegetation Impact Review – Modification Report to provide an overview of the potential ecological impacts associated with the proposed Stage 1 modifications to the layout, including additional ancillary facilities at Ilparran Road and Kelley’s Road. This report also considers impacts from the existing ancillary facilities at the Gwydir Highway (which do not form part of the modification application).

The modification seeks approval for several alternative access tracks, variation to site entry points, and variation of the location of the 132 kV transmission line greater.

Additional ancillary facility locations are also proposed at Ilparran Road and Kelley’s Road, including laydown areas and a southern O&M building. To enable assessment against the siting criteria for ancillary facilities (Condition E18), the changes to the ancillary facilities have been assessed. However, changes to existing ancillary facilities at the Gwydir Highway do not form part of the modification application.

In addition, vegetation mapping was updated for portions of the project area and updated vegetation impact calculations provided to determine ecological impacts associated with Stage 1 of the Project.

The assessed changes in impacts arising from the modified WRWF Stage 1 Project and results are summarised in **Table 8**. This includes modified Project components and changes to proposed and existing ancillary facilities.

Table 8: Change in Impacts on Native Vegetation for WRWF Approved and Modified Layouts (approximate)

Native Vegetation Type	Impact of approved layout (ha)	Impact of modified layout (ha)	Impact difference (approved minus modified layout) (ha)
Yellow Box Gum Woodland	2.090	1.189	-0.901
Ribbon Gum-Mountain Gum	19.849	18.675	-1.174
Scattered Native Vegetation	5.276	5.208	-0.068
Total	27.215	25.072	-2.143

In summary, there is a net reduction in impact on native vegetation for the modified WRWF Stage 1 Project relative to the approved WRWF Project of approximately 2.143 ha. This involves reduced impact for both Yellow Box Gum Woodland EEC and Ribbon Gum – Mountain Gum EEC of approximately 0.901 ha and 1.174 ha respectively.

The assessment determined that the proposed alternative access tracks would result in an increased impact to Ribbon Gum – Mountain Gum Woodland (an increase of approximately 0.084 ha), and Scattered Native Vegetation (an increase of approximately 0.271 ha), but would result in reducing the impact to Yellow Box Woodland by approximately 0.195 ha. Careful attention is required to locating access tracks and minimising widths as far as reasonably and feasibly possible to minimise native vegetation impacts. The Environmental Work Method Statements should aim to achieve this outcome.

The added locations for the batch plants near Turbine 20 and at the southern entry point adjacent Kelley’s Road do not require the disturbance of native vegetation.

The assessment also determined that the proposed modifications to the transmission line easements would result in reduced impacts to all vegetation communities.

The proposed modifications would not result in an exceedance of the Project's clearance limit of 22 ha for Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland Bioregion EEC on site.

The updated vegetation impacts based on the revised mapping and the modified layout would not result in an exceedance of the approved clearing limits for Ribbon Gum – Mountain Gum Woodland. The updated vegetation impacts based on the compliant layout would also not result in an exceedance of the approved clearing limits for Ribbon Gum – Mountain Gum Woodland.

The updated mapping did identify the presence of Yellow Box EEC under the TSC Act. Of the Yellow Box Woodland potentially impacted by the approved Project, approximately 0.109 ha (within the approved layout) are also considered to be an EPBC Act TEC, namely White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands. The modified layout has been designed to avoid impacts to the TEC mature trees.

To minimise impacts associated with the modification application, as well as disturbances to the recently mapped Yellow Box Woodland, the mitigation measures outlined in the FFMP (RPS 2015) provided as part of the CEMP (ERM 2015) will be implemented. Indirect impacts to areas of vegetation to be retained will be managed through the implementation of the CEMP and FFMP. The CEMP includes specific management actions to ameliorate impacts associated with dust and water quality, which have the potential to result in indirect impacts to ecological values on site.

In addition to the above mitigation measures, a Biodiversity Offset Package is being prepared for the Stage 1 Project. This will include developing suitable offsets for the disturbance of 1.189 ha of Yellow Box Woodland EEC, as well as additional areas of Ribbon Gum – Mountain Gum Woodland identified in the project area.

5.0 References

ERM (2015a) White Rock Wind Farm Construction Environmental Management Plan. Prepared for WRWFPL Australia.

RPS Pty Ltd (2011a) Ecological Assessment Report - White Rock Wind Farm. Prepared for Epuron Pty Ltd.

RPS Pty Ltd (2011b) Letter Report, Condition of the White Box Yellow Box Blakely's Red Gum Woodland, White Rock Wind Farm. August 2011. Attachment 1 of White Rock Wind Farm Submissions Report, November 2011, Vegetation Type Details and Flora Quadrat Data. Prepared for Epuron Pty Ltd.

RPS Pty Ltd (2015a) White Rock Wind Farm - Native Vegetation Impact Review. Prepared for White Rock Wind Farm Pty Ltd.

RPS Pty Ltd (2015b) White Rock Wind Farm – Flora and Fauna Management Plan. Prepared for White Rock Wind Farm Pty Ltd.