



# White Rock Wind Farm

## Native Vegetation Impact Review – Modification Application

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Name	Signature	Date
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## Summary

White Rock Wind Farm Pty Ltd is seeking a modification to the Project Approval for White Rock Wind Farm.

The Project will be implemented in two stages. This modification application relates to minor variations to the layout for Stage 1 that would, if approved, reduce environmental impacts and result in construction and operational efficiencies. This report does not consider any impacts associated with any subsequent stage.

The proposed modifications include:

- Changes to site entry points;
- Several alternative access tracks;
- Adjustments to the alignment of the 132 kV transmission line;
- A minor change to a section of the 33 kV overhead transmission line to a 33 kV underground cable;
- Relocation of the Operations and Maintenance Facility closer to the northern entry point;
- The construction of an additional Operations and Maintenance Facility near the southern entrance; and
- Additional temporary batching plants.

In relation to the alternative access tracks, the Project Approval currently authorises the construction and use of access tracks based on the indicative layout, subject to a micro siting allowance of 100 m. The proponent seeks approval for certain alternative access tracks (beyond the micro siting allowance), which will avoid or reduce vegetation impacts and result in other Project efficiencies. The final selection of access routes is subject to constructability assessments and preparation of Environmental Work Method Statements required by the WRWF Stage 1 CEMP.

In addition, the locations of ancillary facilities for Stage 1 (such as construction compounds and laydown areas) have been confirmed by the proponent. Ancillary facilities are required to be located in accordance with condition E18 of the Project Approval. For completeness, this report includes an assessment of vegetation impacts associated with the ancillary facilities. However, the locations of ancillary facilities that were addressed by the Euron Environmental Assessment 2011 do not form part of the modification application. Only additional ancillary facilities not addressed by the EA 2011 are included in the Modification Application.

Specifically, the RPS assessment of the proposed modifications and changes to ancillary facilities has included:

- Area 1 – Assessment of northern construction compound and laydown area and alternative access track between the Gwydir Highway and Turbine 1;
- Area 2 – Alternative access track to Turbine 19;
- Area 3 – Inclusion of an additional batch plant near Turbine 20;
- Area 4 – Alternative access tracks to Turbine 29 and from Turbines 28 to 30;
- Area 5 – Alternative access track to Turbines 54, 55 and 56;
- Area 6 – Alternative access track from Kelley's Road to Turbine 110;

- Area 7 – Alternative access track from Kelley’s Road to Turbine 83 and southern construction compound, O&M building and laydown area;
- Area 8 – Alternative access track between Ilparran Road and Turbine 51, eastern construction compound and laydown area;
- Area 9 – Relocation of the 132 kV transmission line spanning from existing 132kV line to substation;
- Area 10 – Alternative Access Track Between Turbines 9 and 10;
- Area 11 – Alternative Access Track in vicinity of Turbine 40;
- Area 12 – Replacement of 0.5 km section of 33 kV Transmission Line with 33kV Underground Cable between Turbines 57 and 59;
- Area 13 – Alternative Access Tracks between Turbine 76 and 79;
- Area 14 – Inclusion of two permanent masts and four temporary masts; and
- Area 15 – 33 kV Overhead line between Turbines 35 and 62.

RPS were commissioned to prepare this report to provide an overview of the potential ecological impacts associated with the 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).

Since Goldwind Capital Australia acquired the Project in 2014, it engaged RPS to undertake further ecological assessments in preparation for implementation of Stage 1 of the Project. This included further vegetation mapping of the Stage 1 project area and updated vegetation impact calculations to determine more reliable ecological impacts associated with Stage 1 of the Project.

An additional 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, and areas not previously mapped. The methods utilised for this assessment were consistent with those employed for the initial Native Vegetation Impact Review (RPS, 2015a). The field survey attempted to identify 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.

The assessment determined that four vegetation communities occur within the Stage 1 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 assessed changes in impacts arising from the modified Project and results are summarised in Table S1.

**Table S1: Approximate change in impacts on Native Vegetation for WRWF 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
<b>Total</b>	<b>27.215</b>	<b>25.072</b>	<b>-2.143</b>

In summary, there is a net reduction in impact on native vegetation for the modified Project relative to the approved 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.

In terms of the respective Project components, 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. The added location for the batch plant near Turbine 20 does not require the disturbance of native vegetation.
- 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 exceedence of the Project's clearing limit of 22 ha for Ribbon Gum – Mountain Gum – Snow Gum Grassy Forest / Woodland of the New England Tableland Bioregion EEC on site.

The site assessment also verified vegetation communities within previously unmapped extents of the project area. Updated impact calculations are outlined in Table S2 (based on the modified layout for Stage 1). Key amendments to the vegetation impact calculations are:

- The alternative access track route from Ilparran Road to Turbine 51 has been designed to avoid impacts to Yellow Box Woodland (previously impacting approximately 0.18 ha of Ribbon Gum – Mountain Gum Woodland and Yellow Box Woodland, based on the compliant layout).
- The inclusion of permanent meteorological masts and temporary masts (resulting in the removal of approximately 1.906 ha of Ribbon Gum – Mountain Gum Woodland, and approximately 0.056 ha of Scattered Native Vegetation based on 50 % removal of the impact area); and
- Replacement of 0.5km of 33 kV Transmission line (clearance width of 30 m) with underground cabling (clearance width of only 5 m) between Turbine 57 and 59. The transmission line connection would result in the removal of approximately 0.385 ha of Ribbon Gum – Mountain Gum Woodland, approximately 0.029 ha of Scattered Native Vegetation, and approximately 0.039 ha Yellow Box Woodland, while the underground cabling would result in the removal of approximately 0.28 ha of Ribbon Gum – Mountain Gum Woodland.

To minimise impacts associated with the modification application, additional ancillary facilities (Ilparran Road and Kelley's Road) and existing ancillary facilities at the Gwydir Highway (not forming part of the modification application), as well as disturbances to the recently mapped Yellow Box Woodland, the 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) 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 (Condition C7) is being prepared for the Project. This will include developing suitable offsets for the disturbance of Yellow Box Woodland EEC, as well as impacted areas of Ribbon Gum – Mountain Gum Woodland in the Stage 1 project area.

**Table S2: Updated Calculations (approximate) based on the modified Stage 1 layout**

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	-	<b>0.002</b>
Substation	-	-	0.041	<b>0.041</b>
Electrical Reticulation	0.015	1.214	0.506	<b>1.735</b>
Access Track (14 – 22 m)	0.095	6.403	3.003	<b>9.502</b>
Turbines (footings, hardstand, and rotor blades)	-	3.336	1.274	<b>4.610</b>
Masts (permanent and temporary)	-	1.906	0.056	<b>1.962</b>
132 kV Lines (8 km)	1.039	5.429	0.299	<b>6.767</b>
33 kV Lines	0.039	0.385	0.029	<b>0.454</b>
<b>Total</b>	<b>1.189</b>	<b>18.675</b>	<b>5.208</b>	<b>25.072</b>
Reduction from approved layout	<b>-0.901</b>	<b>-1.174</b>	<b>-0.068</b>	<b>-2.143</b>



## 1.0 Introduction

### 1.1 Background

The White Rock Wind Farm received Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* on 10 July 2012 (MP 10\_0160; modified in July 2015), which authorises the construction and operation of up to 119 turbines and associated infrastructure. The proponent is currently planning for implementation of Stage 1 of the Project, which includes up to 70 turbines and associated infrastructure.

The proponent is now seeking a modification to the Project Approval to relocate certain infrastructure beyond the micro siting allowance contained in the Project Approval. RPS has prepared this report to provide an overview of the potential ecological impacts associated with the proposed modification.

Vegetation mapping for previously unmapped portions of the project area also required ground-truthing, to provide updated impact calculations and determination of potential ecological impacts associated with the Project.

### 1.2 Scope of Works

The objective for this assessment was to conduct a field assessment for the modification areas provided by White Rock Wind Farm Pty Ltd, as well as previously unmapped portions of the project area, to enable a quantifiable review and comparison of ecological impacts associated with the modification application. The scope of works included:

- Conducting a field survey to verify the type and extent of native vegetation and fauna habitat features impacted by the proposed modifications, as outlined in **Section 1.3**;
- Refining the vegetation mapping for the project area to allow for impact calculations as outlined in **Section 1.4**;
- Determining the impact of the proposed modifications on native vegetation and ecological values in comparison to the approved Stage 1 layout and identifying relevant mitigation measures to be implemented; and
- Determining ecological impacts associated with updated vegetation calculations and identifying additional mitigation measures that may be required.

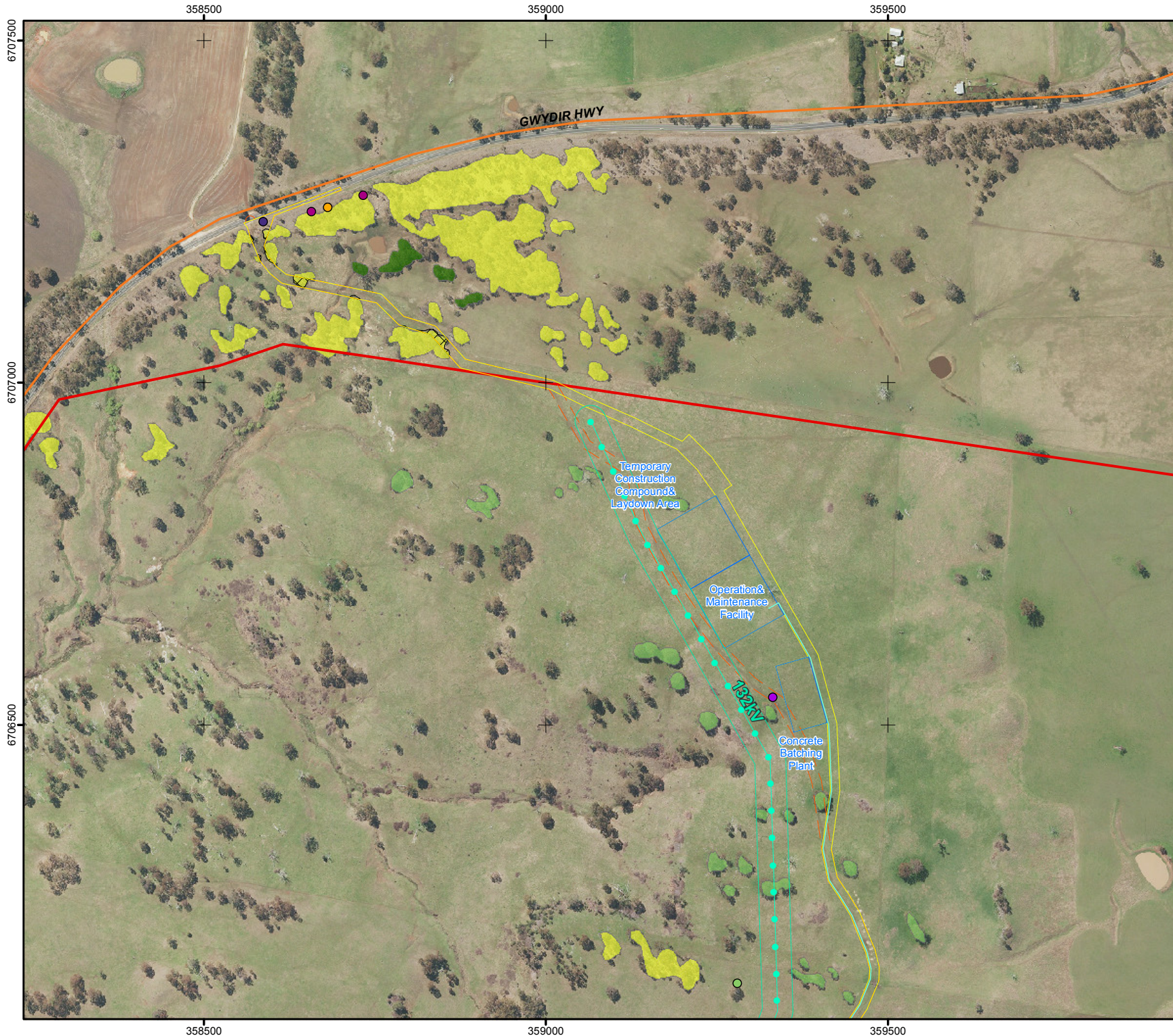
### 1.3 Modification Application

For the purpose of the proposed modification, a number of areas have been assessed to identify changes in project layout and associated impacts. This includes changes to the approved locations (in some instances by more than 100 m) for site entry points, access tracks, the 132 kV transmission line and replacement of 0.5 km of 33kV overhead line with underground cable. Changes in ancillary facilities, such as the addition of new ancillary facilities (Ilparran Road and Kelley's Road) and concrete batch plants, are also considered. Specifically, the assessments of potential modifications and changes to ancillary facilities have included the following assessment areas:

- Area 1 – Assessment of northern construction compound and laydown area and alternative access track between the Gwydir Highway and Turbine 1 (**Figure 1 and 2**);
- Area 2 – Alternative access track to Turbine 19 (**Figure 3**);
- Area 3 – Inclusion of an additional batch plant near Turbine 20 (**Figure 4**);

- Area 4 – Alternative access tracks to Turbine 29 and from Turbines 28 to 30 (**Figure 5**);
- Area 5 – Alternative access track to Turbines 54 and 56 (**Figure 6**);
- Area 6 – Alternative access track from Kelley's Road to Turbine 110 (**Figure 7**);
- Area 7 – Alternative access track from Kelley's Road to Turbine 83 and southern construction compound, O&M building and laydown area (**Figure 8**);
- Area 8 – Alternative access track between Ilparran Road and Turbine 51, eastern construction compound and laydown area (**Figure 9**);
- Area 9 – Relocation of the 132 kV transmission line spanning from existing 132 kV line to substation (**Figures 10 and 11**);
- Area 10 – Alternative Access Track Between Turbines 9 and 10 (**Figure 12**);
- Area 11 – Alternative Access Track in vicinity of Turbine 40 (**Figure 13**);
- Area 12 – Replacement of 0.5km section of 33 kV Transmission Line with 33 kV Underground Cable between Turbines 57 and 59 (**Figure 14**);
- Area 13 – Alternative Access Tracks between Turbine 76 and 79 (**Figure 15**);
- Area 14 – Inclusion of two permanent masts and four temporary masts (**Figures 16 and 17**); and
- Area 15 – 33 kV Overhead line between Turbines 35 and 62 (**Figure 18**).





**Relocation of Laydown Areas and Access Track from the Gwydir Highway**

**Figure 1**

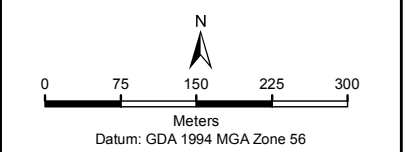
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White Rock Wind Farm

Client:  
Goldwind Australia

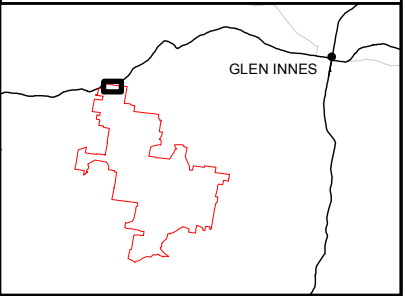
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Approved by: —      Date: 4/12/2015

- Highway
- Overhead Line - Layout 66 (Modified)
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Overhead Line Buffer - Layout 66 (Modified)
- Facility - 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**
- Hollow Bearing Tree
- Hollow Bearing Tree Yellowbox
- Hollow Log
- Retain Tree
- Stag



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

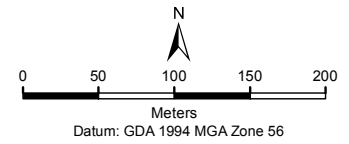




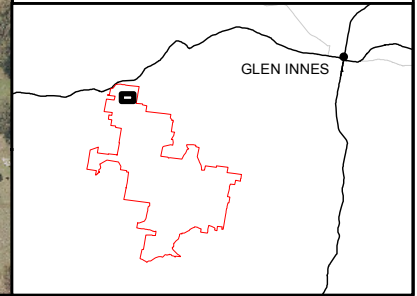


<b>Alternative Access Track to Turbine 1</b>	
<b>Figure 2</b>	
Project: <b>White Rock Wind Farm</b>	
Client: <b>Goldwind Australia</b>	
Compiled by: DL	Date: 4/12/2015
Approved by: —	Date: 4/12/2015

- ◆ Layout 66 Turbine Location
  - Overhead Line - Layout 66 (Modified)
  - Electrical Reticulation - 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**
- Scattered Vegetation
  - Yellow Box - Blakely's Red Gum Woodland
  - Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- Habitat Tree
  - Hollow Bearing Tree
  - Stag



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







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**Alternative Access Track to Turbine 19**

**Figure 3**

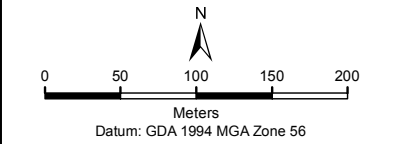
Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

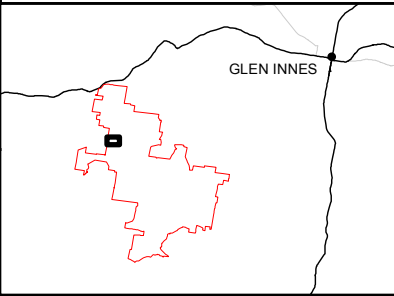
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Approved by: **—** Date: **4/12/2015**

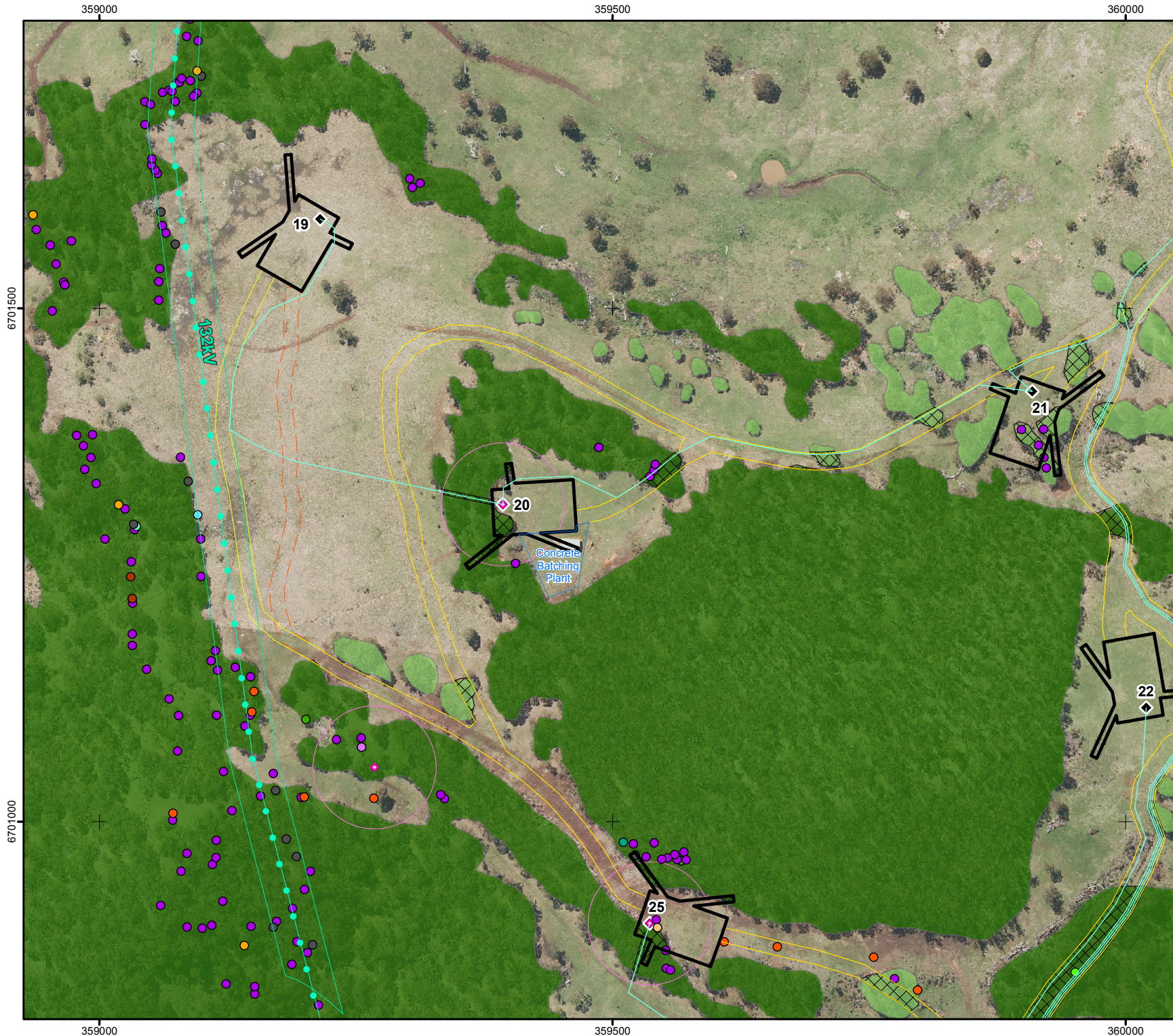
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- ◆ Layout 66 Turbine Location
- Overhead Line - Layout 66 (Modified)
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- WRWF Mast - 60m Buffer
- Overhead Line Buffer - Layout 66 (Modified)
- Facility - 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>
- Dead Stag
- Drainage Feature
- Hollow Bearing Tree
- Hollow Bearing Tree Potential
- Hollow Log
- Log Pile
- Rocky Escarpment
- Rocky Outcrop
- Rocky Outcrop And Fallen Tree
- Scattered Habitat Trees
- Small Flowing Spring



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







**Inclusion of an Additional Batch Plant near Turbine 20**

**Figure 4**

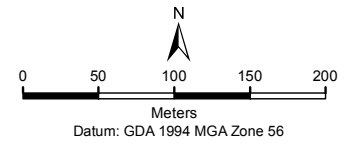
Project: **White Rock Wind Farm**

Client: **Goldwind Australia**

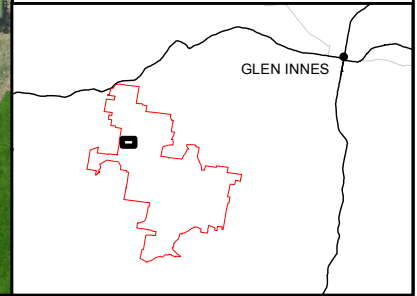
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- ◆ WRWF Mast
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- ◆ Electrical Retiulation - Layout 66 (modified)
- ◆ Footprint - Layout 66 (FFMP)
- ◆ Footprint - Layout 66 (Modified)
- ◆ WRWF Mast - 60m Buffer
- ◆ Overhead Line Buffer - Layout 66 (Modified)
- ◆ Facility - 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>
- ◆ Dead Stag
- ◆ Drainage Feature
- ◆ Habitat Tree
- ◆ Hollow Bearing Tree
- ◆ Hollow Bearing Tree Potential
- ◆ Hollow Log
- ◆ Log Pile
- ◆ Rocky Escarpment
- ◆ Rocky Outcrop
- ◆ Rocky Outcrop And Fallen Tree
- ◆ Rocky Outcrop And Woodpile
- ◆ Scattered Habitat Trees
- ◆ Small Flowing Spring



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### Alternative Access Tracks to Turbine 29 and from Turbines 28 to 30

## Figure 5

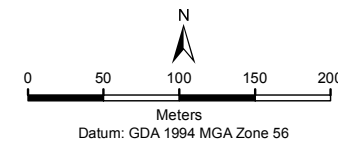
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Client: Goldwind Australia

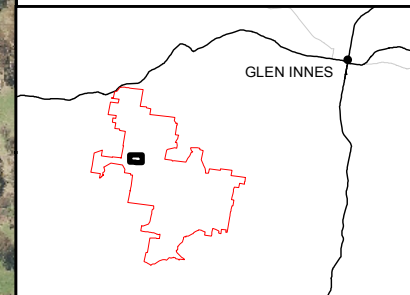
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- Scattered Vegetation
- Vegetation Impact Area / Future Rehabilitation Zone
- Habitat Features**
- <all other values>
- Habitat Tree
- Hollow Bearing Tree
- Hollow Log
- Log Pile
- Rocky Escarpment
- Rocky Knoll
- Rocky Outcrop
- Stag



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# Alternative Access Track to Turbines 54, 55 and 56

## Figure 6

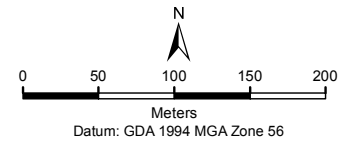
Project: White Rock Wind Farm

Client: Goldwind Australia

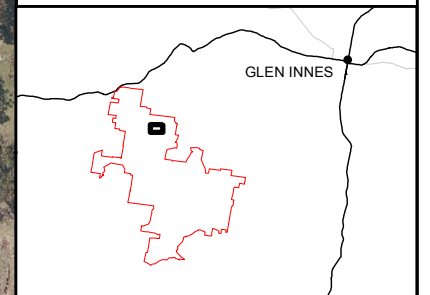
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

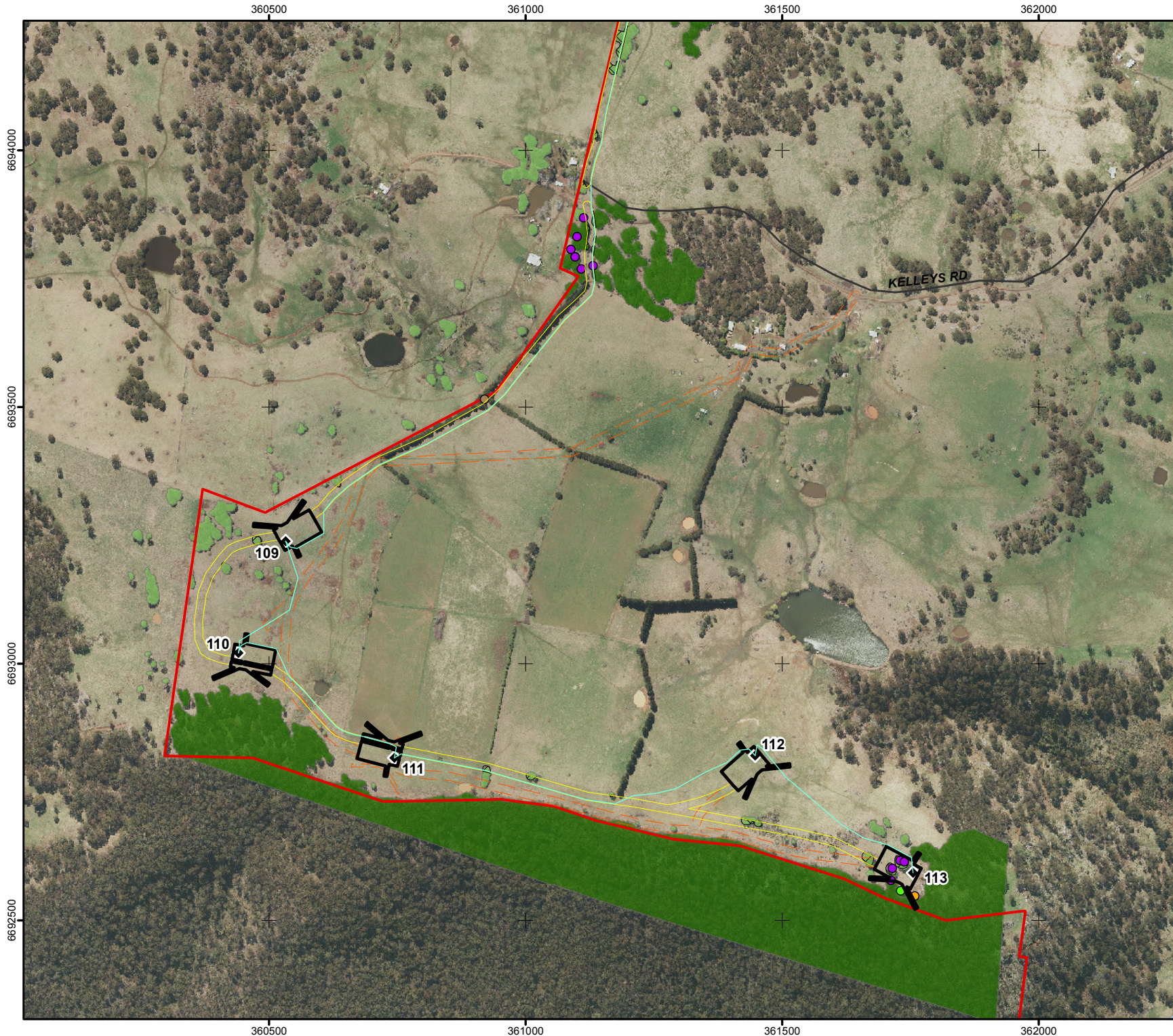
- ◆ Layout 66 Turbine Location
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
- Scattered Vegetation
- Vegetation Impact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



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







**Alternative Access Track from Kelley's Road to Turbine 110**

**Figure 7**

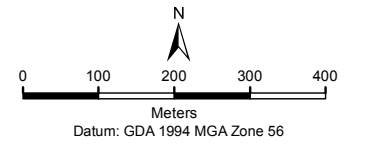
Project:  
**White Rock Wind Farm**

Client:  
**Goldwind Australia**

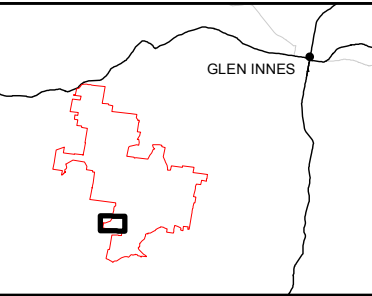
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

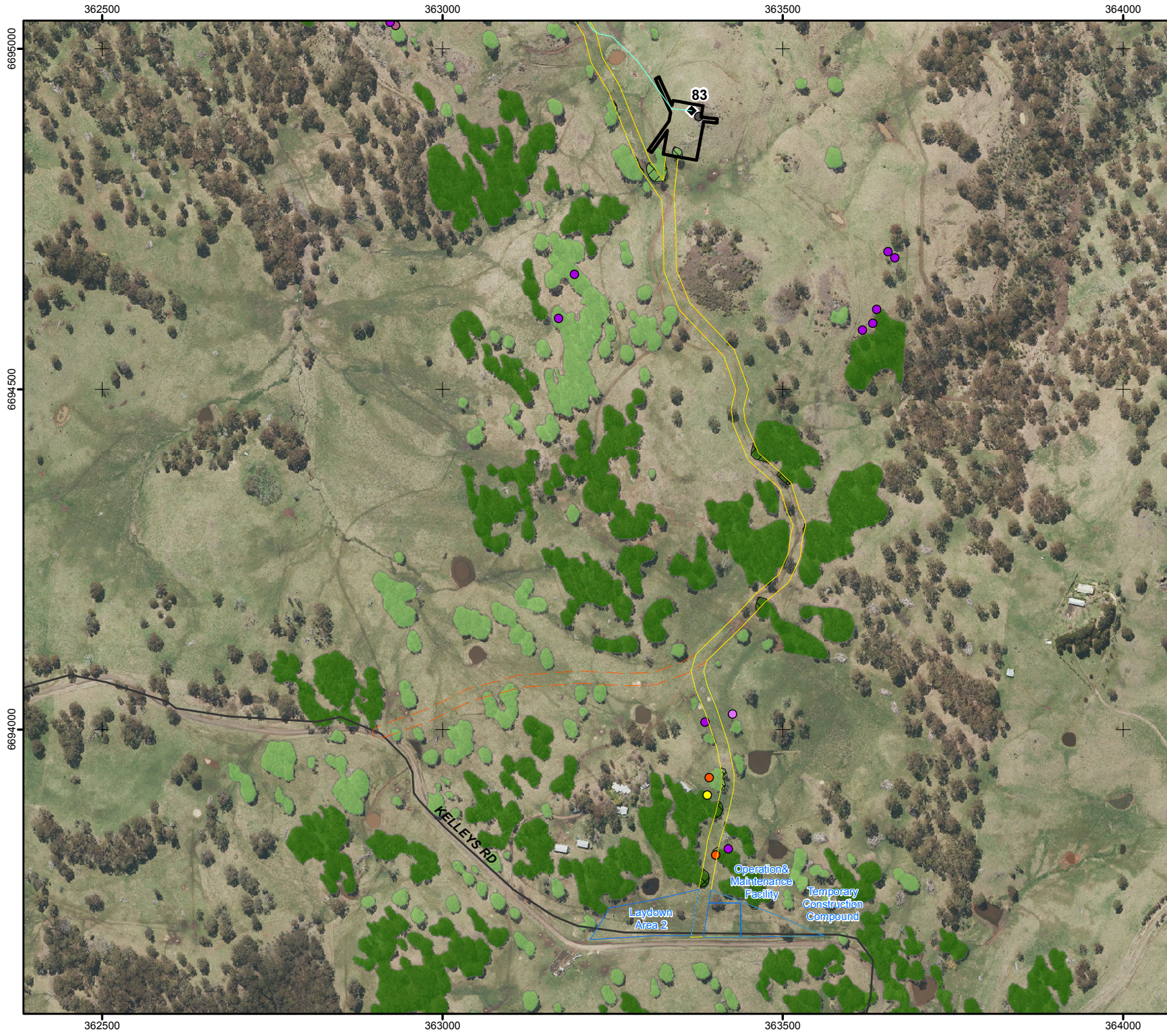
- ◆ Layout 66 Turbine Location
- Minor road
- Watercourse
- Electrical Reticulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Site Perimeter
- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
- Scattered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



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







**Alternative Access Track from Kelley's Road to Turbine 83 and Southern Construction Compound, O&M building and Laydown Area**

**Figure 8**

Project: White Rock Wind Farm

Client: Goldwind Australia

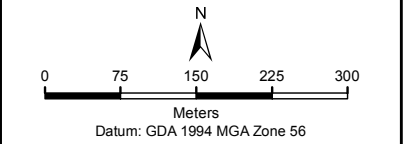
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

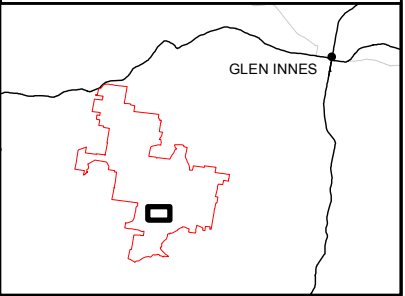
- ◆ Layout 66 Turbine Location
- Minor road
- Electrical Retiulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Facility - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Site Perimeter

- Vegetation Communities**
- Ribbon Gum - Mountain Gum Woodland
  - Scattered Vegetation
  - Vegetation Impact Area / Future Rehabilitation Zone

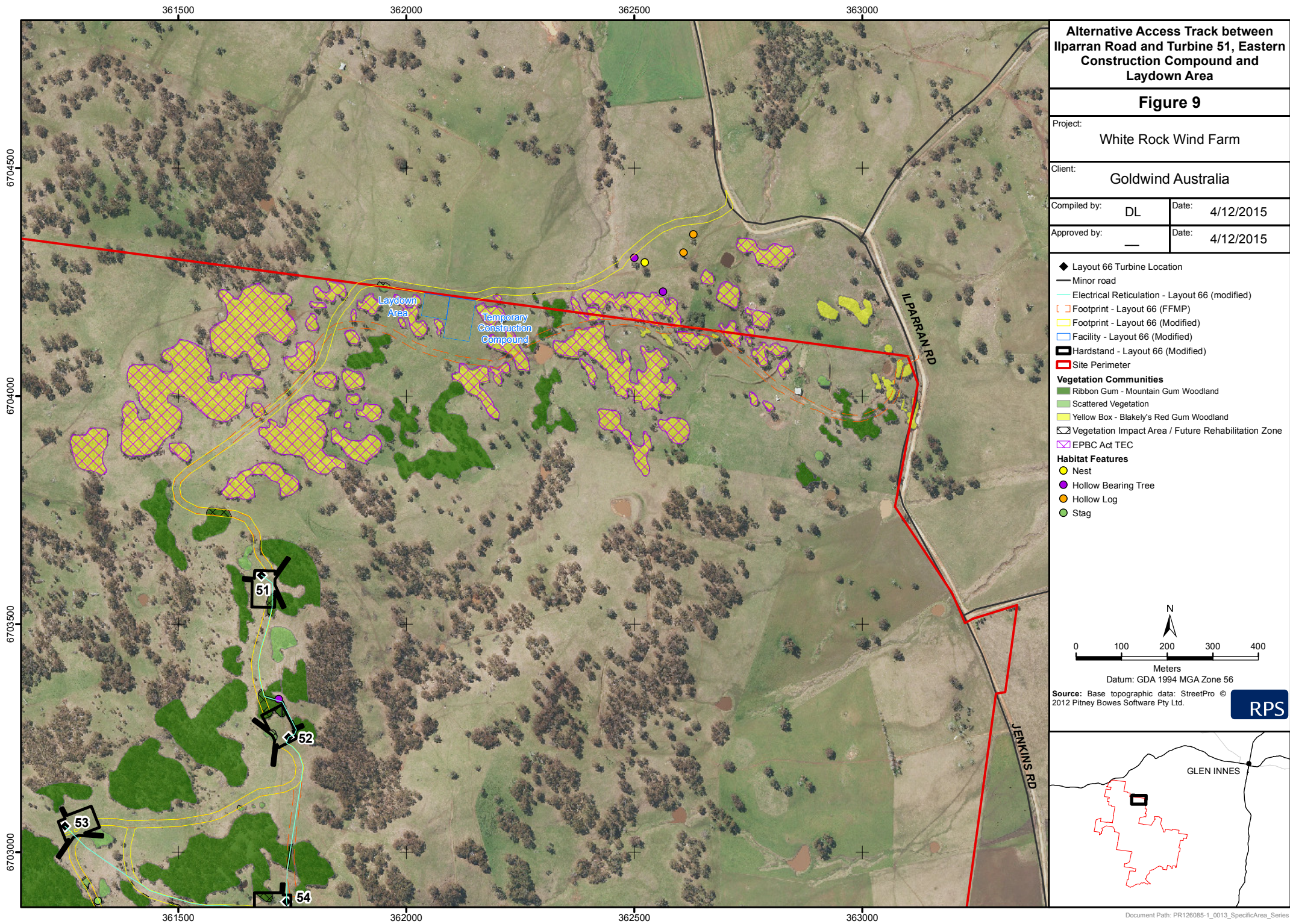
- Habitat Features**
- Nest
  - Hollow Bearing Tree
  - Hollow Bearing Tree Potential
  - Log Pile
  - Rocky Knoll
  - Rocky Outcrop



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







**Alternative Access Track between Ilparan Road and Turbine 51, Eastern Construction Compound and Laydown Area**

**Figure 9**

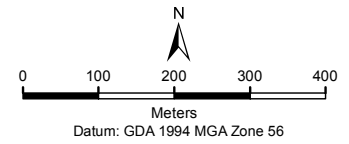
Project:  
White Rock Wind Farm

Client:  
Goldwind Australia

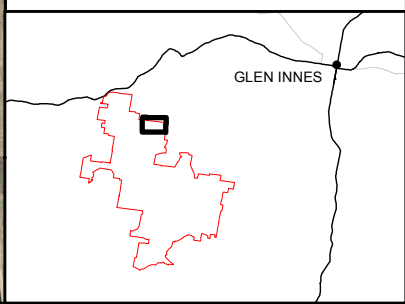
Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

- ◆ Layout 66 Turbine Location
- Minor road
- Electrical Retiulation - Layout 66 (modified)
- Footprint - Layout 66 (FFMP)
- Footprint - Layout 66 (Modified)
- Facility - 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
- EPBC Act TEC
- Habitat Features**
- Nest
- Hollow Bearing Tree
- Hollow Log
- Stag



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





358000

360000

67040000

67040000

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360000

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

## Figure 10

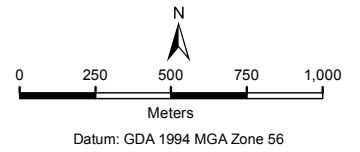
Project: White Rock Wind Farm

Client: Goldwind Australia

Compiled by: DL Date: 4/12/2015

Approved by: — Date: 4/12/2015

- Locality
- Highway
- Watercourse
- Overhead Line - Layout 66 (Modified)
- Electrical Reticulation - Layout 66 (modified)
- Facility - Layout 66 (Modified)
- Overhead Line Buffer - Layout 66 (Modified)
- Hardstand - Layout 66 (Modified)
- Footprint - Layout 66 (Modified)
- Site Perimeter



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

