Environmental Report and Spring Flora Survey in Support of Clearing Permit Application: Transmission line in Glendower Road Reserve, Southern Cross, Shire of Yilgarn

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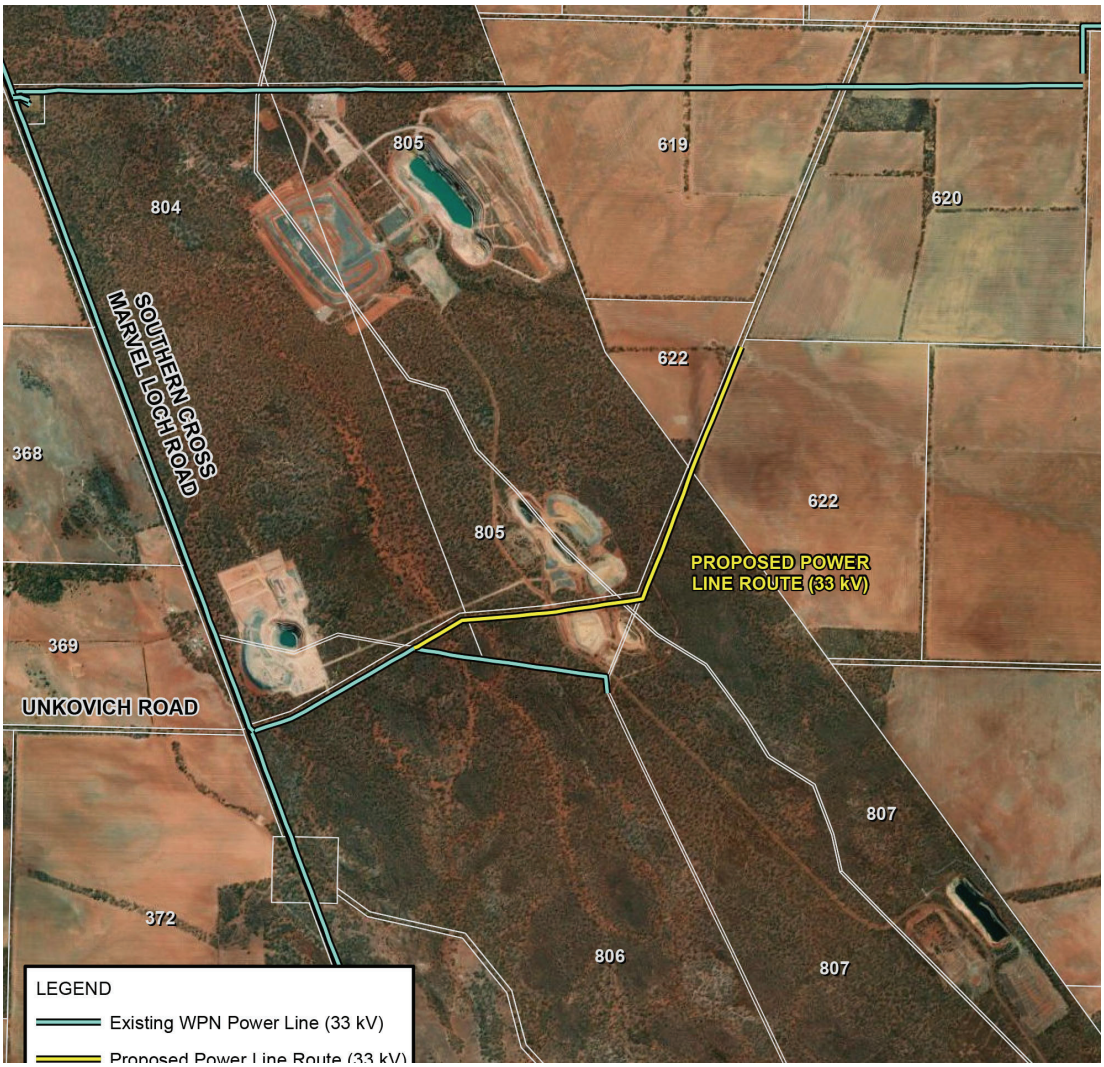
Report Date 10th May 2024
Report Ref: YW/001/2023

Prepared for:
Southern Cross Wind Pty Ltd



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EXECUTIVE SUMMARY

Southern Cross Wind Pty Ltd proposes the construction of a new 33 kV transmission line which will connect their new wind farm project near Southern Cross to the existing electrical transmission grid.

The transmission line will be located within the road reserve of Glendower Road and will extend from near the junction of Glendower Road and Marvel Loch Road along a generally easterly and north-easterly alignment, before terminating at a selected location on Glendower Road, 4 km distant.

Appropriate approvals have been obtained from the Shire of Yilgarn for the transmission line to be located in the existing road reserve of Glendower Road. Glendower Road presently consists of a gravel standard road of approximately 20 m width within a reserve width of 60 m. The outer portions of the road reserve support native vegetation.

This document reports on the findings of investigations into the natural environmental attributes of the transmission line route, focussing on the characteristics of the vegetation and flora in recognition that implementation of the proposal will require native vegetation to be cleared.

The purpose of the report is to support an application to the Department of Water and Environmental Regulation for Clearing Permit to enable the works to proceed.

The transmission line will require a clearing area of 6m width within the approximately 25 m wide vegetated portion of one side of the road reserve, over a distance of approximately 4 km.

All or most of the tree vegetation within the proposed clearing area will need to be removed for both construction purposes then ongoing protection of the conductors from fire.

Once the transmission line is in operation, fuel loads and tree growth under the conductors will be managed by pruning, however ground level flora, which is naturally sparse, may be allowed to re-establish.

Site survey and desk top investigation of the conservation value characteristics of the vegetation, flora, habitats and fauna which would be impacted by clearing, has been conducted by specialist botanists and environmental scientists.

Assessment of the findings of survey in the context of the EPA's *"principles for clearing"* found that the proposal to clear does not contravene any of the principles, and on this basis could be approved.

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References.

Barto Gold (2020), Additional information in regard to CPS 8966/12

Ecoscape (2023), Appendix 5 Flora and Fauna Desktop Assessment, for Yilgarn Wind Pty Ltd

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DBCA (2019a) Statewide Vegetation Statistics

Landgate (2021), Landgate 2021, Shared Land Information Platform (SLIP). Available from: https://maps.slip.wa.gov.au/landgate/locate/.

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Figures

Attachment

1.0 Introduction

Southern Cross Wind Pty Ltd proposes to establish a new wind farm at a site approximately 13 kilometres south-east of the Southern Cross townsite, on privately owned land which is cleared and has been historically used for cropping.

There will be a requirement to connect the wind farm to the existing Western Power network, being a 33 kV line on the Southern Cross-Marvel Loch Road, with a new 33 kV transmission line which will be constructed within a portion of the road reserve corridor of Glendower Road, between a location near to the Southern Cross-Marvel Loch Road and Glendower Road intersection, over a distance of approximately 4 km.

The purpose of this document is to support evaluation of a Clearing Permit Application for the areas of native vegetation which will require clearing.

A route for the transmission line within the road reserve corridor has been determined but remains to be refined by further survey prior to construction.

Therefore, recognising the final route may alter from current plans, survey has included the whole of the vegetated portions of the road reserve. Consistent with this status, the Clearing Permit Application to the Department of Water and Environmental Regulation (DWER) also includes all vegetation within the road reserve, notwithstanding a lesser area than the application area will be cleared.

Figures 1A to 1E presents a plan showing the location and relevant portions of the Glendower Road reserve which are the subject of the Clearing Permit application.

Figure 2 presents a schematic cross section of the clearing profile required along the transmission line route to enable its construction and ongoing operation.

This document presents an environmental report which has been prepared to support an application to clear native vegetation to allow construction of the transmission line.

The document describes the physical environmental characteristics of the proposed clearing areas, as well as the findings of a spring flora and vegetation survey of within the relevant portion of the Glendower Road reserve. Fauna data is derived from published literature and evaluation of photographic evidence, ground level and remote.

The document also presents an assessment of the proposed clearing against the criteria published as “principles for clearing” published by the EPA.

2.0 Project Description and Background

Southern Cross Wind Pty Ltd proposes the construction of a new 33 kV transmission line which will connect their new wind farm project to the existing electrical transmission grid.

Appropriate approvals have been obtained from the Shire of Yilgarn for the transmission line to be located in the existing road reserve of Glendower Road, in the Shire of Yilgarn.

Glendower Road presently consists of a gravel standard road with a pavement width of approximately 20m wide within a reserve width of 60 m.

On each side of the road surface there is a band of native vegetation of approximately 15 -25 m width, beyond which the land is private property.

The transmission line will extend from near Glendower Road's junction with Marvel Loch Road, along a generally easterly and north-easterly alignment, before terminating at a selected location on Glendower Road.

This document reports on the findings of investigations into the natural environmental attributes of the transmission line route, focussing on the characteristics of the vegetation and flora in recognition that implementation of the proposal will require native vegetation to be cleared. Fauna habitats and potential populations have also been evaluated.

The new transmission line will have a length of approximately 4.0 km and will require a clearing area of 6m width.

The total clearing area will be between approximately 2.4 and 3.0 ha. The clearing area remains to be defined at fine scale, as whilst a preliminary plan alignment has been determined, the final route has yet to be confirmed.

For reasons of construction efficiency, it is intended to plot the final transmission line route immediately before construction proceeds.

This will enable an optimum route to be chosen with construction outcome benefits in the form of tower locations and conductor spans, and will also facilitate best planning to minimise vegetation and habitat impacts.

As far as is practical, it is intended to route the line so as to avoid mature trees and those with hollows which may have breeding habitat values, and also minimise future maintenance pruning around the conductors.

Apart from the large trees with hollows, there are no other environmental features which require special attention during final route planning.

The clearing application area specified in the accompanying Clearing Application, is therefore larger than will ultimately be required to accommodate the transmission line.

It includes all of the roadside vegetation within the Glendower Road reserve, but with the knowledge that only a 6m cross section of this larger area will be required.

Upon completion of the construction operations, geospatial data describing the final clearing area will be submitted to DWER.

All or most of the tree vegetation within the proposed clearing area will need to be removed for both construction purposes then ongoing protection of the conductors from fire. Very low ground flora will likely not require removal.

Once the transmission line is in operation, fuel loads and tree growth under the conductors will be managed by pruning, however the ground level flora, which is naturally sparse, will be allowed to re-establish.

Site survey and desk top investigation of the conservation value characteristics of the vegetation, flora, habitats and fauna which would be impacted by clearing, has been conducted by specialist botanists and environmental scientists, and is reported here.

3.0 General Description of The Existing Environment

3.1 Climate

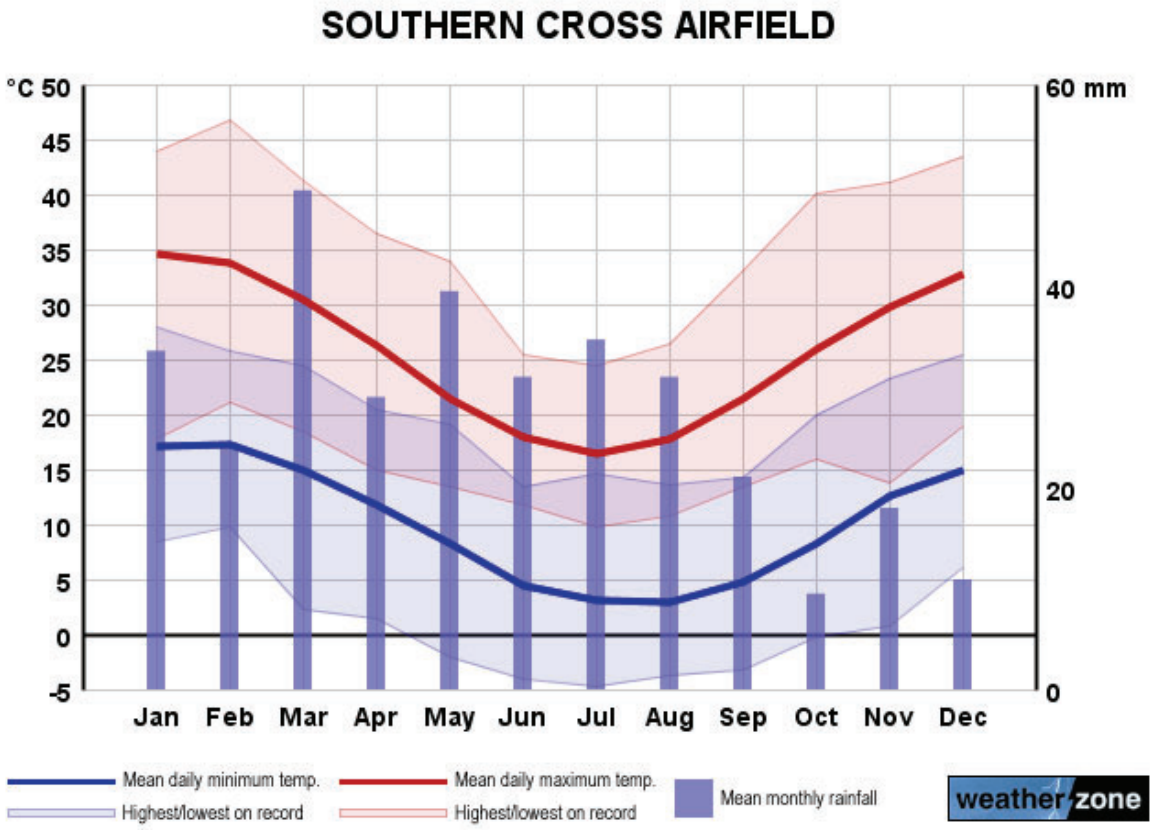
The climate of the Southern Cross area is described having hot dry summers and cold winters.

The long term average annual rainfall is 300.8 mm. Average maximum daily temperatures range from 16.8 – 34.7 degrees C, and average minimum daily temperatures of 3.7 – 17.9 degrees C.

Table 1 shows average monthly rainfall and temperature data for Southern Cross Airport.

Table 1. Climate data for Southern Cross (http://www.farmonline.com.au)

Southern Cross Airport Annual Temperatures & Rainfall



3.2 Physiography and Geology

The Glendower Road reserve is located on broad gently sloping upland terrain which lies between the elevations approximately 380 m AHD to 390 m AHD. (refer ***Figure 3)***.

The geology of this region is dominated by the Marda-Diemals greenstone belt, which is divided into three layers including the lower greenstone belt which is comprised of mafic volcanic and BIFs, a felsic-intermediate volcanic layer and an upper sedimentary layer which is dominated by calc-alkaline volcanic and clastic sedimentary rocks.

3.3 Hydrology

The clearing area and its locality and region are located within the Yilgarn Craton, an area dominated by Archaean Greenstones with significant granitic and gneiss inliers. The Greenstones within the area can be significantly metamorphosed. The Archaean units are generally considered to be a poor groundwater source; however, some quartzite rocks, together with shear zones, can offer potential groundwater resources (Barto Gold, 2020).

In general, the underlying strata can contain groundwater at depth as described above. The surface soil landscapes are not highly permeable and annual rainfall is very low with high annual evaporation. There are no wetlands or drainage lines along the survey area, nor in the locality.

On a regional scale, the groundwater flows are generally towards the north, and the chains of Lakes (such as Seabrook, Polaris, Koorkoordine and Deborah). The regional groundwater table is 5 to 45 m deep, with groundwater flowing in a north-westerly direction, towards the paleodrainages (Barto Gold, 2020)

Groundwater is hypersaline and has no near-by users or value to vegetation. Groundwater salinities are generally in the range of 10,000 and 180,000 mg/L Total Dissolved Solids (TDS), but more typically between 20,000 and 110,000 mg/L TDS (Barto Gold, 2020).

3.4 Soil Landscapes

Soil landscape mapping by the Department of Primary Industries and Regional Development (DPIRD, 2020), is presented as ***Figure 4*** and shows that the Glendower Road Reserve crosses the soil landscape types listed in ***Table 2***.

Table 2. **Soil Landscape Types (DPIRD, 2020)**

Mapping unit	Land system	Description
261Bd_3ge	Buladagie 3 with mafic or schist influence phase	Areas of rocky heavy soils associating with mafic schist and phyllite geology
261Bd_3u	Buladagie 3 Undiferentiated phase	Undifferentiated
261GrPE	Greenmount, Perilya subsystem	Tributary valley floors on greenstone, in the Southern Cross Zone. Calcareous loamy earths and shallow duplex
261Gr_3	Greenmount 3 subsystem	Rolling low hills in the eastern Zone of Ancient Drainage. Loamy earth (mostly calcareous) and clay
261Gt_1Qc	Garratt 1Qc phase	Lower slopes and foot slopes adjacent to salt lakes in the eastern Zone of Ancient Drainage

Using less technical soil science terms, the flora survey findings reported the soils as having a consistent characteristic throughout most of the clearing area alignment, being orange and brown silty clays, with a small area where granite rock is expressed at the surface.

3.5 Biogeographic Region

Biogeographic regions are delineated on the basis of similar climate, geology, landforms, vegetation and fauna and are defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Department of Agriculture Water and the Environment 2020).

The survey area is located in the Coolgardie IBRA region (COO2 Southern Cross subregion) (Map 2), described as follows. (Cowan, Graham & McKenzie, 2001);

The subregion has subdued relief, comprising gently undulating uplands dissected by broad valleys with bands of low greenstone hills. It lies on the 'Southern Cross Terrains' of the Yilgarn Craton. The granite strata of Yilgarn Craton are interrupted by parallel intrusions of Archaean Greenstone. Drainage is occluded. It has an arid to semi-arid Warm Mediterranean climate with 250-300 mm of mainly winter rainfall.

3.6 Pre- European Vegetation

During the 1970s, John Beard and Associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250,000 in the south-west and at a scale of 1:1,000,000 in less developed areas.

Beard's vegetation maps attempted to depict the native vegetation as it was presumed to be at the time of settlement and is known as the pre-European vegetation type and extent. Beard's vegetation maps have since been developed in digital form by Shepherd, Beeston & Hopkins (2002) and updated by DPIRD (2019).

The pre-European vegetation associations identified from the survey area (DPIRD 2019) and its pre-European and current extents are listed in ***Table 2*** (DBCA, 2019a).

Table 3: Pre-European vegetation association representation (DBCA, 2019a)

Region	Vegetation association	Original extent (ha)	Current extent (ha)	% remaining
Western Australia	141	1,158,760.28	960,755.60	82.91
	511	700,692.60	520,615.26	74.30
	1068	268,900.45	142,088.42	52.84
	1148	260,383.60	258,227.40	99.17
	1413	1,679,916.32	1,286,855.48	76.60
IBRA biogeographic region (Coolgardie)	141	883,085.75	858,525.10	97.22
	511	464,423.62	435,177.21	93.70
	1068	193,988.20	104,804.17	54.03
	1148	254,931.80	252,775.60	99.15
	1413	1,061,212.28	1,042,553.77	98.24
	141	883,085.75	858,525.10	97.22

Region	Vegetation association	Original extent (ha)	Current extent (ha)	% remaining
IBRA biogeographic sub-region (COO2)	511	464,423.62	435,177.21	93.70
	1068	193,988.20	104,804.17	54.03
	1148	254,931.80	252,775.60	99.15
	1413	953,237.73	934,825.95	98.07
LGA (Shire of Yilgarn)	141	711,450.38	690,599.08	97.07
	511	161,933.75	135,457.48	83.65
	1068	268,900.45	142,088.42	52.84
	1148	79,301.07	77,149.48	97.29
	1413	538,791.10	395,458.48	73.40

Figure 5 presents a map of the pre-European vegetation for the Glendower Road reserve and adjacent land and shows that the land falls within the mapping area for Yilgarn 1068 which is described as medium woodland: salmon gum, morrel, gimlet and *Eucalyptus sheathiana.*

Table 3 advises that of an original extent of 268,900 ha, (52.84%) of this vegetation type remained extant in the Shire of Yilgarn (DBCA ,2019a).

3.7 Environmentally Sensitive Areas

The survey area does not support any mapped Environmentally Sensitive Areas (ESAs) (Landgate 2021) or DBCA legislated Nature Reserves (DBCA 2021).

The nearest ESAs are located approximately 8 to 10 km east of the survey area, as shown on ***Figure 6.***

3.8 Conservation Lands

There are no lands which are reserved for conservation purposes in the immediate vicinity of the site.

The nearest legislated conservation lands to the survey area are shown on ***Figure 6*** and include.

- Nature Reserve R 25801
- Yellowdine Nature Reserve Dulladgin Nature Reserve,
- Condamin Rock Nature Reserve
- Jibadgi Nature Reserve
- Wokallarry Nature Reserve Frog Rock Nature Reserve

The land between the transmission line clearing area and these reserves is predominantly cleared agricultural land and there are no significant vegetated wildlife linkages.

4.0 Vegetation and Flora

Investigation of the vegetation and flora within the proposed clearing area has been conducted by direct spring survey by specialist botanists, and by review of recent remote images and published technical data for the locality, district and region.

A spring flora survey for the vegetated margins of Glendower Road Reserve was conducted by PGV Environmental in November 2023.

The resulting report is included in full as ***Appendix 1*** of this document.

For the purposes of this section of the environmental report, the findings of the flora assessment may be summarised as follows:

- A total of 70 plant species were recorded on the site including 63 native and 7 introduced species (10%);
- No Threatened or Priority flora species were recorded on the site;
- Seven vegetation types were described and mapped on the site; six of which were Eucalypt woodlands dominated by varying mixtures of *Eucalyptus salmonophloia*, *Eucalyptus loxophleba*, *Eucalyptus yilgarnensis* or *Eucalyptus spathulata* and one Shrubland dominated by *Acacia acuminata*;
- The condition of the native vegetation was assessed as Very Good for areas surrounded by farmland due to an impacted understorey and Excellent in areas surrounded by native vegetation;
- The site is within the Coolgardie C002 IBRA sub-region;
- The vegetation is part of Beard vegetation association Yilgarn 1068. There is approximately 31.5% of the pre-European extent of vegetation association Yilgarn 1068 remaining. The vegetation on the site is therefore not of regional significance;
- None of the vegetation types is a Threatened or Priority Ecological Community. The vegetation has similar characteristics to the Eucalypt woodlands of the Western Australian Wheatbelt TEC, however does not meet the Key Diagnostic Characteristic as it is outside the IBRA region and sub-region in which the TEC occurs.

Whereas the detailed findings of the vegetation and flora survey are set out in full in ***Appendix 1***, for this section of the report, the factors above indicate that there are no special conservation values present, which would reasonably constrain the proposal to clear land as described in this document.

5.0 Habitats and Fauna

The discussion presented here is based on desk top review of aerial and ground level photography of the vegetation, habitat types derived from the ground level photography collected during the *PGV* (2024) botanical site survey of the Glendower Road reserve land, and by reference to the findings of a regional desk top investigations including of the flora and fauna of the proposed wind farm area which is located at the northern terminus of the clearing application area *by* Ecoscape (2023), and fauna survey conducted in generally equivalent vegetation and habitat types for a location near Marvel Loch (Barto Gold, 2020).

In general terms, the structural components of the fauna habitats presented within the proposed clearing area include arboreal habitats in the form of low woodland to woodland tree vegetation, some shrubland vegetation habitats with a sparse cover of ground level flora and an abundance of leaf and bark litter over a silty clay surface soil habitat.

Noting that tree hollows are important potential nesting sites for native parrots including the Western Rosella, the vegetation survey included a search for trees of sufficient age and size to potentially support hollows. Within the survey area seven eucalyptus trees with trunk hollows of varying size but mainly small, were located. Their locations are plotted on ***Figure 7.***

The preliminary route plan indicates that each of these trees can be avoided, by the clearing activity, with the northern two trees possibly requiring pruning.

The terrain is flat to gently sloping plain with an orange silty clay soil substrate with a low degree of microscale surface level variations.

In the northern half of the transmission line route, the natural habitats form a narrow strip each side of the Glendower Road pavement. Beyond the road reserve the native vegetation has been replaced by cleared farmland.

In the south-western half of the route, the Glendower Road reserve and proposed transmission line route crosses a tract of naturally vegetated land which extends over approximately 40 km, starting just south of the Southern Cross township, and extending to Marvel Loch, and has a width of approximately 5 km along its length. See ***Figure 8***. The area of this expanse of remaining natural vegetation and habitat is approximately 200 km2 (compared to a clearing area of 3.0 ha)

The terrain, vegetation and habitats within this expanse of naturally vegetated land are interpreted from aerial photographic analysis to be generally equivalent to the eucalyptus low woodland and woodland over silty clay plains which have been

confirmed for the surveyed portions of the Glendower Road reserve within this vegetated area.

The Ecoscape (2023) investigation found that the DBCA threatened and priority fauna species database search provided the following 17 conservation listed fauna species that are likely to occur within the survey area and an applied 70 km surrounding locus.

- *Calidris ferruginea (Curlew Sandpiper), MI - EPBC Act; CR - BC Act*
- *Calidris ruficollis (Red-necked stint), MI - EPBC Act; MI - BC Act*
- *Dasyurus geoffroii (Chuditch, Western Quoll), VU - EPBC Act; VU - BC Act*
- *Falco peregrinus (Peregrine Falcon), OS – BC Act*
- *Idiosoma castellum (Tree-stem Trapdoor Spider), DBCA P4*
- *Idiosoma intermedium* (Coolgardie Shield-backed Trapdoor Spider), DBCA P3
- *Leipoa ocellata* (Malleefowl), VU - EPBC Act; VU - BC Act
- *Leporillus conditor* (Greater Stick-nest Rat), VU - EPBC Act; CD - BC Act
- *Macrotis lagotis* (Bilby), VU - EPBC Act; VU - BC Act
- *Myrmecobius fasciatus* (Numbat), EN - EPBC Act; EN - BC Act
- *Notamacropus irma* (Western Brush Wallaby), DBCA P4
- *Nyctophilus major tor* (Central Long-eared Bat), DBCA P3
- *Paroplocephalus atriceps* (Lake Cronin Snake), DBCA P3
- *Petrogale lateralis lateralis* (Black-flanked Rock-wallaby), EN - EPBC Act; EN - BC Act
- *Phascogale calura* (Red-tailed Phascogale), VU - EPBC Act; CD - BC Act
- *Thinornis rubricollis* (Hooded Plover, Hooded Dotterel), DBCA P4
- *Tringa nebularia* (Common Greenshank), MI - EPBC Act; MI - BC Act.

From the list above the following species were the only species to be recorded within 20 km of the survey area and within the previous 20 years,

- *Leipoa ocellata* (Malleefowl), VU - EPBC Act; VU - BC Act
- *Tringa nebularia* (Common Greenshank), MI - EPBC Act; MI - BC Act.

The Common Greenshank, can be eliminated as a species which could potentially occur,

utilise or rely upon the vegetation proposed for clearing as it is an obligate wetland bird species, which could not utilise the fauna habitats in this area.

In regard to the Malleefowl, and its potential presence within the proposed clearing area, the following factors are relevant:

- It is possible that there are Malleefowl populations present within the remaining vegetated areas of the locality and district,

- At the Barto Gold minesite, located some 30 km south east, within the same vegetated continuum as the southern portion of the transmission line clearing area, firm evidence of local Malleefowl populations was found by specialist fauna survey, covering a large undisturbed vegetated area in the periphery of that company's proposal area, (Barto Gold, 2020)

- The Malleefowl is known to be a secretive bird, which will avoid intrusion into its territory by non- natural environmental factors, including noise and vibration, and is described as having a keen system of avoidance techniques when territory characteristics change.

- This suggests that whilst a population may exist within the extensive area of vegetation through which the southern portion of the transmission line would pass, they are unlikely to favour the road reserve portion of the available habitats, due to vehicle movements and associated noise, vibration and dust, and are much more likely to frequent the more isolated parts of the available habitats, distant from Glendower Road,

- Further, the Malleefowl's preferred habitat is mallee/woodland with a shrubland dominated by acacia species, which are an important food stuff: there are two small areas only, where these general habitat characteristics are met – in the northern portion of the route, extending about 700 m along the road reserve vegetation, with a patch width of approximately 15 to 20 m each side of Glendower Road, and bounded by extended distances of cleared land.

- The botanical survey scope of work, included a visual survey for the characteristic and unmistakable nesting mounds of the Malleefowl within the Glendower Road reserve habitats of which none was observed,

- This is to be expected for the reasons noted above – non-ideal habitats and disturbances arising from vehicle transit and loss of adjacent habitat for the vegetation in the northern sector of the transmission line route.

On the basis of these factors, and site survey, it is reasonable to conclude that the potential for impacts to any Malleefowl populations which inhabit this area are minimal to insignificant.

Nonetheless, immediately prior to the clearing area finalisation, the route will be inspected for Malleefowl nest mounds and adjusted accordingly if any such mounds have been found to have been established after the November 2023 survey.

6.0 ASSESSMENT OF CLEARING IMPLICATIONS

It is reasonable to conclude that the absence of any specific environmental values for which conservation legislation or policy would constrain clearing, indicates that the proposal to construct and operate the transmission line should be enabled by the issue of a Clearing Permit by the DWER.

Of the environmental values identified there are two which should be the subject of design attention to minimise actual or potential impact.

Firstly, it will be important to protect the seven eucalyptus trees with hollows to the greatest practical extent. The preliminary route alignment suggested that this will be possible, however the two northern trees may need pruning as they are very close to the conductors.

This item, whilst not an absolute constraint to clearing, will not be able to be finalised until immediately prior to construction, however attention to this matter should be addressed within the construction contracts.

Secondly, there is no evidence that there are any Malleefowl nest mounds that could be disturbed by construction.

Direct ground level survey by experienced scientists during the flora and vegetation surveys did not report any mounds. However, it would be prudent for a second survey to be conducted prior to route finalisation.

There is a large (approximately 200km2) tract of equivalent vegetation and habitats directly adjacent to the proposed clearing area. This indicates that the environmental values and functions of the proposed clearing areas are well represented at a local scale.

Addressing these matters will attend to the environmental management requirements for the proposal.

7.0 Evaluation of the Proposal Against Principles for Clearing

This section assesses the vegetation proposed to be cleared against the principles set down in the Department of Environmental Regulation explanatory document *"A guide to the assessment of applications to clear native vegetation",* (December 2014).

7.1 Principle (a) Native Vegetation should not be cleared if it contains a high level of biodiversity.

Factors listed in the guidance document and the status of the proposal area vegetation in regard to each factor are as follows:

(i) *Biodiversity hotspots*: the site is not located at any of the listed hotspots

(ii) *Priority or other significant flora* – there are no priority or other significant flora at the site

(iii) *Priority ecological communities* – there are no PECs present at the site

(iv) Ecosystem diversity

- At the regional association scale of diversity, there is only one vegetation association present within the proposal area, being the Yilgarn 1068 association,
- In terms of structural diversity, the vegetation is consistently a eucalypt low woodland to woodland formation, with occasional areas of tall shrubland understory,
- The fauna habitats include arboreal habitats in the form of low woodland to woodland tree habitats, some shrubland habitats with a sparse cover of ground level flora and an abundance of leaf and bark litter over a silty clay surface soil habitat,
- There were seven vegetation mapping units identified, which whilst distinguishable botanically, comprise varying mixtures of several common eucalypt species, in generally equivalent structural formation,
- The floristic diversity determined by quadrat analysis found that the assigned vegetation mapping units for the proposal area had about 70 species in total with an average quadrat density of 9.9 species per 10 m quadrat,
- The soil substrate has a consistent characteristic throughout most of the clearing area alignment, being orange and brown silty clays, with small areas where granite rock is expressed at the surface,
- The topography is consistent throughout the site being a gently sloping plain

with little natural microscale variation,

- these factors indicate there is a consistency or ground level habitat types for flora and fauna along the full length of the proposed clearing area,

On the basis of this analysis, recognizing the absence of flora or habitats with special conservation significance, it is reasonable to conclude that the proposed clearing area does not have an especially high level of biodiversity when assessed against these criteria, and has typical ecosystem characteristics to the Cooolgardie COO2 Subregion vegetation type.

7.2 Principle (b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

There are no environmental characteristics of the site, or information in the published literature which indicates that the proposed site could be inconsistent within this criterion.

Two factors are determinative in this regard.

For the southern portion of the proposed route, clearing will comprise a 12 m wide portion of the road reserve located parallel to Glendower Road, and within the existing road reserve.

In the south-western half of the route, the Glendower Road reserve and proposed transmission line route crosses a rectangular shaped area of naturally vegetated land which extends over approximately 40 km between just south of the Southern Cross township and Marvel Loch, and has a width of approximately 5 km along its length. The area of this large local remnant of the pre-European vegetation is in the order of 200 km2. See ***Figure 8***.

The terrain, vegetation and habitats within this expanse of naturally vegetated land are interpreted from aerial photographic analysis to be generally equivalent to the eucalyptus low woodland and woodland over silty sand plains found within the surveyed portions of the Glendower Road reserve within this vegetated area.

It is therefore highly unlikely that any of the local fauna populations would be reliant upon the vegetation to be cleared for any element of their biology or life cycle.

In the northern portion of the proposed clearing, the existing vegetation is a very small linear remnant of the original vegetation. The land each side of the vegetation in the road reserve is extensively cleared.

The role of this vegetation in the maintenance of local fauna populations is likely to be very minor due to its extent and shape, notwithstanding transient usage for perching, feeding, nesting and local movements by local fauna is to be expected.

Overall, it is reasonable to interpret the proposal in the context of the degree to which local fauna habitat will be diminished, to be of very low significance on a local, district and regional scale.

On a local and district scale the 200 km2 continuum of native vegetation through which Glendower Road passes will function as the core essential habitat for local and district scale fauna populations.

7.3 Principle (c) Vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.

The botanical survey conducted in November 2024 did not locate any populations of rare flora, and desk top investigations of relevant databases indicate that the area is not especially prospective for any declared rare flora.

7.4 Principle (d) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a threated ecological community.

The vegetation is not classified as a threatened ecological community, and has no known or apparent maintenance role or relationship with any threatened ecological community,

7.5 Principle (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area which has been extensively cleared.

This criterion does not apply to the proposed clearing area as it is limited in area and is located mainly within an existing area of approximately 200 km2 of equivalent vegetation which will be unaffected by the proposed clearing.

7.6 Principle (f) Native vegetation should not be cleared if the clearing of the vegetation is growing in or in association with a watercourse or wetland.

The vegetation within the proposed clearing area is not growing in or in association with a watercourse or wetland.

7.7 Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

There are no characteristics of the proposed clearing area in and of itself, or in its local environmental setting which indicates that any appreciable land degradation could result from its clearing.

Land disturbance will be confined to earthworks for the installation of the tower base structures, which will be secured against erosion in their design and stabilization during the completion of works.

Within the area cleared below the conductors, the vegetation will be cleared to ground level, but with no requirement to completely clear the ground level vegetation, which may be rolled or brush harvested, which will largely leave the root structures in place with minimal disturbance to the soil profile.

7.8 Principle (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

There are no adjacent or nearby conservation reserves, with the nearest located some 8 km to the north-west of the proposal area.

There are no environmental features or known functioning environmental processes which could constitute any significant linkage to this reserve, such that there could be detrimental environmental impacts caused by the proposed clearing.

7.9 Principle (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration of the quality of surface or underground water.

The surface and groundwater hydrology of the area does not feature processes which could be susceptible to and significant change as a result of the clearing of vegetation within the proposed transmission alignment within the road reserve of Glendower, and the installation of transmission towers.

8.0 Conclusions

The findings of a spring survey together with desk top analysis of aerial photography and published technical information, when assessed in the context of the principles for clearing, lead to the conclusion that a Clearing Permit should be issued for the application area set out in the accompanying Application Permit.

The vegetation is not regionally or locally significant in regard to its species composition or floristic characteristics.

There are no occurrences of Threatened Ecological Communities or Species, or Priority Ecological Communities within the proposed clearing area.

There a habitat values in the form of tree hollows in seven eucalypt trees. Initial planning indicates that these trees can be avoided.

There is a 200 km2 tract of equivalent vegetation bounding approximately half the proposed clearing area which presently functions as the core area in the locality and district where natural environmental conditions prevail and will provide an ongoing extant example of the vegetation and habitats in the proposed clearing area.

On this basis, there are no apparent constraints to clearing of vegetation to enable transmission line construction and operation, as proposed.

9.0 Recommendations

Detailed route planning for the transmission line alignment and tower positioning should be preceded by a survey to confirm that no Malleefowl nest mounds have been established in the time since the November botanical survey.

Detailed route planning for the transmission tower alignment and tower positioning should seek to avoid eucalypt trees supporting hollows are protected to the greatest practical extent.

Figures

Figures 1 - 8


LEGEND
Proposed Power Line Route (33 kV)
Cadastre
Glendower Road Reserve
Clearing Application Area
619
620
622
622
805
805
804
804
805
807
807
806
Glendower Rd
PROPOSED POWER LINE ROUTE (33kV)
Triad Access Rd
ENVIRONMAPS 0406 590 006 Environmental Mapping Solutions www.environmaps.com.au
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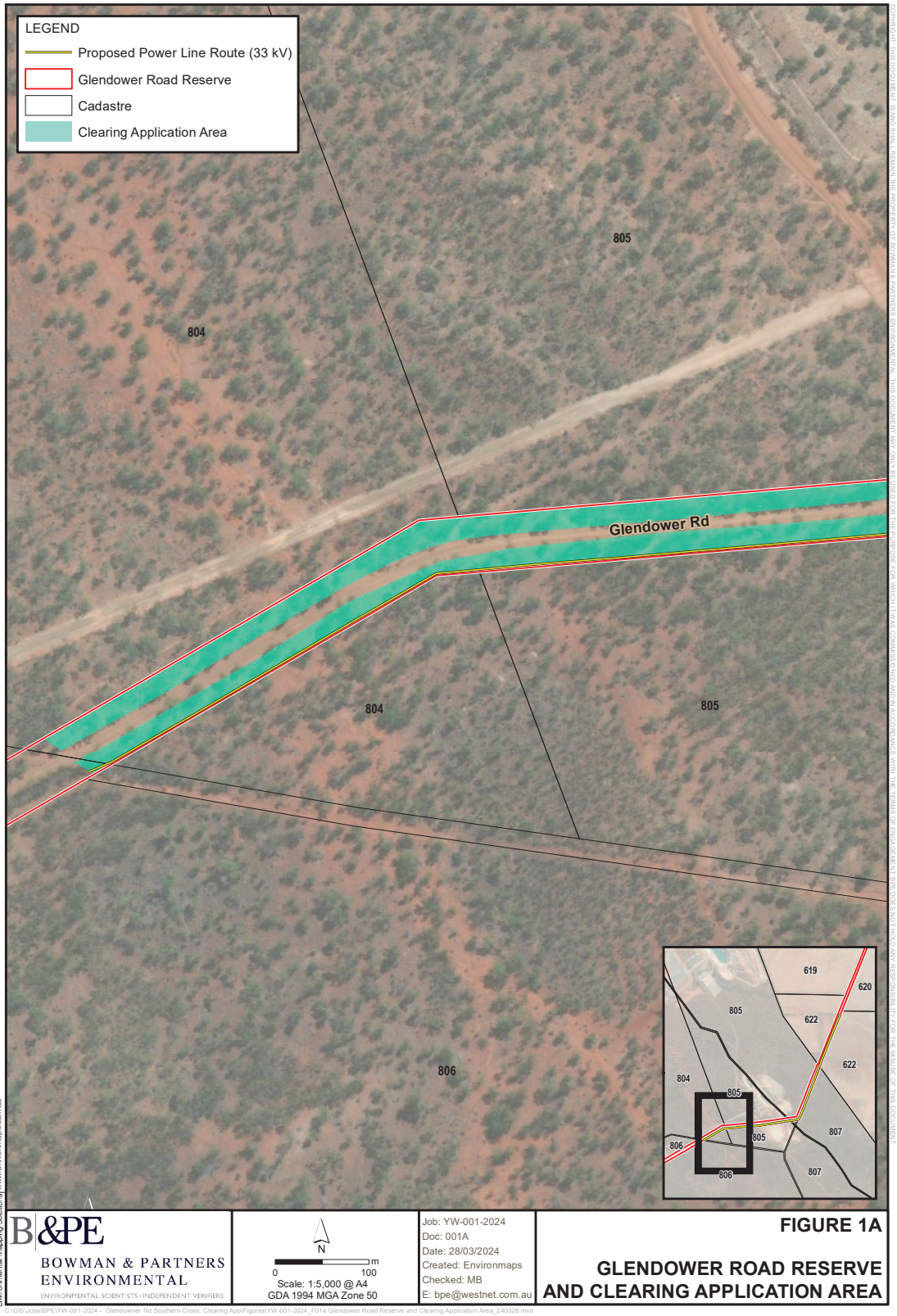
BOWMAN & PARTNERS ENVIRONMENTAL
ENVIRONMENTAL SCIENTISTS • INDEPENDENT VERIFIERS
N
0
m
400
Scale: 1:15,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 001
Date: 22/03/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 1
GLENDOWER ROAD RESERVE AND CLEARING APPLICATION AREA
C:\GIS\Jobs\BPE\YW-001-2024 - Glendower Rd Southern Cross, Clearing App\Figures\YW-001-2024_F01 Glendower Road Reserve and Clearing Application Area_240322.mxd


LEGEND
Proposed Power Line Route (33 kV)
Glendower Road Reserve
Cadastre
Clearing Application Area
805
804
Glendower Rd
804
805
806
619
620
805
622
622
804
805
807
806
805
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807
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N
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Scale: 1:5,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 001A
Date: 28/03/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 1A
GLENDOWER ROAD RESERVE AND CLEARING APPLICATION AREA
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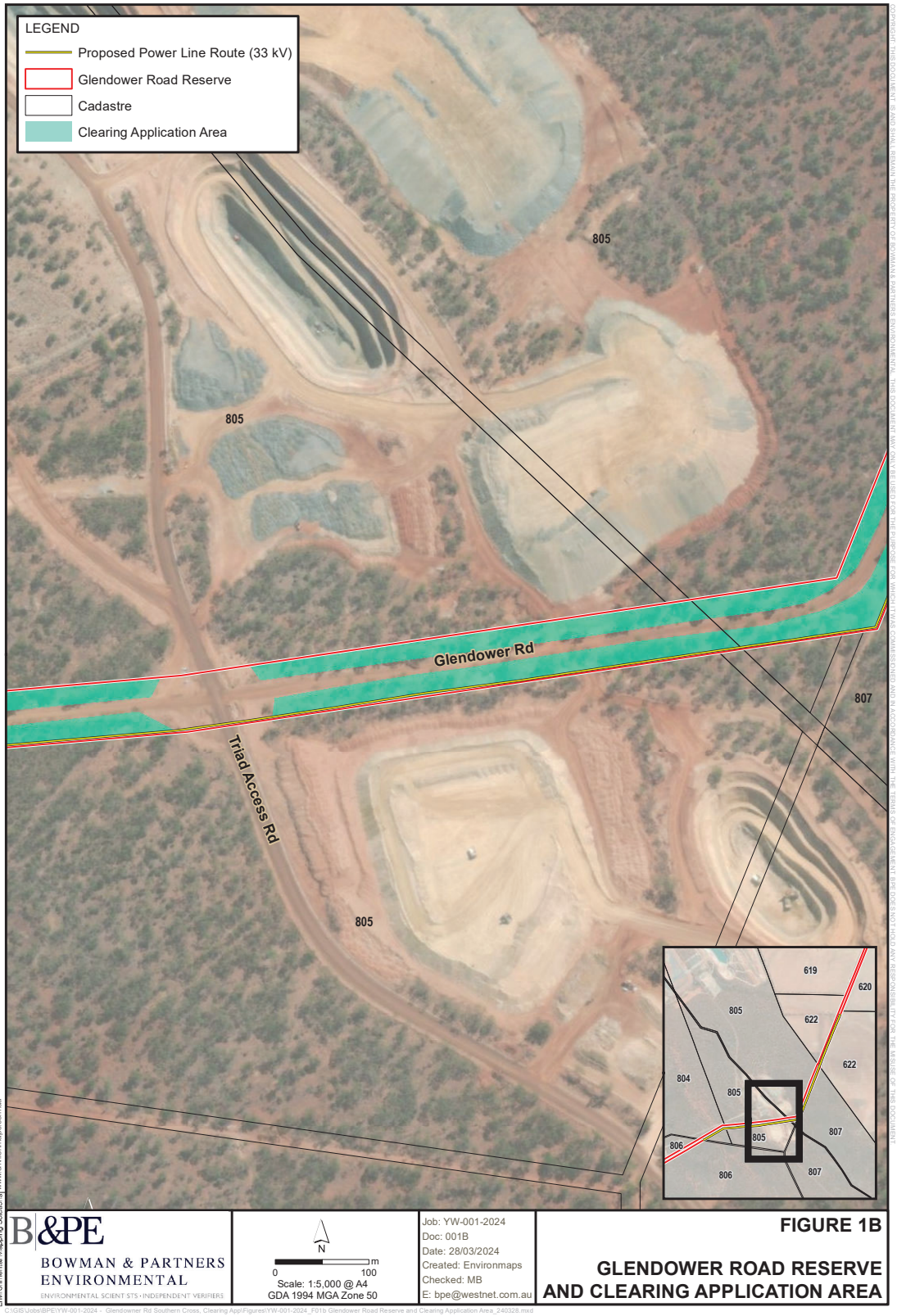
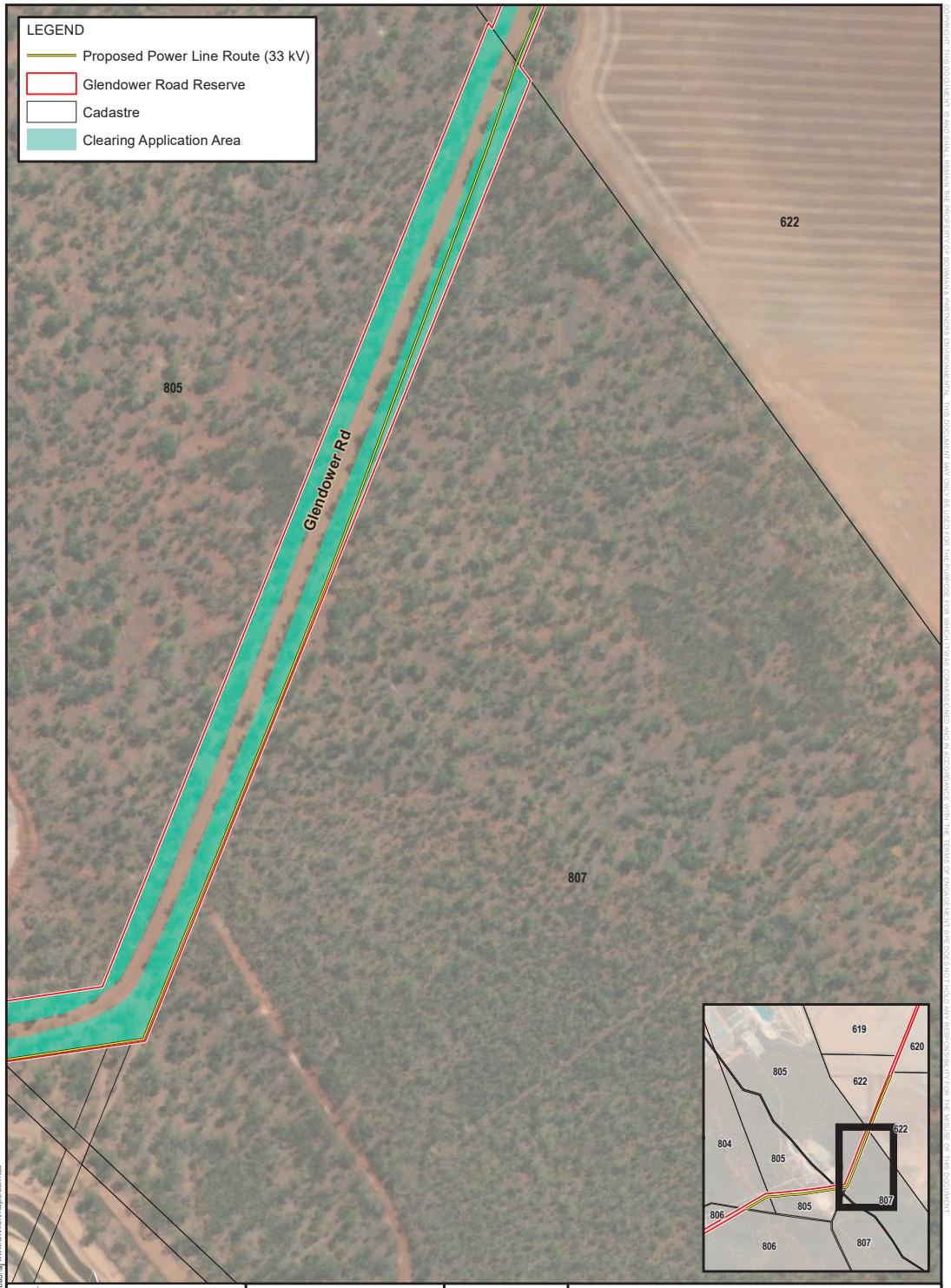


FIGURE 1B

GLENDOWER ROAD RESERVE AND CLEARING APPLICATION AREA



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Scale: 1:5,000 @ A4
GDA 1994 MGA Zone 50

Job: YW-001-2024
Doc: 001C
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FIGURE 1C

GLENDOWER ROAD RESERVE AND CLEARING APPLICATION AREA

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LEGEND
Proposed Power Line Route (33 kV)
Glendower Road Reserve
Cadastre
Clearing Application Area
620
622
Glendower Rd
622
805
619
620
805
622
622
804
805
807
806
805
806
807
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t: 0406 500 006
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N
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Scale: 1:5,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 001D
Date: 28/03/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 1D
GLENDOWER ROAD RESERVE AND CLEARING APPLICATION AREA
C:\GIS\Jobs\BPE\YW-001-2024 - Glendower Rd Southern Cross, Clearing App\Figures\YW-001-2024_F01d Glendower Road Reserve and Clearing Application Area_240328.mxd

NOTES:

1. COORDINATE SYSTEM USED IS MAP GRID OF AUSTRALIA (MGA) ZONE 50, GEOCENTRIC DATUM OF AUSTRALIA (GDA) 94.
2. LOCATION OF DISTRIBUTION LINES, ROAD CROSSINGS ARE TENTATIVE AND WILL BE REVIEWED IN DETAIL IN THE FEASIBILITY STUDY OF PROJECT.
3. LOCATION OF 33kV KIOSK AND THE CONNECTION POINT IS BASED ON 2 X 15MW CONNECTIONS OPTION BASED ON CS039346 - DETAILED ENQUIRY ASSESSMENT.
4. HAUL ROAD CROSSING WILL BE REVIEWED IN DETAIL IN FEASIBILITY STUDY OF PROJECT.

LEGEND:

- OVERHEAD LINE CORRIDOR
- OVERHEAD LINE
- OVERHEAD LINE POLE PAD (5m x 5m)
- TREES WITH HOLLOWS
- ROAD RESERVE

TYPICAL DISTRIBUTION POLE
SCALE: N.T.S.

N

SCALE OF METRES

Source: Fortescue Future Industries, 05.02.24

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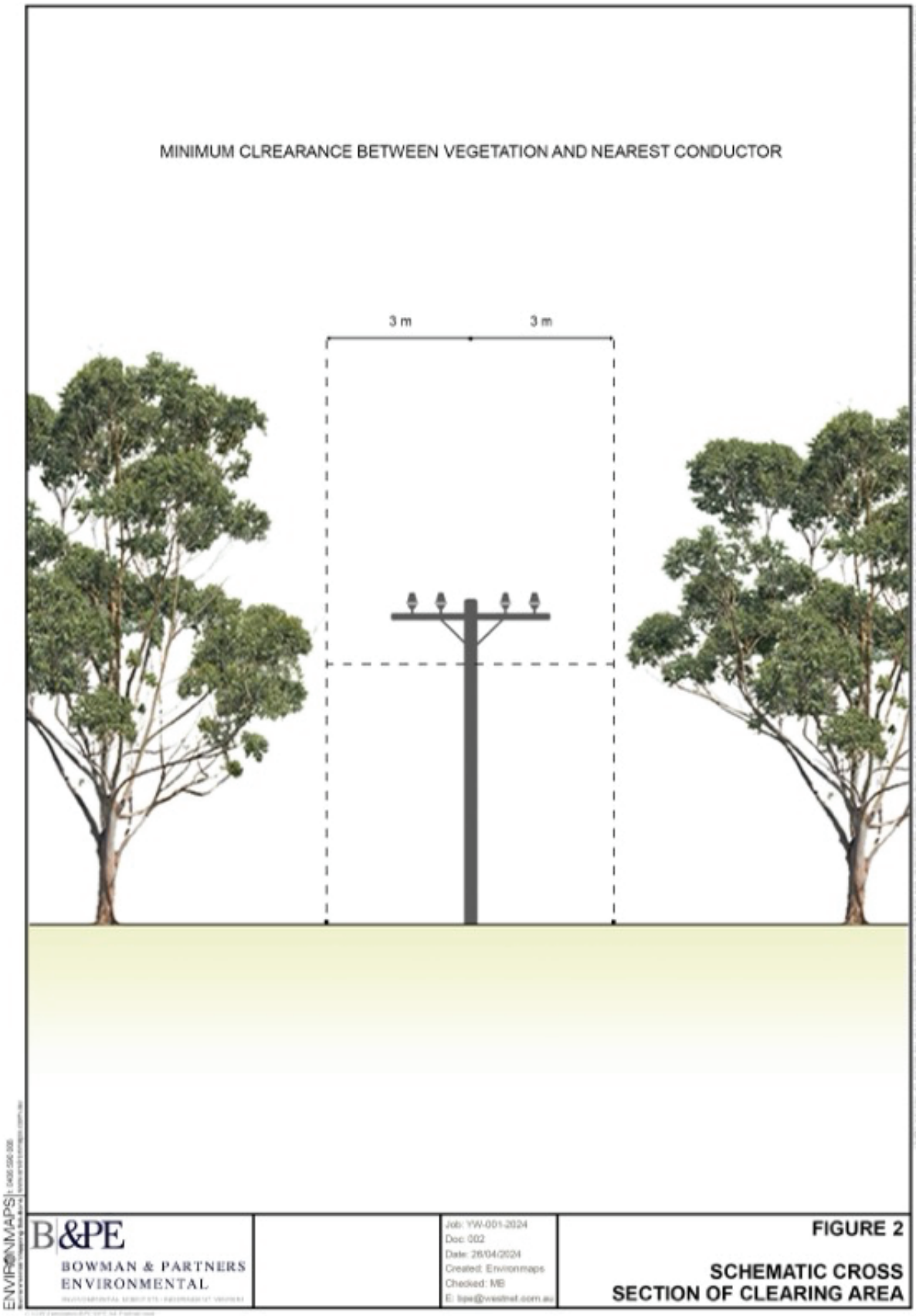
FIGURE 1E

PRELIMINARY TRANSMISSION LINE ROUTE AND TOWER LOCATIONS


MINIMUM CLREARANCE BETWEEN VEGETATION AND NEAREST CONDUCTOR
3 m
3 m
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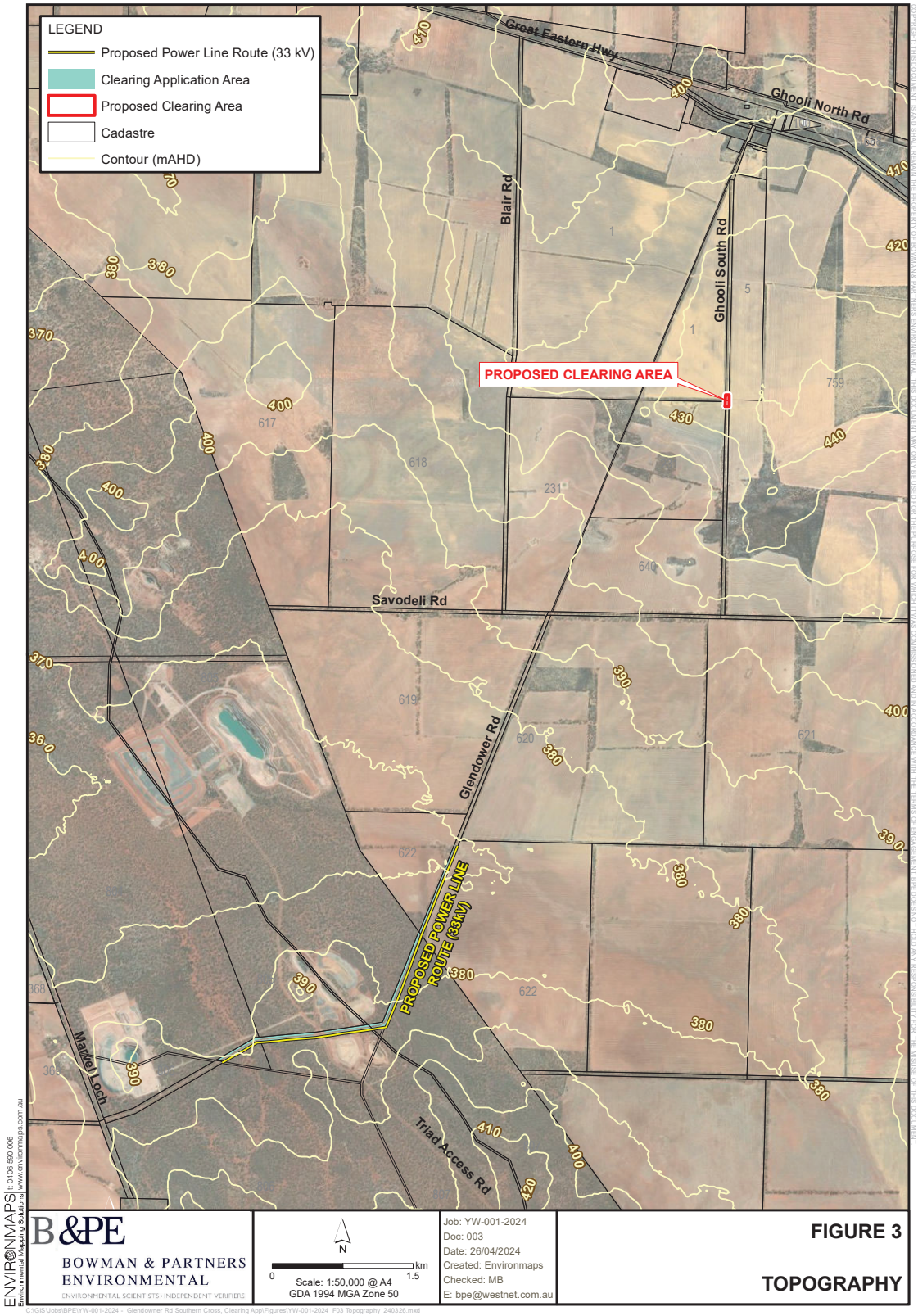
ENVIRONMENTAL
Job: YW-001-2024
Doc: 002
Date: 26/04/2024
Created: Environmaps
Checked: MB
FIGURE 2
SCHEMATIC CROSS
SECTION OF CLEARING AREA


LEGEND
Proposed Power Line Route (33 kV)
Clearing Application Area
Proposed Clearing Area
Cadastre
Contour (mAHD)
PROPOSED CLEARING AREA
PROPOSED POWER LINE ROUTE (33 kV)
Great Eastern Hwy
Ghooli North Rd
Blair Rd
Ghooli South Rd
Savodeli Rd
Glendower Rd
Marwg Loch
Triad Access Rd
N
0
1.5
km
Scale: 1:50,000 @ A4
GDA 1994 MGA Zone 50
BOWMAN & PARTNERS ENVIRONMENTAL
ENVIRONMENTAL SCIENTISTS • INDEPENDENT VERIFIERS
Job: YW-001-2024
Doc: 003
Date: 26/04/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 3
TOPOGRAPHY
ENVIRONMAPS
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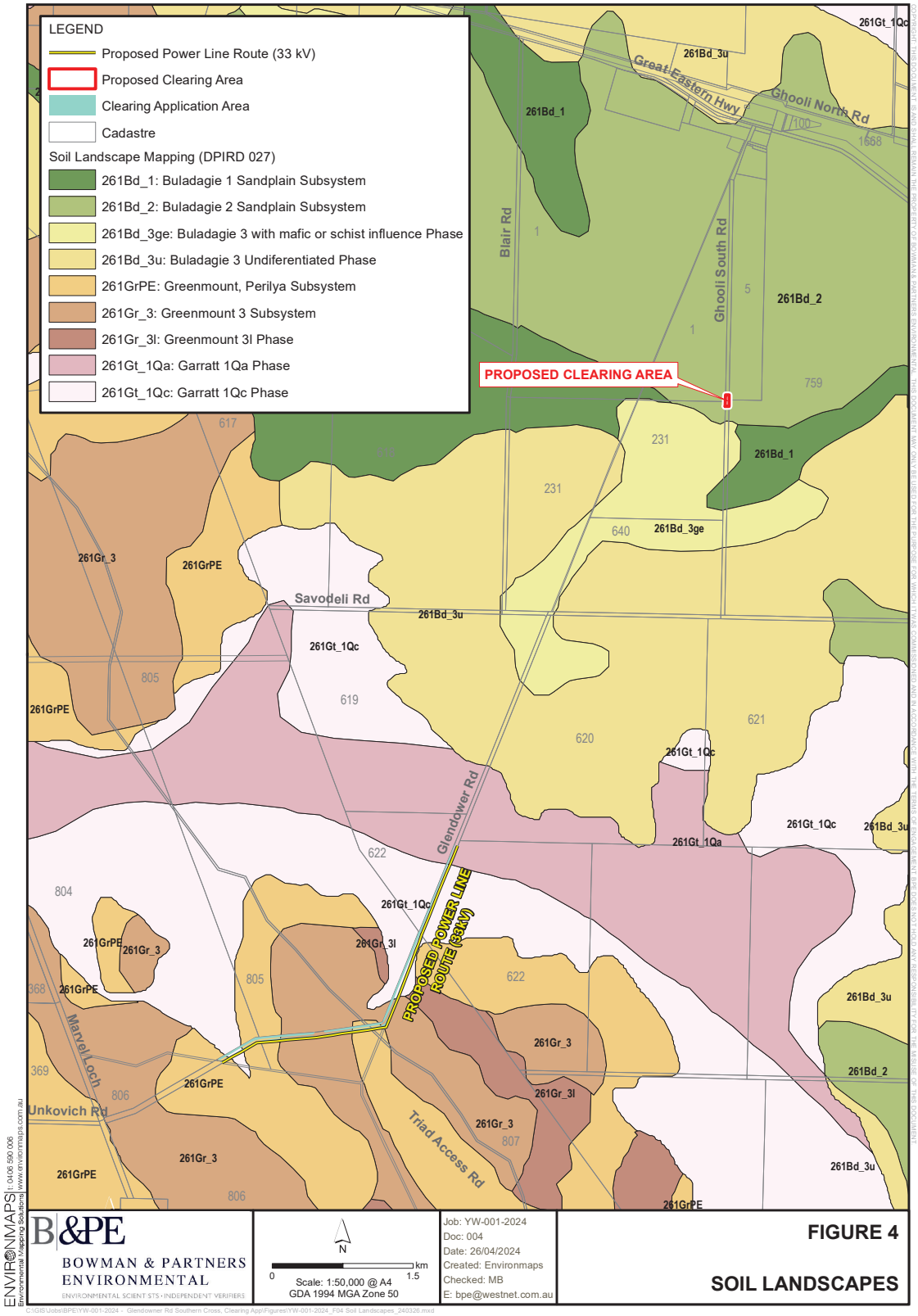
LEGEND
Proposed Power Line Route (33 kV)
Proposed Clearing Area
Clearing Application Area
Cadastre
Soil Landscape Mapping (DPIRD 027)
261Bd_1: Buladagie 1 Sandplain Subsystem
261Bd_2: Buladagie 2 Sandplain Subsystem
261Bd_3ge: Buladagie 3 with mafic or schist influence Phase
261Bd_3u: Buladagie 3 Undiferentiated Phase
261GrPE: Greenmount, Perilya Subsystem
261Gr_3: Greenmount 3 Subsystem
261Gr_3l: Greenmount 3l Phase
261Gt_1Qa: Garratt 1Qa Phase
261Gt_1Qc: Garratt 1Qc Phase
PROPOSED CLEARING AREA
PROPOSED POWER LINE ROUTE (33kV)
Great Eastern Hwy
Ghooli North Rd
Ghooli South Rd
Blair Rd
Savodeli Rd
Glendower Rd
Marvel Loch
Unkovich Rd
Triad Access Rd
261Bd_1
261Bd_2
261Bd_3u
261Bd_3ge
261Gr_3
261Gr_3l
261GrPE
261Gt_1Qa
261Gt_1Qc
ENVIRONMAPS
B&PE
BOWMAN & PARTNERS ENVIRONMENTAL
N
0
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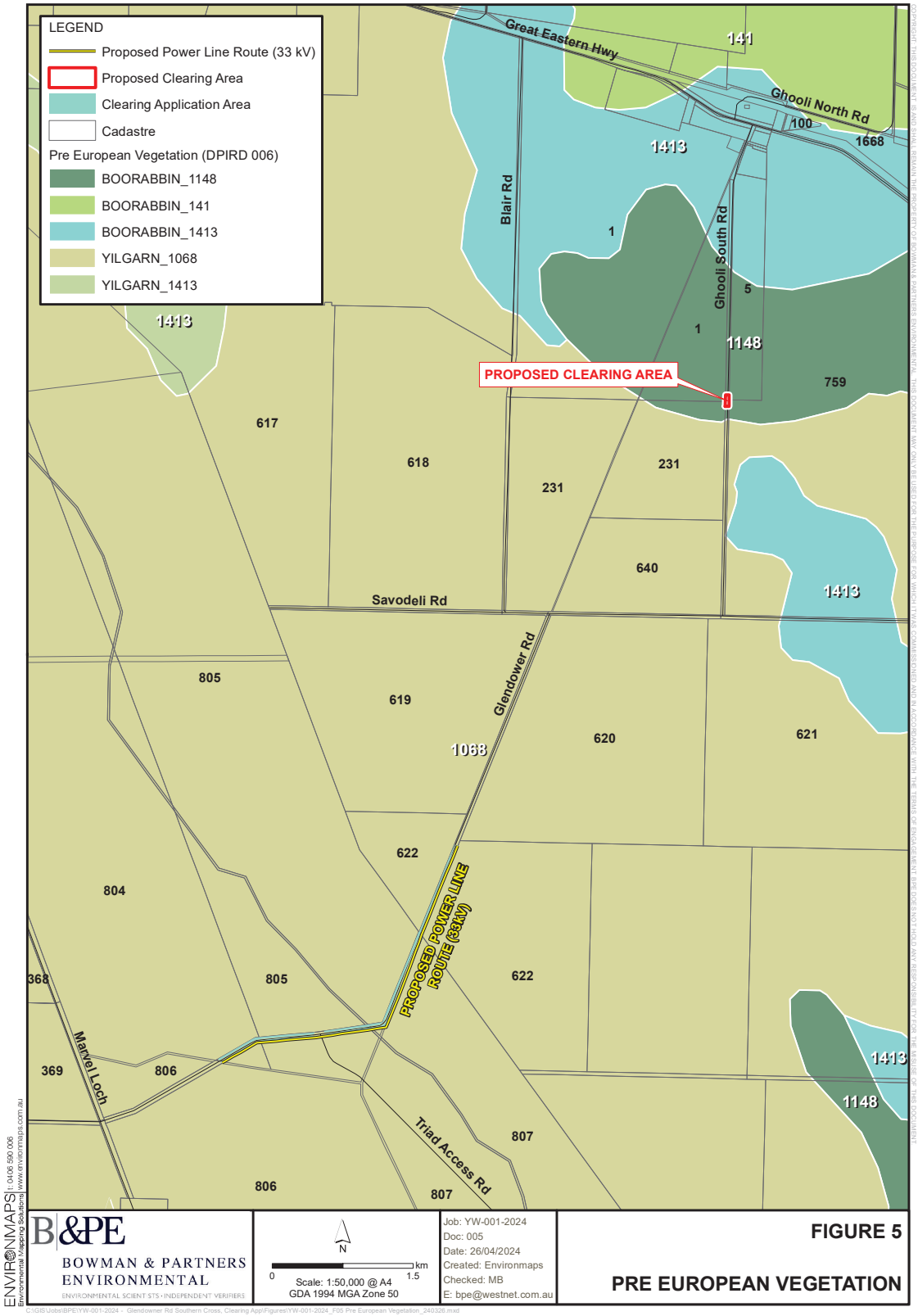
km
Scale: 1:50,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 004
Date: 26/04/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 4
SOIL LANDSCAPES


LEGEND
Proposed Power Line Route (33 kV)
Proposed Clearing Area
Clearing Application Area
Cadastre
Pre European Vegetation (DPIRD 006)
BOORABBIN_1148
BOORABBIN_141
BOORABBIN_1413
YILGARN_1068
YILGARN_1413
Great Eastern Hwy
Ghooli North Rd
Blair Rd
Ghooli South Rd
Savodeli Rd
Glendower Rd
Marvel Loch
Triad Access Rd
PROPOSED CLEARING AREA
PROPOSED POWER LINE ROUTE (33kV)
141
100
1668
1413
1
5
1148
759
617
618
231
640
805
619
1068
620
621
622
804
368
369
806
807
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ENVIRONMENTAL SCIENTISTS • INDEPENDENT VERIFIERS
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Scale: 1:50,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 005
Date: 26/04/2024
Created: Environmaps
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E: bpe@westnet.com.au
FIGURE 5
PRE EUROPEAN VEGETATION
ENVIRONMAPS 0406 590 006
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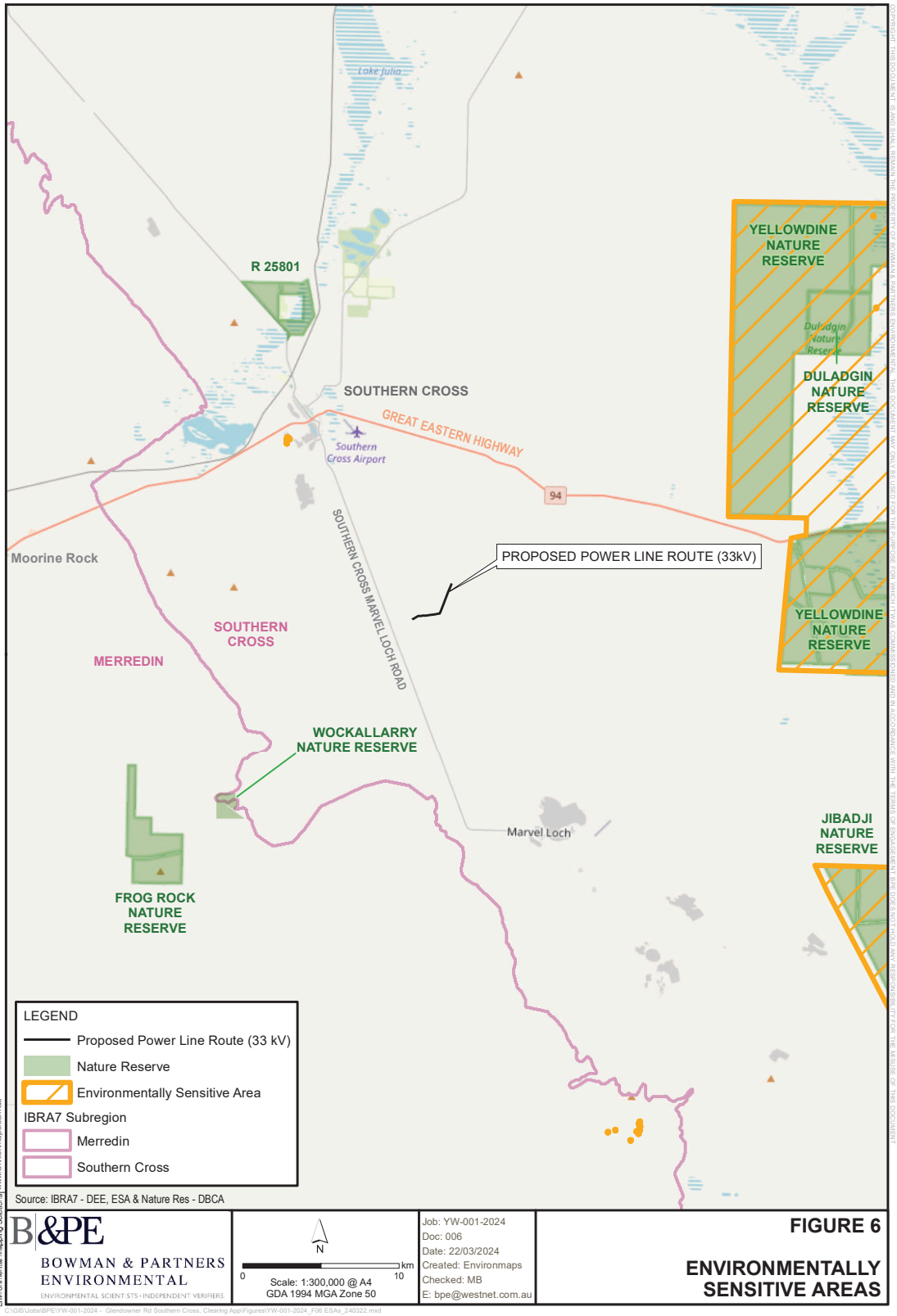
Lake Julia
R 25801
SOUTHERN CROSS
GREAT EASTERN HIGHWAY
Southern Cross Airport
94
YELLOWDINE NATURE RESERVE
Duladgin Nature Reserve
DULADGIN NATURE RESERVE
PROPOSED POWER LINE ROUTE (33kV)
Moorine Rock
SOUTHERN CROSS MARVEL LOCH ROAD
SOUTHERN CROSS
MERREDIN
YELLOWDINE NATURE RESERVE
WOCKALLARRY NATURE RESERVE
Marvel Loch
JIBADJI NATURE RESERVE
FROG ROCK NATURE RESERVE
LEGEND
Proposed Power Line Route (33 kV)
Nature Reserve
Environmentally Sensitive Area
IBRA7 Subregion
Merredin
Southern Cross
Source: IBRA7 - DEE, ESA & Nature Res - DBCA
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km
Scale: 1:300,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 006
Date: 22/03/2024
Created: Environmaps
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E: bpe@westnet.com.au
FIGURE 6
ENVIRONMENTALLY SENSITIVE AREAS

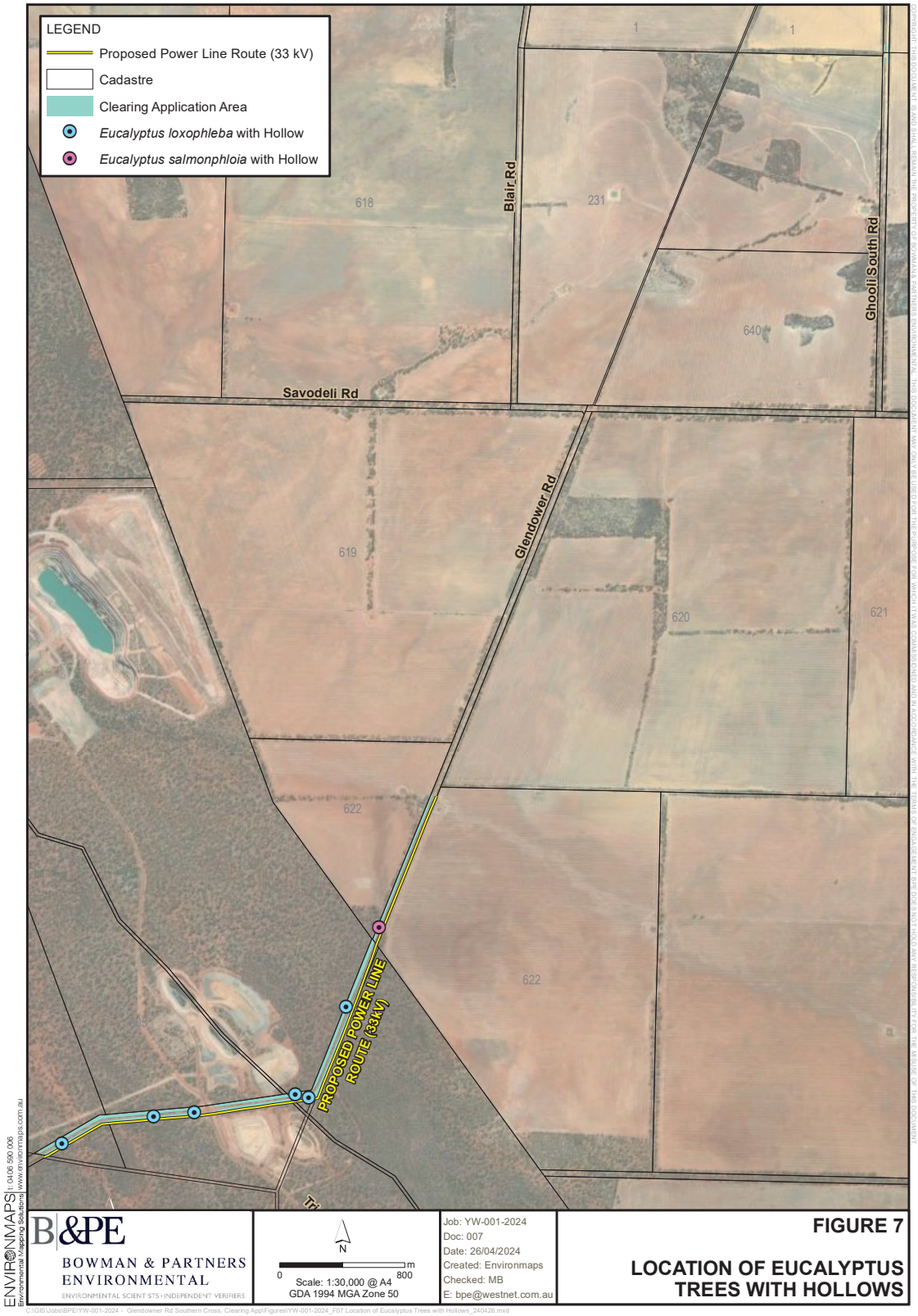
LEGEND
Proposed Power Line Route (33 kV)
Cadastre
Clearing Application Area
Eucalyptus loxophleba with Hollow
Eucalyptus salmonphloia with Hollow
Blair Rd
Ghooli South Rd
Savodeli Rd
Glendower Rd
PROPOSED POWER LINE ROUTE (33kV)
618
231
640
619
620
621
622
1
B&PE
BOWMAN & PARTNERS ENVIRONMENTAL
ENVIRONMENTAL SCIENTISTS • INDEPENDENT VERIFIERS
N
0
m
800
Scale: 1:30,000 @ A4
GDA 1994 MGA Zone 50
Job: YW-001-2024
Doc: 007
Date: 26/04/2024
Created: Environmaps
Checked: MB
E: bpe@westnet.com.au
FIGURE 7
LOCATION OF EUCALYPTUS TREES WITH HOLLOWS
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FIGURE 8
LOCATION OF TRANSMISSION LINE IN RELATION TO THE VEGETATED LAND IN THE LOCALITY

Appendix 1

Transmission Line for Southern Cross Windfarm. Vegetation and Flora Survey, PGV Environmental, 2024

APPENDIX 1 IS ATTACHED AS A SEPARATE FILE

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ABN: 11 159 736 777