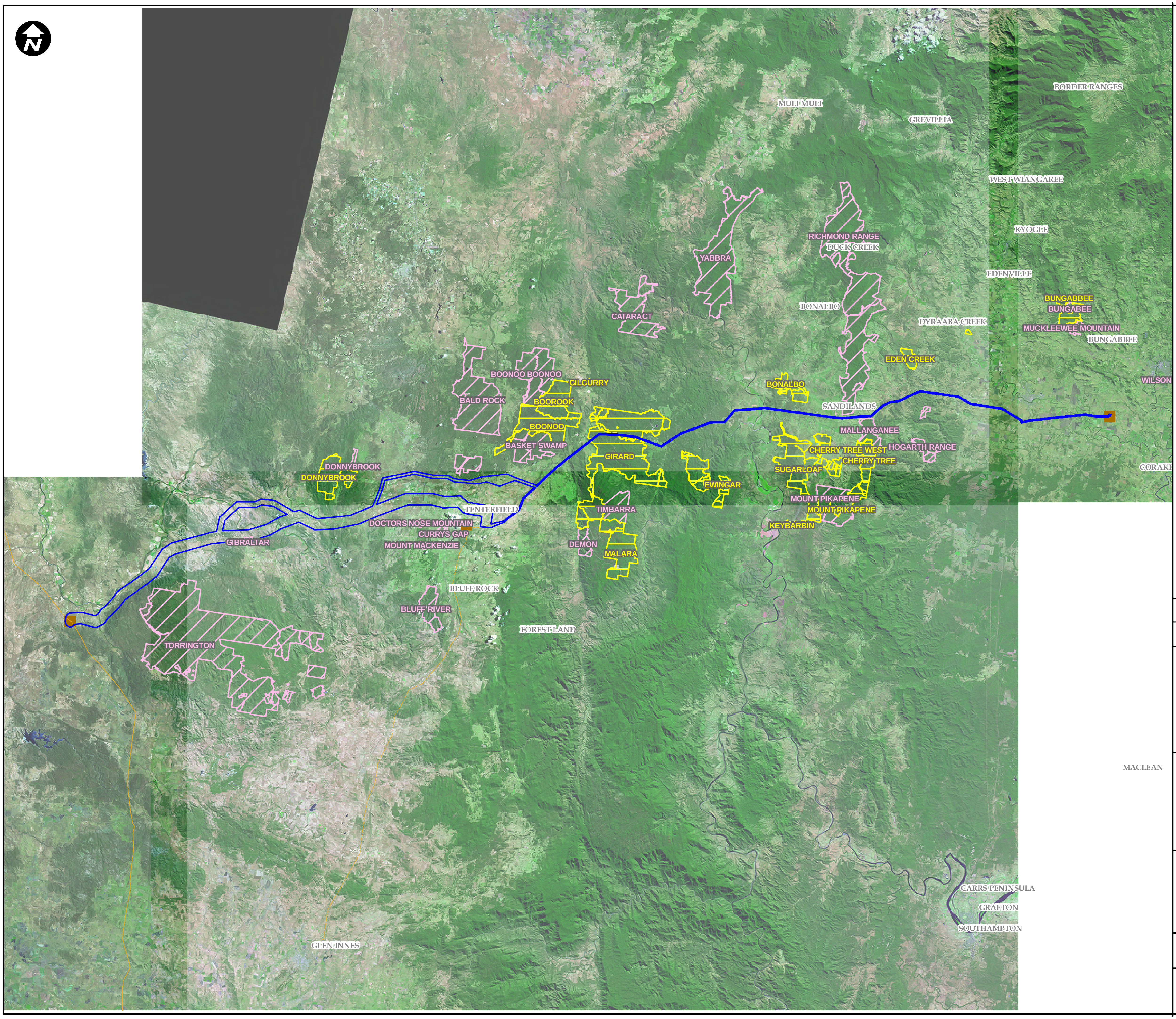

Legend

- Substation
- Transmission Lines
- Dumaresq to Lismore Study Area
- National Parks
- State Forest

Note: Component C7 not shown.
(refer to Section 3)

0 10 20 40
Kilometres

Source: TransGrid

Drawn: AJW	Approved: LB	Date: 9/09/2009
Job No.: 43177662	File No.: 43177662.011.mxd	

Client

TransGrid

Project

DUMARESQ TO LISMORE
330 kV TRANSMISSION LINE

Title

NATIONAL PARKS AND
STATE FORESTS SURROUNDING
THE STUDY AREA

Figure: 5.1

URS

As outlined above, EEC mapping was conducted along available roads, and for the most part was vehicle based. As a result there are limitations to the vegetation mapping that should be clearly understood:

- all mapping will need to be verified by conducting detailed vegetation surveys including quadrat assessments;
- all mapping including community boundaries and species composition are subject to change following detailed surveys;
- URS can not confirm with certainty vegetation communities that are more than 50m from public roads prior to detailed surveys; and
- based on the above limitations the listing status of communities is also subject to change following detailed surveys. This is particularly true for the EPBC listed community.

Biodiversity Constraints

Biodiversity constraints were defined and mapped across the Study Area based on the presence of EECs, including:

- conservation status of native vegetation (i.e. its legal status on the TSC and EPBC Act); and
- age, structure and degree of disturbance to native vegetation.

Three biodiversity constraint classes have been identified: high (EECs and possible habitat for threatened species), medium (fragments, low condition native remnants), and low (cleared land) (refer **Figure 5.3 series** in **Appendix D**). These classes are described below.

As discussed, threatened species habitat was not mapped in detail during the recent field survey, however this will be described in a landscape context that can be inferred from aerial photographs for the purposes of this assessment. Areas of low biodiversity constraint can also be identified clearly from aerial photographs.

High - EECs

This constraints class includes all native vegetation consistent with EECs whether listed on the TSC or EPBC Act or both.

Two woodland communities are present in the Study Area: box gum woodland and inland grey box woodland. A third community, fuzzy box woodland[1] is possibly present. Original intact stands of these EECs are very limited in distribution and mostly occur as linear strips along road corridors and waterways. These areas have high conservation significance both as EECs and as habitat for a number of threatened species. Route selection should aim to avoid impacts, both direct and indirect on these EECs wherever practicable. Small patches or linear strips perpendicular to the Study Area potentially can be bridged by the transmission line with minimal impacts. Larger patches or strips parallel with the Study Area present a significant constraint and should be avoided.

Degraded remnants, regrowth and derived grasslands with the capacity to regenerate are all consistent with the DECCW definition of these EECs. Accordingly, all disturbed/regrowth woodland in the Study Area should be considered as a high biodiversity constraint. Final route selection may be able to identify a route through these patches that utilises existing clearings and avoids significant impacts. Regardless, construction through these areas will require a detailed assessment of the impacts and potentially an EPBC Referral and calculation of biodiversity offsets.

[1] This community has been mapped as Inland Grey Box Woodland or Box Gum Woodland. Until botanical samples are collected from these communities it is incredibly difficult to confirm the presence of Fuzzy Box (*Eucalyptus conica*), particularly in woodland communities in close proximity to Tenterfield.

One wetland community is present within the Study Area: Montane peatlands and swamps. Montane peatlands and swamps are a treeless community of plants with a scattered to dense midstorey of shrubs including *Leptospermum* species (sp.) *Callistemon* sp. and/or *Hakea* sp. The community is often referred to as either a bog or fen and is very limited in distribution due to past land clearance and agricultural activities. Route selection should aim to avoid impacts, both direct and indirect on this EEC wherever practicable. In the majority of cases wetlands can likely be bridged by the transmission line with minimal impacts.

Both intact and disturbed grassy woodlands and peatlands and swamps contain important habitat for native fauna including threatened species. Construction through or around these areas will require an assessment of potential impacts on these species. These communities are also likely to contain important habitat resources such as mature hollow-bearing trees, breeding and foraging habitat. Targeted surveys of the preferred route will require a survey for important habitat and final route selection should aim to avoid these features as far as is practicable.

<u>High – Threatened Species Habitat</u>

This constraints class includes intact native vegetation that does not qualify as an EEC. These areas contain important habitat for native flora and fauna including threatened species. This constraints class occurs as large, continuous stands of vegetation, particularly on the ranges in the central and western sections of the Study Area and along water ways and lowland floodplains. Significant habitat occurs along existing water ways in the form of mature river red gums and she-oaks. These communities provide potential foraging and roosting habitat for a number of species listed under both the TSC and EPBC Acts. Most of these patches are continuous with vegetation on protected lands or adjacent to partially cleared woodland on the lower slopes. Large patches are likely to have a greater abundance and diversity of native species, are more likely to contain threatened species and may act as important habitat corridors. Accordingly non-EEC native vegetation poses a similar level of biodiversity constraint to EECs.

The proposed transmission line will need to pass through this constraints class in order to cross the main ranges in the central and western portion of the Study Area and traverse waterways in the western end of the corridor. Where possible route selection should utilise existing disturbed corridors such as road and electricity easements where it traverses the ranges and waterways. Where vegetation clearing is unavoidable route selection should aim to minimise fragmentation of habitat and disruption of significant vegetation corridors.

Construction through or around these areas will require an assessment of potential impacts on threatened species. Targeted flora and fauna surveys along sections of the preferred alignment through this constraints class will be required. These communities are also likely to contain important habitat resources such as rock outcrops, wetlands or mature hollow-bearing trees. A number of granite outcrops and cliffs were identified during recent surveys. Targeted surveys of the preferred route will require a survey for important habitat features and final route selection should aim to avoid these features as far as is practicable.

Medium Constraints

This constraints class includes all fragmented, low quality remnants of native vegetation, including regrowth, which does not qualify as an EEC. These areas vary from the 'high-threatened species habitat' class given they occur as isolated patches of vegetation. This class occurs as secondary patches of vegetation along the lower slopes, floodplains and foothills in the central and western sections of the Study Area. Smaller areas of this class also occur in the eastern section of the Study Area surrounding Lismore, Casino and other minor towns along the Bruxner highway. The majority of this class is likely to occur on private land tenures used for agriculture.

Small island habitats of vegetation are not likely to contain a vast diversity or abundance of native species; however these areas still provide potential habitat resources for migrating or mobile individuals (including threatened species). Migrating species will often use patch habitats for brief shelter or food respites in between long journeys. Alternatively, some mobile native species (e.g. Powerful Owl or Squirrel Glider) may use these areas as supplementary habitats (or add on) to home ranges. Vegetation clearing west of the Great Dividing Range has been so extensive in the past for agricultural practices that native species' home ranges tend to be much larger then areas along the coast or on the ranges. In these areas, island habitats are readily used to supplement larger linear remnant patches (Van der Ree 2002).

The proposed transmission line will need to pass through this constraints class in isolated areas in the central and western portion of the Study Area and in some small areas surrounding the towns of Lismore and Casino in the eastern section. Where possible, route selection should avoid these areas altogether given their isolated nature.

Construction through or around these areas is likely to require an assessment of potential impacts given threatened species are known to utilise them. Targeted flora and fauna surveys along sections of the preferred alignment through this constraints class will be required. These communities are also likely to contain important habitat resources such as rock outcrops, wetlands or mature hollow-bearing trees. A number of granite outcrops were identified during recent surveys. Targeted surveys of the preferred route will require a survey for important habitat features and final route selection should aim to avoid these features as far as is practicable.

Low Constraints

The low biodiversity constraints class comprises all land within the Study Area that has been cleared of vegetation for agricultural purposes or urban development.

This includes large areas of cleared grazing land, cropland and residential and industrial land. Large areas of the proposed corridor, particularly the eastern end, falls within this constraints class and will not require detailed assessment of impacts on native biodiversity. It also includes smaller areas of degraded open space such as road verges, derelict sites and areas of environmental weed infestation. These areas often occur as linear strips through areas of moderate or high biodiversity constraints. Where possible, final route selection should aim to utilise these low-value corridors.

5.2.4 Key Constraints

Further to the information provided in **Section 5.2.3**, key constraints identified within each component are provided below. Refer to **Appendix D** for mapping of the constraints within each component and **Section 5.2.3** for definitions of each constraint category.

C1: This component passes to the north of Torrington National Park. 'High Threatened Species' constraint covers the southern half of this component, generally following the low lying areas and creeklines. A large area of 'High EEC' constraint also exists (**Figure 5.3c**) and spans the component. Generally the northern edge of the component has fewer ecological constraints.

C2: This component encompasses a small section of the Gibraltar National Park. 'High Threatened Species' constraints cover the majority of this component, with the exception of cleared agricultural land. A patch of 'High EEC' constraint exists at the western end of C2, covering approximately the width of the component. Within this patch of 'High ECC' constraint, Diamond Firetails and Turquoise Parrots have been identified. Ecological constraints cover the majority of this component.

C3: This component passes to the west of Donnybrook National Park. 'High EEC/Threatened Species' constraint covers the majority of this component, with the exception of being cleared grazing land in the west of C3. 'Medium Threatened Species' constraints have been identified in smaller sections within the component in low lying areas. There are large areas within the western section of this component where no ecological constraints have been identified.

C4: This component passes to the south of Donnybrook National Park. 'High Threatened Species' constraint is scattered throughout this component generally following the hills. A large section of 'High EEC' follows the length of C4, generally restricted to low lying areas. Although a significant proportion of this component is covered by ecological constraints, there are a number of opportunities to avoid these.

C5: This component passes to the southeast of Donnybrook National Park. Constraints within this component are similar to C4, with a contiguous section of 'High ECC' constraint in low lying areas. Potential to avoid 'High EEC' constraints occurs along the southern boundary of this component.

C6: This component passes to the north of Mount Mackenzie, Currys Gap and Doctors Nose Mountain National Parks. 'High Threatened Species' constraint is scattered along the western end of this component, generally associated with remnant vegetation on grazing land. Large contiguous sections of 'High EEC' constraint are present at the western end of C6, associated with remnant vegetation on grazing land and road corridors. Ecological constraints are concentrated at the western end of the component and span the majority of it, with only small areas of 'High EEC' found at the eastern end, north of Tenterfield.

C8: This component passes to the east of Donnybrook National Park and to the south of the Bald Rock and Basket Swamp National Parks. In areas of dense vegetation and riparian zones 'High EEC/Threatened Species' have been identified as potentially occurring. These cover a significant proportion of the component. Small patches of potential 'Medium Threatened Species' also occur within this component. All areas of ecological constraint cannot be avoided within this component.

C9: This component spans from where C8 joins the existing 132kV easement to the Lismore Substation. It passes through the Girard State Forest and between Mallanganee and Richmond Range National Parks. Numerous ecological constraints exist along this component, ranging from 'High EEC' through large patches of vegetation to 'low threatened species' constraints in the cleared agricultural land. Threatened bird species including the Brown Treecreeper have been recorded in the area. Potential to avoid ecological constraints is low as it is unlikely the current line will deviate from the existing alignment. In general there is less ecological impact if the current alignment is maintained.

5.2.5 Further Study

The study area contains significant biodiversity constraints that will require a detailed assessment of impacts and may require 'biodiversity offsets' as per Department of Environment, Climate Change and Water (DECCW) guidelines depending on the route of the transmission line. Parts of the Study Area have undergone extensive clearing and modification so there are opportunities to restrict significant parts of the proposed transmission line to areas with low biodiversity value. In determining the final route alignment, areas identified as endangered ecological communities (EECs) should be avoided as far as practicable to minimise potential impacts of the proposal and reduce the size and costs of potential offsets that may be required (where impacts cannot be avoided).

5.3 Heritage

A desk based Heritage Study has been undertaken by OzArk Environmental and Heritage Management and is provided in **Appendix E**. The study provides information regarding Indigenous and non-indigenous heritage resources within and in proximity to the Study Area. It provides background settings, register search results, and the conclusions of predictive modelling undertaken to date. Where appropriate, the provision of recommendations to assist TransGrid in selecting a preferred corridor has been made. These recommendations are also provided in **Section 6.5.**

5.3.1 Indigenous Heritage

Previous Studies: Local Context and Register Searches

A search of the DECCW Aboriginal Heritage Information Management System (AHIMS) database was undertaken in September 2009, encompassing the Project Area in its entirety (**Figure 5.4a and 5.4b).** This search identified fifty nine (59) previously recorded Aboriginal sites including shelters, burial grounds, open camp sites and scarred trees (**Table 5-2**). Whilst reviewing the site data that comprises this search, it has come to light that at least two of the 59 sites is likely to have been entered onto the AHIMS twice and thus the total number of sites for the searched area should really have been only 57. Although the AHIMS is an important tool for understanding the types of sites recorded for the local area, it is important to remember that the distribution of recorded sites across this landscape reflects as much the pattern of development, the ad-hoc nature of incidental recordings and factors of visibility, and cannot be interpreted as providing a true picture of Aboriginal settlement patterns.