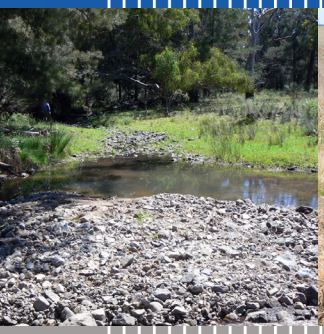



Appendix H
Visual Assessment

DUMARESQ TO LISMORE 330kV TRANSMISSION LINE PROJECT



VISUAL IMPACT ASSESSMENT

Prepared for:

URS

May 2011

Prepared by:

GREEN BEAN DESIGN

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Date: May 2011

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Status: V9 – Final

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Introduction and Methodology

SECTION 1

1.1 Introduction

The Visual Impact Assessment (VIA) for the Dumaresq to Lismore 330kV Transmission Line Project (the Project) has been prepared by Green Bean Design Landscape Architects on behalf of URS Australia Pty Ltd for a section of transmission line and associated works between the existing Dumaresq Switching Station and Lismore Substation located in far northern New South Wales.

The VIA methodology has been applied to a number of similar assessments prepared by Green Bean Design, including transmission line, electrical infrastructure and power generation projects. The VIA methodology adopts a number of principles outlined in the Guidelines for Landscape and Visual Impact Assessment, The Landscape Institute and Institute of Environmental Management and Assessment 2002.

The VIA involved an evaluation of landscape character along, and surrounding, the Projects west and east alignment together with an assessment of visual impact that may result from the construction and operation of the Project.

A primary objective of the VIA was to determine the likely visual impact of the Project on people living and working in, or travelling through surrounding areas.

The VIA methodology comprised the following key activities:

- Desktop study addressing visual character of the proposed west and east alignments and immediate surrounding area;
- Identification of the Project view catchment;
- Site inspection and fieldwork;
- Assessment and determination of Visual Absorption Capability;
- Preparation of photomontages;
- Assessment of visual impact from publicly accessible view points and residential dwellings; and
- Discussion of mitigation measures and how they may reduce levels of visual impact.

1.2 Desktop study

A desktop study was carried out to identify the potential view catchment of the Project. This was undertaken by reference to 1:25,000 topographic maps as well as aerial photographs of the alignment and immediate surrounding areas.

The desktop study identified the visual character of the surrounding landscape including features such as the site context, landform and elevation. The desktop study also identified and mapped a number of potential receptor locations from which the Project may be visible.

Although it is not feasible to assess each and every view that may exist toward the Project, the desk top study did seek to identify and assess key receptor locations, including views from residences and road corridors.

1.3 Fieldwork

The fieldwork involved:

- A detailed site inspection to determine the potential extent of visibility of the Project and associated infrastructure;
- Determination of the various receptor locations from which the Project and associated infrastructure could potentially be visible from; and
- Preparation of a photographic and written record.

1.4 Assessment of visual impact

The visibility of the Project would primarily result from the combination of two factors:

- the extent to which the Project would be visible from surrounding areas; and
- the degree of visual contrast between the Project and the surrounding landscape that would be visible from key receptor locations.

The overall visual impact is generally determined by a combination of factors including:

- the category and type of situation from which people may view the components of the Project (e.g. resident or motorist);
- the potential number of people with a view toward components of the Project from any one view location;
- the distance between a person and components of the Project; and
- the duration of time that a person may view components of the Project.

An underlying rationale for the visual assessment is that if people are not recorded at a particular location, or if views toward the Project are screened, then there is likely to be a nil visual impact at that location.

It should be noted that all residential dwellings identified through the desk top assessment of aerial photographs and mapping were assessed during the field work study; however the visual assessment field work was undertaken from publicly accessible locations only. It is therefore possible that additional residential receptors may be identified once further access

onto private property is obtained. Should additional receptor locations become known, these would be considered and assessed following exhibition of the Environmental Assessment.

The Project

SECTION 2

2.1 Project Location

The Project is located within five Local Government Areas (Inverell, Tenterfield, Kyogle, Richmond Valley and Lismore) and can be broadly divided into two main sections:

Alignment and Tracks West: this section of the proposed alignment would be approximately 96km long and would traverse eastward from the existing Dumaresq Switching Station just south of Bonshaw to a point on the existing 132kV alignment approximately 14km north east of Tenterfield. Within this area, there is no existing transmission line. To maintain the existing 132kV supply to Tenterfield, a substation (Tenterfield 330kV Substation) would be established at this point. Access to each structure for both construction and maintenance during operation would be required.

Alignment and Tracks East: the proposed alignment runs from the location of the proposed Tenterfield 330kV Substation to the Lismore Substation and would be approximately 109km in length. From the Tenterfield 330kV Substation to the south of Casino, the existing 132kV transmission line would be dismantled and replaced with the new 330kV transmission line. The existing easement would be widened from 45m to 60m. To allow the 330kV line to be built parallel to the existing 132kV transmission line, the easement would be 90m wide from south of Casino to Lismore (14km). This would maintain the existing 132kV supply to Country Energy's Casino Substation from the TransGrid 330/132kV Lismore Substation. The majority of access tracks in alignment east are currently established to provide access to the existing 132kV line. Some upgrade and/or re-alignment would be required in parts. The Project location is illustrated in **Figure 1**.

2.2 Project Description

The 205km, 330kV easement incorporating pole and tower structures would comprise:

- construction of a new 96km 330kV transmission line and 60m easement through greenfield areas from Dumaresq Switching Station to the proposed location of the new Tenterfield 330/132kV Substation (Tenterfield 330kV Substation);
- construction of a new 109km 330kV transmission line between Tenterfield 330kV Substation and Lismore Substation through the existing 132kV easement. Between the Tenterfield 330kV Substation and Casino (95km), the 330kV transmission line would be located on the route of the former 132kV transmission line. The existing 45m easement would be extended to 60m. Between Casino and Lismore Substation (14km), the new 330kV transmission line would run adjacent to the existing 132kV transmission line (which would remain operational on completion of construction). The existing 45m easement would be extended to 90m for this section;
- removal of 95km of the existing 132kV transmission line between the proposed Tenterfield 330kV Substation and structure 395 to the south of Casino;

- upgrades to the Lismore Substation and Dumaresq Switching Station. Upgrades would be within the existing sub/switching station footprints;
- establishment of a new 330/132kV substation approximately 14km north east of Tenterfield to maintain the existing 132kV connection to the Tenterfield 132kV Substation;
- establishment of access tracks both within the easement and outside the easement for the purposes of transmission line construction and operational maintenance; and
- replacing and restringing the existing earthwire between the new Tenterfield 330kV Substation and existing Tenterfield 132kV Substation with optical ground wire.

Subject to final design, the proposed west and east alignments would include approximately 534 tension and supporting structures. Of the 534 structures, approximately 70 would be tension structures (square based steel lattice towers); the remaining 464 structures would be support structures (H-frame twin poles). The suspension structures (refer Plate 1) would generally comprise concrete H-Frame arrangements for the majority of the west and east alignments. The average height of the suspension structures would be around 28m with a maximum height of 37m. Tension structures (refer Plate 2) would be rectangular or square based steel lattice towers with typical tower heights ranging from 28m to 40m. An intermediate type may be designed for angles up to 40 degrees and a 'heavy duty' type provided for angles above 40 degrees and termination positions, such as at each end of the line.

Plate 1 Indicative 330kV supporting structure

Plate 2 Indicative 330kV tension structure

Plate 3 Existing 132kV transmission line

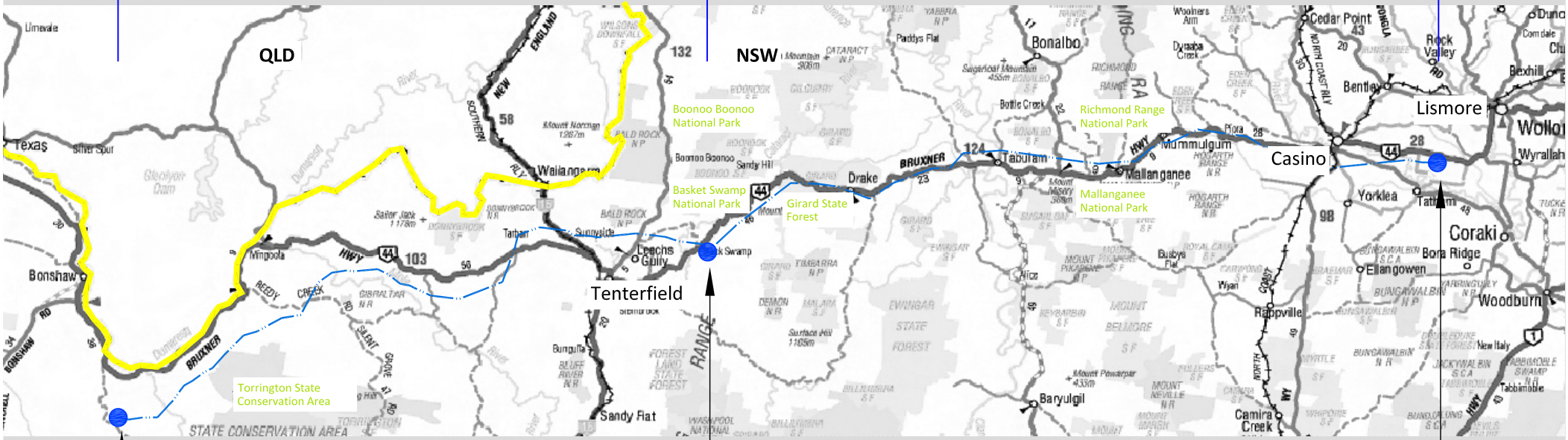
Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment

Legend

- State border
- Proposed 330kV alignment
- Existing/Proposed substation as noted

Alignment West

Alignment East



Existing Dumaresq Switching Station

Proposed Tenterfield 330kV Substation

Existing Lismore Substation

Not to Scale

N

Figure 1 - Location Plan

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Source: Copyright Department of Lands
Panorama Avenue Bathurst 2795
(www.lands.nsw.gov.au)

View Catchment

3.1 View Catchment

For the purpose of this VIA, the view catchment is defined as the area within which the Project would be most readily visible from surrounding areas. Identification of the view catchment considers the character of the landscape, landform and existing structural elements with regard to their potential for localised visual screening effects.

For the purpose of this report, the view catchment has been determined as a one kilometre offset from either side of the transmission line. Beyond one kilometre views toward the Project may have a greater tendency to be screened by undulating landform or the presence of vegetation for portions of the west and east alignments. It is also considered that whilst some Project components would be noticeable from areas beyond one kilometre, they are unlikely to appear as a dominant visual element within the landscape at this distance.

The view catchment is a generalised assessment, where views toward the Project could, in some situations, be blocked by buildings, vegetation or local landform features at specific points within the one kilometre offset, and similarly glimpses of the Project would be available from isolated positions outside the view catchment area.

Plate 4. Existing 132kV twin pole transmission line and 330kV supporting structures north of the Armidale Substation.

Visual Absorption Capability

SECTION 4

4.1 Introduction

Visual Absorption Capability (VAC) is a classification system used to describe the relative ability of the landscape to accept modifications and alterations without the loss of landscape character or deterioration of visual amenity.

VAC relates to physical characteristics of the landscape that are often inherent and often quite static in the long term.

Undulating areas with a combination of open views interrupted by groups of trees and small forested areas would have a high capacity to visually absorb the proposed transmission line without significantly changing its amenity.

On the other hand, areas of cleared vegetation on level ground with limited screening, or areas spanning across prominent ridgelines without significant vegetation, would have a lower capacity to visually absorb the proposed transmission line without changing the visual character and potentially reducing visual amenity.

Given the extent and combination of existing natural and cultural character along the Project alignment, the capability of the landscape to absorb the key components of the Project is primarily dependent upon vegetation cover and landform.

4.2 Visual Absorption Capability Ratings

For the purpose of this report, the VAC ratings have been determined as:

Low – components of the Project would be highly visible either due to lack of screening by existing vegetation or surrounding landform (e.g. open flat farmland cleared of vegetation, or steep hillside crossing ridgeline).

Medium – components of the Project would be visible but existing vegetation and surrounding landform would provide some screening or background to reduce visual contrast.

High – components of the Project would be extensively screened by surrounding vegetation and undulating landform.

The determination of the VAC assessment is illustrated in **Figures 2** to **12** and **Plates 4** to **29**.

Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment

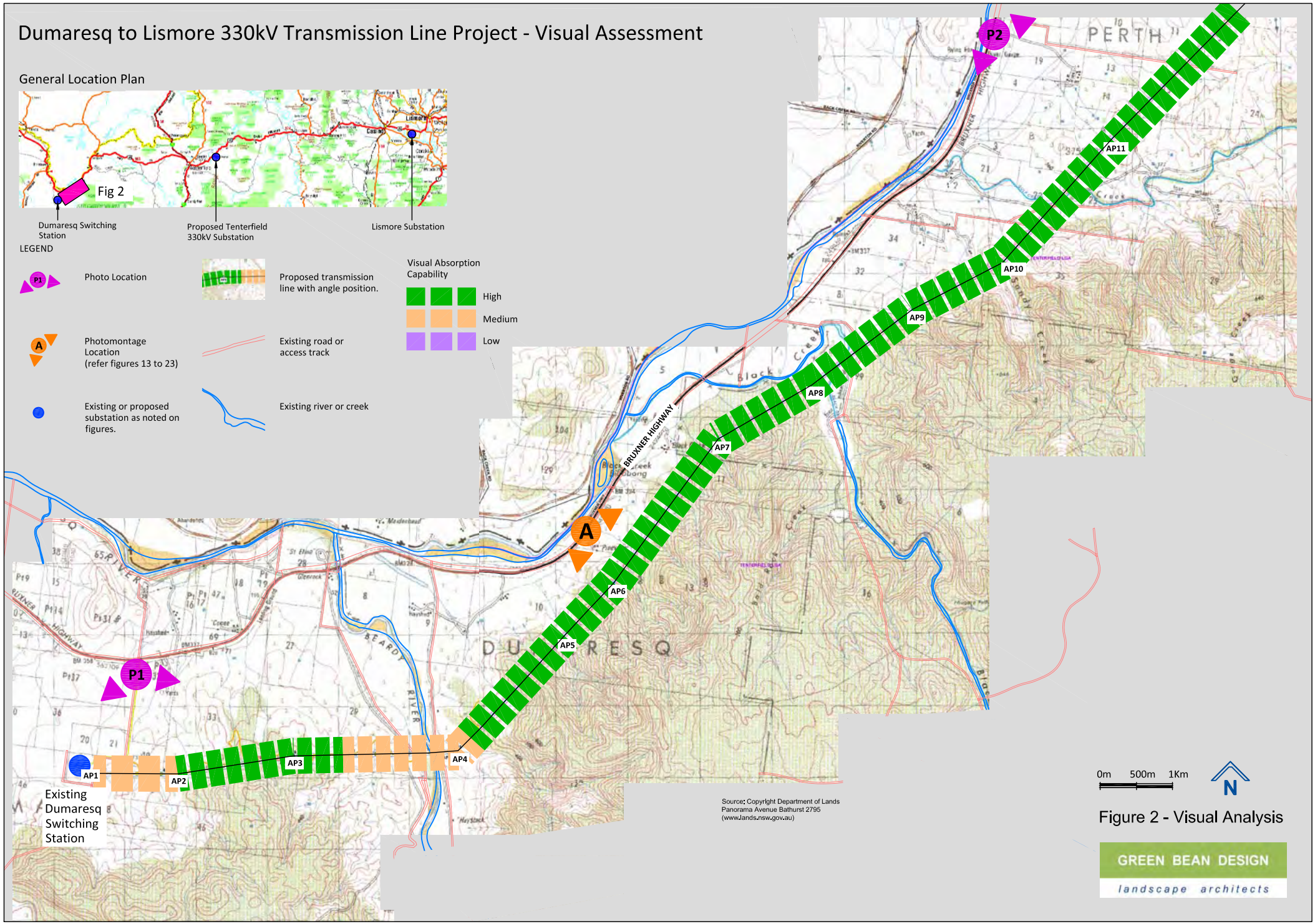

Figure 2 - Visual Analysis

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Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment

General Location Plan

LEGEND

- P1 — Photo Location
- Proposed transmission line with angle position.
- A — Photomontage Location (refer figures 13 to 23)
- Existing road or access track
- Existing or proposed substation as noted on figures.
- Existing river or creek

Visual Absorption Capability

- High
- Medium
- Low

P3 B P4 AP12 AP13 AP14 AP15 AP16 AP17 AP18 AP19

DUMARESQ

PERTH

0m 500m 1Km

N

Figure 3 - Visual Analysis

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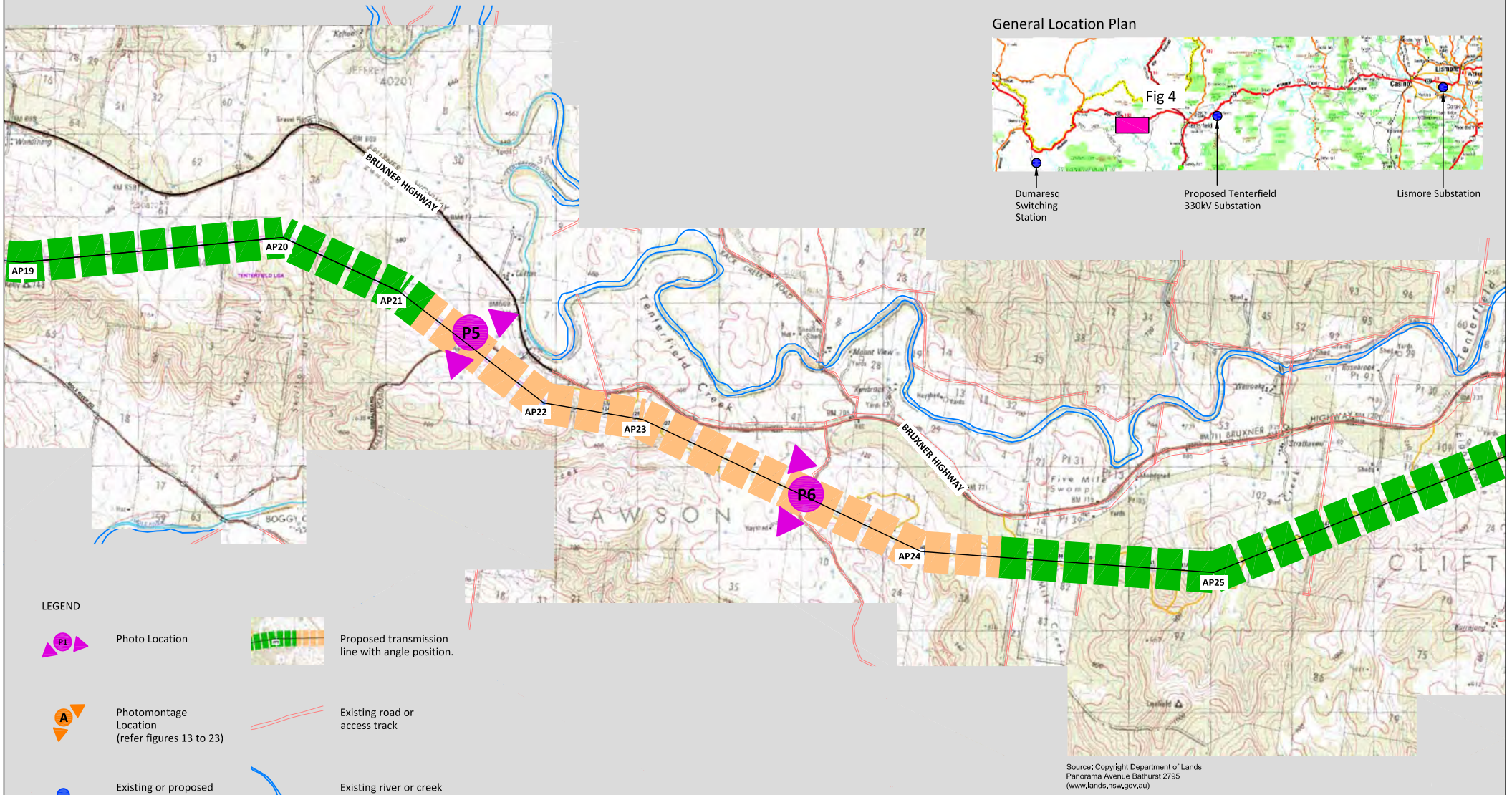
Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment



General Location Plan

LEGEND

- Photo Location
- Proposed transmission line with angle position.
- Photomontage Location (refer figures 13 to 23)
- Existing road or access track
- Existing or proposed substation as noted on figures.
- Existing river or creek

Visual Absorption Capability

- High
- Medium
- Low

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0m 500m 1Km

N

Figure 4 - Visual Analysis

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Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment

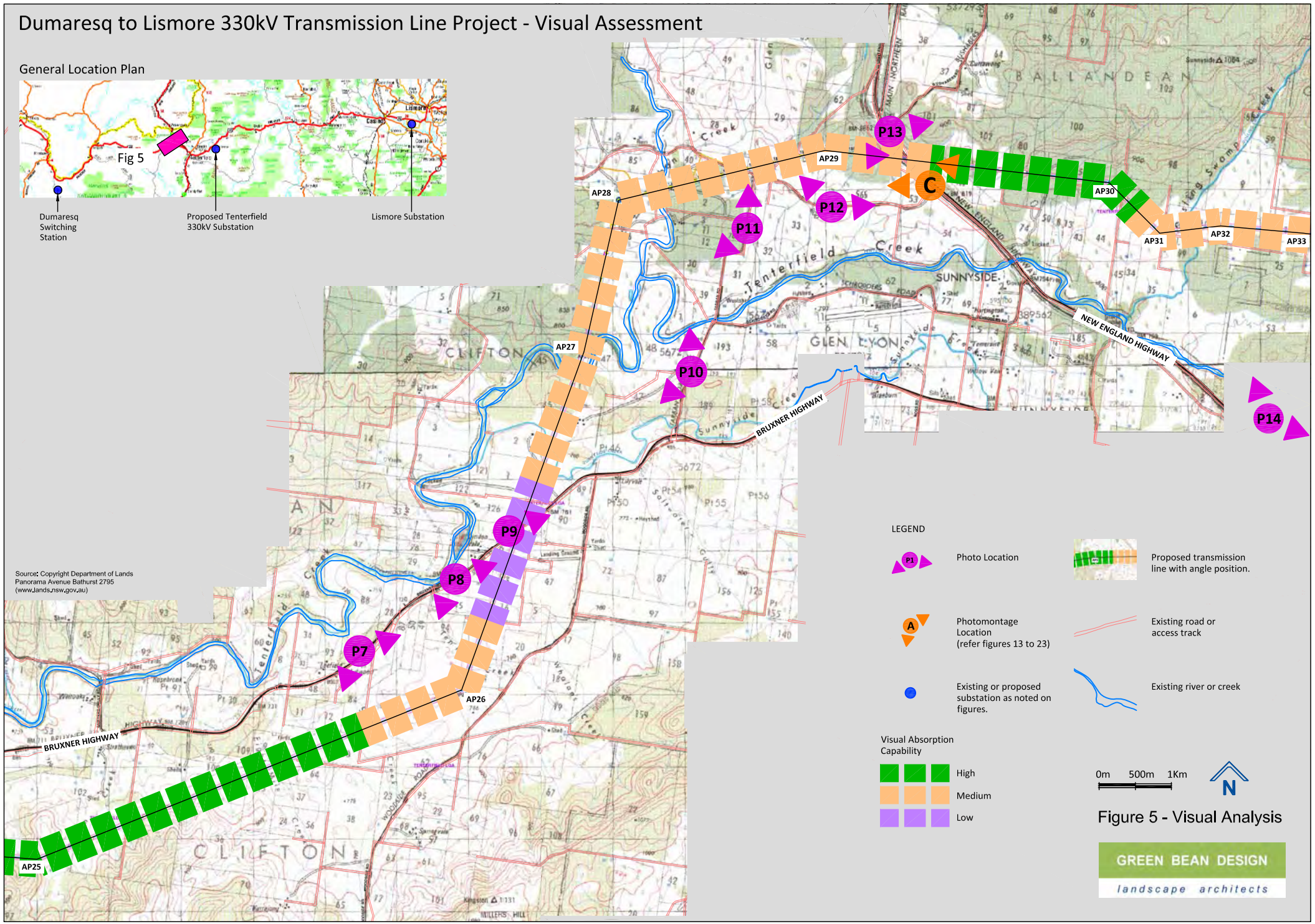

Figure 5 - Visual Analysis

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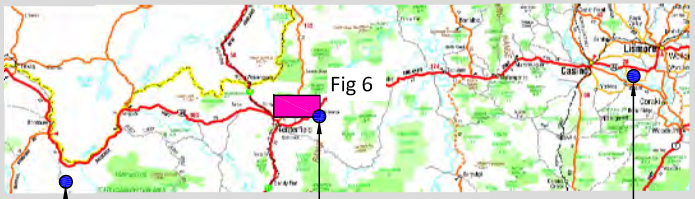
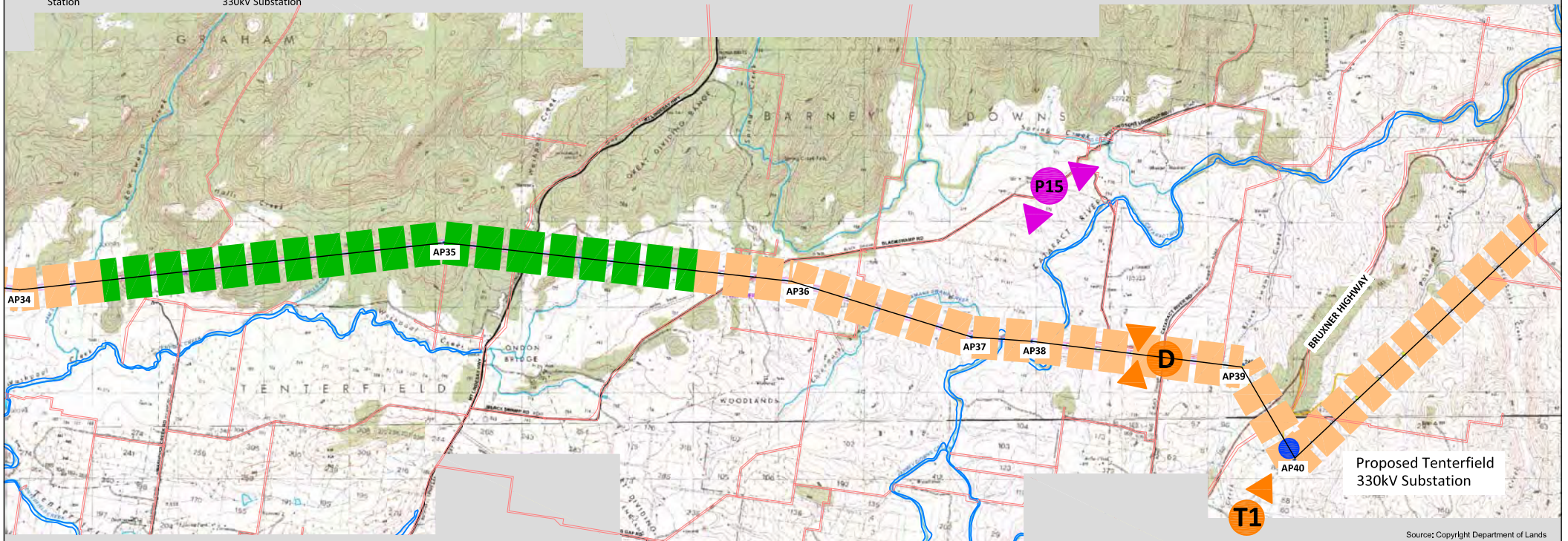
Dumaresq to Lismore 330kV Transmission Line Project - Visual Assessment

General Location Plan





Source: Copyright Department of Lands Panorama Avenue Bathurst 2795 (www.lands.nsw.gov.au)

LEGEND

- Photo Location (P1)
- Photomontage Location (refer figures 13 to 23) (A)
- Proposed transmission line with angle position.
- Existing road or access track
- Existing or proposed substation as noted on figures.
- Existing river or creek

Visual Absorption Capability

- High
- Medium
- Low

0m 500m 1Km

N

Figure 6 - Visual Analysis

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