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Baldon wind farm
Preliminary landscape and visual assessment

Prepared for Goldwind Australia Pty Ltd | 11 March 2022

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Green Bean Design Pty Ltd (GBD)
ABN 86 603 575 702

LIMITATIONS
This report has been prepared in accordance with the usual care and thoroughness of the consulting profession for the use of Goldwind Australia Pty Ltd. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the GBD Proposal dated Spetember 2021.

The methodology adopted and sources of information used are outlined in this report. GBD has made no independent verification of this information beyond the agreed scope of works and GBD assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to GBD was false.

This report was completed between September 2021 and March 2022 and is based on the conditions encountered and information reviewed at the time of preparation. GBD disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

DOCUMENT CONTROL

Project Name	Baldon Wind Farm
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Author	Andrew Homewood Registered Landscape Architect AILA, EIANZ *Graduate Diploma Landscape Management, BSc. (Dual Honours) Landscape Design and Archaeology, National Diploma Horticulture*
Date	10 March 2022

Contents

Figures

Tables

Section 1. Report structure

1.1 Report structure

This Preliminary Landscape Visual Assessment (Preliminary LVIA) report has been structured as follows:

Table 1 – Report structure

REPORT SECTION		DESCRIPTION
1	Report structure	This section outlines the content and structure of the Preliminary LVIA report.
2	Introduction	This section provides an introductory section that describes the intent and purpose of the Preliminary LVIA.
3	Methodology	This section sets out the structure and methodology employed in the LVIA preparation.
4	Wind Energy Visual Assessment Bulletin	This section sets out the objectives, stages and key steps described in the Visual Bulletin as applicable to the Preliminary LVIA.
5	Community Consultation	This section describes the community consultation activities undertaken by the Proponent and feedback received from the community relevant to this Preliminary LVIA.
6	Visual Magnitude	This section provides an analysis of the preliminary assessment tool for visual magnitude as set out in the Visual Bulletin.
7	Multiple Wind Turbine Tool	This section provides an analysis of the preliminary assessment tool for the multiple wind turbine tool as set out in the Visual Bulletin.
8	Summary	This section provides a summary of the Preliminary LVIA.

Section 2. Introduction

2.1 Introduction

Green Bean Design Pty Ltd (GBD) has been commissioned by Goldwind Australia Pty Ltd (Goldwind) to undertake a Preliminary LVIA report for the Baldon Wind Farm (the project).

This Preliminary LVIA has been prepared as required by the New South Wales Government, Department of Planning, Industry and Environment (DPIE) in order to meet the objectives of the NSW Government - *Wind Energy: Visual Assessment Bulletin* – for State Significant Wind Energy Development (DP&E, 2016), dated December 2016 (the Visual Bulletin). This Preliminary LVIA supports the Scoping Report (a preliminary environmental assessment) and has been prepared to specifically address the Visual Bulletin requirements applicable to a new wind farm development application for a State Significant Development (SSD) through the Secretary's Environmental Assessment Requirements (SEARs).

This Preliminary LVIA has been prepared to consider a layout consisting of 162 wind turbine generator (turbine/s) locations, with a maximum tip height of 300 metres. The wind turbine layout has been subject to several iterations and should be considered as a draft layout for the purposes of this Preliminary LVIA. This Preliminary LVIA has not considered the location or extent of some ancillary infrastructure commonly associated with wind farm developments, including electrical infrastructure and access tracks. Ancillary infrastructure items will be detailed and included in the Stage 2 Environmental Impact Statement (EIS) Assessment and Determination process.

The Visual Bulletin requires consideration of dwellings and key public viewpoints within a defined study area. The study area for the Preliminary LVIA has been defined within an 8 km offset from the wind turbines for the Magnitude Tool assessment (refer Section 6 of this Preliminary LVIA). The study area extends to 8 km for the application of the Multiple Wind Turbine Tool (refer Section 7 of this Preliminary LVIA). A small number of view locations beyond 8 km have also been added. These include dwellings within urban localities, road corridors as well as more distant lookouts and campsites in National Parks.

The Magnitude Tool study area within 4 km (below the black line) of the wind turbines did not identify any key public viewpoints (e.g. dedicated lookouts, public spaces, recreational areas etc.), and accordingly the preliminary analysis has focused on residential dwellings between the black and blue threshold lines. A further and detailed analysis of key public viewpoints surrounding the wind farm will be undertaken in the Stage 2 EIS report.

The Visual Bulletin requires provision of an overlay of the wind resources (Issue of SEAR's, page 11). An overlay of wind resources is included in **Figure 2**.

Information and stated requirements from the Visual Bulletin included in this Preliminary LVIA are presented in *italics*.

2.2 Professional assessment skills

The Visual Bulletin states that '*Professional assessment skills are critical to the effective application of visual assessment*', and that '*The proponent is expected to engage professionals from relevant natural resource management and design professions (for example environmental planners, geographers, landscape architects, architects, or other visual resource specialists), with demonstrated experience and capabilities in visual assessment to carry out a wind energy project visual assessment'*.

GBD confirms that this Preliminary LVIA has been prepared by GBD Principal Landscape Architect Andrew Homewood. Andrew is a registered Landscape Architect and member of the Australian Institute of Landscape Architects and the Environmental Institute of Australia and New Zealand. Andrew holds tertiary qualifications in Landscape Management, Landscape Design, Archaeology and Horticulture and has over 30 years' experience in landscape consulting. Andrew has prepared multiple wind farm LVIA in New South Wales, Victoria, Queensland, South Australia and Tasmania, at preliminary and detailed stages. Andrew has also acted as an independent expert providing peer reviews for wind farm LVIA on behalf of the DPIE.

2.3 Project overview

The project is situated approximately 65 kilometres (km) south west of Hay and 45km east of Balranald in the New South Wales Riverina region. The project extends for approximately 38km in a north to south alignment across both the Hay Shire and Murray River Council Local Government Areas (LGA) and approximately 12.5km east to west between the Maude Road and Keri Keri Road.

The project site is approximately 40km north to south and 15km east to west and is at an elevation of approximately 70 metres above sea level (+/- 5m). The site landform is visually flat with the horizon line extending out at eye level in most directions from the project site. As a generally flat region visibility from eye level extends to around 5km from a static viewpoint before the curvature of the earth interrupts visibility. Regional context is identified in **Figure 1**.

The project is proposed to consist of up to 162 wind turbine generator (turbine/s) locations with a combined maximum installed capacity of up to 900 megawatts (MW). A maximum tip height of 300m is proposed.

The project would also include:

- an internal electrical reticulation network (both overhead and underground).
- on-site collector substations.
- new and upgraded access roads.
- temporary construction facilities (including concrete batching plants) and
- operation and maintenance buildings.

The project would connect to an existing 220kV overhead transmission line extending east to west through the central portion of the project site. Alternatively the project may connect to the proposed EnergyConnect 330kV transmission line which would run parallel to the existing line.

Figure 1
Regional context

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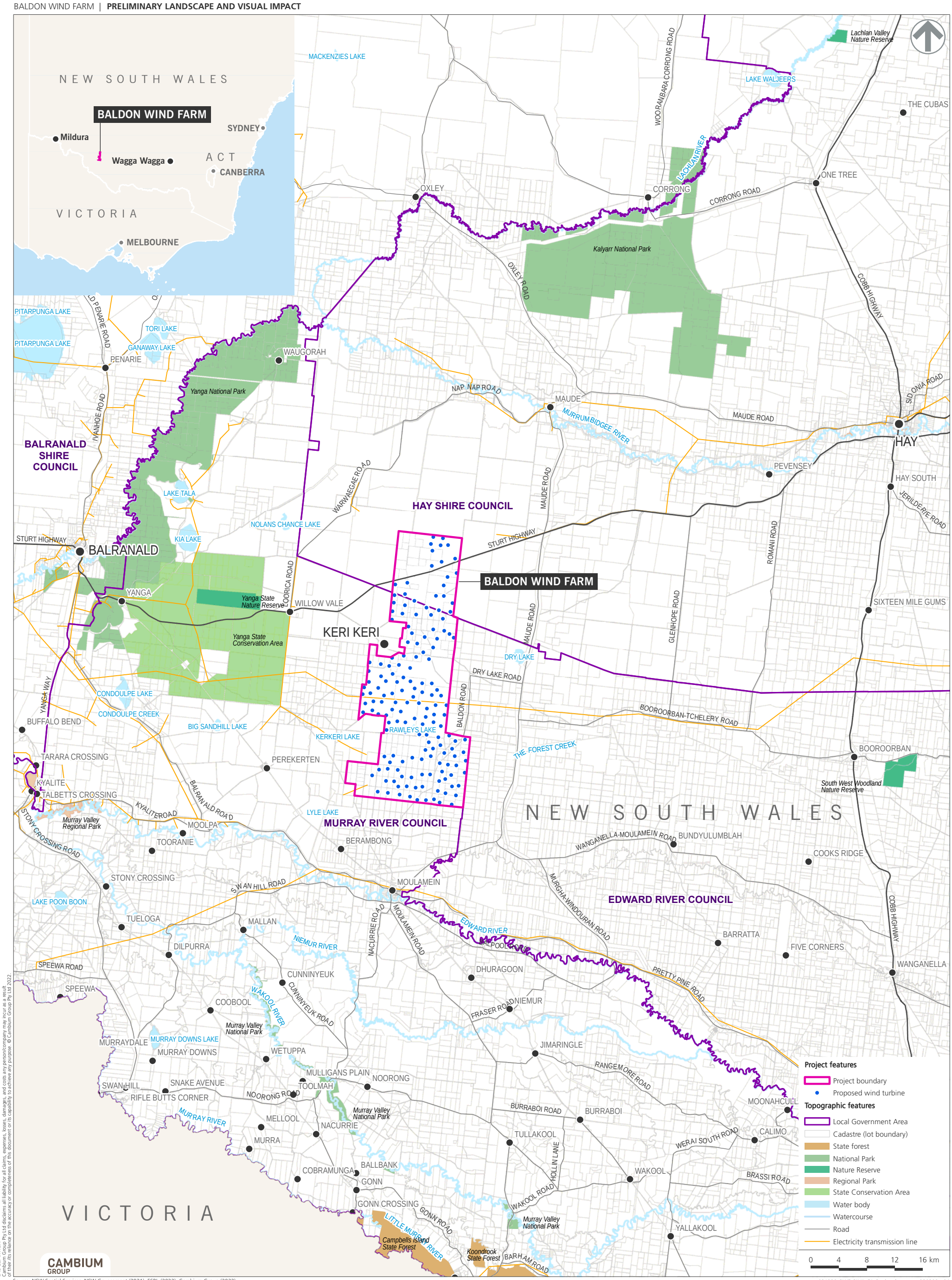

Source: NSW Spatial Services, NSW Government (2021), ESRI, (2022), Cambium Group (2022).

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Figure 2
Wind resource

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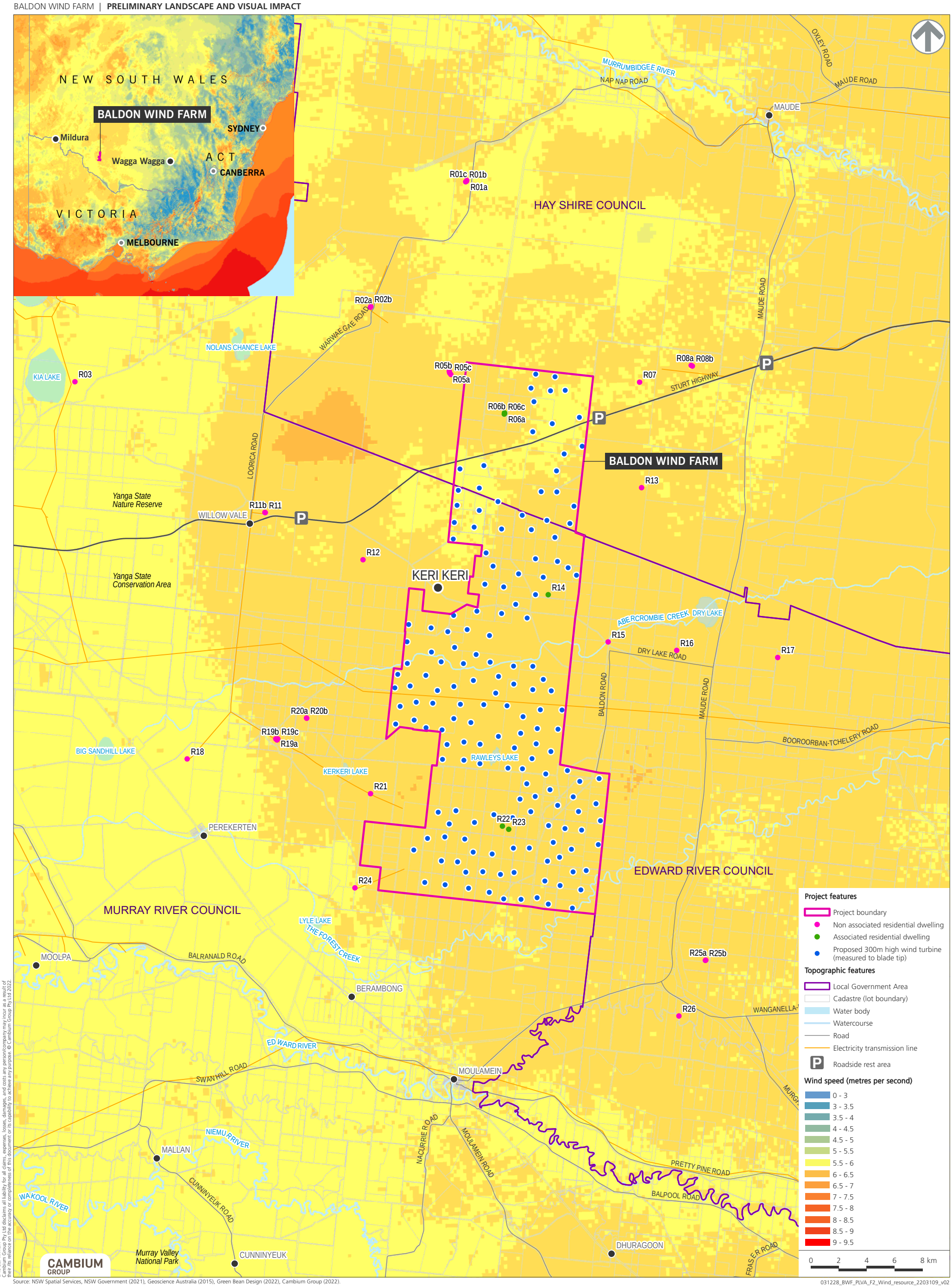

Source: NSW Spatial Services, NSW Government (2021), Geoscience Australia (2015), Green Bean Design (2022), Cambium Group (2022).

Section 3. Methodology

3.1 Introduction

This Preliminary LVIA has been prepared to address the Visual Bulletin through a range of tasks outlined in the Visual Bulletin and/or commonly associated activities applicable to landscape and visual assessment. This Preliminary LVIA included the following key tasks:

- Desktop studies
- Site photography
- Mapping and analysis

3.2 Desktop studies

A desktop study reviewed the preliminary wind turbine layout provided by the Proponent in Google Earth and Google Maps applications. The Proponent provided updated wind turbine layouts during the desktop review process to indicate adjustments to wind turbine locations following on-going landowner consultation by the Proponent.

The desktop study also reviewed dwelling locations against built form considered to be potential agricultural structures such as shearing sheds. The desktop study identified the location, extent and general boundaries between broad landscape character areas to be reviewed during the site inspection work. Desktop studies also identified key sensitive landscape elements and areas including the Yanga State Conservation Area and Yanga Nature Reserve around 15km west of the project site.

3.3 Site photography

The landscape characteristics and elements within and surrounding the project site were captured in a series of ground and aerial images utilising a 35mm SLR full sensor digital camera and aerial drone. The CASA registered drone was flown in strict accordance with CASA rules and regulations applicable to a sub 2kg drone operated for commercial purposes. Outputs from the site inspections included preparation of illustrated material to inform community consultation undertaken by the Proponent.

3.4 Mapping and analysis

A series of figures have been prepared to address the Visual Bulletin requirement to demonstrate the potential influence of visual magnitude and multiple wind turbines on dwellings. This was undertaken with ArcGIS software using the line-of-sight analysis. Inputs included wind turbine coordinates, tip of blade height, the regional digital elevation model and dwelling locations provided by Goldwind.

Section 4. Wind energy visual assessment bulletin

4.1 Introduction

The Visual Bulletins stated objectives are to:

- *provide the community, industry and decision-makers with a framework for visual impact analysis and assessment that is focused on minimising and managing the most significant impacts*
- *facilitate improved wind turbine and ancillary infrastructure siting and design during the pre-lodgement phase of a project, and encourage early consideration of visual impacts to minimise conflicts and delays where possible, and provide for a better planning outcome*
- *provide the community and other stakeholders with greater clarity on the process along with an opportunity to integrate community landscape values into the assessment process and*
- *provide greater consistency in assessment by outlining appropriate assessment terminology and methodologies.*

GBD confirm that this Preliminary LVIA has been prepared in order to satisfy the key objectives of the Visual Bulletin.

The Visual Bulletin breaks the visual assessment process in to 2 main stages (**Figure 3**). These include:

- Stage 1 Preliminary Environmental Assessment and
- Stage 2 Assessment and Determination.

This Preliminary LVIA has been prepared to address the requirements of the Stage 1 PEA, which is to be submitted in a Scoping Report to DPIE as part of a request for SEAR's. Stage 1 is broken down into 3 steps which include:

- *Undertake community consultation on likely areas of development and establish key landscape features, areas of scenic quality and key viewpoints valued by the community*
- *Apply the Preliminary Assessment Tools to the preliminary turbine layout and*
- *Prepare a Preliminary Environmental Assessment.*

The Visual Bulletin also states that Stage 1 must '*undertake a preliminary environmental assessment that considers the landscape in which a proposed wind energy project will be located. The analysis must include*:

- *undertaking community consultation to establish key landscape features valued by the community, key viewpoints in the area (both public and private) along with information about the relative scenic quality of the area*
- *production of a map detailing key landscape features (informed by community consultation and any ground-truthing undertaken), the preliminary wind turbine layout, the location of dwellings and key public viewpoints and an overlay of the wind resource; and*
- *results of the application of the preliminary assessment tools for both the visual magnitude and multiple wind turbine parameters.*

GBD confirms that this Preliminary LVIA has been prepared in accordance with the Visual Bulletin for Stage 1 PEA (pre-lodgement).

Figure 3
Visual Bulletin - visual assessment stages 1 and 2

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STAGE 1

Scoping and design

- Undertake **community consultation** on likely areas of development and establish key landscape features, areas of scenic quality and key viewpoints valued by the community
- Apply the **Preliminary Assessment Tools** to the preliminary turbine layout
- Prepare a **Preliminary Environmental Assessment**

SEARs

- Submit the Preliminary Environmental Assessment including a map with results of community consultation on landscape values overlayed with the wind resource
- Submit the results of the Preliminary Assessment Tools
- DPE issues **Secretary's Environmental Assessment Requirements** (SEARs) including any project specific requirements

STAGE 2

Prepare EIS

- Prepare a **Visual Baseline Study** as part of the **Environmental Impact Statement** (EIS)
- Undertake community consultation on aspects of the visual baseline study and describe **mitigation and management options** in the EIS
- Establish **Visual Influence Zones** from viewpoints using inputs from the visual baseline study
- Undertake an evaluation of the project against the **Visual Performance Objectives**

Public exhibition

- EIS including the visual assessment is exhibited for a minimum period of 30 days
- Proponent may revise the project in response to issues raised during public exhibition
- Proponent submits a **Response to Submissions** report

Assessment and determination

- DPIE undertakes a thorough assessment of the visual impacts of the wind energy project drawing on all relevant information provided through the assessment process
- The consent authority determines the overall acceptability of landscape and visual impacts and balance these matters along with other environmental, social and economic considerations
- The consent authority will consider whether **conditions of consent** should be imposed

Monitoring and compliance

- If the project is approved, DPIE is responsible for ensuring that the approved project is constructed and operated in accordance with the conditions of consent

CAMBIUM GROUP

Source: Wind Energy - Visual Assessment Bulletin, NSW Government (2016), Cambium Group (2022).

Consultation

5.1 Introduction

The Visual Bulletin notes that 'Consultation with the community at this early stage may be broad, but should include discussions about the proposed project area, likely corridors for development, or preliminary turbine layouts and must involve people from the visual catchment'.

The Visual Bulletin describes the purpose of early communications is to:

- *Establish the key landscape features, areas of scenic quality and key public viewpoints valued by that community.*
- *Allow the community to have input into the ranking of those features and scenic quality into high, moderate or low visual significance.*
- *Inform landholders about the proposed project area, likely corridors for development, preliminary turbine layouts and access routes.*
- *Inform the community about the proposed project, listen to the community's concerns and suggestions for alternative siting and location designs, and discuss potential visual impacts.*

Key landscape features can include natural features of the landscape (for example, a distinctive mountain peak) as well as important cultural features (for example, an iconic church). Consideration of areas of scenic quality involves the identification of areas of the landscape that are of high scenic quality and those that are moderate or low. It is also important to establish which viewpoints are important to the community. An important source of information at this stage is likely to be the local council. A community survey or focus group could also be utilised to gather this information. Any surveys undertaken should reflect the population profile in the project area as indicated by the most up-to-date Census data available.

Landscape character areas surrounding the project site have been identified and illustrated in **Figure 4**.

A detailed summary of consultation conducted for the project is provided in the overarching Scoping Report. Issues relevant to this assessment are described below.

In order to support the community consultation process, GBD prepared a number of figures to illustrate the results of preliminary site work. The figures outline landscape characteristics associated with Scenic Quality Areas (SQA's), which are generally defined by land use, land cover and topography. A preliminary landscape analysis identified six landscape areas within and surrounding the project boundary, including:

- Township
- Agriculture (cultivated)
- Creek line
- Transmission line corridor
- Road corridor
- Floodplain and backplain

Each landscape area was photographed and described for the purposes of the broader project community consultation and stakeholder engagement (**Figures 5 to 7**).

5.2 Consultation activities

During the consultation process, maps were prepared showing the area of investigation, including elevated ridges that had the potential to host wind turbines. This was done to allow feedback to be incorporated into the design of the layout at the earliest stage. Specific landscape features and lookout points identified by residents include:

- Saltbush plains
- Baldon Road
- Edward River
- Moulamein lake
- Moulamein township (heritage values)
- Moulamein heritage village
- Woolsheds and Court House
- Edward River gardens

These areas and landscape elements will be considered in an assessment of visual impact during the EIS Assessment and Determination.

The Visual Bulletin notes that '*Where a regional survey or study of landscape values has been undertaken, it must be considered. Proponents should confirm with the Department if there is any such recognised study in place'*.

GBD is not aware of any regional surveys or study of landscape values that have been undertaken within or surrounding the project boundary. This will be confirmed with DPIE prior to the commencement of the detailed assessment prepared for the EIS.

Consultation will be ongoing during the EIS Assessment and Determination process.

Figure 4
Scenic quality assessment - Landscape character areas

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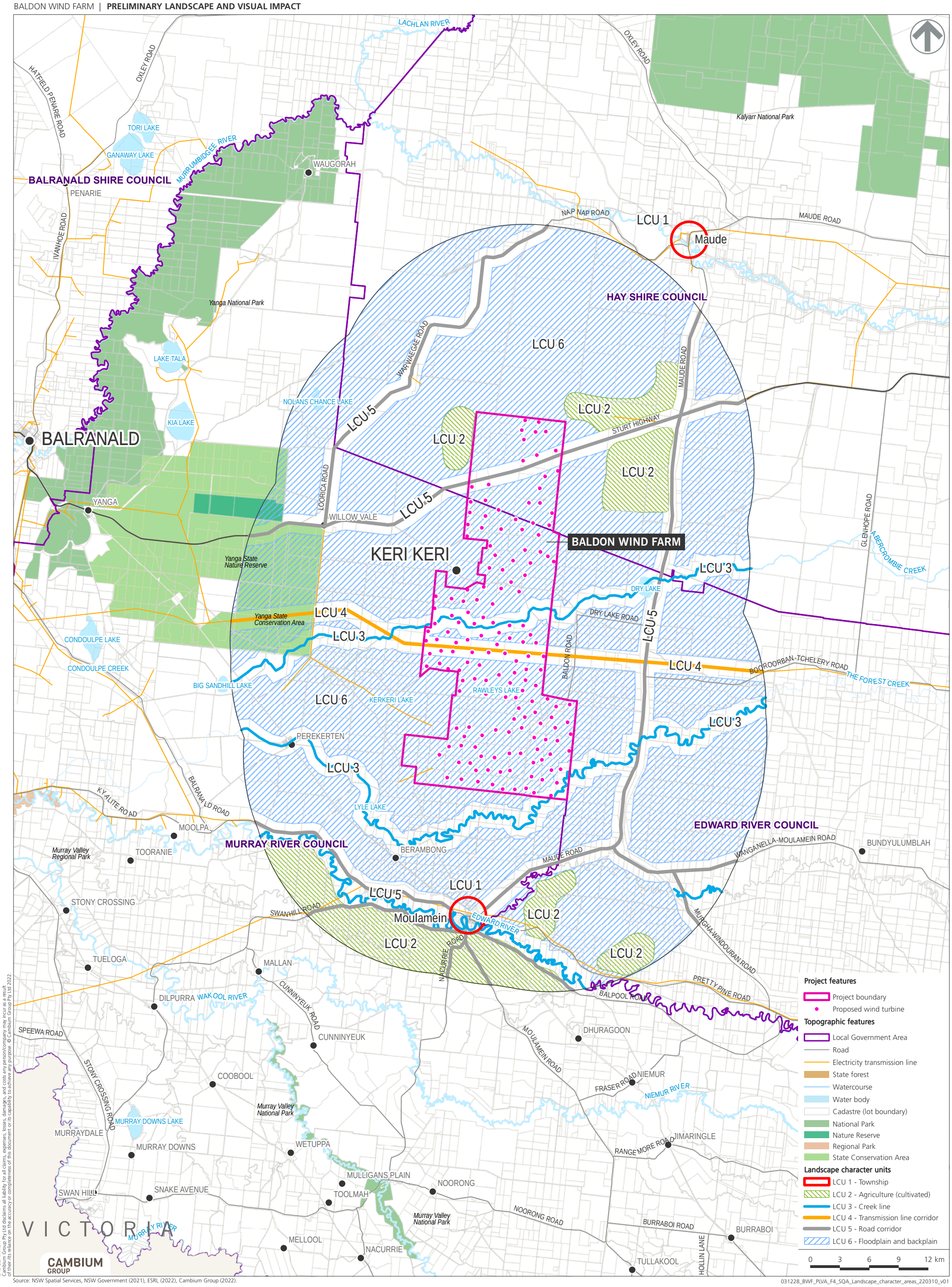

Source: NSW Spatial Services, NSW Government (2021), ESRI, (2022), Cambium Group (2022).

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Figure 5
Scenic quality assessment photographs - sheet 1

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LCU 1 Township (Moulamein)

LCU 1 Township (Moulamein)

Townships and localities, including Moulamein around 10km south of the project site, are located in generally flat landscapes, in proximity to landscape features such as creeks and rivers.

Townships and localities include a range of built structures such as dwellings, commercial buildings and public facilities. Built structures are moderate to small in scale with a varied colour palette.

Visual connectivity between townships and the surrounding landscape is partially restricted and disrupted by tree planting within urban areas and extensive tree cover alongside creeks and drainage lines.

Townships and localities do not tend to include elements or features which might be considered significant or high scenic quality at a national or state level. Notwithstanding, townships and localities do contain elements which may have local visual and historical significance.

LCU 2 Agriculture (cultivated)

LCU 2 Agriculture (cultivated)

Agriculture (cultivated) landscapes tend to extend beyond townships and localities and are often associated with creeks and irrigation channels. Cultivated landscapes present as moderate to large visual elements broken by field boundaries, roads and occasional tree cover.

Constructed elements within cultivated landscapes include roads and tracks, agricultural buildings such as silos and sheds as well as rural dwellings and homesteads.

Visual connectivity extends beyond the cultivated landscapes to adjoining and more distant views across floodplains and backplains.

Cultivated landscapes do not generally exhibit features which tend to result in significant or high levels of scenic quality.

CAMBIUM GROUP

Source: Matt Beaver Photography (2022), Green Bean Design (2022), Cambium Group (2022).

Figure 6
Scenic quality assessment photographs - sheet 2

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LCU 3 Creek line

LCU 3 Creeks and rivers (Edward River)

Creeks and smaller ephemeral drainage lines occur across the landscape within and beyond the project site. Principal waterways include Edward River to the south of the project site (adjoining Moulamein), Forest Creek which flows through the south portion of the project site and Abercrombie Creek which flows through the central portion of the project site. Creek lines meander in a general east to west direction often within corridors of former channels and billabong.

Built structures are largely absent except where creeks adjoin townships such as Moulamein. Creek and drainage lines are visually marked in the landscape by trees growing along drainage corridors.

Creek lines provide opportunities for visual relief against large extents of floodplain and backplain backdrops. Creek lines are considered to provide landscape elements of moderate scenic quality.

LCU 4 Transmission line corridor

LCU 4 Transmission line corridor

A short section of transmission line corridor extends east to west through the central portion of the project site. The transmission line corridor extends across open pasture/floodplain and through easements created within existing tree and shrub vegetation.

Transmission line structures do not form visually prominent features within the landscape and are not considered to contribute to surrounding scenic quality.

CAMBIUM GROUP

Source: Matt Beaver Photography (2022), Green Bean Design (2022), Cambium Group (2022).

Figure 7
Scenic quality assessment photographs - sheet 3

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LCU 5 Road corridor

LCU 5 Road corridor

Road corridors extend through the landscape connecting townships and localities north and south of the project site. Principal road corridors include the Sturt Highway to the north of the project site and the Newell Highway extending north east away from the project site. A small number of local and largely unsealed roads extend through the project site providing access to rural dwellings and farms.

Roads form small scale built elements within the landscape and provide a range of direct and indirect transitory views toward the project site as well as moderate to long views along road corridors. Road corridors are occasionally framed by tree and shrub vegetation screening and filtering views to the surrounding landscape.

LCU 6 Floodplain and backplain

LCU 6 Floodplain and backplain

Areas of floodplain and backplain are generally flat and visually large scale landscapes that extend across a large portion of the project site extending toward distant horizon lines.

As part of the extensive Murray Basin alluvial fans, the floodplain and backplain contain a range of landscape features such as meandering channels, floodplain, dunes, overflow lakes and swamps.

Landcover largely comprises pasture interspersed with scattered tree and denser forested areas. Areas of vegetation also comprise shrub and saltbush cover.

Constructed elements within areas of floodplain and backplain include occasional sealed road and unsealed tracks, rural dwellings and agricultural structures.

The landscape offers open and distant views toward and beyond other landscape character units with screening and filtering of views provided by vegetation within proximity to drainage channels and overflow lakes.

Floodplain and backplain are considered to provide landscape elements of moderate scenic quality.

CAMBIUM GROUP

Source: Matt Beaver Photography (2022), Green Bean Design (2022), Cambium Group (2022).

Section 6. Preliminary Assessment Tool – Visual magnitude

6.1 Introduction

The Visual Bulletin states that '*By mapping the dwellings, key public viewpoints and proposed turbines at scale, the potential visual magnitude of a turbine relative to that dwelling or public viewpoint can be established. This is based on the height of the proposed wind turbines to the tip of the blade and distance from dwellings or key public viewpoints shown in the graph at Figure 2' (The Visual Bulletin, page 9). 'The line depicted in the graph at Figure 2 provides an indication of where proponents should give detailed consideration to the visual impacts on dwellings or key public viewpoints from turbines located below the black line'.*

For the purpose of the Preliminary LVIA the proposed wind turbines are nominated at a 300m tip height (from base of tower to tip of blade at vertical position). In accordance with the Visual Bulletin, the black line intersects at a distance of 4km from a tip height of 300m (**Figure 8**).

The Visual Bulletin states the '*Proposed turbines below the black line must be identified, along with the dwellings or key public viewpoints as part of the request for SEARs*'.

The Visual Bulletin notes that *'Further assessment and justification for placement of turbines located in these sensitive areas in the EIS will be required, along with a description of the mitigation and management measures being employed to reduce impacts. This assessment may identify those factors such as topography, relative distance and existing vegetation may minimise or eliminate the impacts of the project'*.

The Visual Bulletin also notes that '*there may be circumstances where dwellings or key public viewpoints located above the line may require further consideration due to topography or other landscape features. The further detailed assessment and ground-truthing at the visual assessment stage must also consider impacts on these dwellings or key viewpoints*.

This Preliminary LVIA also illustrates dwellings located to a distance of 8km from the wind turbines which coincides with the threshold for multiple wind turbine tool analysis as indicated in Figure 12. Dwellings located between 4km and 5.9km have been identified and illustrated to provide a greater degree of context regarding the location and number of dwellings surrounding the proposed wind farm.

The EIS Assessment and Determination will undertake an assessment and justification for the placement of wind turbines in sensitive areas, including those located within and between the 4km and 5.9km thresholds from the wind turbine locations. Non-associated dwellings located below the black line, as well as residential dwellings between the black and blue lines and those extending out to 8km from the wind turbines, are illustrated in **Figure 9**.

Figure 8
Visual magnitude thresholds

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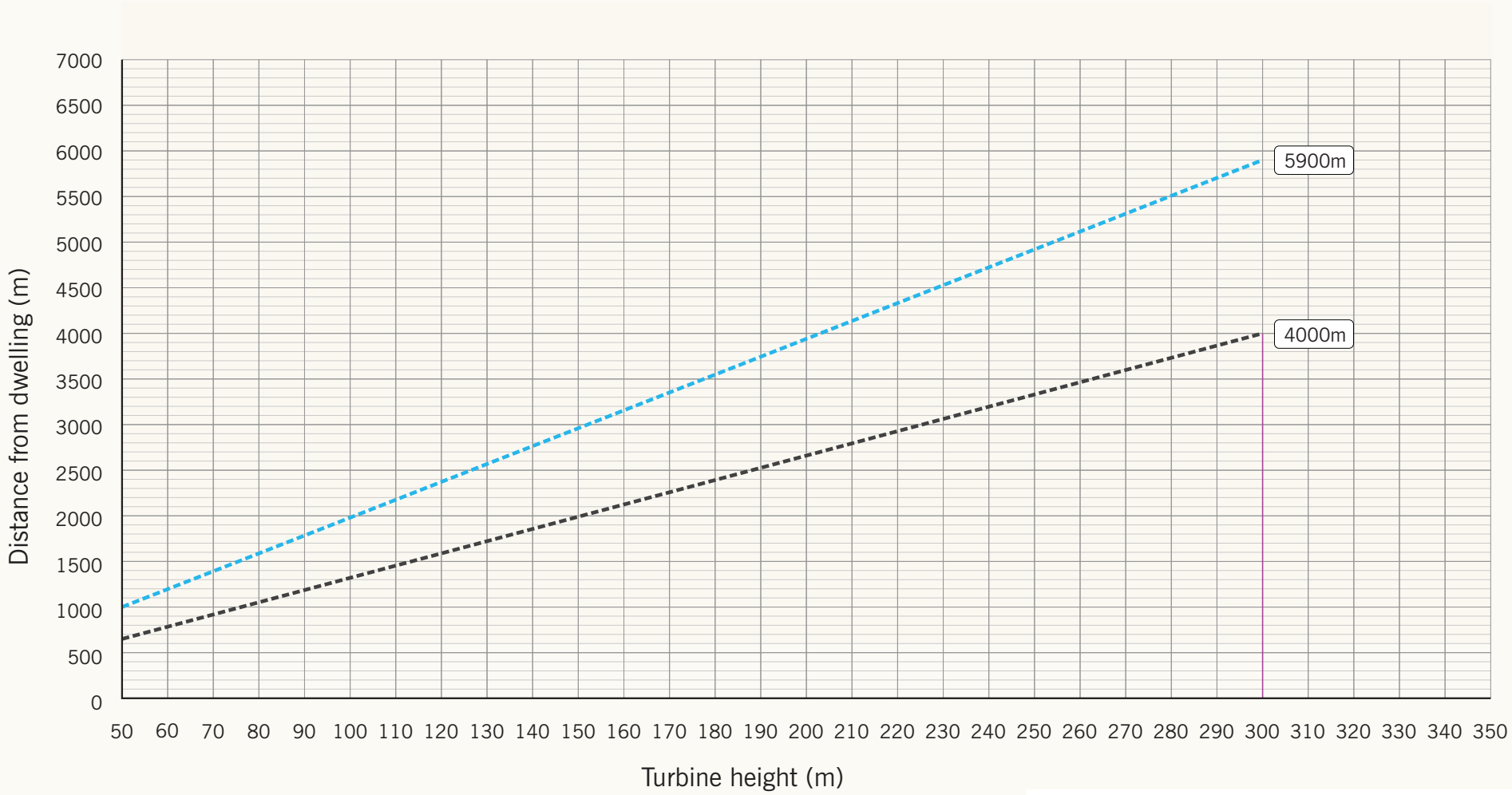

Visual magnitude
This line provide an indication of where proponents should give detailed consideration to the visual impacts on dwellings or key public viewpoints from turbines located below the black line.

Threshold distance line
Identifies potentially high visual magnitude impacts.

CAMBIUM GROUP

Source: Wind Energy - Visual Assessment Bulletin, NSW Government (2016), Cambium Group (2022).

Section 7. Preliminary assessment tool – Multiple wind turbines

7.1 Introduction

The Visual Bulletin states that '*This tool will provide a preliminary indication of potential cumulative impacts arising from the proposed wind energy project. To establish whether the degree to which dwellings or key public viewpoints may be impacted by multiple wind turbines, the proponent must map into six sectors of 60° any proposed turbines, and any existing or approved turbines within eight kilometres of each dwelling or key public viewpoint*'.

This Preliminary LVIA has identified 12 individual representative view locations which contain single or multiple viewpoints to 8km from the wind turbines. This Preliminary LVIA has incorporated multiple residential dwellings into a single view location where dwellings occur within a 500m radius of each other. GBD consider that views from these locations would be similar or identical in most cases.

The Visual Bulletin (at Stage 2 EIS Assessment and Determination, page 12) permits representative view locations, and states '*where relatively close clustering of houses belonging to different landowners or occupants occur, representative viewpoints may be selected and assessed in lieu of every single dwelling in the following types of areas*':

- rural residential clusters
- rural villages and
- urban residential and commercial areas.

The 12 representative view locations and the multiple wind turbine analysis are presented in **Figure 9**.
Figure 10 illustrates a Zone of Visual Influence (ZVI) analysis, which indicates areas of the landscape from which wind turbines will not be visible, or visible toward blades only. The extent of screening illustrated in **Figure 10** relates to screening by landform only and does not account for vegetation (tree cover) within the landscape or surrounding residential dwellings.

Where wind turbines are visible within the horizontal views of the dwelling or key public viewpoints in three or more 60° sectors, the proponents must identify the turbines, relative dwelling and key public viewpoint, along with the relative distance and submit these to the Department as part of the request for SEARs. These turbines will become a focus for assessment in the EIS.

Table 2 summarises the results of the multiple wind turbine tool analysis undertaken as part of the Preliminary LVIA. The results include the identification of non-involved residential dwellings and key public view locations within 8km of the wind turbines, the distance to the closest wind turbine (and wind turbine ID), the number of 60° sectors the wind turbines occur within out to a distance of 8 km from the view location, and the number of wind turbines visible within three or more 60° sectors out to a distance of 8 km from the view location.

Table 2 – Multiple wind turbine analysis results

Representative view location ID	Distance (km) from dwelling to closest wind turbine (and turbine ID)	Number of 60°sectors with wind turbines up to 8km from dwelling	Number of visible wind turbines within 3 or more 60° sectors up to 8km from dwelling
R07	5.00km (T7)	1	
R24	5.00km (T138)	1	
R13	5.01km (T21)	2	
R21	5.03km (T121)	3	10
R15	5.3km (T38)	3	20
R12	5.70km (R48)	2	
R05c (R05a and R05b)	5.83km (T3)	2	
R04a (R04b)	6.20 (T3)	2	
R20a (R20b)	6.40 (T88)	1	
Moulamein township	13.00km (T159)	0	
Sturt Highway (rest area east)	1.38km(T7)	3	16
Sturt Highway (rest area west)	10.85km (T31)	0	

Of the 12 representative dwelling view locations:

- 9 are predicted to have views toward wind turbines in either 1 or 2 of the 60° sectors and
- 3 are predicted to have views towards wind turbines within 3 or more of the 60° sectors.

Further assessment and justification for placement of turbines in multiple sectors will be detailed in the EIS, along with a description of the mitigation and management measures being employed to reduce impacts. Such further assessment may identify factors such as relative distance and existing vegetation may minimise the impacts of the project on nearby involved and non-involved residences. The Visual Bulletin notes that '*the relative position of the viewpoints in relation to a dwelling is also an important consideration that will be outlined in the EIS. For example, views to the turbines from the primary living areas of the dwelling would be considered more important than views from non-habitable areas*'.

The Stage 2 EIS Assessment and Determination will provide further assessment and justification for the placement of wind turbines within three or more 60° sectors where necessary, and/or provide reasonable and feasible mitigation measures to reduce visual impacts.

A comprehensive assessment of potential cumulative visual impacts will be carried out and included in the Stage 2 EIS Assessment and Determination report.

Multiple wind turbine tool diagrams for the representative view locations are included in **Figures 11 to 22**.

Figure 9
Dwelling locations - Visual magnitude thresholds

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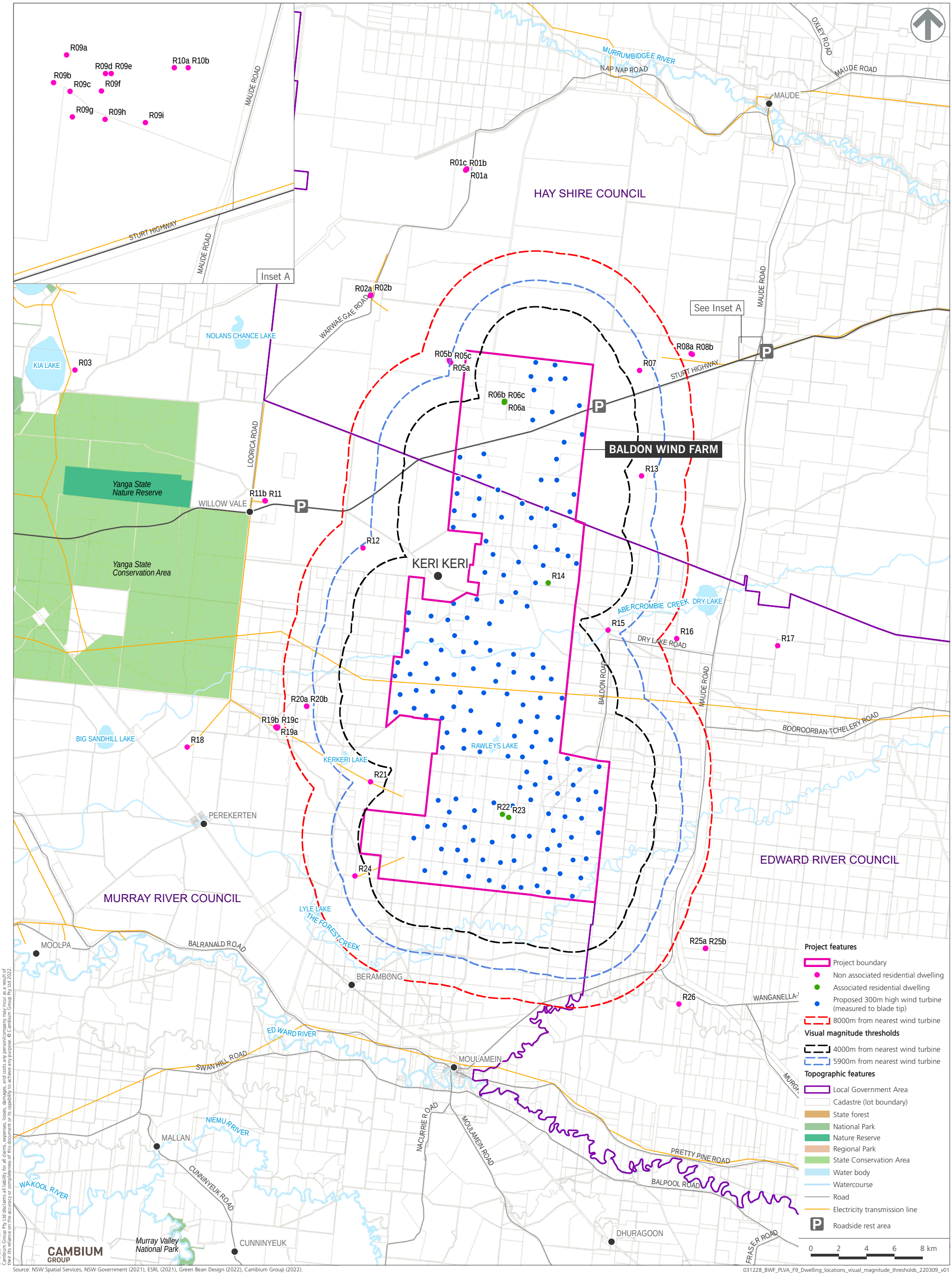

CAMBIUM GROUP

Source: NSW Spatial Services, NSW Government (2021), ESRI, (2021), Green Bean Design (2022), Cambium Group (2022).

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Figure 10
Visibility analysis

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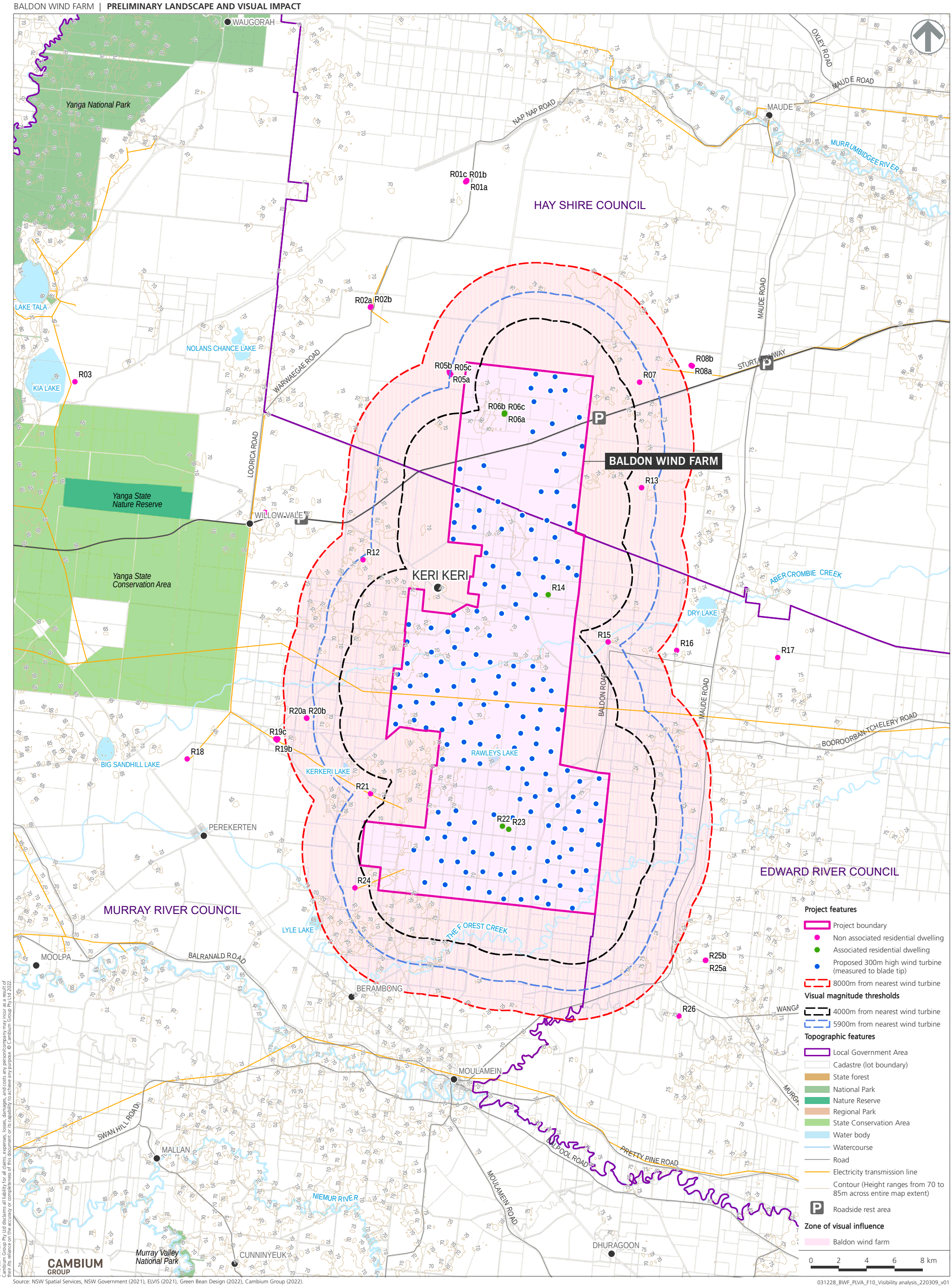
Landscape architecture

BALDON WIND FARM | **PRELIMINARY LANDSCAPE AND VISUAL IMPACT**



CAMBIUM GROUP

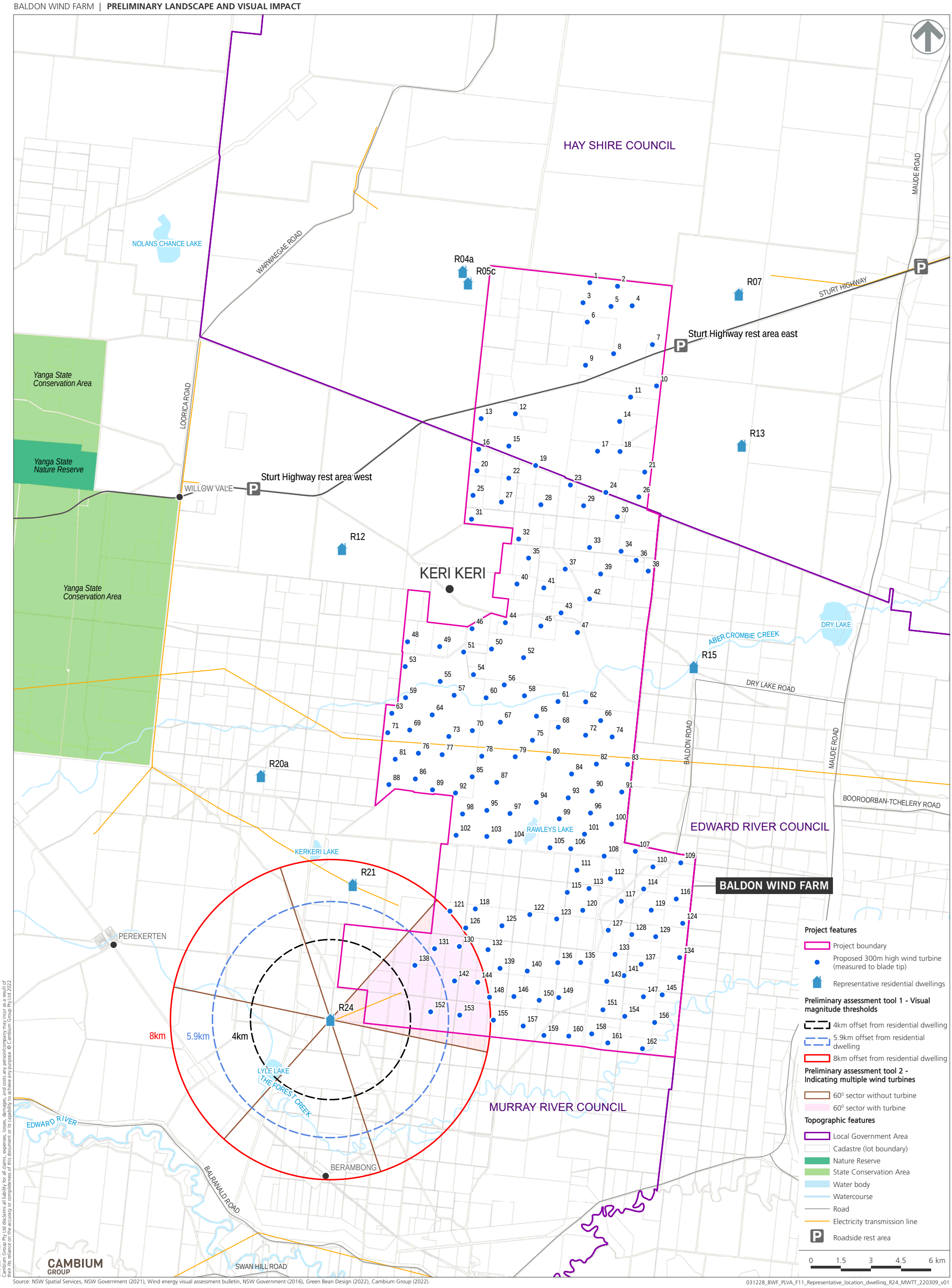
Source: NSW Spatial Services, NSW Government (2021), ELVIS (2021), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F10_Visibility analysis_220309_v01

Figure 11

Representative location dwelling R24 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

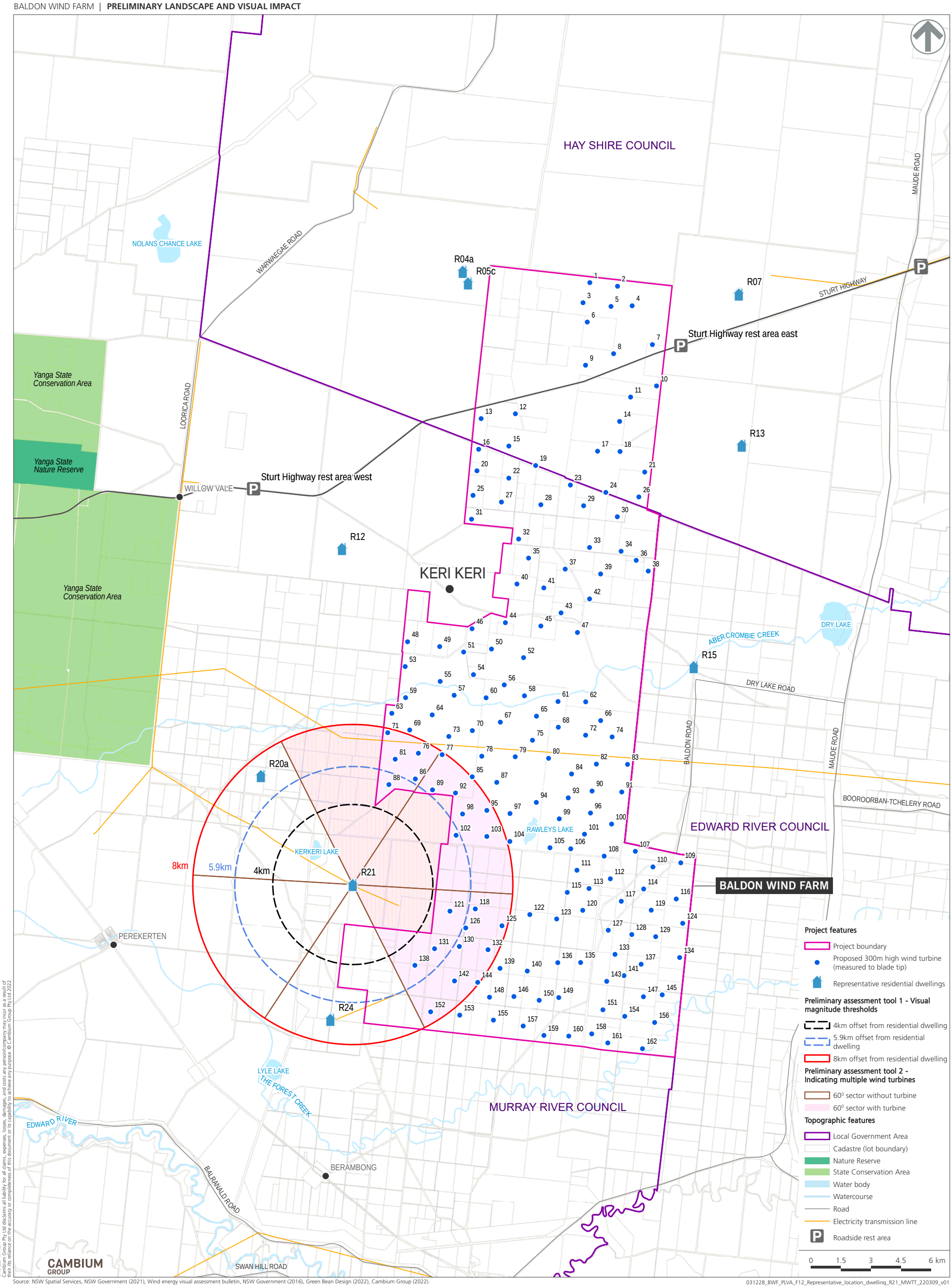
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F11_Representative_location_dwelling_R24_MWTT_220309_v01

Figure 12

Representative location dwelling R21 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

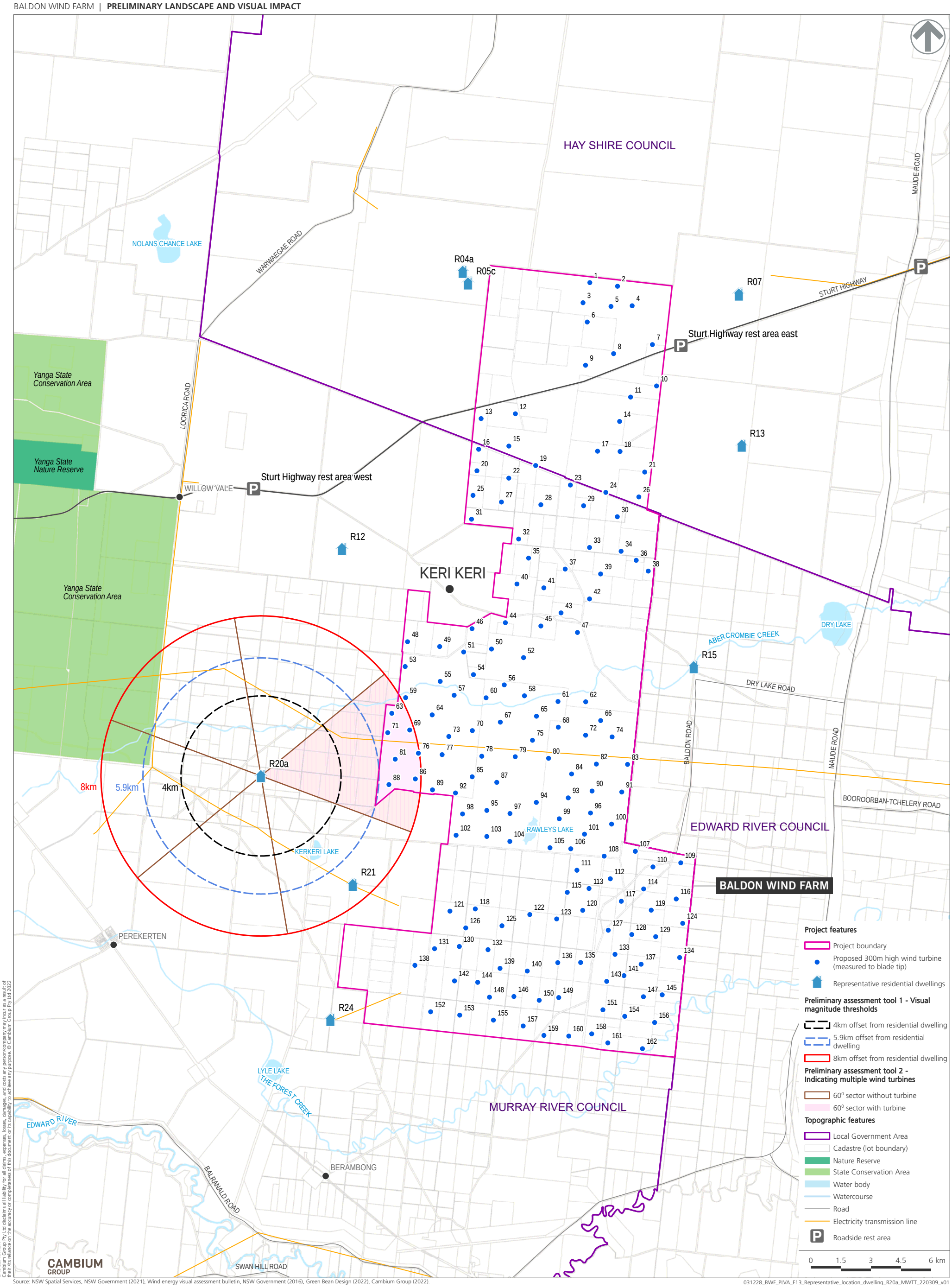
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F12_Representative_location_dwelling_R21_MWTT_220309_v01

Figure 13

Representative location dwelling R20a - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

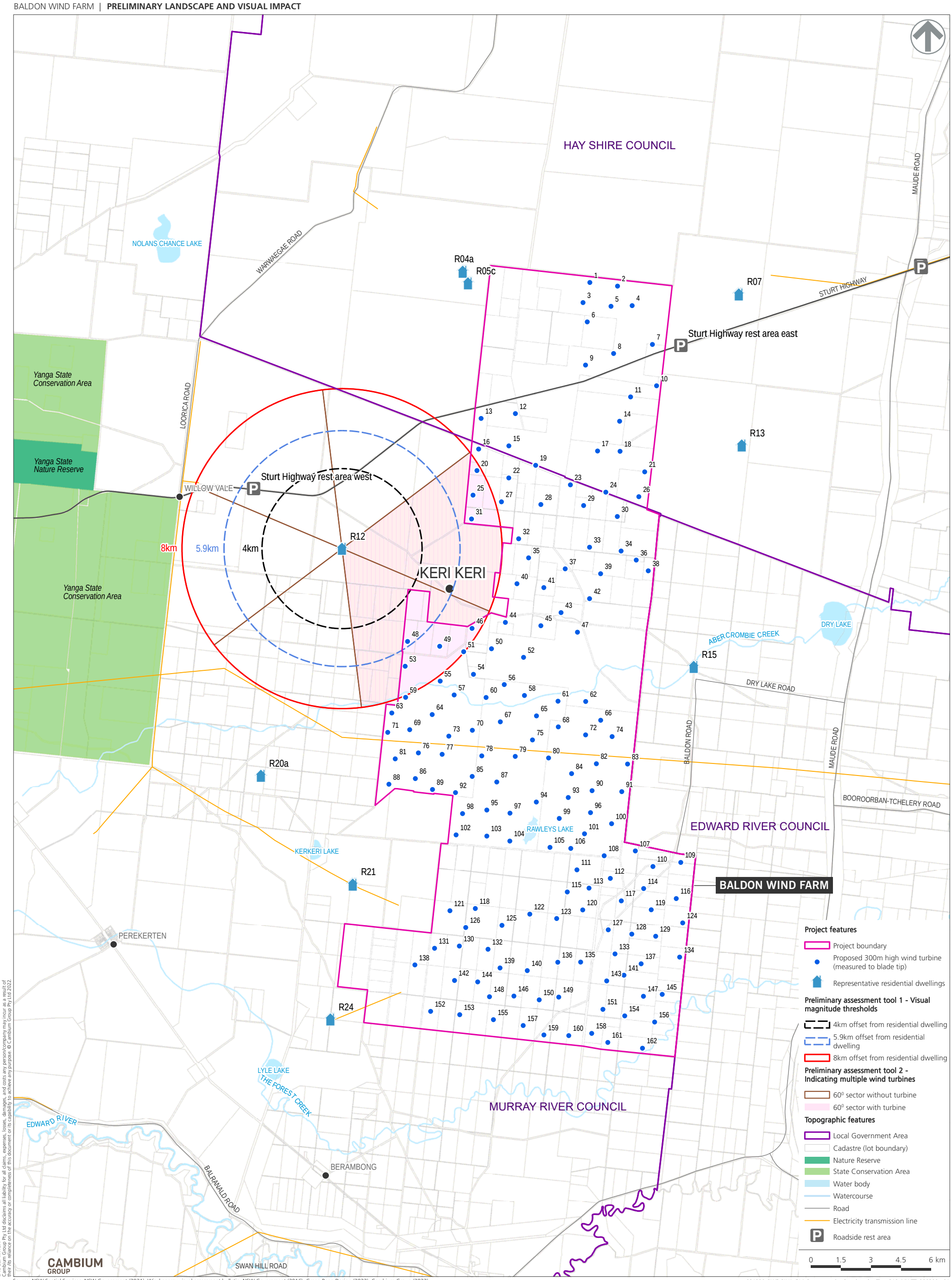
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F13_Representative_location_dwelling_R20a_MWTT_220309_v01

Figure 14

Representative location dwelling R12 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

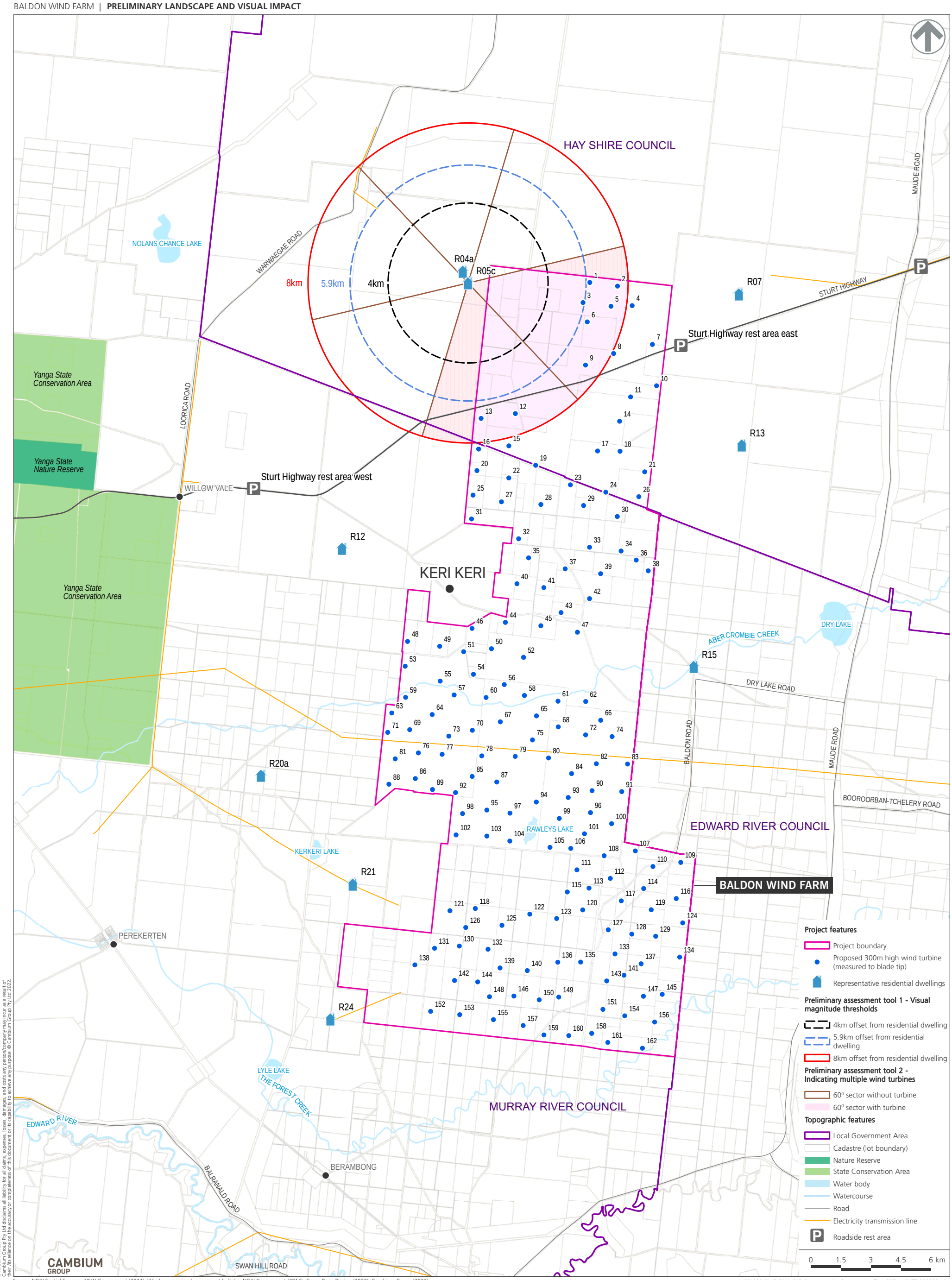
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F14_Representative_location_dwelling_R12_MWTT_220309_v01

Figure 15

Representative location dwelling R05c - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

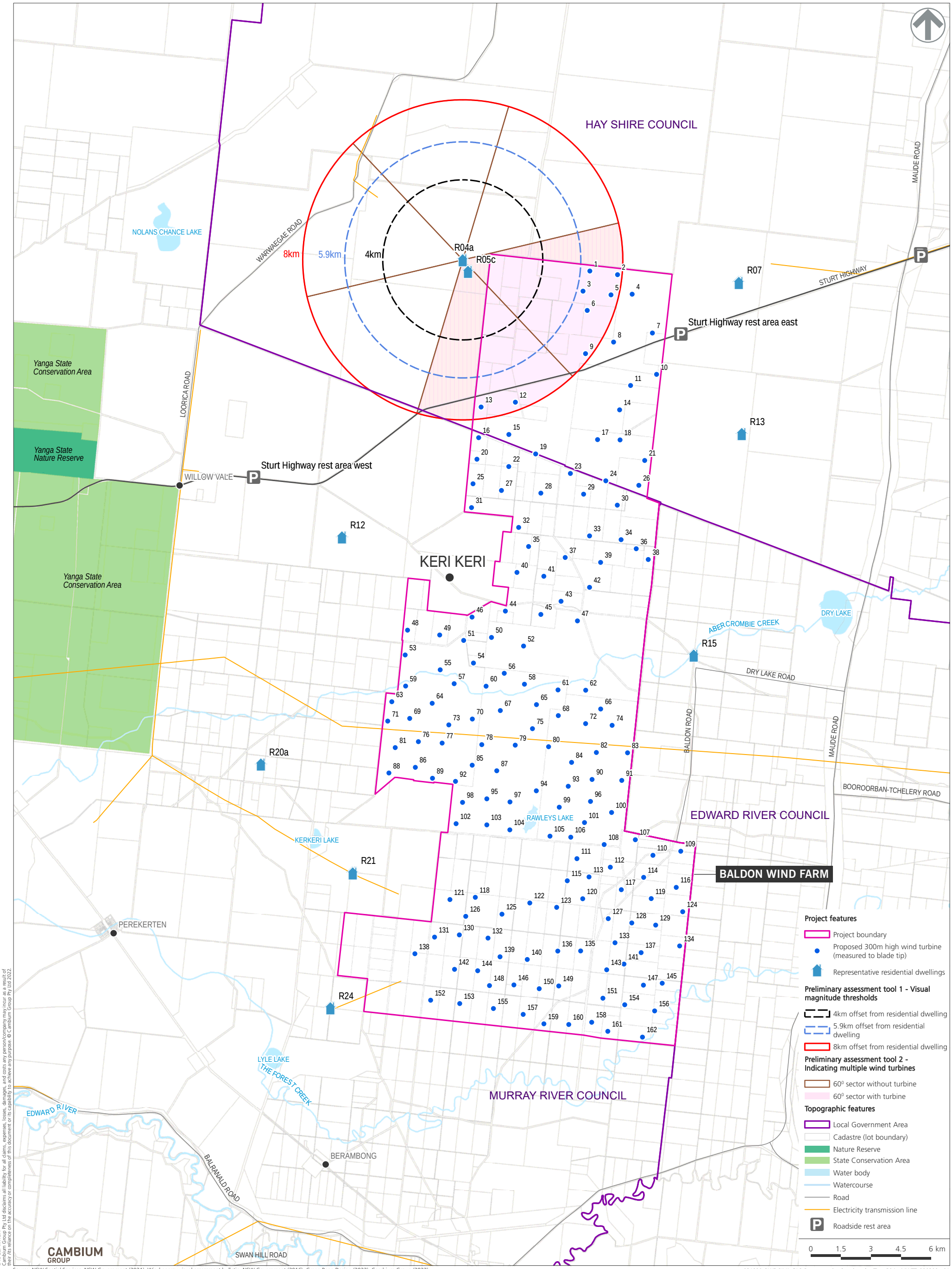
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F15_Representative_location_dwelling_R05c_MWTT_220309_v01

Figure 16

Representative location dwelling R04a - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

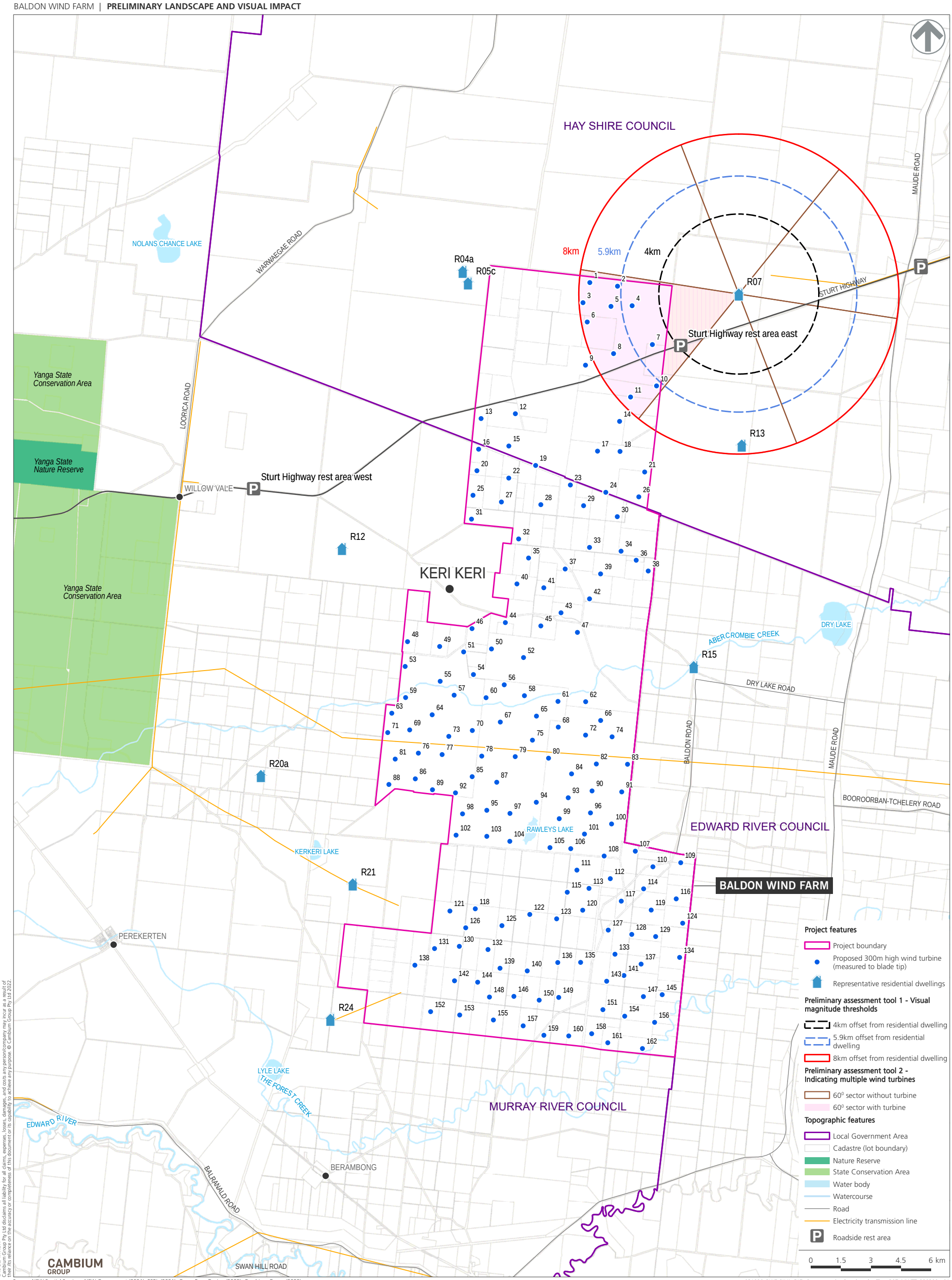
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F16_Representative_location_dwelling_R04a_MWTT_220309_v01

Figure 17

Representative location dwelling R07 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

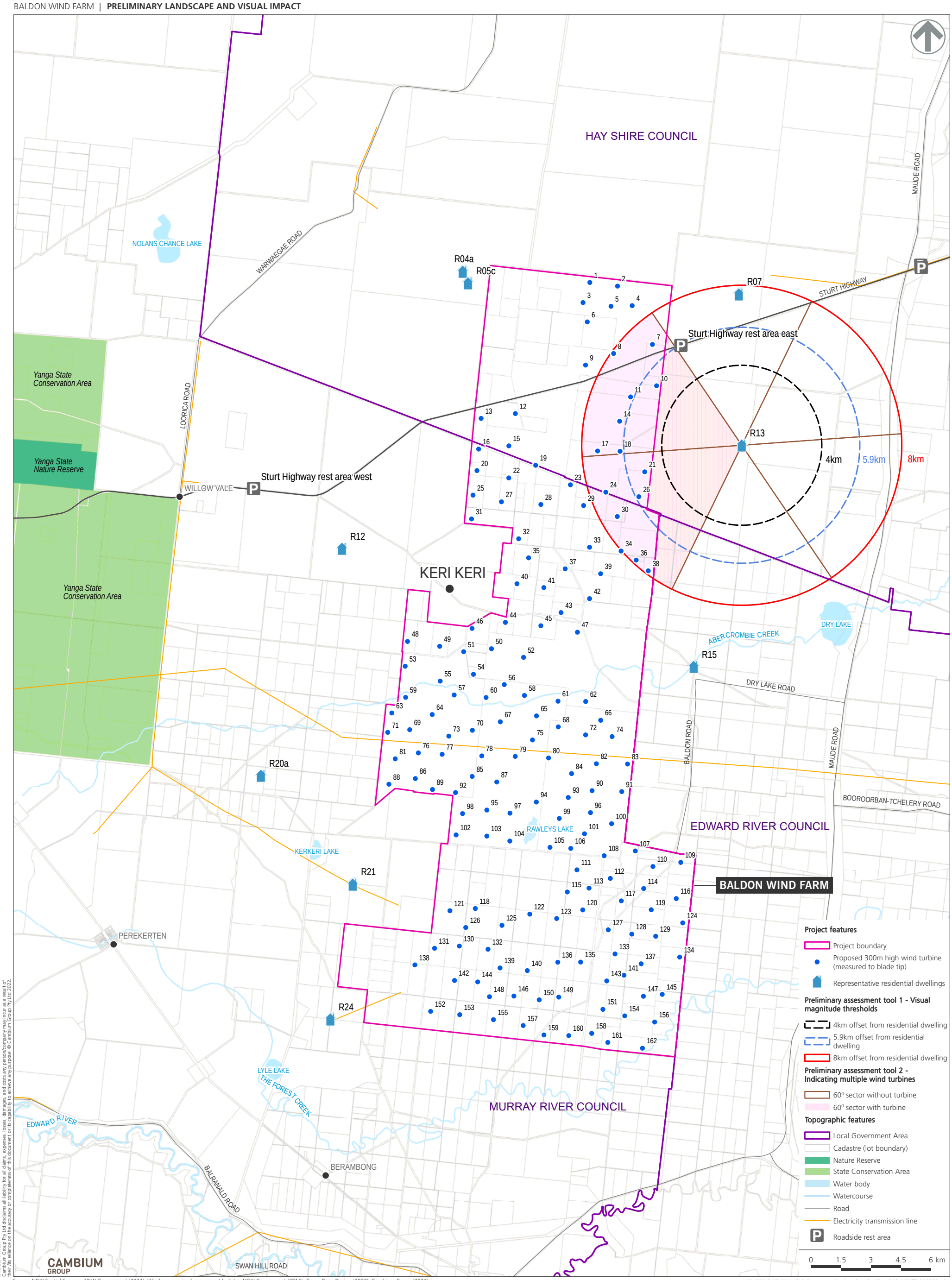
Source: NSW Spatial Services, NSW Government (2021), ESRI, (2021), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F17_ Representative_location_dwelling_R07_MWTT_220309_v01

Figure 18

Representative location dwelling R13 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

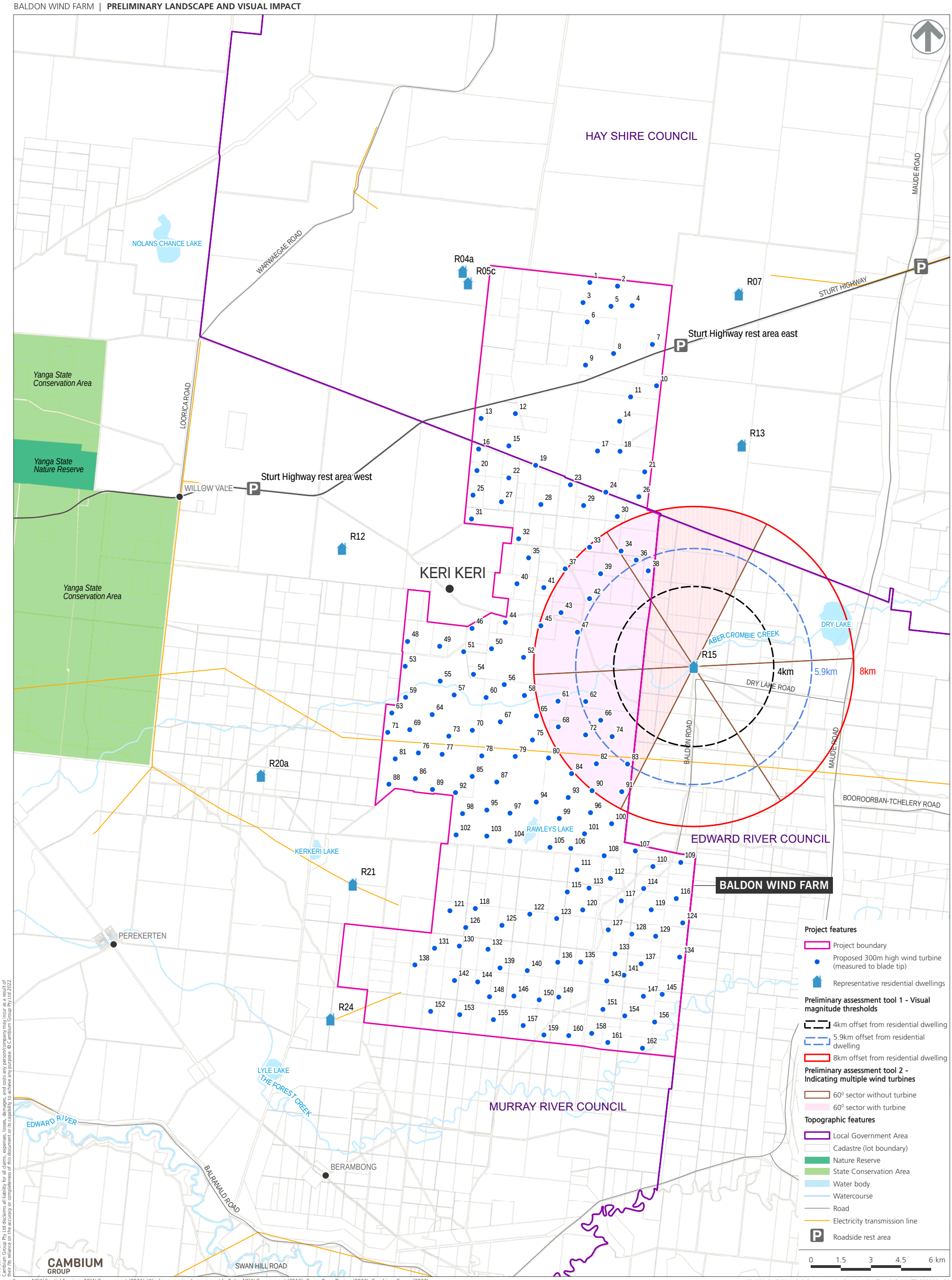
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F18_Representative_location_dwelling_R13_MWTT_220309_v01

Figure 19

Representative location dwelling R15 - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F19_Representative_location_dwelling_R15_MWTT_220309_v01

Figure 20

Representative location Moulamein - Multiple wind turbine tool

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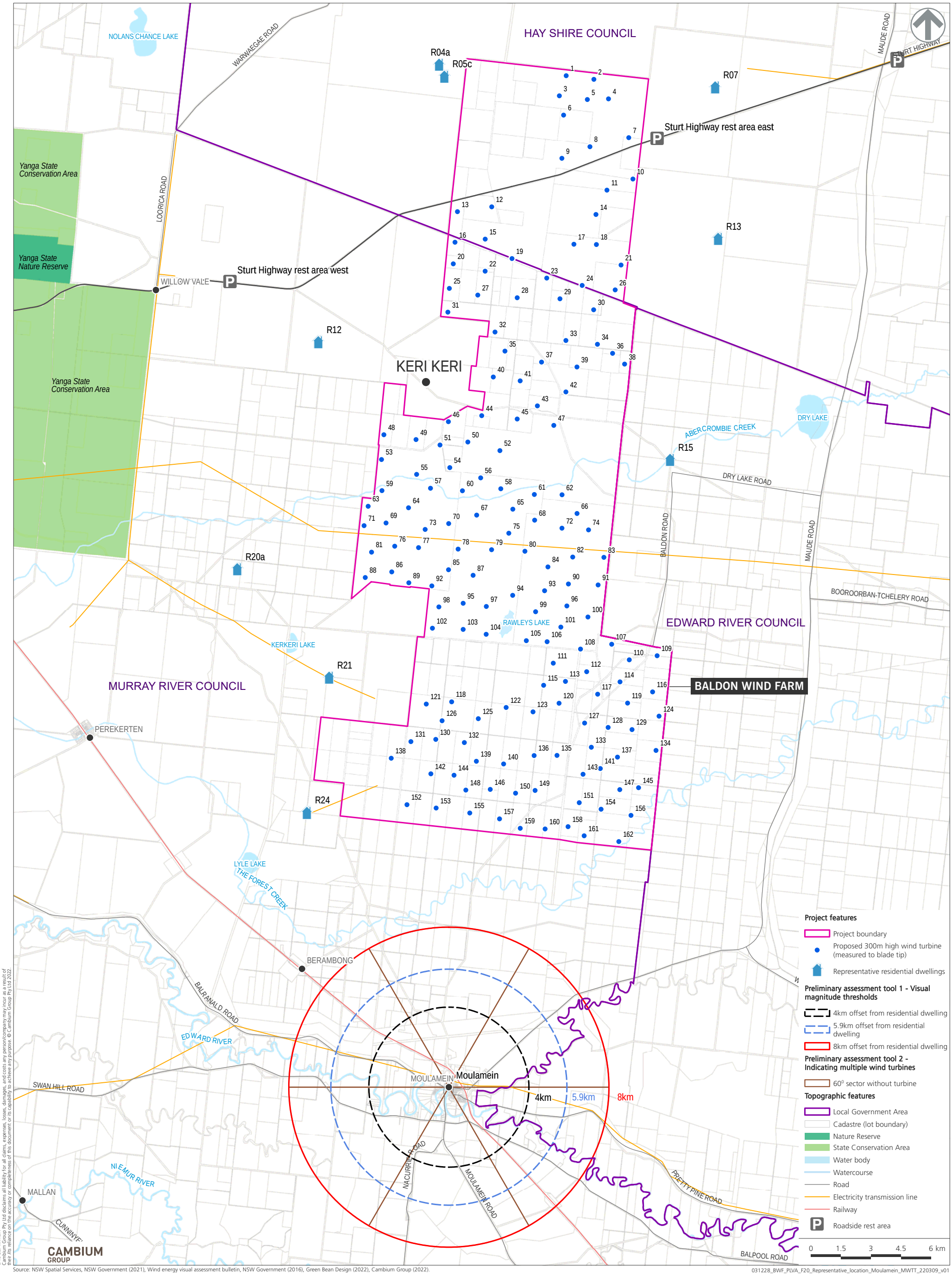
BALDON WIND FARM | **PRELIMINARY LANDSCAPE AND VISUAL IMPACT**



CAMBIUM GROUP

Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F20_Representative_location_Moulamein_MWTT_220309_v01

Figure 21

Representative location Sturt Highway rest area east - Multiple wind turbine tool

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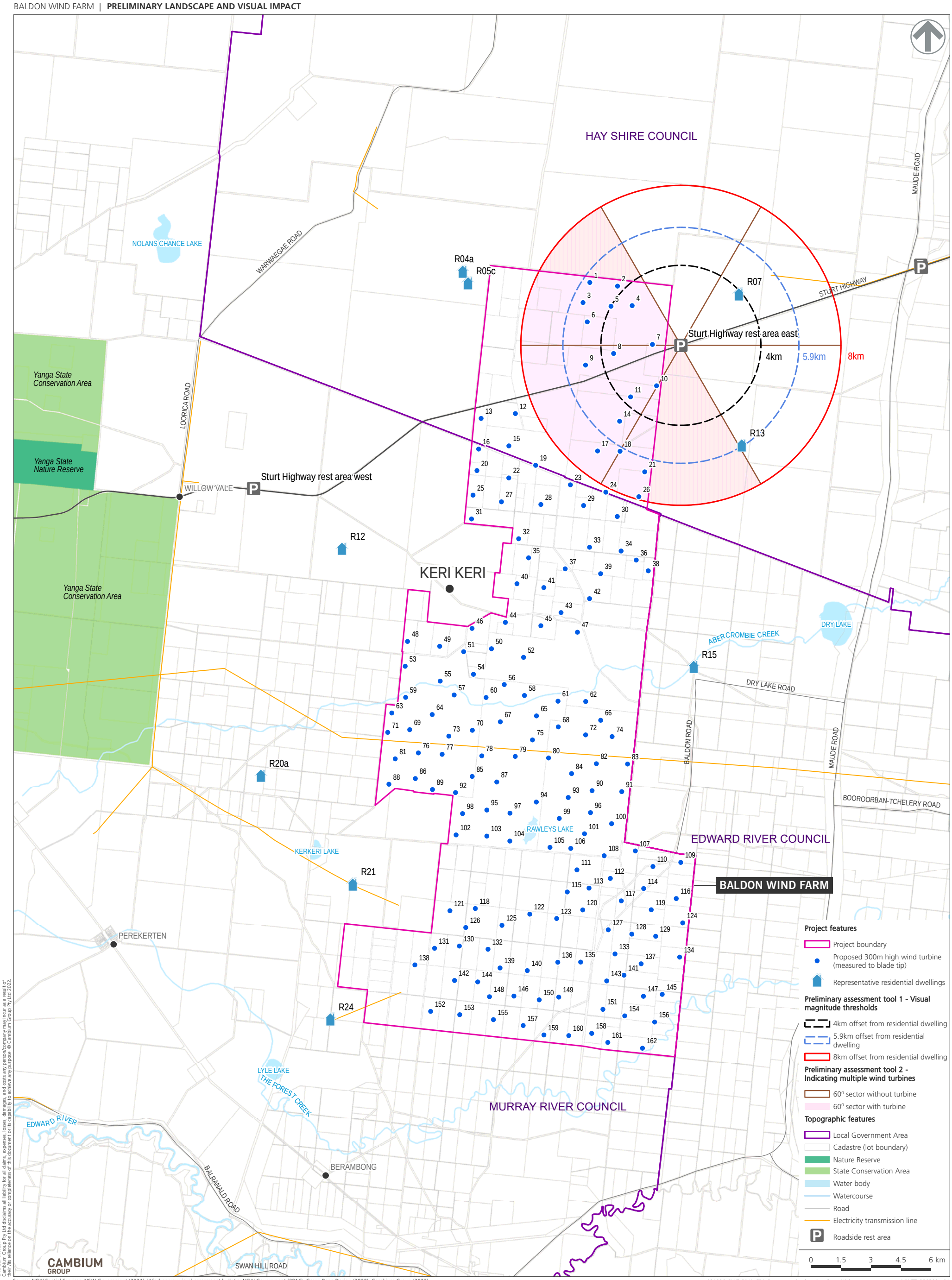


CAMBIUM GROUP

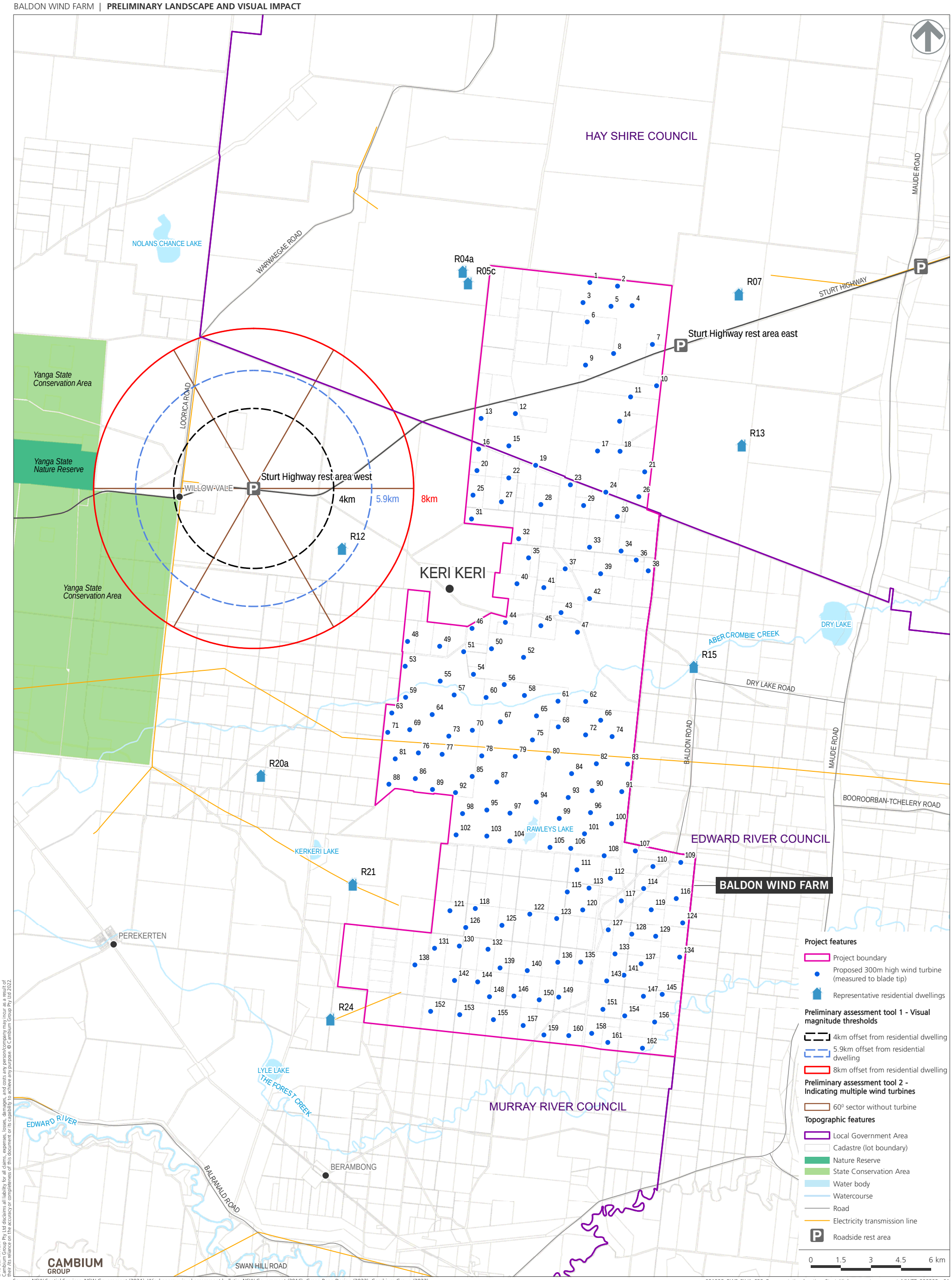
Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F21_Representative_location_Sturt_Highway_rest_area_east_MWTT_220309_v01

Figure 22

Representative location Sturt Highway rest area west - Multiple wind turbine tool

GBD Landscape architecture



CAMBIUM GROUP

Source: NSW Spatial Services, NSW Government (2021), Wind energy visual assessment bulletin, NSW Government (2016), Green Bean Design (2022), Cambium Group (2022).

031228_BWF_PLVA_F22_Representative_location_Sturt_Highway_rest_area_west_MWTT_220309_v01

Section 8. Summary

8.1 Summary

This Preliminary LVIA has been prepared in accordance with the Visual Bulletin and specifically addresses the key steps set out in Stage 1 PEA / Scoping Report (pre-lodgement). The Preliminary LVIA has:

- Outlined the community consultation activities undertaken by the Proponent and identified the key landscape features and characteristics that are found within and surrounding the project boundary.
- Noted the landscape features and locations of concern to the community and will further consider these within the Stage 2 EIS Assessment and Determination process.
- Applied the preliminary assessment tools (magnitude and multiple wind turbine) to the preliminary wind turbine layout.
- Documented the process and analysis of the Stage 1 Preliminary Environmental Assessment.

The Preliminary LVIA will be carried forward to the Stage 2 EIS, which will consider the proposed wind farm development against the Visual Bulletin performance objectives and requirements.

8.2 Next steps

This Preliminary LVIA, incorporating the preliminary assessment tools, will be submitted to DPIE together with the Scoping Report as a pre-requisite as a request for the Secretary's Environmental Assessment Requirements (SEARs). The Visual Bulletin notes that '*In relation to visual assessment, SEARs for wind energy applications will require the Proponent to provide a comprehensive assessment of the project in accordance with (the) Bulletin that analyses the proposed wind energy project in relation to the visual performance objectives'*.

The Steps in Visual Assessment (refer Section 4) identifies the key steps in the Stage 2 EIS visual assessment. These include:

- Prepare a Visual Baseline Study as part of the EIS
- Undertake community consultation aspects of the visual baseline study and describe mitigation and management options in the EIS
- Establish Visual Influence Zones from viewpoints using inputs from the visual baseline study
- Undertake an evaluation of project against the Visual Performance Objectives.

The Proponent will commission a detailed Landscape and Visual Impact Assessment (LVIA) report. The LVIA report will be prepared in accordance with the Visual Bulletin requirements and incorporate:

- Baseline Study Factors
- Visual Performance Evaluation and
- Visual Performance Objectives

The Stage 2 EIS will incorporate a detailed Landscape and Visual Impact Assessment to address the Visual Bulletin Stage 2 requirements.

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Landscape architecture

Green Bean Design Pty Ltd (GBD) is a highly experienced landscape architectural consultancy specialising in landscape and visual impact assessment. Established in 2006 as an independent consultancy, GBD provide professional advice to a range of commercial and government clients involved in large infrastructure project and policy development.

GBD Director Andrew Homewood is a Registered Landscape Architect, member of the Australian Institute of Landscape Architects and the Environmental Institute of Australia and New Zealand. Andrew has over 30 years' continuous employment in landscape consultancy and has completed numerous landscape and visual impact assessments for a range of state significant developments including wind energy, solar, mining, industrial and transport developments.

GBD has been commissioned for large scale renewable energy projects across New South Wales, Victoria, South Australia, Queensland and Tasmania.

GBD has been engaged as a peer reviewer of renewable energy landscape and visual impact assessments in Victoria and New South Wales.

CONTACT
Green Bean Design Pty Ltd
Andrew Homewood
0430 599 995
GreenBeanDesign@outlook.com

PO Box 3178 Austral, NSW 2179