WILLATOOK
Wind Farm

www.willatookwindfarm.com.au

WIND PROSPECT

What is to be presented today

- Welcome
- Housekeeping
- Project overview
  - Michael Sale, Wind Prospect
- Assessments by technical specialists:
  - Environmental noise – Chris Turnbull (Sonus)
  - Landscape and visual– Hayden Burge (Landform Architects)
  - Biodiversity – Brett Lane (Nature Advisory)

Q&As

Welcome

We acknowledge the traditional owners of the lands on which we are meeting tonight and pay our respects to their elders, past present and emerging.

Housekeeping

Housekeeping

- Attendees have been placed on mute to minimise background noise
- Please submit questions using the **"Q&A"** feature on your screen
- At all times, please remain **courteous** – this is an information sharing forum
- To enable us to answer as many questions as possible within the timeframe, please **keep your questions concise** and preferably on the topics included in this presentation
- Questions that not answered tonight will be included in a FAQ document that will be made available on the project website **www.willatookwindfarm.com.au**
- We encourage you sign up to mailing list via the NEWS page on the project website
- This session will finish at **8.00pm**

WIND PROSPECT

Project overview

1. Where we are in the process
2. Design development process
3. Project overview
4. Some of the project benefits

Michael Sale, Senior Development Manager

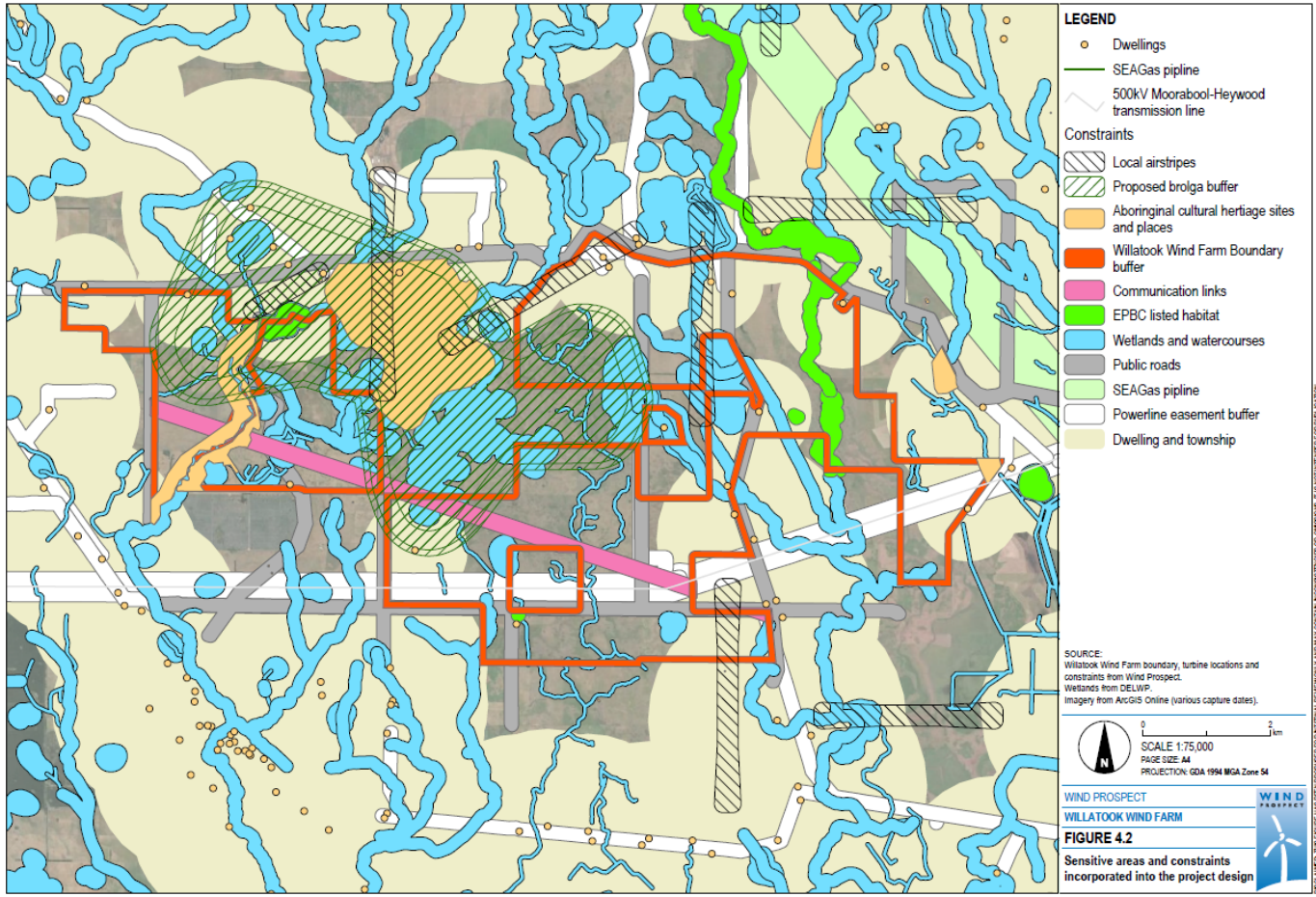
Project status

WIND PROSPECT

Design development

From the earliest point in the design, a number of constraints have influenced the location of wind turbine and other infrastructure, namely:

- Dwellings
- Neighbouring property boundaries
- Township zones
- Aboriginal cultural heritage sites and places
- Potential Brolga nesting areas
- Native vegetation and fauna habitat
- Watercourses and wetlands
- Powerlines, roads and communication links
- Local air strips



Design evolution

Initial concept (2010)

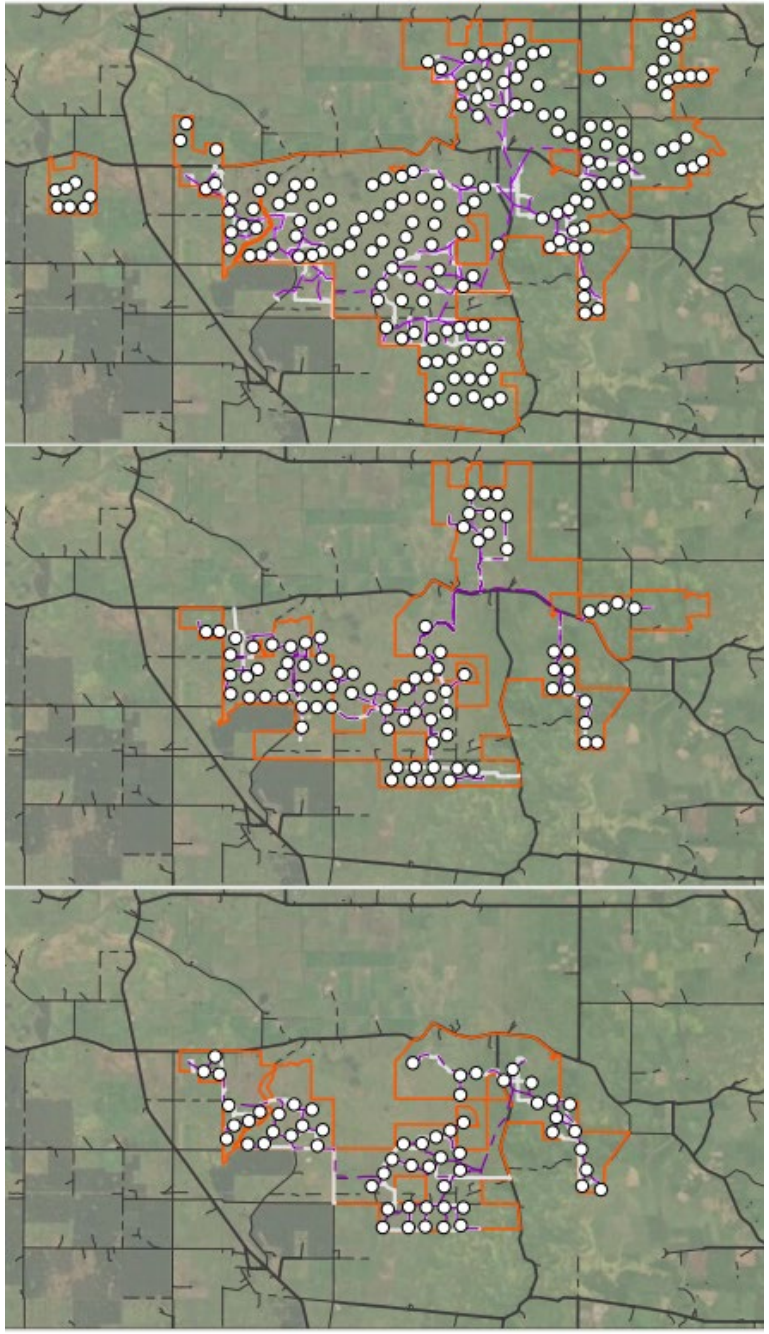
- 190 wind turbines with maximum blade tip of 160 m based on site reconnaissance and initial stakeholder engagement

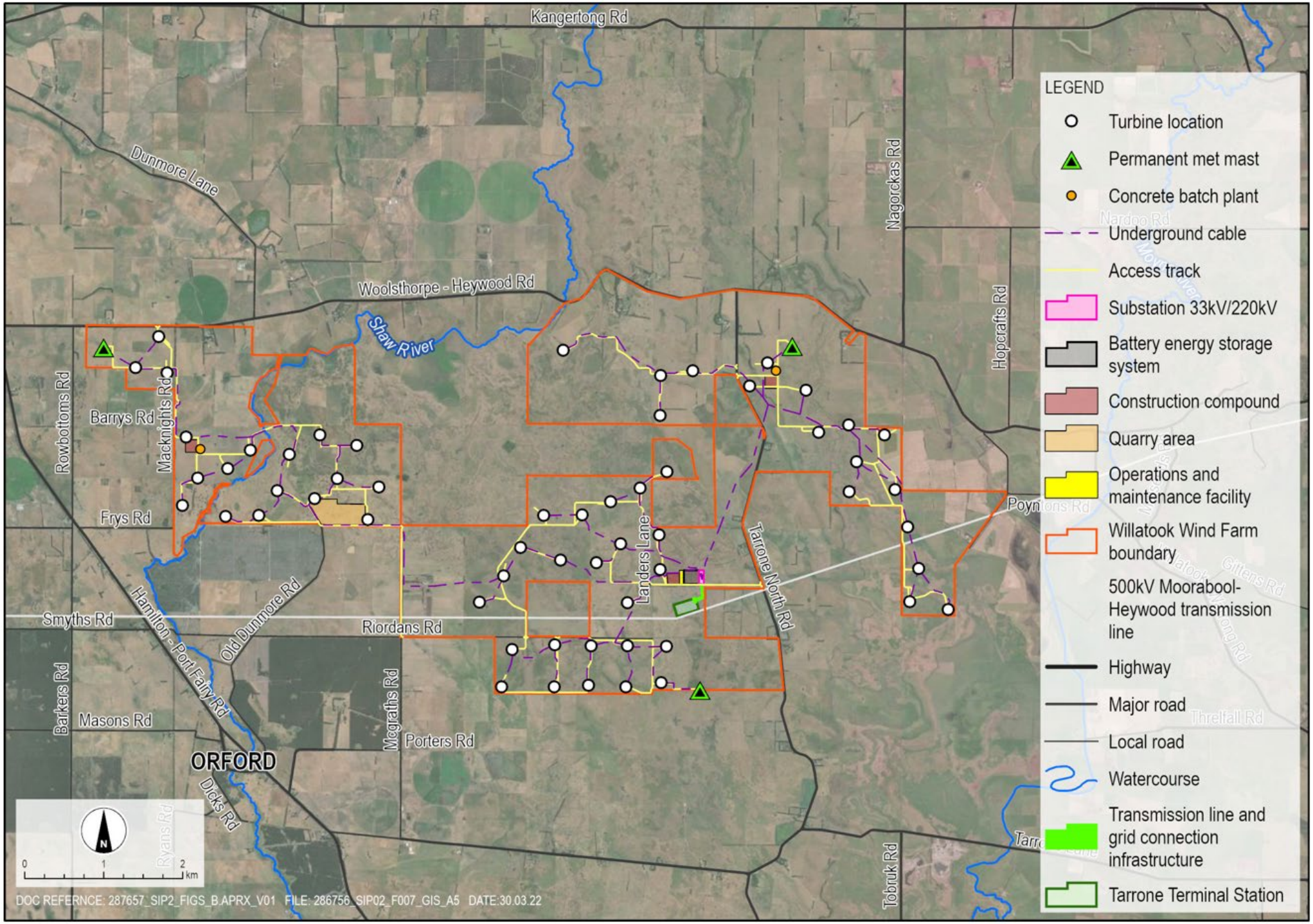
Revised concept design (2018; proposed in EES referral)

- 83 wind turbines with maximum blade tip height of 220 m
- Incorporated the findings of a wide range of technical assessments undertaken in the lead up to the EES referral

Current project design (2022; in the EES and permit application)

- 59 wind turbines with maximum blade tip height of 250 m
- Incorporated the findings of additional (more detailed) technical assessments




Kangertong Rd
Dunmore Lane
Woolsthorpe - Heywood Rd
Shaw River
Nagorckas Rd
Hopcrafts Rd
Rowbottoms Rd
Barrys Rd
Macknights Rd
Frys Rd
Landers Lane
Tarrone North Rd
Smyths Rd
Riordans Rd
Old Dunmore Rd
Hamilton - Port Fairy Rd
Barkers Rd
Masons Rd
Megraths Rd
Porters Rd
ORFORD
Dicks Rd
Ryans Rd
Tobruk Rd
Nardoo Rd
Gitters Rd
Threlfall Rd
0
1
2
km
LEGEND
Turbine location
Permanent met mast
Concrete batch plant
Underground cable
Access track
Substation 33kV/220kV
Battery energy storage system
Construction compound
Quarry area
Operations and maintenance facility
Willatook Wind Farm boundary
500kV Moorabool-Heywood transmission line
Highway
Major road
Local road
Watercourse
Transmission line and grid connection infrastructure
Tarrone Terminal Station
DOC REFERNCE: 287657_SIP2_FIGS_B.APRX_V01 FILE: 286756_SIP02_F007_GIS_A5 DATE:30.03.22

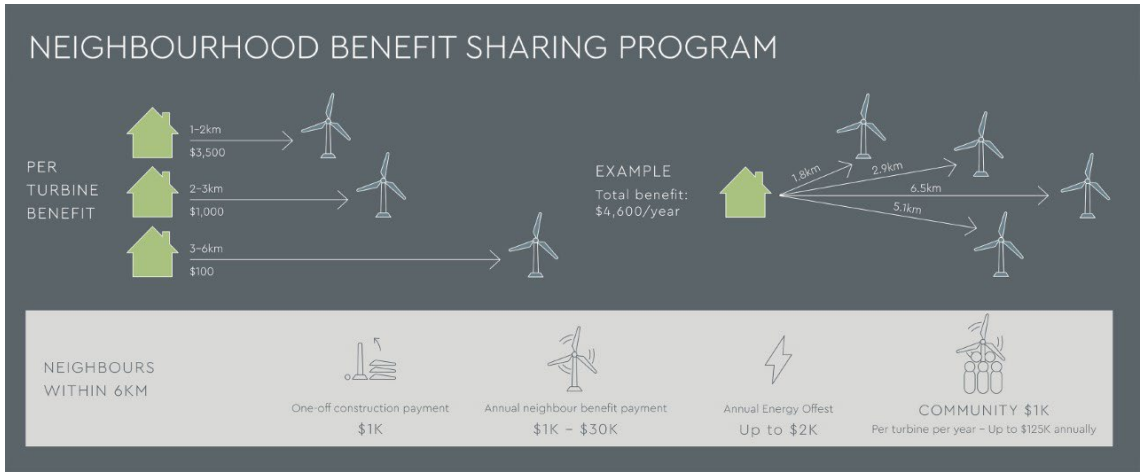
Summary

Feature	Description
Wind turbines	59 wind turbines with a maximum height of 250 metres, rotor diameter up to 190 metres and minimum tip height of 40 metres
Wind farm capacity	~350MW
Battery storage	200MW/400 MWh located immediately north of the Tarrone Terminal Station
Substation	Located immediately north of the Tarrone Terminal Station
Access tracks	~6m wide mostly internal track network would provide to minimise the use of local roads
Transmission lines	Underground transmission lines would connect wind turbines to the substation. A short (<300m) overhead transmission line would connect the substation to the Tarrone Terminal Station
Construction	2 years
Component transport	Transport of wind turbine components would be from Portland and via the regional road network

WIND PROSPECT

Some of the project benefits

- Injection of approximately $3.5 million (2022 dollars) in additional spending to local and regional economies over the construction phase, supporting around 23 FTE jobs in the service sector
- Approximate number of jobs anticipated to be sourced from the area:
  - Average of 110 direct and 75 in-direct FTE jobs during construction
  - 9 direct and 9 in-direct FTE jobs during operation
- Neighbour Benefit Sharing Program valued at ~$900,000 annually for the life of the project
- Reduction in greenhouse gas emissions
- Replaces a significant portion of aging (and retiring) coal generation
- Will contribute to lower wholesale electricity prices



WIND PROSPECT

Willatook Wind Farm

Environmental Noise Assessment

Chris Turnbull

7 April 2021

Assessment includes:

- The operational noise from Willatook Wind Farm turbines
- The cumulative effect of other wind farms in the vicinity
- An assessment of construction noise
- The operational noise from site substations and ancillary activity

Standards and Guidelines

- Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (Department of Environment, Land, Water and Planning, July 2021).
- New Zealand Standard NZS6808:2010, Acoustics - Wind Farm Noise
- Noise limit and assessment protocol 1826, EPA Jul 2021
- Civil construction, building and demolition guide, EPA Nov 2020

Wind Farm Criteria

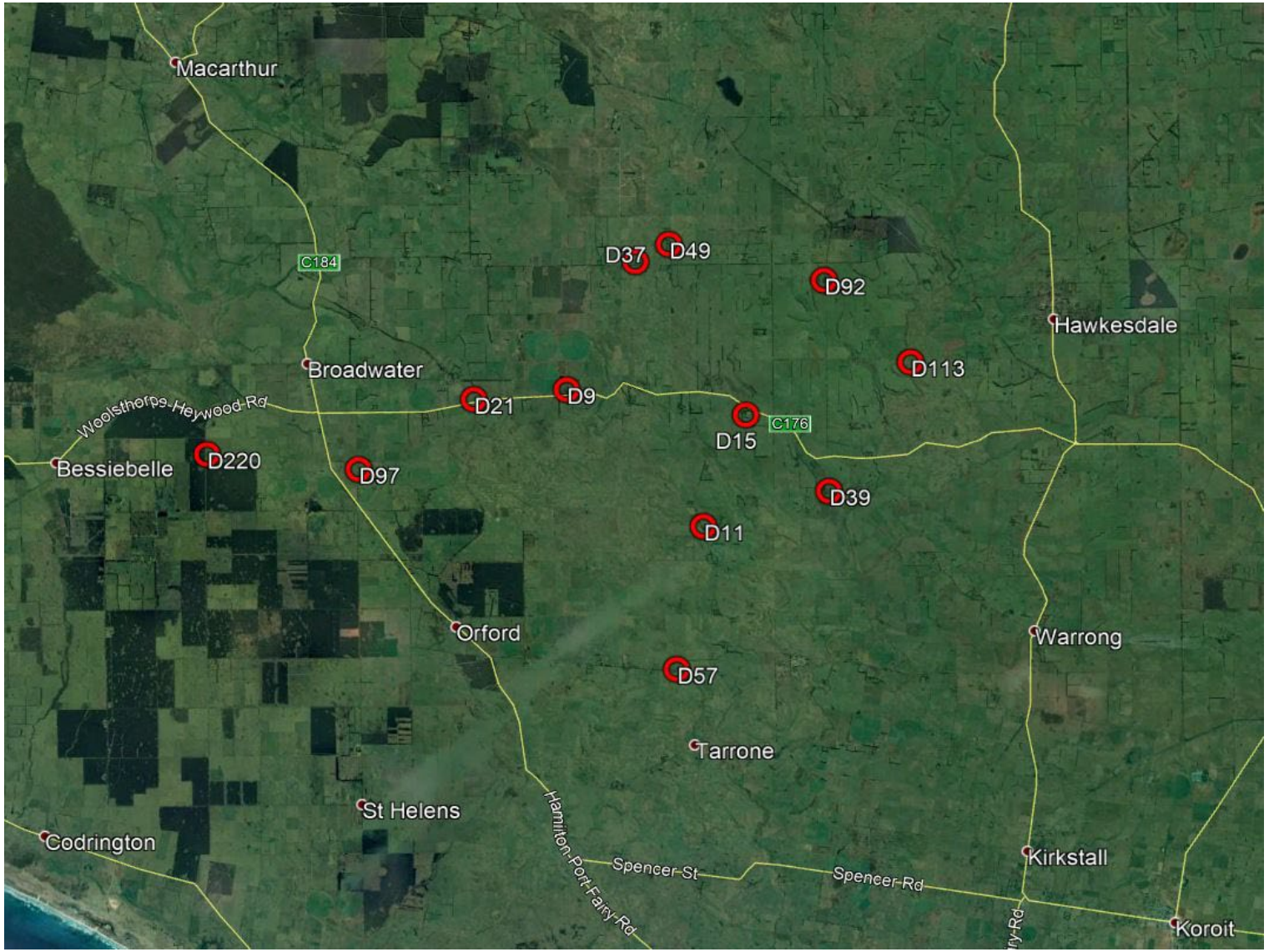
40 dB $L_{A90(10min)}$ outdoors

or 'background +5 dB', whichever is the greater

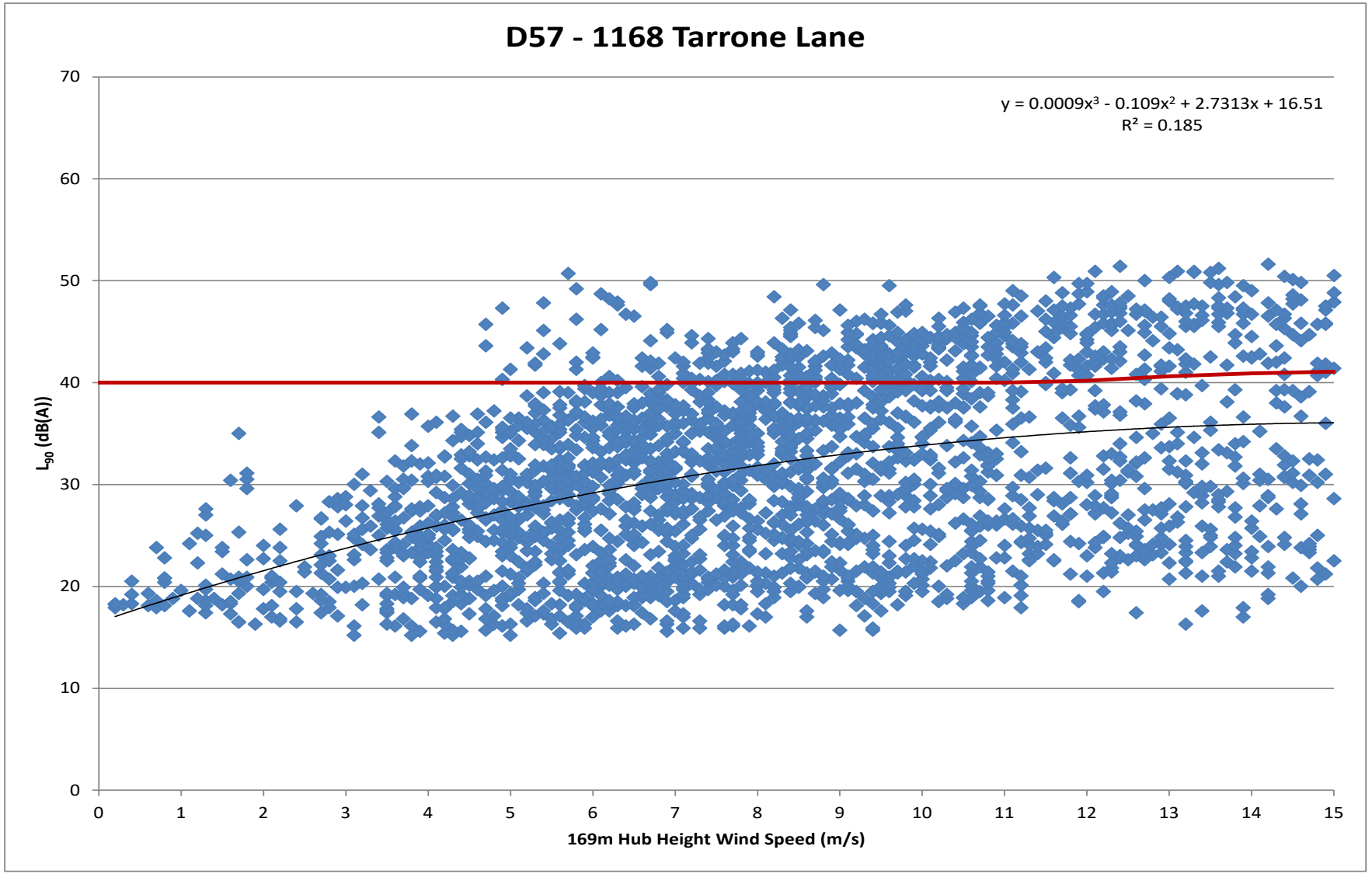
a 'high amenity noise limit' of 35 dB(A) may be justified in special circumstances but not where all residences inside the 35 dB(A) noise contour are in a Farming (or Similar) Zone

Background noise monitoring was conducted in accordance with NZS6808:2010 between 30 September and 10 November 2010 and will be repeated prior to construction

Background Noise



Background Noise



Criteria

Hub height wind speed	Criteria (dB(A))											
	D9	D11	D15	D21	D37	D39	D49	D57	D92	D97	D113	D220
3 m/s	40	40	40	40	40	40	40	40	40	40	40	40
4 m/s	40	40	40	40	40	40	40	40	40	40	40	40
5 m/s	40	40	40	40	40	40	40	40	40	40	40	40
6 m/s	40	40	40	40	40	40	40	40	40	40	40	40
7 m/s	40	40	40	40	40	40	40	40	40	40	40	40
8 m/s	40	40	40	40	40	41	40	40	40	40	40	40
9 m/s	40	40	40	40	40	41	40	40	40	41	40	40
10 m/s	40	41	40	40	41	42	40	40	40	41	40	40

Noise Predictions

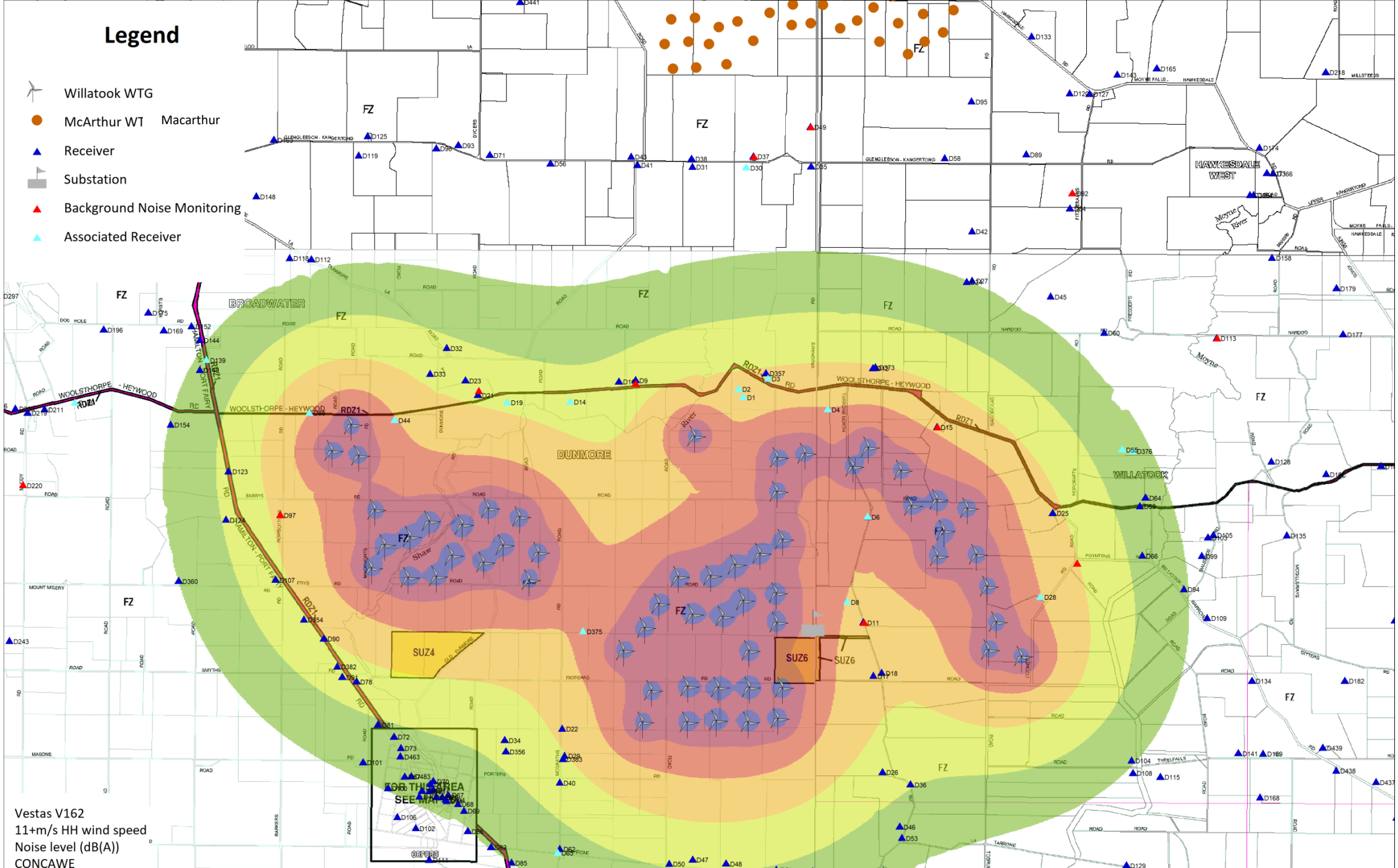
59 Vestas V162 WTGs with a hub height of 149m

CONCAWE

- atmospheric conditions at 10°C and 80% relative humidity
- acoustically soft ground (finite acoustic impedance)
- barrier attenuation of no greater than 2 dB(A);

ISO9613-2

- atmospheric conditions at 10°C and 70% relative humidity
- 50% acoustically hard/soft ground;
- barrier attenuation of no greater than 2 dB(A);
- 4m receiver height; and,
- 3 dB(A) correction where a "concave" ground profile exists


Legend
Willatook WTG
McArthur WT
Macarthur
Receiver
Substation
Background Noise Monitoring
Associated Receiver
Vestas V162
11+m/s HH wind speed
Noise level (dB(A))
CONCAWE
BROADWATER
DUNMORE
WILLATOOK
HAWKESDALE WEST
WOOLSTHORPE - HEYWOOD
HAMILTON PORT FAIRY
RDZ1
SUZ4
SUZ6
FZ
FOR THIS AREA SEE MAP

Cumulative Noise

Ryan Corner and Hawkesdale

> 5km from Willatook

Willatook contribution <25 dB(A) at 3.3km

25 dB(A) + 40 dB(A) = 40 dB(A)

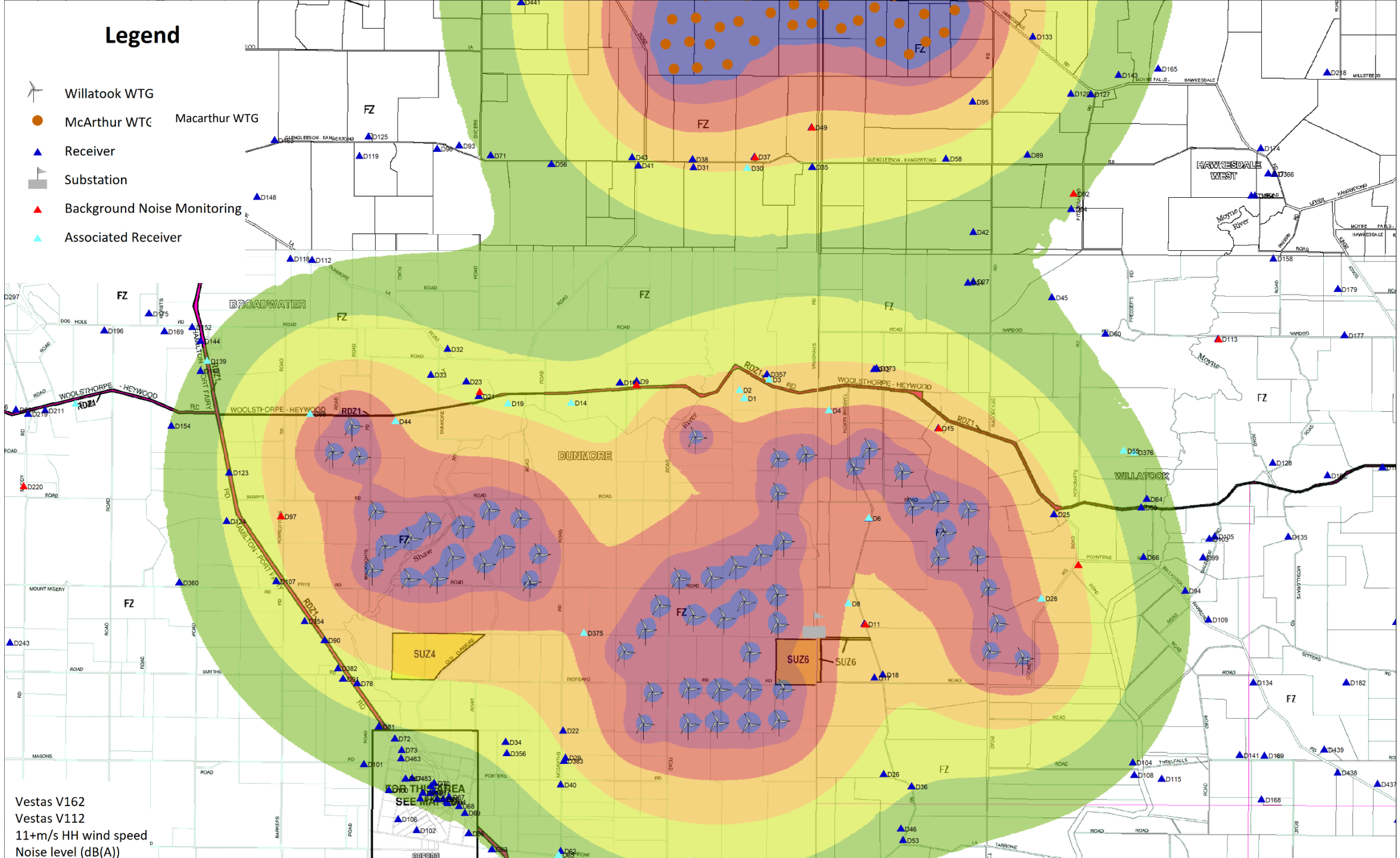
Wind cannot be in both directions

Macarthur

Cumulative predictions conducted

Highest cumulative level 38 dB(A) at D49 (<25 dB(A) from Willatook)

Wind cannot be in both directions


Legend
Willatook WTG
McArthur WTG
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Receiver
Substation
Background Noise Monitoring
Associated Receiver
Vestas V162
Vestas V112
11+m/s HH wind speed
Noise level (dB(A))
FZ
SUZ4
SUZ6
RDZ1
BROADWATER
DUNMORE
WILLATOOK
HAWKESDALE WEST
WOOLSTHORPE - HEYWOOD
HAMILTON - PORTLAND
GLENGLEESON - KANGERTONG
SEE MAP 4

Ancillary Infrastructure

Utilities (Substation & BESS)
Protocol criterion at night 34 dB(A), during the evening 39 dB(A) and during the day 45 dB(A)

Recommend reduced noise output from transformer to account for tonality and cumulative noise

Quarry
Protocol criterion at night 36 dB(A), during the evening 41 dB(A) and during the day 45 dB(A)

Noise levels from the quarry predicted to be less than 25 dB(A)

Construction

A Construction noise assessment has been prepared based on the *Civil construction, building and demolition guide*, EPA Nov 2020

The Guide requires minimising the impact of noise and vibration at all times (including community consultation, work scheduling and noise reduction measures)

Outside of “normal working hours” restricted to:

- Low-noise impact works;
- Managed-impact works; or,
- Unavoidable works

Construction activity at a wind farm is seldom an issue as it typically occurs at significant separation distances from residences for relatively short periods of time at each site.

Conclusion

- Wind turbine criteria determined based on
  - Policy and Planning Guidelines
  - NZS6808:2010

- Noise Predictions conducted using CONCAWE and ISO9613-2
  Willatook and cumulative noise are compliant with criteria

- Ancillary equipment assessed in accordance with Protocol

- Construction Noise and Vibration Management Plan proposed to address construction Noise and Vibration

Questions

Landscape and Visual Assessment

Hayden Burge

Landform Architects

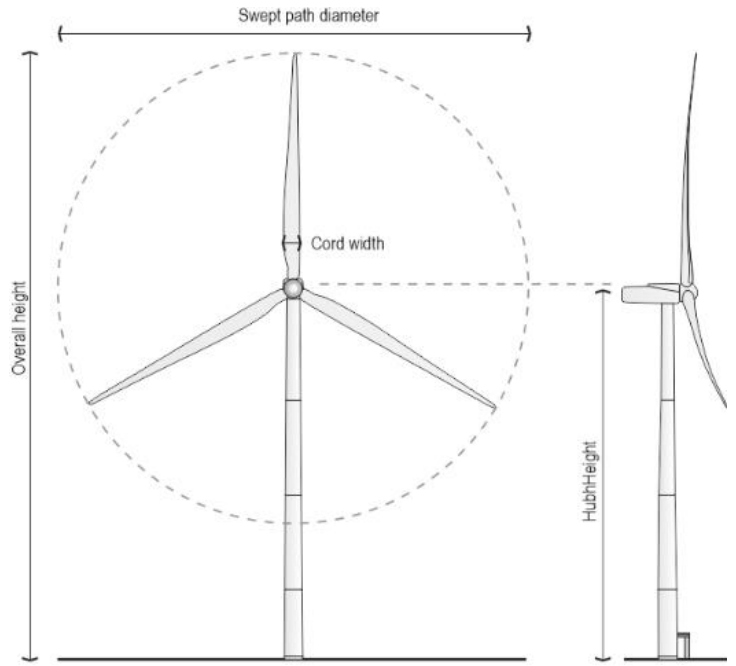
7 April 2022

Landscape and visual

Methodology

- **Project description**
- **The Study Area / ZVI**
- **Policy and Planning**
- **Landscape Character Units and Sensitivity**
- **Seen Area Analysis**
- **Cumulative Considerations**
- **Viewpoint Assessments**

  Public and Private
- **Mitigation Measures**



L A N D F O R M
ARCHITECTS

Landscape and visual

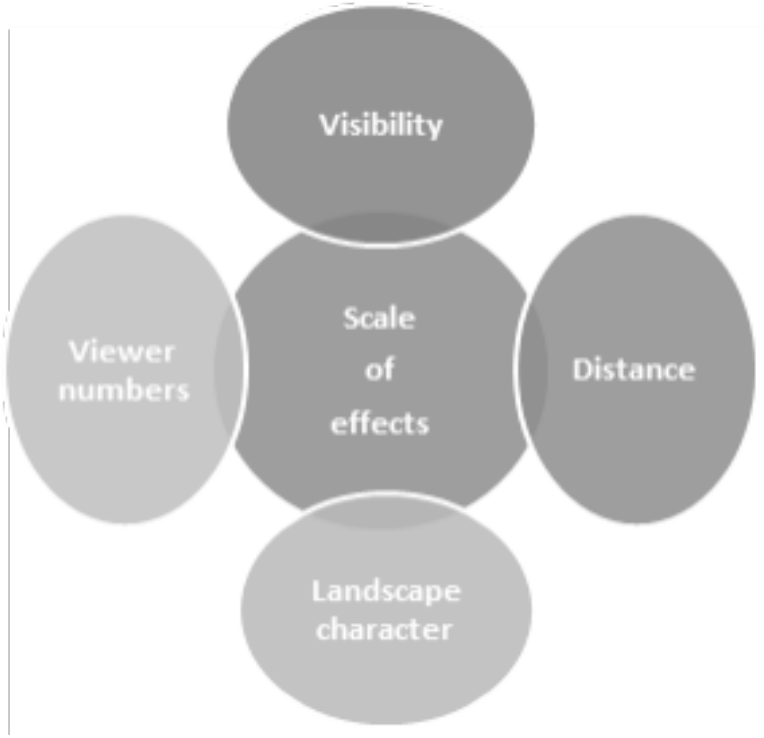
Visual Impact from the public domain

- **Visibility**
- **Distance**
- **Landscape Character and Sensitivity**
- **Viewer numbers**

Visual Impact from the Private Dwellings

- **Visibility**
- **Distance**

Sensitivity: Is always rated as "high", viewer numbers are not relevant



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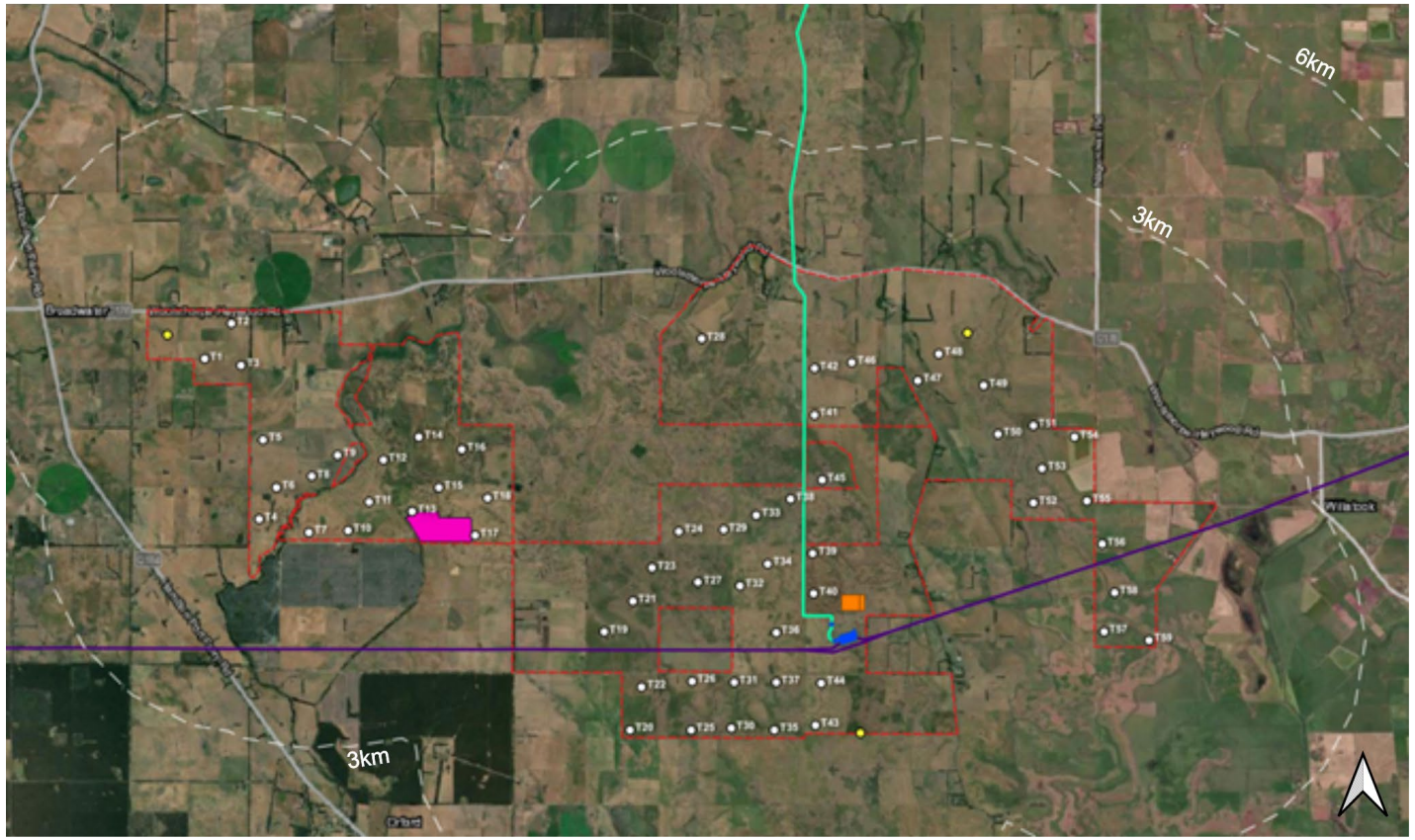
Landscape and visual

- 59 turbines
- Overall height – 250 m
- Hub/Nacelle height – 169 m
- Rotor Diameter – 190 m
- Cord width – 5 m

- Meteorological masts

- Transmission Lines (Onsite)
- In site Sub-station
- On-site Quarry
- Aviation Obstacle Lighting – (If required)



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Landscape and visual

- 28.6 km Study area
- Land use and sensitivity
- Significant and recognised public viewing locations
- Townships and localities
- Roads and tourist routes
- Dwellings

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Landscape and visual

- 118 - Public Viewpoints informed the assessment and observations
- 7 from open space and recreation areas
- 17 from major roads and highways
- 3 from local roads
- 4 from town ships and localities

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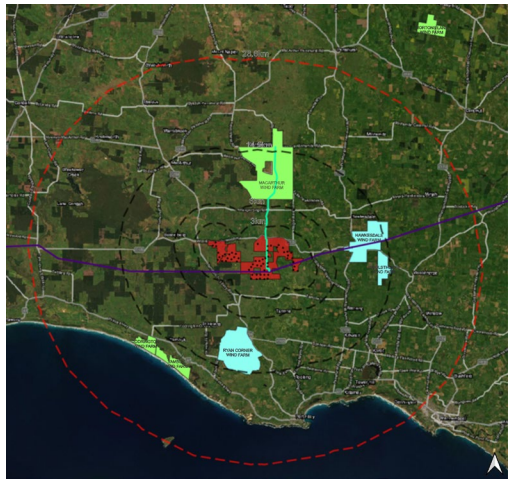
Landscape and visual

Wind Farm Name	Oper	App'd	Height	~ Dist
Macarthur Wind Farm			145m	5.8 km
Codrington Wind Farm			86m	14.6 km
Yambuk Wind Farm			105m	14.5 km
Ryan Corner Wind Farm			180m	7.4 km
Hawkesdale Wind Farm			180m	6.3 km
Woolsthorpe Wind Farm			180m	11.4 km
Mortons Lane Wind Farm			150m	37.8 km
Mortlake South Wind Farm			186m	49.3 km
Portland Wind Farms			106m	46.1km



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Landscape and visual

Public Viewing locations

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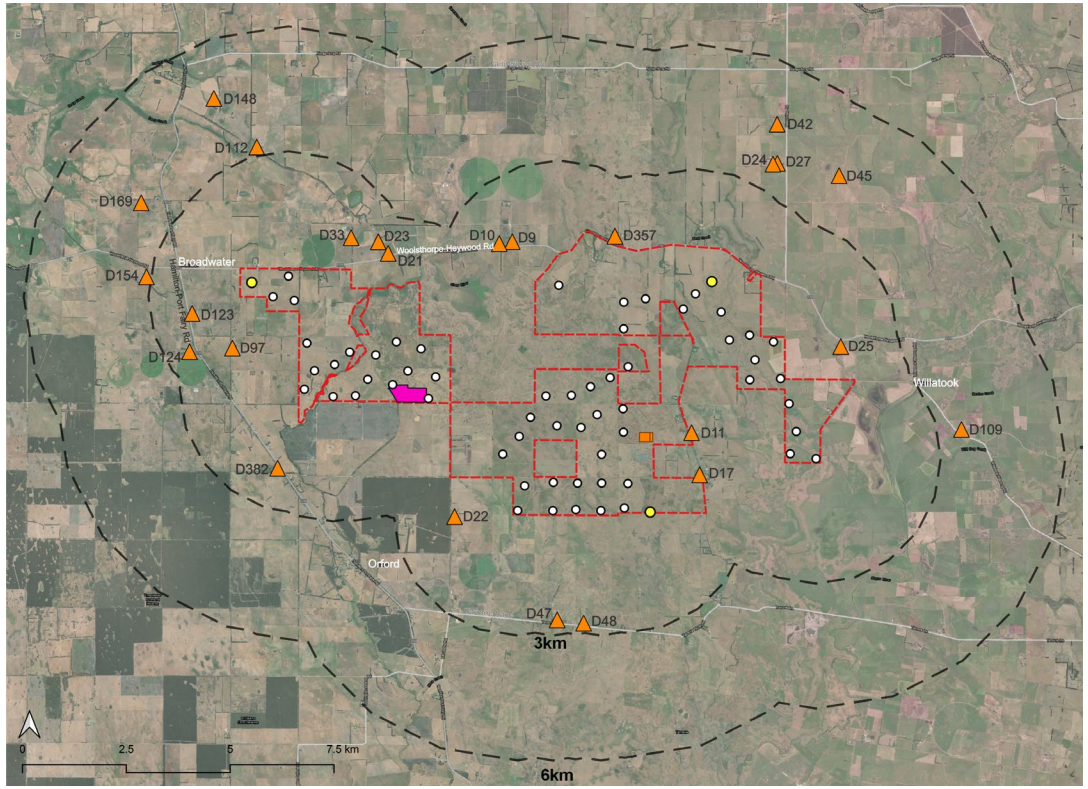
Landscape and visual

Residential Dwellings



- 141 Neighbouring dwellings within 6.0 km
- Clusters at Orford and Broadwater
- 25 included in the assessment

Visual impact would be:

- 5 - High
- 3 - Moderate / high
- 2 – Moderate
- 3 – Moderate / low
- 5 – Low
- 1 – Moderate / low
- 1 – Low / Negligible
- 5 – Negligible / Nil

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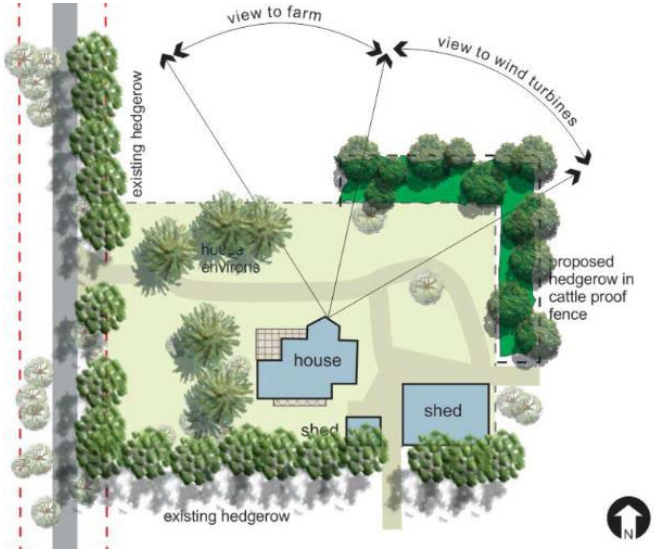
Landscape and visual

Mitigation Measures



L A N D F O R M
ARCHITECTS

Questions

Willatook Wind Farm

Biodiversity Assessment
Brett Lane

Trusted ecological experts

Nature Advisory

Overview

EES Scoping requirement:

> *"To avoid or minimise potential adverse effects on biodiversity values within and near the site including native vegetation, listed threatened species and ecological communities, and habitat for these species. Where relevant, offset requirements are to be addressed consistent with state and Commonwealth policies"*

Nature Advisory has prepared the biodiversity assessment for the project, including input from:

- Ecology and Heritage Partners (2009 – 2012)
- Nature Advisory specialists (2016 – 2022)
- Liaison with DELWP
- EES Technical Reference Group

Nature Advisory

Methods

- Broad range of ecological field surveys conducted between 2009 to 2021
- Native vegetation mapping and habitat scoring (Cl. 52,17)
- Targeted surveys of the footprint for threatened flora
- Assessment and mapping of threatened communities (GEW, SHW)
- Targeted fauna surveys and habitat assessments for:
  - Bird utilisation surveys (2009 and 2018-19)
  - Migratory shorebirds (one year – EPBC Act surveys guidelines)
  - Extensive Brolga studies - Interim Guidelines (2012) (five breeding/flocking seasons over the last 11 years)
  - Bats (over four years, ~5,000 detector nights – more than any other wind farm in Victoria)
  - Striped Legless lizard, Swamp Skink, Glossy Grass Skink, Growling Grass
  - Freshwater fish surveys

Findings existing conditions – desktop review

From existing information and online databases, 37 EPBC Act listed species and 48 FFG Act listed species were recorded, or their habitat was predicted to occur within 10 km of the project including:

- Migratory birds including Common Greenshank, Curlew Sandpiper, Eastern Cattle Egret, Eastern Great Egret, Fork-tailed Swift, Glossy Ibis, Latham's Snipe, Red-necked Stint, Sharp-tailed Sandpiper
- Threatened birds including Brolga, Curlew Sandpiper, White-throated Needletail, Australasian Shoveler, Black Falcon, Blue-billed Duck, Hardhead, Little Eagle, Musk Duck and Plumed Egret
- Threatened bats including Southern Bent-wing Bat, Yellow-bellied Sheathtail Bat and Grey-headed Flying-Fox
- Threatened frog and reptiles including Growling Grass Frog and Glossy Grass Skink
- Threatened fish species Little (Dwarf) Galaxias and Yarra Pygmy Perch

Findings – Vegetation and flora

- A total of 848 hectares of native vegetation, including DELWP-mapped wetlands, was documented, representing ~12% of the project site as well as 75 large trees
- Design measures were implemented to avoid impacts on native vegetation where possible. A total of 4.6 ha of native vegetation would require clearance (<0.5% of mapped native vegetation) as well as 6 large trees
- 0.5 ha of Commonwealth listed ecological community Seasonal Herbaceous Wetland of the Temperate Low Plain would require clearance
- Clearance of native vegetation and Seasonal Herbaceous Wetland of the Temperate Low Plain would require offsets in accordance with Victorian and Commonwealth requirements
- Two nationally threatened plants were recorded the Swamp Everlasting and the Trailing Hop-bush. These populations have been avoided during the project design

Plains Grassy Wetland

Basalt Shrubby Woodland

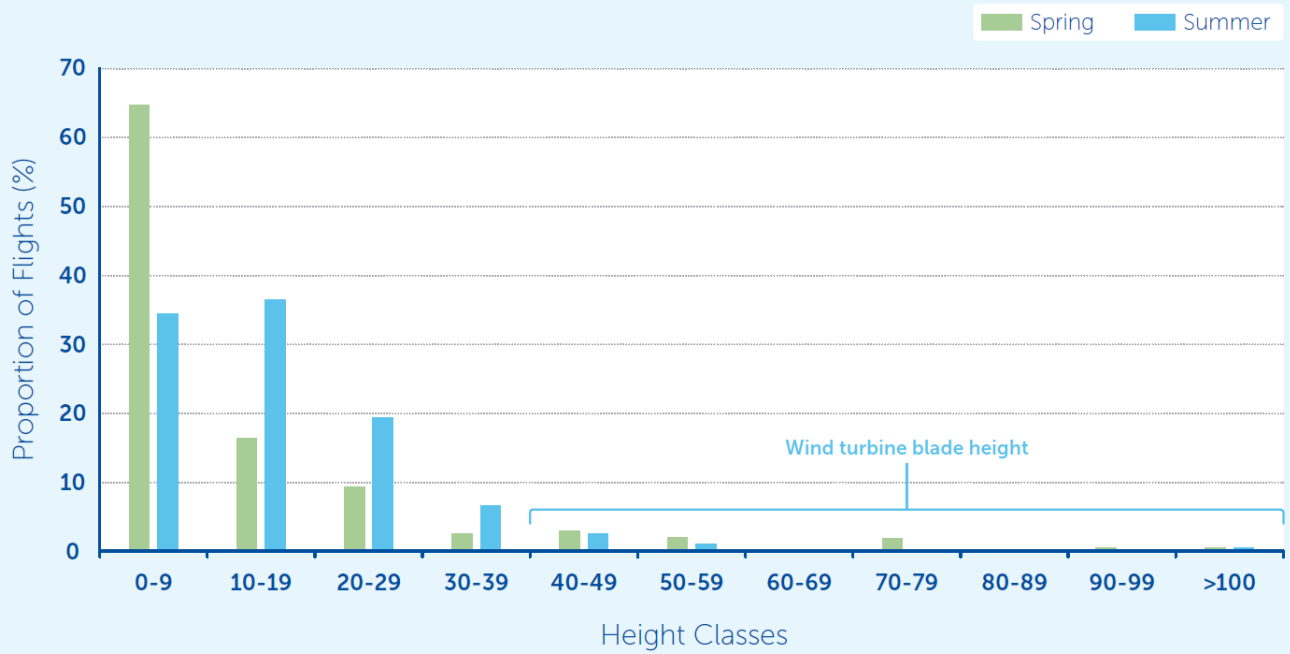
Stony Knoll Shrubland

Swamp Everlasting

Findings – Birds

- Five most abundant species of birds at the survey sites were common resident species (Australian Magpie, Little Raven, Eurasian Skylark, Common Starling, with Magpie–lark and European Goldfinch equal fifth, made up 75 % of all bird movements
- Most bird sightings (95%) were recorded below turbine rotor swept area (RSA) height of 40 metres
- One non-wetland listed migratory species was recorded the Fork-tailed Swift
- Wetlands occasionally support small numbers of Eastern Great and Cattle Egrets and Glossy Ibis (listed migratory spp.) and less than 10 of three species of listed migratory shorebird (Latham's Snipe, Common Greenshank, Sharp-tailed Sandpiper)

Sharp-tailed Sandpiper



Findings – Brolga

- Extensive field and aerial surveys, water modelling, landowner consultation
- One Brolga pair breeds near the wind farm. Two others elsewhere in the 10 km investigation area > 3 km from the wind farm (one of which is within the Macarthur Wind Farm)
- Six wetlands confirmed as breeding wetlands in the 'Cockatoo Swamp complex'

Brolga Records & Surveys

Brolga records in VBA database
Review of previous breeding records from databases within 10 km

Community Consultation
Community consultation with landowners within 10 km and extensive

Brolga field surveys
Roaming field surveys for Brolga over 5 breeding seasons with wetlands visited monthly for 3-4 consecutive days

All historical records of breeding associated with a wetland were assumed to indicate sites where breeding could occur in the future. The only exception was where the historical records of breeding was located at a wetland that had been permanently drained

Assessment of Brolga Habitat

Victorian Wetland Inventory
Wetlands identified within the DELWP Victorian Wetland Inventory ('current wetlands') database

Aerial Surveys
In October 2010, an aerial survey was conducted to record potential Brolga nests within 20 km of the project. A second aerial survey was undertaken in October 2018 within 10 km of the project in accordance with the Interim Brolga Guidelines

Field Inspection
Assessed habitat characteristics of mapped wetlands , including surface water cover, drainage, emergent vegetation present and grazing pressures

After two years of monitoring the wetlands, it was noticed that many of the wetlands on the wetland layer were inaccurate in terms of size, shape or presence of water. Therefore, detailed hydrological modelling was conducted for the site and immediate surrounds (i.e., within ~2km of potential turbine locations)

Hydraulic Modelling
Hydraulic model results were used to delineate which wet areas would move to a more detailed hydrologic assessment. Inundated areas with an area of less than 0.1 Ha were removed

Desktop Review
Refined using a desktop assessment of LiDAR, hydraulic model results and aerial imagery to exclude areas that are permanently drained, shallow (less than 300mm), incorrect topographic representation. The review assessed all potential wetland areas within 2 km of a confirmed breeding record

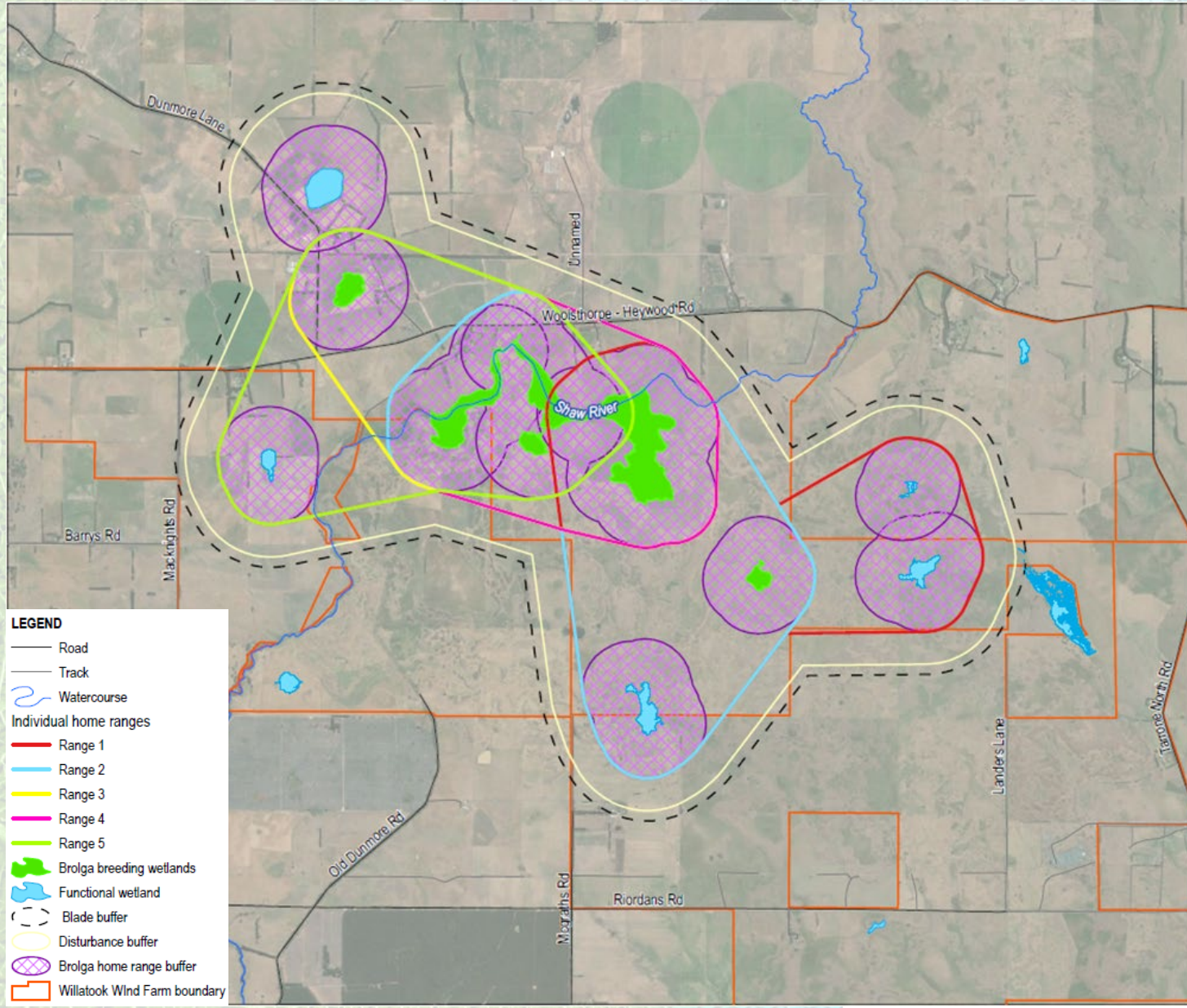
Hydrologic Modelling
Water balance modelling of each wetland individually or as a series of connected wetlands. This estimated both runoff volumes and wetland levels.

Field Assessment
Visited on foot, habitat characteristics assessed, including surface water cover, drainage, emergent vegetation present and grazing pressures

Nature Advisory

Findings – Brolga

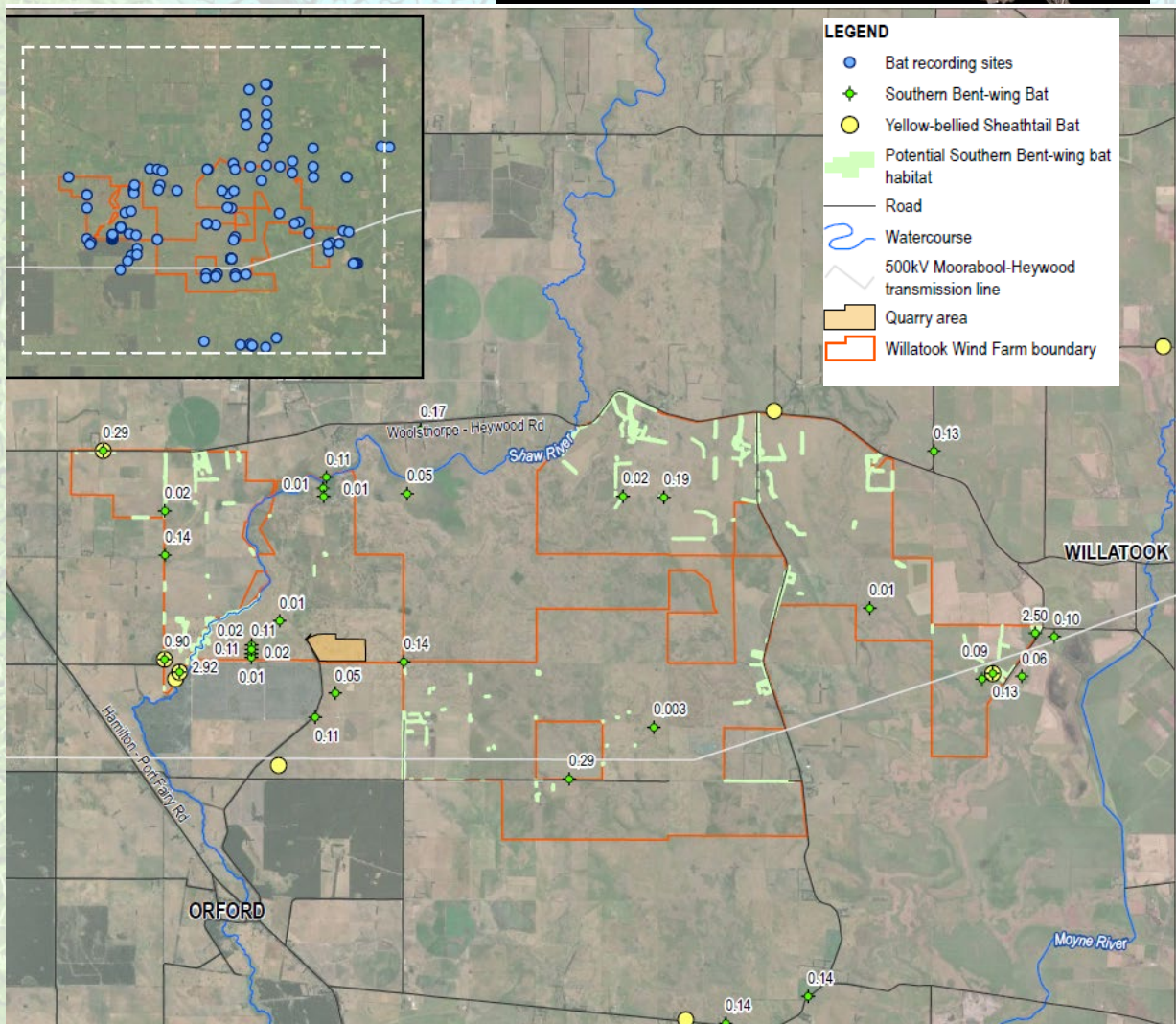
- Turbine free buffers were created around Cockatoo Swamp complex (>2,600 ha)
- Collision risk modelling predicts average 2.8 and up to 4 birds affected over the 25-year life of the project (90% avoidance rate)
- Population Viability Assessment predicts total population will reduce by less than one bird over that time (0.8 - 90% avoidance)
- Brolga compensation plan proposed to restore potential Brolga breeding sites



Findings – Bats

- 10 species – mostly common and widespread (Gould's Wattled Bat, Chocolate Wattled Bat and Large Forest Bat
- Two listed: Southern Bentwing Bat, Yellow-bellied Sheathtail bat (very low activity levels, particularly where turbines are proposed, due to poor quality habitat)
- Much lower bat activity at 40-50 meters at height compared with ground level activity and no Southern Bentwing Bats
- Turbines located in open areas where bat activity is lower

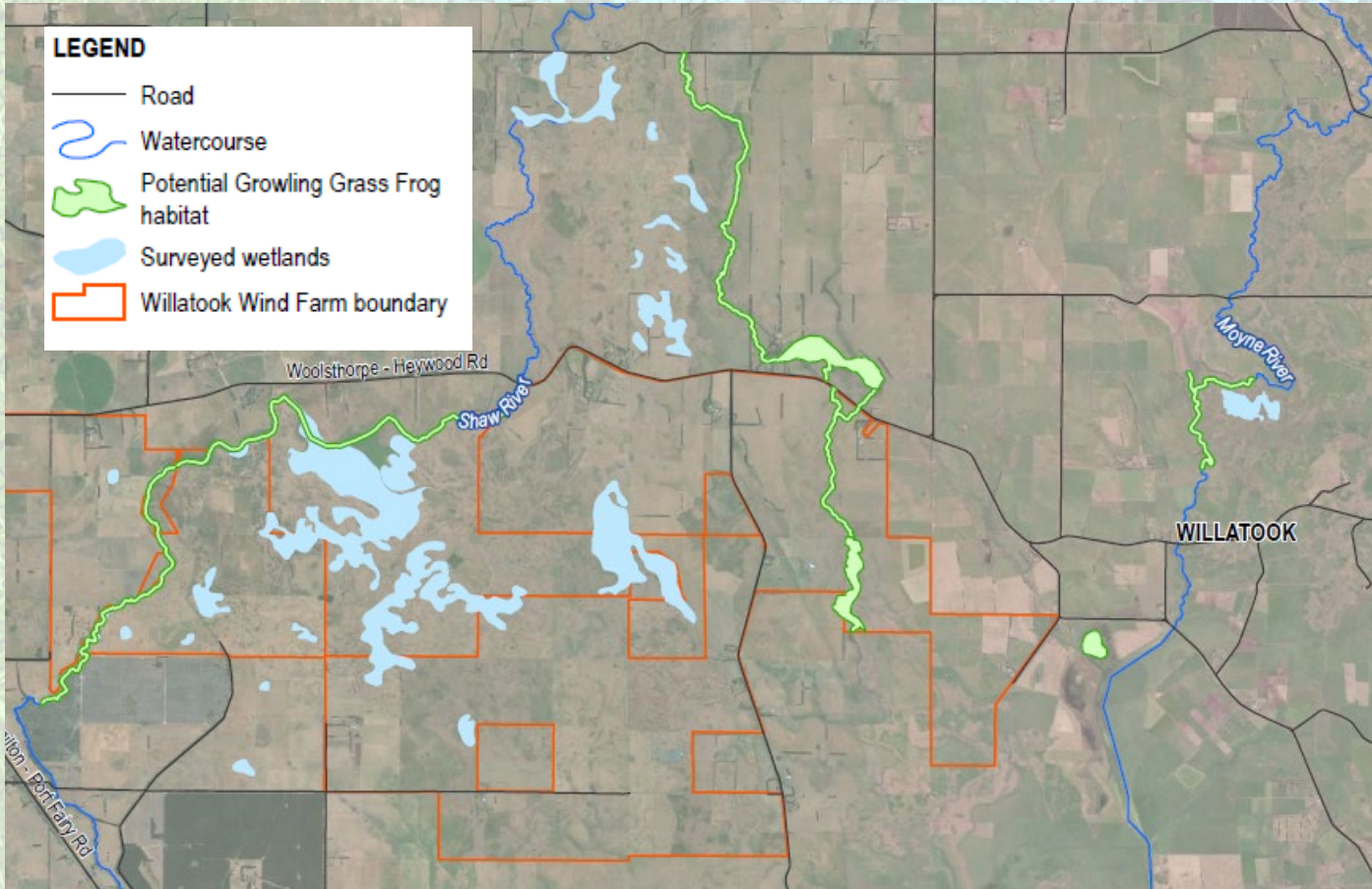
Southern Bent-wing Bat



Findings – Reptiles, frogs and fish

- Striped Legless Lizard not found
- Swamp Skink and Glossy Grass Skink found outside project area
- Growling Grass Frog recorded in Back Creek
- Little Galaxias and Yarra Pygmy Perch recorded in two waterways
- Apart from two waterway crossings, project will remain 100+ metres from waterways to avoid impacts wherever possible

Growling Grass Frog



Questions

For more information

- Project website - www.willatookwindfarm.com.au
- Department of Environment, Land, Water and Planning - documents relating to the proposed Willatook Wind Farm project www.planning.vic.gov.au/environment-assessment/browse-projects/projects/willatook-wind-farm