

Keri Keri Wind Farm

Amended Agricultural Impact Assessment

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EXECUTIVE SUMMARY

PROJECT DESCRIPTION

The amended Project involves the construction, operation, maintenance and decommissioning of a wind farm, with up to 114 wind turbine generators, together with associated and ancillary infrastructure (including three electrical substations, a battery energy storage system, underground 33 kV electrical reticulation and 220 kV to 330 kV overhead transmission lines) at Keri Keri NSW.

The amendments to the EIS Project include the reduction in the number of wind turbine generators (from 155 to 114) and reductions in the temporary development footprint (from 1,137 hectares to 'up to' 764 hectares) and in the permanent development footprint (from 574 hectares to 'up to' 491 hectares)

EXISTING ENVIRONMENT

GENERAL

The Project area is located in the Murray River local government area and the Murray Local Land Services Region on the Riverina Plains which has very low relief.

Rainfall in the study area averages approximately 323 millimetres per annum with moderate variability. Summers are relatively hot with an average of 76 days per year over 30°C.

Most soils in the Project area are moderate fertility vertosols, with some smaller areas of lighter textured, low fertility soils. Land and soil capability class 5 (moderate-low capability) is the dominant land types with a small area of lower capability land class 6 land.

LAND USE AND AGRICULTURAL PRODUCTIVITY

Historically, the Project area has mainly run Merino sheep for meat and wool production.

The property that forms 84 per cent of the Project area (Property 1) operates a Merino stud as the main land use. Some irregular cropping on a share farming basis has been undertaken in the past on about 710 hectares. The carrying capacity has been 5,500 ewes on approximately 24,000 hectares, although less sheep are carried during poor seasons. This property has also grown out purchased cattle during past good seasons, or taken on agistment cattle.

The other property (Property 2) which forms 16 per cent of the Project area has only run ewe weaners since about 2008. The carrying capacity has been 1,500 ewe weaners on approximately 4,160 hectares. Cattle have also been purchased for growing out during past good seasons. No cropping has been undertaken.

IMPACT ASSESSMENT

Construction and operation of the Project would have similar types of agricultural impacts. However, in most cases the extent and intensity of potential and expected impacts are greater during construction due to higher activity and a larger impact footprint.

LOSS OF AGRICULTURAL LAND USE

The loss of agricultural land use will be relatively high during construction. Although it would be possible to continue grazing the Project area during construction, the owner of Property 1 advises that the entire Project area will be destocked. The potential loss of grazing income is estimated at approximately \$531,225 over an 18-month construction period. This loss could be substantially mitigated by the continuation of some grazing on Property 1 and the utilisation of spare grazing capacity on parts of Property 1 and Property 2 not affected by construction activities, if available.

The loss of grazing income during operation is much lower due to the expected continuation of grazing across most of the Project area. The loss of income is estimated at approximately \$14,422 per annum.

The area of agricultural production lost during construction and operation is a small fraction of the total agricultural land in the Murray River LGA. Therefore, the impacts of the Project at a regional scale would be minimal.

BIOSECURITY

The potential spread of weeds by vehicles, machinery, personnel and movement of soil and water is the highest biosecurity risk. The introduction of plant disease or pest species is also a relevant biosecurity risk. The risks would be managed by implementing mitigation measures and conformation to the biosecurity protocols of the landowners.

OTHER POTENTIAL IMPACTS

Other potential impacts include disturbance of livestock by noise and fire risks. However, these impacts are expected to be relatively small and would have a minor effect on productivity.

MITIGATION MEASURES

The proposed mitigation measures during construction and operation of the Project are provided in Chapter 8.

GLOSSARY, ACRONYMS AND ABBREVIATIONS

ABARES	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
Acciona	Acciona Energy Australia Global Pty Ltd ('the Applicant')
AGL	above ground level
AIA	Agricultural Impact Assessment for the Project – this report
ALC	Agricultural Land Classification system (see Hulme et al, 2002)
amended Project (the), or Project (the)	The development to which the Application applies generally.
Applicant (the)	Acciona Energy Australia Global Pty Ltd ('Acciona')
Application (the)	Application for amended development consent under Part 4, Division 4.7 of EP&A Act and Sections 18 and 18A of EPBC Act.
APZ	Asset protection zone
BESS	Battery energy storage system
BJD	Bovine Johne's disease
BoM	Bureau of Meteorology
BSAL	Biophysical strategic agricultural land
Commonwealth	Reference to the Commonwealth of Australia such as Commonwealth land or Commonwealth legislation
construction footprint	The area of construction disturbance, including construction compounds and temporary access tracks.
disturbance footprint	The area of land that is directly impacted by the Project including: all temporary and permanent disturbance areas; and all areas where vegetation may be removed during project construction and operation.
DPE	Department of Planning and Environment
DPI	Department of Primary Industries

DPIE	Department of Planning, Industry and Environment (now DPE)
EIS	Environmental Impact Statement
EIS Project (the)	The project 'Keri Keri Wind Farm' as approved
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
ERM	Environmental Resources Management Pty Ltd
ha	hectare(s)
Host landowners	Landholder of land where physical Project elements are to be located.
km	kilometre(s)
kV	kilovolt
LGA	Local government area
LLS	Local Land Services
LSC	Land and soil capability assessment scheme (see OEH, 2012)
m	metre(s)
mAHD	metres above the Australian Height Datum
MW	megawatt
NSW	New South Wales
OEH	Former (NSW) Office of Environment and Heritage
OJD	Ovine Johne's disease
O&M facility	Operations and maintenance facility
permanent disturbance footprint	The area of land that will be subject to permanent alteration as a result of construction and operation of the Project's infrastructure until decommissioning.
Primary Production SEPP	State Environmental Planning Policy (Primary Production) 2021

Project area	Red boundary to which the Application applies as shown in Figure 1-1 and 1-2.
Property 1	The current agricultural property operated by the landowner who controls approximately 84 per cent of the Project area.
Property 2	The current agricultural property operated by the landowner who controls approximately 16 per cent of the Project area.
REZ	Renewable Energy Zone
SEARs	Planning Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSAL	State significant agricultural land
SSD	State significant development
stock units	In this assessment, one sheep or goat is equated to one stock unit, and cattle are equated to ten stock units each.
study area	The area which applies to the AIA and includes the disturbance footprint.
temporary disturbance footprint	The area of land that will be temporarily disturbed during construction of the Project, and later rehabilitated.
TIA	Tremain Ivey Advisory
TSR	Travelling stock reserve
WTG	Wind turbine generator

1. INTRODUCTION

This Agricultural Impact Assessment (AIA) has been prepared for the amended Keri Keri Wind Farm (the amended Project) for Acciona Energy Australia Global Pty Ltd (the Applicant). The Applicant is seeking state significant development (SSD) consent for the amended Project under Part 4, Division 4.7 of the *Environmental Planning & Assessment Act 1979* (EP&A Act).

This AIA supplements the Amendment Report prepared by Environmental Resources Management Pty Ltd (ERM) for the Project and is required to be prepared as part of the SSD consent process. A previous version of the AIA was prepared for the EIS for the Project.

1.1 SITE CONTEXT

The Project is located about 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay in the Murray River local government area (LGA) (refer Figure 1). The Project is located within the South West Renewable Energy Zone (REZ) and is directly south of the Sturt Highway on land that is predominately used for sheep grazing and cropping. The Project extends over an area of approximately 18,006 hectares (ha) across 66 freehold land parcels (the Project Area) (refer Figure 2). It is anticipated that up to 764 ha of this land will be subject to construction and operation of the Project (disturbance footprint).

1.2 PROJECT AMENDMENTS

The Applicant has made amendments to the Project since the EIS was exhibited. The Amended Project has:

- Further avoided and/or minimised adverse environmental impacts;
- Protected sensitive areas and receivers identified through specialist assessments including biodiversity, heritage, visual, hazards and risks;
- Addressed matters raised in submissions of the exhibited Project EIS and outcomes of ongoing engagement with the community, landowners, government agencies, local council and other stakeholders; and
- Maximised the yield of wind power generation through optimising the position of WTGs on-site and in consideration of heritage and environmental constraints.

Specifically, the amendments include:

- Revised Project area to remove two site access points;
- Removal of 41 wind turbine generators (WTGs);
- Micro-siting (moved <100 metres [m]) of 57 WTGs;
- Relocation (moved >100 m) of 6 WTGs;
- Optimisation of electrical reticulation, including:
 - Eliminating 64.5 km of 33 kilovolt (kV) overhead transmission;
 - Increase in the length of 33 kV underground transmission by 20.3 km;
 - Decrease in the length of 330 kV overhead transmission by 3.79 km;
- Reduction in the number of proposed Operations and Maintenance (O&M) facilities, from three to one;
- Reduction in the number of security huts, from four to two;
- Optimisation of internal access tracks, which has reduced the total length by 31.8 km (from 148.3 km to 116.5 km);
- Relocation (<100 m, within micro-siting corridor) of ancillary infrastructure including:

- 33/330 kV substations;
 - 200 MW/800 MWh BESS;
- Reduction in the number of biosecurity wash bays from 4 to 2 (aligned with the reduction in site access points);
- Removal of the option to use Port of Newcastle as a port of import, and associated transport route from the Port of Newcastle;
- Relocation (<100 m, within micro-siting corridor) of temporary infrastructure, including:
 - Worker accommodation camp;
 - Concrete batching plants;
 - Laydown areas;
 - Carparks;
 - Construction compounds;
- Reduction in the number of permanent meteorological masts, from four to three; and
- Reduction in the number of temporary meteorological masts, from four to three.

1.3 PROJECT OVERVIEW

1.3.1 DESCRIPTION

The amended Project involves the construction, operation, maintenance, and decommissioning of a wind farm, with up to 114 wind turbine generators (WTGs), together with associated and ancillary infrastructure.

The amended Project consists of the following key components:

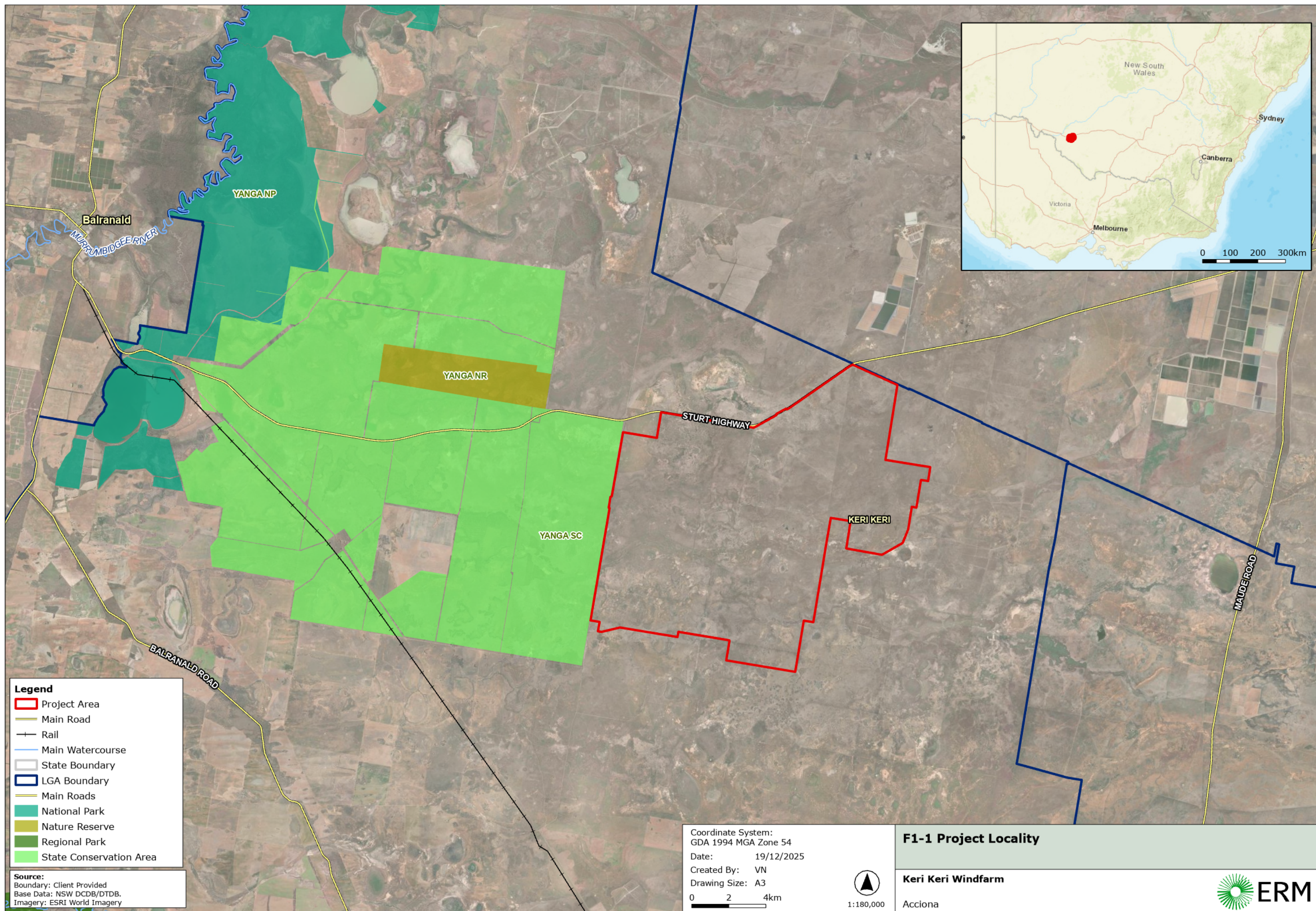
- Up to 114 WTGs, each comprising:
 - Three blades mounted to a rotor hub (hub height of up to 200 metres (m)) on a nacelle above a tubular steel tower, with a blade tip height (blade length plus hub height) of up to 291.5 m above ground level (AGL);
 - A gearbox and generator assembly housed in the nacelle; and
 - Adjacent hardstands for use as crane pads, assembly and laydown areas;
- Electrical infrastructure comprising:
 - Three 33/330 kV electrical substations, including control room, communications tower, transformers, circuit breakers, switches, lighting protection and other ancillary equipment;
 - A battery energy storage system (BESS) of up to 200 megawatt (MW) /800 MW hour (MWh) (approximately four hours of storage);
 - 195.6 km of underground 33 kV electrical reticulation connecting the WTGs to the onsite substations (where practicable, these are generally following site access tracks);
 - 16.21 km of 330 kV overhead transmission line connecting the three substations to a new electrical switchyard (including circuit breakers, switches and other ancillary equipment) and up to 0.7 km of 220 kV or 330 kV overhead transmission line connecting the new switching station to the existing transmission line or the planned NSW-SA interconnector, Project EnergyConnect;
- Ancillary infrastructure:
 - Two site access points from the Sturt Highway and from Keri Keri Road;

- An O&M facility
- Two security huts;
- Two biosecurity wash bays;
- Internal access tracks connecting the WTGs and associated Project infrastructure with the public road network;
- Decommissioning of three temporary meteorological monitoring masts and installation of up to three permanent meteorological monitoring masts for power testing. The permanent monitoring masts will be located close to a WTG location and will have a maximum height of approximately 200 m AGL; and
- Upgrades to public roads and intersections required for the delivery of oversize and overmass WTG components, transformers and associated construction-phase materials and vehicular movements.

The following temporary elements will be required during the construction phase of the Project:

- Two temporary construction site compounds, comprising site buildings and facilities for construction contractors and equipment, site offices, car parking and amenities for the construction workforce;
- Two concrete batching plants to supply concrete for WTG footings and substation construction works;
- Earthworks for access tracks, WTG platforms and foundations;
- One workers' accommodation compound and carpark;
- Four hardstand laydown areas for the storage of construction materials, plant, and equipment;
- Three temporary meteorological monitoring masts. The temporary monitoring masts will be located close to a WTG location with a maximum height of approximately 200 m AGL;
- External water supply and storage for concrete batching and construction activities;
- The transport, storage and handling of fuels, oils and other hazardous materials for construction and operation of wind farm infrastructure; and
- Beneficial reuse of materials won from within the disturbance footprint during cut and fill and WTG foundation excavation works for use in access track, hardstands and foundation material.

The construction period would be 18 months, with peak construction activities over approximately 12 months. Ultimately, the project will be decommissioned, and the Project area will be rehabilitated.



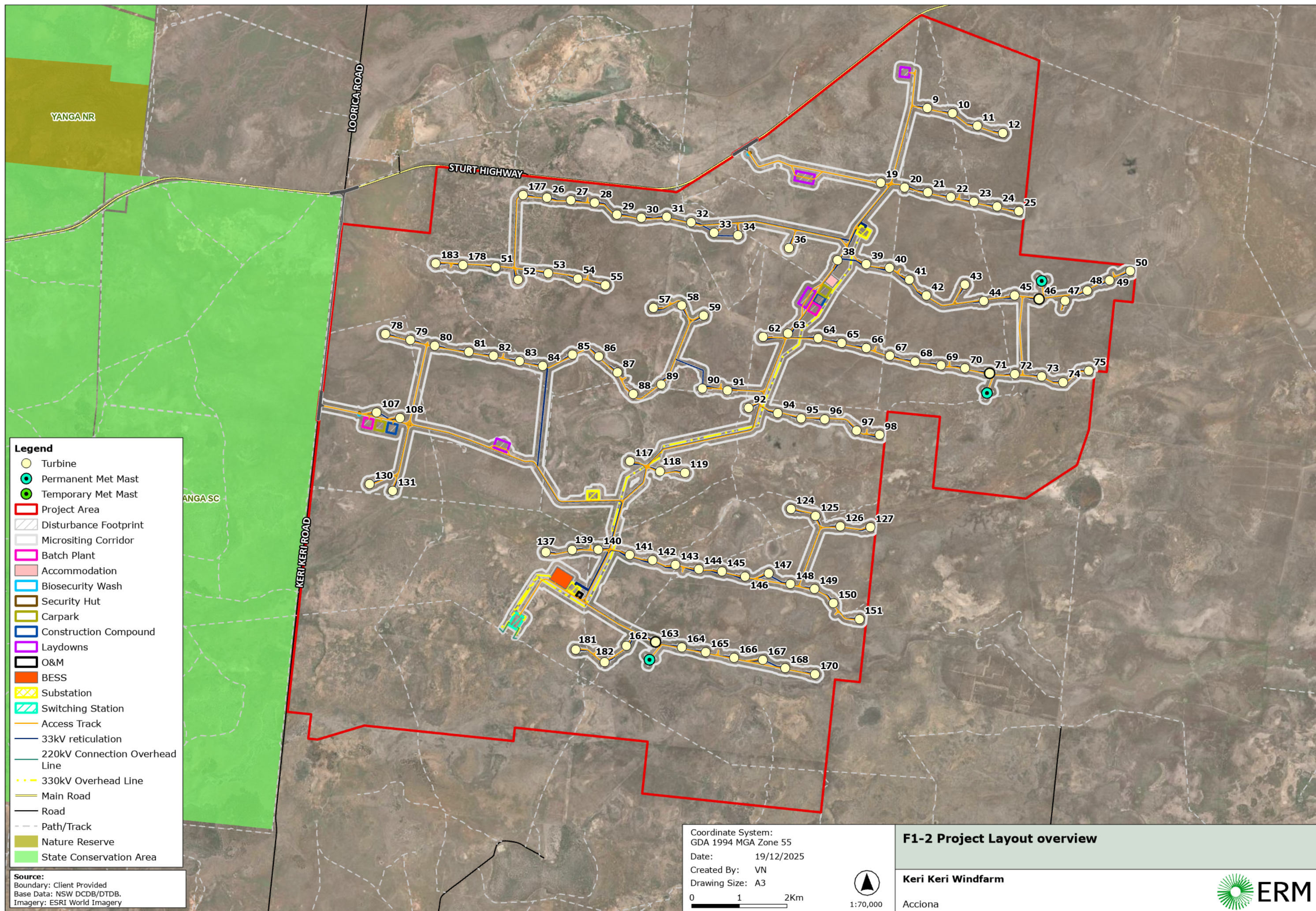


Table 1-1
Project Components and Amendments

Project Elements	EIS (original) Project	Amended Project	Difference between EIS and Amended Project
Project Footprint			
Project Area	18,012	18,006	Reduced by 6 ha (0.03%)
Temporary Development Footprint	1,137 ha	Up to 764 ha	Reduced by 373 ha (27%).
Permanent Development Footprint	574 ha	Up to 491 ha	Decreased by 83 ha (15%)
WTGs			
WTGs	155	114	Reduced by 41 WTGs (26%)
Rotor Diameter	Up to 183 m	Up to 183 m	No change
Blade Length	Up to 91.5 m	Up to 91.5 m	No change
Uppermost Blade Tip Height	Up to 291.5 m	Up to 291.5 m	No change
Tower (hub) Height	Up to 200 m	Up to 200 m	No change
WTG Hardstand Disturbance Area	Approx. 2.83 ha / WTG	Approx. 2.41 ha / WTG	Reduced by approx. 0.42 ha / WTG
Ancillary Infrastructure			
330 kV transmission line	20.0 km	16.21 km	Reduced by 3.79 km
220 kV or 330 kV transmission line (switching station to proposed connection point)	0 km	0.7 km	Increased by 0.7 km
Underground 33 kV transmission line	175.3 km	195.6 km	Increased by 20.3 km
Overhead 33 kV transmission line	64.5 km	0 km	Reduced by 64.5 km

Project Elements	EIS (original) Project	Amended Project	Difference between EIS and Amended Project
33/330 kV Substations	3	3	No change
	200 m x 300 m +35 m APZ all sides	190 m x 240 m +35 m APZ all sides	Reduced by 4.32 ha
Switching Station	1	1	No change
	200 m x 300 m +35 m APZ on all sides	200 m x 300 m +35 m APZ on all sides	No change
BESS	200 MW / 800 MWh	200 MW / 800 MWh	No change
	400 m x 300 m +35 m APZ all sides	400 m x 300 m +35 m APZ all sides	No change
O&M Facility	3	1	Reduced by 2
Security Hut	4	2	Reduced by 2
Biosecurity Wash Bays	4	2	Reduced by 2
Internal Access Tracks	148.3 km	116.5 km	Reduced by 31.8 km
Site Access Points	4	2	Reduced by 2
Permanent meteorological masts	4	3	Reduced by 1
Temporary Facilities and Activities			
Construction Duration	24 months, with peak construction activities over approx. 12 months	18 months, with peak construction activities over approx. 12 months	Duration reduced by 6 months
Construction Workforce	Up to 650 FTE	Up to 650 FTE	No change
Transport Route	From: Port of Adelaide; and Port of Newcastle.	From: Port of Adelaide only.	Elimination of transport route from Port of Newcastle
Temporary Worker Accommodation Camp	1	1	No change
Temporary meteorological masts	4	3	Reduced by 1

Project Elements	EIS (original) Project	Amended Project	Difference between EIS and Amended Project
Concrete Batching Plants	2	2	No change
Laydown Areas	3	4	Increased by 1
Construction Compound (e.g., site office, car parking, storage)	2	2	No change

1.3.2 SITE SETTING AND SURROUNDING LAND USE

The Project area is entirely located on land zoned RU1 – Primary Production. The area surrounding the Project area is generally also zoned RU1 – Primary Production, except for the Yanga State Conservation Area to the west of the Project area, which is zoned C1 – National Parks and Nature Reserves.

The Project is situated about 30 km south-east of Balranald. Balranald town centre contains various land uses, including residential, commercial, industrial, and public recreation.

1.4 PURPOSE OF THIS TECHNICAL REPORT

This technical report is one of several technical reports that form part of the amended EIS for the Project.

The purpose of this technical report is to identify and assess the potential impacts of the Project in relation to agriculture. It responds directly to the Secretary’s Environmental Assessment Requirements (SEARs) (refer to Section 1.5).

This report has the following objectives:

- describe the current socio-economic and environmental situation relevant to agricultural enterprises in the Project area
- assess the impacts of the Project on agriculture in the Project area and in the surrounding region
- formulate mitigation and management measures to minimise the impacts on agriculture in the Project area and in the surrounding region.

1.5 SECRETARY’S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The NSW Department of Planning and Environment (DPE) has provided the SEARs for the EIS. The requirements specific to this assessment and where these aspects are addressed in this technical report are outlined in Table 1-2.

Table 1-2
Secretary’s Environmental Assessment Requirements

Reference	Requirement	Where addressed in this document
Keri Keri Wind Farm		
Key Issue - Land:	An assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: ○ (amongst others) consideration of agricultural land; ○ a cumulative impact assessment of nearby developments.	Chapter 7

Reference	Requirement	Where addressed in this document
	An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including: ○ (amongst others) assessment of impact on agricultural resources and agricultural production on the site and region.	Chapters 5 and 6

The AIA addresses assessment requirements from the 'land' key issue in relation to agricultural impacts.

The AIA assesses the impacts of the amended Project on access; agricultural operations; livestock and machinery movements; crop production activities; irrigation and biosecurity risks. The impact on agricultural productivity is quantified and mitigation strategies to minimise resource loss, biosecurity risks and other impacts are addressed.

1.6 STRUCTURE OF THIS REPORT

The structure and content of this report is as follows:

- Chapter 1 – Introduction: Outlines the background and need for the Project, and the purpose of this report.
- Chapter 2 – Legislation and policy context: Provides an outline of the key legislative requirements and policy guidelines relating to the Project.
- Chapter 3 – Methodology: Provides an outline of the methodology used for the preparation of this AIA.
- Chapter 4 – Existing environment: Describes the existing agricultural environment.
- Chapter 5 – Construction impacts: Describes the potential construction impacts associated with the Project.
- Chapter 6 – Operational impacts: Describes the potential operational impacts associated with the Project.
- Chapter 7 – Cumulative impacts: Outlines the potential cumulative impacts with respect to other known developments within the vicinity of the Project.
- Chapter 8 – Management of impacts: Outlines the proposed mitigation measures for the Project.
- Chapter 9 – Conclusion: Provides a conclusion on the potential impacts of the Project on agriculture.
- Chapter 10 – References: Identifies the reports and documents used to generate this report.

Attachments to this report are:

- *Attachment 1 NSW DPI sheep budgets*
- *Attachment 2 Other regional weeds list – Murray LLS.*

1.7 LIMITATIONS

The assessment has been based on information on the amended Project design supplied by Acciona. Not all adjacent landowners were interviewed. Inspections were limited to the Project site and interviews were limited to the two host landowners and one adjacent landowner.

2. LEGISLATION AND POLICY CONTEXT

2.1 LEGISLATION

The Project is subject to environmental assessment under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Other legislation specific to the agricultural impact assessment includes the *Biosecurity Act 2015* and State Environmental Planning Policy (Primary Production) 2021 (Primary Production SEPP). A summary of the relevance of each legislation is provided in the following sections.

2.1.1 BIOSECURITY ACT 2015

The NSW *Biosecurity Act 2015* (the Act) came into effect on 1 July 2017¹ and complements the Commonwealth *Biosecurity Act 2015*². The primary objective of the Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks. The Act is tenure neutral, that is, it applies to all lands in NSW, both public and private tenure.

The Act defines key concepts such as biosecurity matter, carrier, biosecurity impact, biosecurity risks and pests, and specifies a wide range of prohibited matter including pests and diseases of plants and animals.

Under the Act, the responsibility for biosecurity risk is shared between the NSW Government, industry and the community. Specifically, the Act establishes a general biosecurity duty, as follows:

‘Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.’

The NSW Department of Primary Industries (DPI) holds the primary responsibility for management of biosecurity under the Act, ensuring the legislative and policy settings support best practice management of biosecurity risks. In addition, DPI works with other jurisdictions to prevent, prepare for, respond to and recover from biosecurity incursions and incidents. DPI works with a range of partners in the management of biosecurity. Significant partners include Local Land Services (LLS), local government and industry groups (DPI, 2013a).

The Project is located in the Murray LLS region. Regional biosecurity strategies developed by DPI and LLS covering the Project footprint include:

¹ legislation.nsw.gov.au/#/view/act/2015/24

² legislation.gov.au/Series/C2015A00061

- *NSW Invasive Species Plan 2023-2028 (DPI, 2023)*
- *Regional Strategic Weed Management Plan 2023-2027 for the Murray LLS (Murray LLS, 2022)*
- *Regional Strategic Pest Animal Management Plan 2024-2028 for the Murray LLS (Murray LLS, 2024).*

The above listed strategies are considered in sections 5.2 and 6.2 of this report.

2.1.2 PRIMARY PRODUCTION SEPP

The relevant part of the Primary Production SEPP is 'Chapter 2 – Primary production and rural development'. This chapter includes the following relevant aims:

- (a) to facilitate the orderly economic use and development of lands for primary production,*
- (b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,*
- (c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,*
...
- (e) to encourage sustainable agriculture, including sustainable aquaculture.*

Part 2.2 deals with State significant agricultural land within which clause 10 states that '*the objects of this Part are as follows—*

- (a) to identify State significant agricultural land and to provide for the carrying out of development on that land,*
- (b) to provide for the protection of agricultural land—*
 - (i) that is of State or regional agricultural significance, and*
 - (ii) that may be subject to demand for uses that are not compatible with agriculture, and*
 - (iii) if the protection will result in a public benefit.'*

Clause 1 of section 2.8 states that land is State significant agricultural land if it is listed in Schedule 1 of the Primary Production SEPP. Schedule 1 does not list any State significant agricultural land at present. However, a draft map of State significant agricultural land (SSAL) has been recently released (DPI, 2021a).

2.2 GUIDELINES

Policies and guidelines relevant to the AIA include:

- *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE, 2021)
- *Riverina Murray Regional Plan 2041* (DPE, 2023)
- *The Land and Soil Capability Assessment Scheme* (OEH, 2012)
- *Agricultural Land Use Mapping Resources in NSW* (Squires, 2017)
- *Infrastructure Proposals on Rural Land* (DPI, 2013b)
- *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (OEH, 2013).

Some guidelines provide specific guidance in relation to the assessment of agricultural impacts (for example, use of the weed and pest animal management plans in the biosecurity assessment). Where appropriate, these guidelines have been referenced in the relevant sections of this technical report.

3. METHODOLOGY

The methodology for this agricultural impact assessment has been designed to meet the requirements of the SEARs (refer to Section 1.5).

3.1 OVERVIEW OF APPROACH

The key aspects of the methodology were as follows:

- Landowner consultations and property inspections occurred on 19 September 2022 to obtain information on the agricultural enterprises conducted on the Project footprint and the landowners' perceived impacts of the Project on these enterprises.
- A telephone consultation was undertaken with one neighbouring landowner on 16 September 2022.
- Other consultation to identify the main biosecurity risks associated with the Project and recommended mitigation measures was undertaken by telephone with various biosecurity officers from the Murray River Council and Murray LLS.
- The existing environment was described primarily using a desktop study based on data from various sources referenced in Chapter 4.
- The assessment of the impacts on agriculture was based on the desktop study, consultations with landowners and other stakeholders, property inspections and professional knowledge.
- The identification of mitigation and management measures was based on information from the existing environment and impact assessments, consultations with landowners and other stakeholders, property inspections, professional knowledge, and various information sources as referenced in Chapter 4.

3.2 RELEVANT AREAS

The Project area would generally cover the area of direct construction impacts on agriculture. However, some impacts, such as noise disturbance on livestock and restrictions on aerial agriculture, may occur beyond the Project area.

The operational footprint includes Project infrastructure elements which would have an ongoing impact on agricultural activities after the construction period has ended. However, agricultural production would not be directly impacted in all areas of the operational footprint. For example, grazing enterprises would be largely unaffected by the transmission line easements.

3.3 AGRICULTURAL IMPACT ASSESSMENT

3.3.1 LANDOWNER CONSULTATION AND PROPERTY INSPECTIONS

An inspection of the Project footprint occurred on 19 September 2022. Consultations with both host landowners were completed on the same date. The inspection and consultations were undertaken by Peter Tremain of Tremain Ivey Advisory.

One interview with a one neighbouring landowner was undertaken on 16 September 2022.

Consultation with landowners obtained information on the size and land types of each property, the size and nature of agricultural enterprises conducted, and the landowner's perceived impacts of the Project on the agricultural property and enterprises.

Other neighbouring properties were viewed from public roadways and adjacent private property.

Further information on the inspected properties and other properties (such as information on vegetation cover, soil type, land capability, land use, type and locations of horticultural crops, extent of cleared areas and type of cropping) was gained through examination of satellite imagery, reference material and public GIS datasets.

3.3.2 STAKEHOLDER CONSULTATION

Discussions to identify the main biosecurity risks associated with the Project and recommended mitigation measures were undertaken by telephone with biosecurity officers from Murray LLS, and Murray River Council.

3.3.3 AGRICULTURAL IMPACT ASSESSMENT

The description of the existing environment was primarily a desktop study based on data from various sources referenced in Chapter 4. However, this information was also evaluated with reference to the information gathered during the property inspections and landowner consultations described above. The assessment of the existing environment concentrated on:

- Geographical factors (such as climate, topography and soils) that have the greatest influence on agriculture in the study area
- Measures which best appraise the nature and productivity of agricultural enterprises in the study area (such as land and soil capability, land use and value of production).

The assessment of the impacts on agriculture was based on information from the existing environment assessment, consultations with landowners and other stakeholders, property inspections and professional knowledge.

Mitigation measures are defined as actions, processes or structures which minimise or eliminate the impacts of the Project. The identification of mitigation and management measures was based on information from the existing environment and impact assessments, consultations with landowners and other stakeholders, property inspections, professional knowledge, and various information sources as referenced in Chapter 4.

3.4 CONSIDERATION OF BIOSECURITY ISSUES

Relevant information on biosecurity issues for the Project were identified from the following sources:

1. landowner consultation (refer to Section 3.3.1)
2. observations during the property inspections (refer to Section 3.3.1)
3. consultation with various LLS and local government biosecurity officers (refer to Section 3.3.2)
4. reference to the *NSW Biosecurity Act 2015*
5. reference to the relevant regional strategic weed management plans
6. review of other documents set out in Section 5.2.

The methodology for the biosecurity assessment was similar to the agricultural impact assessment set out in Section 3.3.3. Existing biosecurity issues and potential biosecurity risks were primarily based on a desktop study including pest, disease and weed distribution data, and various legislation, regional plans and surveys referenced in Section 5.2. However, information gathered from property inspections and landowner consultation was also considered. The biosecurity assessment concentrated on the main risks associated with the Project.

The identification of mitigation and management measures was based on information from the existing environment and impact assessments of this report, consultations with landowners and other stakeholders and property inspections.

4. EXISTING ENVIRONMENT

4.1 GENERAL DESCRIPTION

4.1.1 LOCATION

The Project area is located in the Murray River LGA and the Murray LLS region approximately 27 kilometres north of Moulamein and 31 kilometres east of Balranald at the respective closest points. It is bounded by the Sturt Highway to the north and by the Keri Keri Road and Yanga State Conservation Area to the east.

4.1.2 TOPOGRAPHY

The Project area is a landscape of relatively flat alluvial riverine plains crossed by an intermittent watercourse, Abercrombie Creek, near the southern boundary. The elevation is approximately 70

metres above Australian Height Datum (mAHD) and varies by only a few metres across the site, generally with a slight fall from east to west.

4.1.3 CLIMATE

Climate, especially rainfall and temperature, has a large impact on the productivity of dryland agricultural properties such as those found on the Project area. The Balranald RSL is the closest Bureau of Meteorology (BoM) recording station to the Project area. It is approximately 31 kilometres west of the Project area at its closest point and at an elevation of 61 metres. It has approximately 144 years of rainfall records and up to 106 years of temperature records. The climate records are summarised in Table 4-1.

Table 4-1
Summary of climate records

Statistic Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<u>Maximum temperature (°C)</u>													
Mean	33.1	32.6	29.2	24.1	19.4	16.1	15.7	17.6	20.9	24.6	28.2	31.0	24.4
Number of days >= 30°C	18.2	16.3	11.3	2.9	0.0	0.0	0.0	0.0	1.1	4.4	8.7	13.5	76.4
Number of days >= 40°C	3.1	1.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	7.1
<u>Minimum temperature (°C)</u>													
Mean	16.6	16.4	13.7	9.7	6.8	4.4	3.5	4.8	7.1	9.9	12.7	14.9	10.0
Number of days <= 2°C	0.0	0.0	0.0	0.1	2.0	6.1	7.8	5.6	2.1	0.1	0.0	0.0	23.8
<u>Rainfall (millimetres)</u>													
Mean	22.6	24.6	21.9	24.1	31.3	29.3	26.1	29.4	29.3	31.4	28.8	25.9	323.0
10th percentile	0.0	0.0	0.4	1.3	4.1	7.6	6.5	7.8	6.5	3.7	2.0	1.5	201.1
Median	11.6	12.0	14.0	15.5	25.1	24.8	23.0	25.8	23.5	22.4	20.3	17.3	312.3
90th percentile	58.8	68.5	57.0	60.5	67.9	55.6	50.3	53.1	59.3	75.3	68.6	57.9	465.9
<u>Other Rainfall Records</u>													
Variability (%)	507%	571%	404%	382%	254%	194%	190%	176%	225%	320%	328%	326%	85%
Number of days of rain	3.1	2.9	3.5	4.1	6.3	7.5	8.2	8.0	6.7	6.0	4.7	3.9	64.9

The mean maximum monthly temperatures reach a peak of approximately 33°C in January and February. The mean maximum monthly temperature varies from 15.7°C to 17.6°C in the winter months.

The average number of days per annum over 30°C is 76.4 days while the average over 40°C is 7.1 days per annum.

The mean minimum temperatures fall to a low of 3.5°C in July and between 4°C and 5°C in the other winter months. A minimum temperature under 2°C is generally regarded as the approximate temperature at which frost will occur. An average of 23.8 such days per annum have been recorded. The highest mean minimum temperatures occur in January and February at approximately 16°C.

The average rainfall at Balranald has been 323 millimetres over 65 rain days per annum. In the driest 10 per cent of years, the average falls to 201 millimetres per annum. The average in the wettest 10 per cent of years is 466 millimetres per annum. The rainfall has moderate variability according to

rainfall records (BoM, 2021). Variability is generally much greater in late summer and early autumn than at other times of the year.

Rainfall is relatively evenly spread throughout the year with a slight dominance in winter and spring.

4.1.4 SOILS

Most soils in the Project area are moderate fertility vertosols (CSIRO, 2016; OEH, 2017). Vertosols have clay texture throughout the profile, display strong cracking when dry, and shrink and swell considerably during wetting and drying phases (Agriculture Victoria, 2021).

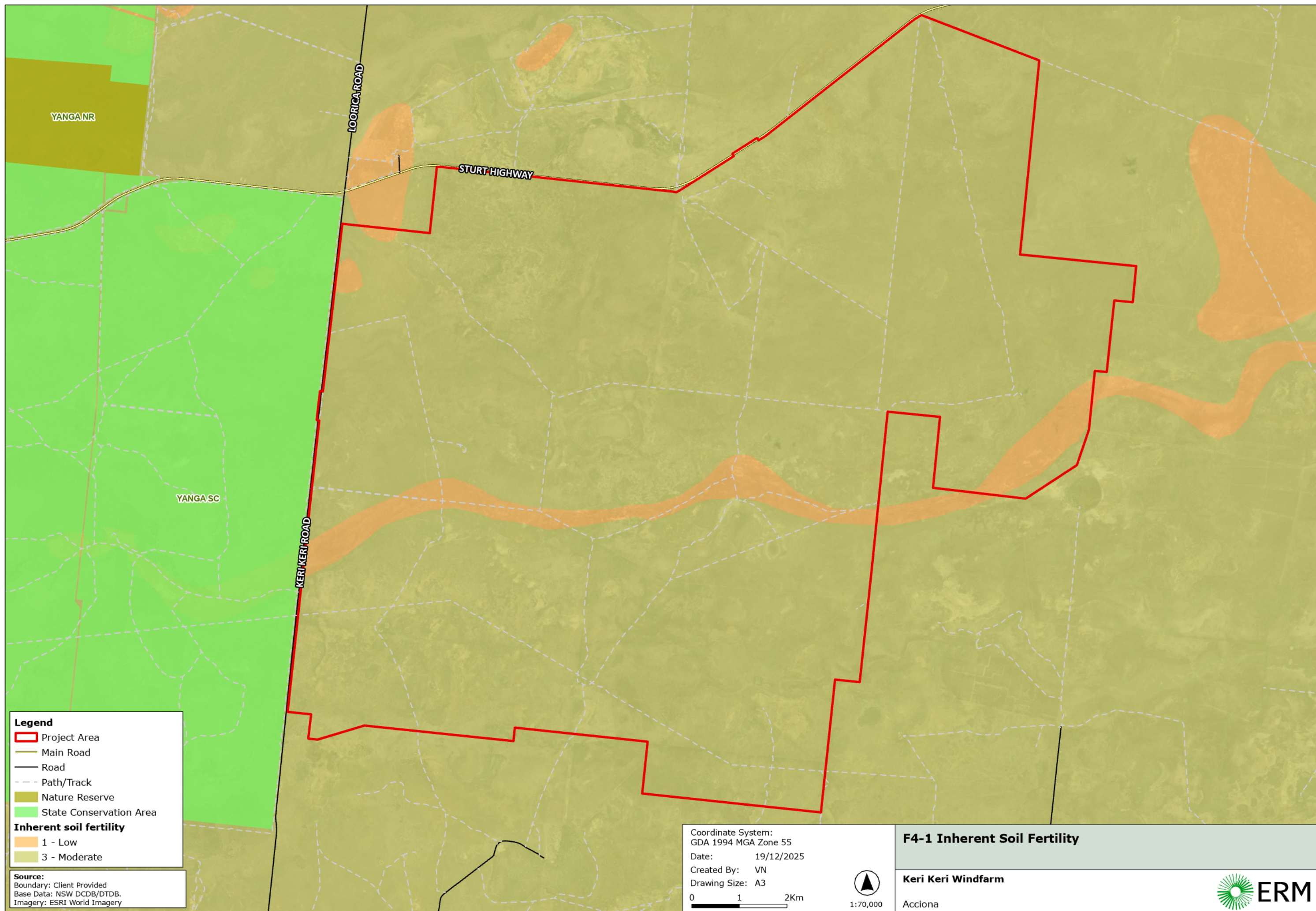
There are some small areas of lighter textured, low fertility soil in the northwest corner of the Project area and in an east-west band across the central part of the site (OEH, 2017). These are mostly rudosols with some areas of chromosols (CSIRO, 2016).

Rudosols have a sandy, weakly developed profile. They are typically acid throughout the profile and plant nutrient availability is quite variable. They may have good infiltration but usually low water holding capacity.

Chromosols have a distinct texture contrast between the loamy A horizons and the clayey B horizons, but the latter is neither strongly acidic nor sodic. (Agriculture Victoria, 2021).

4.1.5 LIVESTOCK WATER

Water for livestock is mainly supplied by a piped water scheme (Abercrombie Water Efficiency Scheme) using water pumped from the Murrumbidgee River at Yanga Woolshed. The water is pumped into tanks and distributed to livestock via pipes and troughs.



4.1.6 LAND USE

A map of land use across the amended Project area as derived from DPIE (2020) has been included as Figure 4-2. Relevant areas of land use are summarised in Table 4-2.

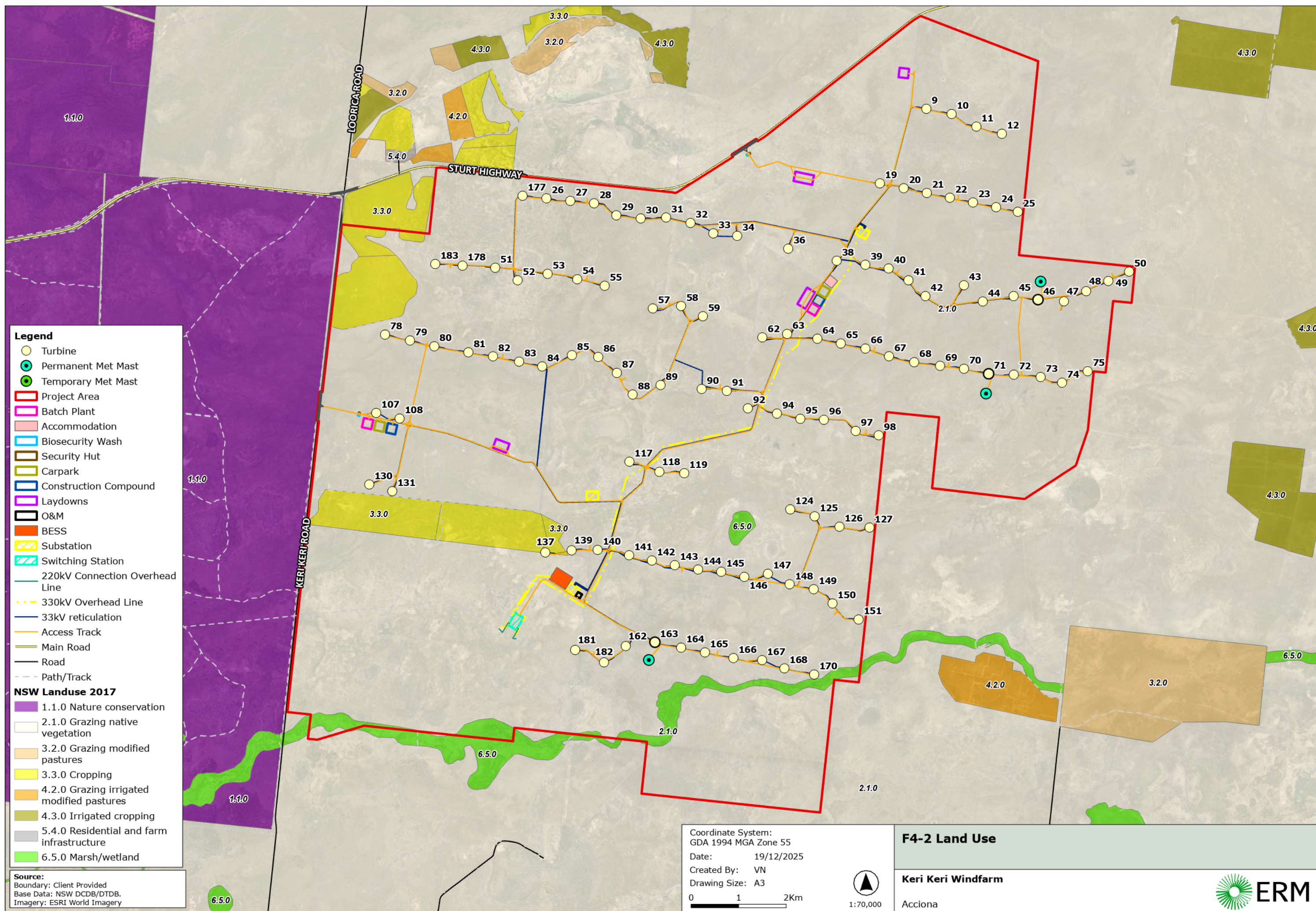
The land use of the Project area is classified as 'grazing of native pastures' apart from some marsh and wetlands along Abercrombie Creek and cropping areas in the north west corner and near the south west corner. The classification is relatively consistent with actual historical land use (Section 4.6.1).

Table 4-2
Summary of land use

Land Use (DPIE, 2020)	Project Area (ha)	Proportion	Construction Footprint (ha)	Permanent Footprint (ha)
<u>Agricultural land uses</u>				
2.1.0 Grazing native vegetation	17,088	94.87%	761	489
3.3.0 Cropping	677	3.76%	2	1
Sub-total - Agriculture	17,764	98.63%	763	491
6.5.0 Marsh & wetland	241.863	1.34%	1	0
Total	18,006	100%	764	491

Note on Table 4-2:

Individual amounts are approximate and may not sum to the amount of the totals due to rounding.



4.2 BIOSECURITY ISSUES

In contrast to much of NSW, the Project area has the potential to effectively manage biosecurity risks due to its separation from major populations and intensive agricultural industries, and the semi-arid climate which is challenging for exotic animals and plants to survive (DPE, 2017).

4.2.1 WEEDS

The most common weed recorded near the Project area by authorised officers during property inspections under the *Biosecurity Act 2015* (DPI, 2021b) was African boxthorn (*Lycium ferocissimum*), which comprised over 80% of reports. Other less common weeds reported are set out in Table 4-3.

Table 4-3
Weeds reported near the Project area

Coolatai grass (<i>Hyparrhenia hirta</i>)	Galvanised burr (<i>Sclerolaena birchii</i>)
Horehound (<i>Marrubium vulgare</i>)	Noogoora burr (<i>Xanthium occidentale</i>)
Prickly pears (<i>Cylindropuntia</i> species)	Prickly pears (<i>Opuntia</i> species)
Silverleaf nightshade (<i>Solanum elaeagnifolium</i>)	Spiny burrgrass (<i>Cenchrus longispinus</i>)
Spiny burrgrass (<i>Cenchrus spinifex</i>)	St. John's wort (<i>Hypericum perforatum</i>)
Star thistle (<i>Centaurea calcitrapa</i>)	

The Murray Regional Strategic Weed Management Plan (Murray LLS, 2022) identifies State and regional priority weeds, some of which may be present in the vicinity of the Project area. Other important weeds are listed the Murray Regional Strategic Weed Management Plan and described as "species that are high risk, high priority for a number of current regional weed programs, though not feasible to contain or eradicate from the region. ". These weeds are listed in Attachment 2, and include Bathurst burr (*Xanthium spinosum*), blue heliotrope (*Heliotropium amplexicaule*, Scotch & Illyrian thistles (*Onopordum* spp.), Spiny emex (*Emex australis*), and St Barnaby's thistle (*Centaurea solstitialis*).

Problematic weeds present in the district with the potential to become more widespread that were mentioned by landowners during consultations included Bathurst burr, prickly saltwort (*Salsola australis*), galvanised burr (*Sclerolaena birchii*) and black roly poly (*Sclerolaena muricata*).

4.2.2 PEST ANIMALS

Foxes, feral cats, wild rabbits, feral pigs and kangaroos have a widespread distribution in the proximity of the Project area (Murray LLS, 2024). Feral goats have a limited distribution with a low presence to the west of the Project area. Wild deer are present in the Balranald area and south of Moulamein (Murray LLS, 2024; DPI, 2021c).

Plague locusts and mice can also cause problems in favourable seasons. Some species (such as goats and pigs) pose important biosecurity, economic and social threats as they can harbour and transmit both endemic and exotic diseases.

4.2.3 ANIMAL AND PLANT DISEASES

Footrot

Footrot is a contagious bacterial disease of sheep and goats, caused by the organism *Dichelobacter nodosus* (*D. nodosus*) in association with several other bacteria. The bacterium *D. nodosus* may persist for many years in the feet of infected sheep and may pass from infected sheep into the soil. Footrot is introduced into a clean flock by the inclusion of infected sheep, or by exposure to contaminated land under favourable conditions.

The occurrence of sheep footrot in the vicinity of the Project area has been low in recent years. DPI reported a total of 19 flocks infected with virulent footrot as of December 2023 across the Murray LLS region. The total number of all flocks across the Murray LLS region was 1,254. Therefore, the infection rate was around 1.5 per cent. However, the infection rate at the western end of the Murray LLS region where the Project area is located is likely to be much lower. As an indicator of this, the Western LLS region, which is similar to the Project area, recorded no infected flocks in December 2023.

Across NSW there was 53 new cases of virulent footrot in 2023, an decrease on the previous two years, which averaged 66 cases per annum (DPI, 2024).

The landowners interviewed generally did not view footrot as a major problem due to its relative rarity and the unlikelihood of it being introduced by Project activities.

Ovine Johne's disease

Ovine Johne's disease (OJD) is an incurable infectious disease caused by the bacterium *Mycobacterium paratuberculosis*.

Little recent data is available on the prevalence of OJD in NSW. However, the Project area was in a low prevalence area in 2010 which had less than 0.8 per cent of flocks estimated to be infected (DPI, 2011).

The owner of Property 2 and a neighbouring landowner confirmed that OJD is not a major concern as it is currently well managed and present little risk to their commercial sheep flocks.

However, the owner of Property 1 operates a sheep stud and has attained MN3 status which is the highest level of assurance under the Australian Johne's Disease Market Assurance Program¹. Therefore, this landowner has a strong interest in excluding OJD from his flock, and is concerned about the risk of introduction during construction of the Project.

¹ The Australian Johne's Disease Market Assurance Program is a voluntary program for producers to identify and promote their high assurance (low-risk) Johne's disease status to clients. Participating herds or flocks are tested to determine their disease status and managed to reduce the risk of infection. The longer a herd or flock is in the Market Assurance Program and the higher the status, the greater the confidence that it is not infected.

4.3 LAND AND SOIL CAPABILITY

There are several measures of land capability relevant to agriculture. This report describes the land and soil capability based on the OEH's Land and Soil Capability (LSC) Assessment Scheme (OEH, 2012). However, other measures are also examined in the following sections.

4.3.1 BACKGROUND

The LSC assessment scheme was published in 2012 by the former Office of Environment & Heritage (OEH, 2012), representing a revision of an earlier scheme that was first published by the former Soil Conservation Service of NSW in 1986 (Emery, 1986). The LSC system builds on the earlier scheme, but with more emphasis on a broader range of soil and landscape properties.

LSC is based on an assessment of the biophysical characteristics of the land, the extent to which this would limit a particular type of land use, and the current technology that is available for the management of the land. It indicates the broad agricultural land uses most physically suited to an area. That is, it determines the best match between the physical requirements of the use and the physical qualities of the land, and the potential hazards and limitations associated with specific uses over a site. The LSC system can provide guidance on the inputs and management requirements associated with different intensities of agricultural land use (Woodward, 1988).

The LSC assessment is based on the premise that using land beyond its capability may have serious consequences for the land and soil resources of the State as well as broader environmental impacts on water, air and biodiversity (Woodward, 1988).

The LSC assessment scheme comprises eight land capability classes (1 to 8) with values representing a decreasing capability of the land to sustain intensive agricultural land use. Class 1 represents land capable of sustaining most intensive land uses including those that are often associated with regular soil cultivation, whereas class 8 represents land that can only sustain very low intensity land uses.

The current LSC scheme was initially developed for the NSW property vegetation planning program under the former *Native Vegetation Act 2003* and further updated for the NSW Natural Resources Monitoring, Evaluation and Reporting program.

The LSC assessment scheme uses the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final LSC class of the land is based on the most limiting hazard.

The LSC class gives an indication of the land management practices that can be applied to a parcel of land without causing degradation to the land and soil at the site and to the off-site environment. As land capability decreases, the management of hazards requires an increase in knowledge, expertise and investment. In lands with lower capability, the hazards cannot be managed effectively for some land uses.

The LSC assessment scheme is most suitable for broad-scale assessment of land capability, particularly for assessment of lower intensity, dryland agricultural land use. It is less applicable for high intensity land use, or for irrigation (Woodward, 1988).

4.3.2 LSC CLASSES

Class 1 land is described as *“extremely high capability land: Land has no limitations.”*

Class 2 land is described as *“very high capability land: Land has slight limitations.”*

Class 3 land is described as *“high capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation”.*

Class 4 land is described as *“moderate capability land: Land has moderate to high limitations for high-impact land uses”.*

Class 5 land is described as *“moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation”.*

Class 6 land is described as *“low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation”.*

Class 7 land is described as *“very low capability land: Land has severe limitations that restrict most land uses and generally cannot be overcome”.*

Class 8 land is described as *“extremely low capability land: Limitations are so severe that the land is incapable of sustaining land use apart from nature conservation”.*

4.3.3 LSC IN THE PROJECT AREA

A map of LSC across the Project area is included as Figure 4-3. The area of each LSC class is summarised in Table 4-4. Published LSC mapping (NSW Government, 2023) indicates that there are no class 1 to 4 lands within the Project area.

The Project area consists mainly of moderate–low capability class 5 land with small areas of low capability class 6 land in the northeast and north west parts of the site, and in an east-west band across the central part of the site.

Table 4-4
Summary of land and soil capability

	Project area		Construction footprint		Permanent footprint	
LSC class	Area (ha)	Proportion	Area (ha)	Proportion	Area (ha)	Proportion
5 - Moderate–low capability	16,936	94.06%	751	98.24%	484	98.77%
6 - Low capability	1,070	5.94%	13	1.76%	6	1.23%
Total	18,006	100.0%	764	100.0%	491	100.0%

The construction footprint and permanent footprint consist almost entirely of moderate–low capability land class 5 land, largely avoiding the lower capability class 6 land.

4.4 OTHER MEASURES OF LAND CAPABILITY

4.4.1 AGRICULTURAL LAND CLASSIFICATION

The Agricultural Land Classification (ALC) system is similar to the LSC assessment scheme. The current ALC system (Hulme, et al, 2002) was developed by the former NSW Agriculture (now DPI).

Under the ALC system, land is classified by evaluating biophysical, social and economic factors that may constrain the use of land for agriculture. In general terms, the fewer the constraints on the land, the greater its value for agriculture. Each type of agricultural enterprise has a particular set of constraints affecting production.

The ALC system is not considered in this assessment due to its similarity to the LSC assessment scheme, and its limitations. Squires (2017) states that the ALC system has limitations with *“poor quality control of product, limited availability and suitability for digital conversion (available as paper maps only in some areas), does not identify specific industry needs and excludes non-soil based agricultural needs”*.

4.4.2 BIOPHYSICAL STRATEGIC AGRICULTURAL LAND

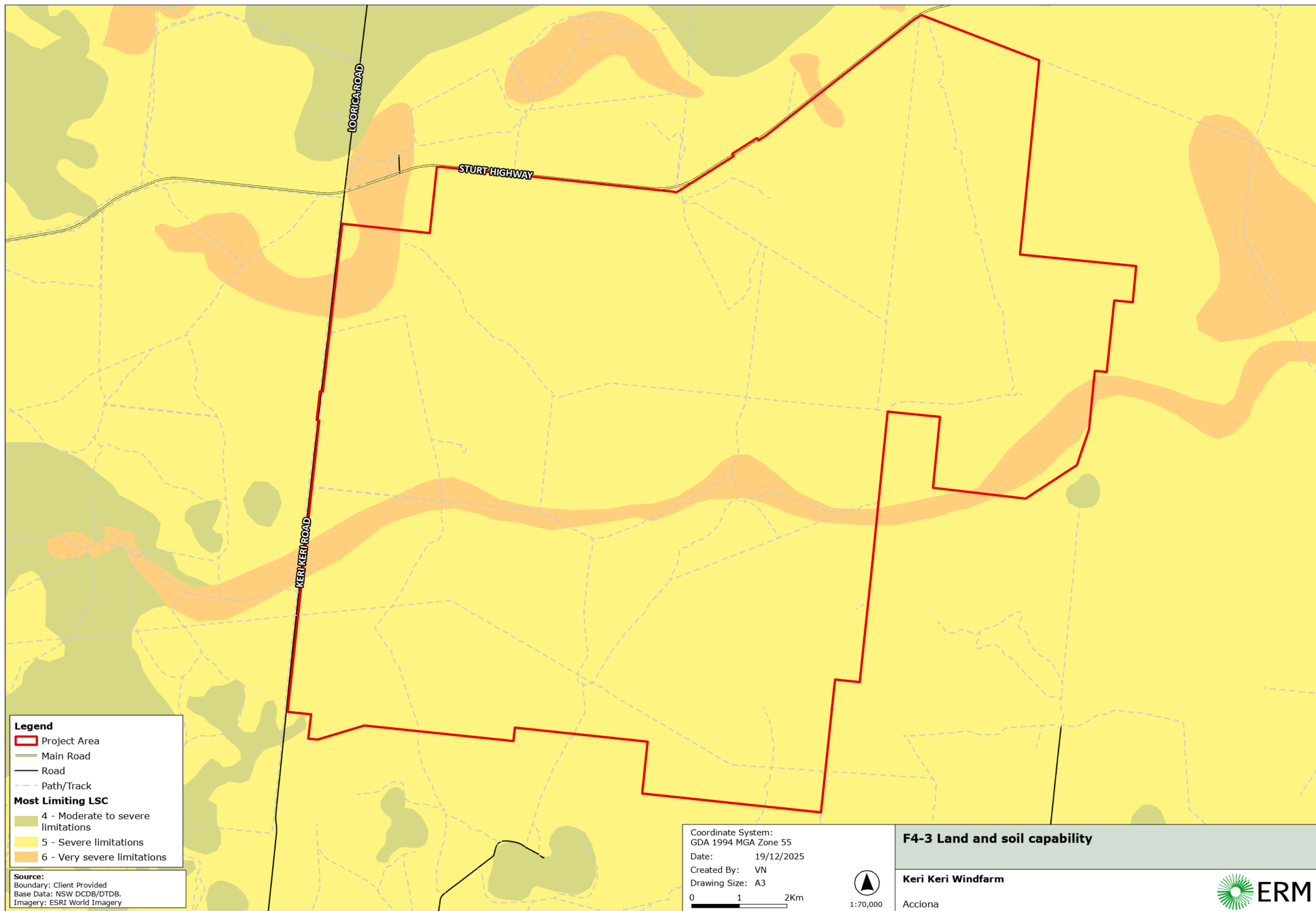
Biophysical strategic agricultural land (BSAL) is land with high quality soil and water resources capable of sustaining high levels of productivity. The protocol for determining BSAL is set out in OEH (OEH, 2013). BSAL has the best quality intrinsic landforms, soil and water resources which are naturally capable of sustaining high levels of productivity and require minimal management to maintain the high quality (DPE, 2013).

Mapping of BSAL was undertaken by the then NSW Department of Planning and Environment. This mapping indicates that there is no BSAL in the Project area.

4.4.3 STATE SIGNIFICANT AGRICULTURAL LAND

A draft map of State significant agricultural land (SSAL) has been recently released (DPI, 2021a). The distribution of SSAL across the Project area is similar to BSAL, as the assessment of both is based on similar parameters.

The draft mapping indicates that there is no SSAL in the Project area.



4.5 REGIONAL AGRICULTURAL PRODUCTIVITY

4.5.1 EMPLOYMENT AND BUSINESSES

Agriculture forestry and fishing is the largest industry (by number of persons employed) in the Murray River LGA. In 2021, employment in ‘agriculture, forestry and fishing’ was 17.9 per cent of employed persons. Total employment in ‘agriculture, forestry and fishing’ is estimated at approximately 1,011 persons across the LGA (ABS, 2024).

In 2022, there were 516 ‘agriculture, forestry and fishing’ businesses in the Murray River LGA (ABS, 2024). This is approximately 36 per cent of all businesses in the LGA.

4.5.2 AGRICULTURAL LAND USE

The total area of agricultural holdings across the Murray River LGA in 2020-21 (ABS, 2022a)¹ was 930,332 hectares. The number of businesses was 347, which gives an average size of 2,681 hectares per business.

The same ABS statistics show the following broad land uses on agricultural holdings in the Murray River LGA. Nearly 74 per cent of the agricultural area is used for grazing. Most of the remainder is used for broadacre cropping, with relatively small areas of horticulture.

Table 4-5
Land use on farms 2020-21

Land use	Area (ha)	Proportion
Wheat for grain	58,963	6.34%
Other broadacre crops	77,913	8.37%
Unused cropping land (e.g. fallow)	44,906	4.83%
Hay and Silage	17,741	1.91%
Grapes	263	0.03%
Fruit and nuts	677	0.07%
Other horticulture	413	0.04%
Grazing improved pastures	150,073	16.13%
Grazing other land	534,620	57.47%
Other agriculture	335	0.04%
Total agricultural area	885,903	95.22%
Forestry	4,388	0.5%
Other	40,041	4.3%
Total area of holdings	930,332	100.0%

¹ Detailed agricultural statistics are only produced by the ABS to an LGA level every five years. The most recent LGA data are from 2020-21.

4.5.3 LIVESTOCK CARRIED

Table 4-6 sets out total livestock numbers across the Murray River LGA in 2020-21.

The number of grazing 'stock units' is calculated as one unit for sheep, lambs, goats and 'other', and 10 units each for meat cattle and dairy cattle. Pigs and poultry are disregarded for this calculation as they are generally intensively raised rather than grazed on pasture.

The 'stock units per hectare' amount is calculated as the total grazing 'stock units' divided by the pasture area (Table 4-5), and indicates the average stocking rate of pastures in the Murray River LGA.

The average stocking rate of 1.43 units per hectare in 2020-21 is relatively low. The average stocking rate across all of NSW in 2016 was 1.53 stock units per grazing hectare (ABS, 2022a). This includes large areas of semi-arid rangeland in the west of the State.

Table 4-6
Total livestock numbers

Livestock type	Number
Grazing livestock	
Sheep and lambs	550,320
Meat cattle	32,767
Dairy cattle	9,886
Goats and other livestock	2,408
Total - grazing stock units	979,257
per hectare	1.43
Other livestock	
Pigs	29,309
Poultry	2,193

Source: ABS, 2022a

4.5.4 VALUE OF AGRICULTURAL PRODUCTION - ABS

The total gross value of agricultural production across the Murray River LGA in 2020-21 (ABS, 2022b) is shown in Table 4-7 at \$316 million.

Wheat was the most valuable agricultural product at nearly \$48 million, but barley, rice and 'other broadacre crops were also substantial each valued at over \$20 million. The production of hay in 2020-21 was slightly lower at nearly \$18 million.

Vegetable production in irrigated areas is also important, contributing a gross value of production of over \$36 million.

The disposal of 'sheep and lambs' and 'cattle and calves' (mostly for meat) each exceeded \$26 million in 2020-21. Milk, wool and pigs were also substantial products.

The total gross value of agricultural production in 2020-21 was equivalent to \$356 per hectare over the total agricultural area of holdings (885,903 hectares, refer to Table 4-5). However, there were large differences between the average gross value of broadacre cropping production (\$915 per hectare), horticulture production (approximately \$46,200 per hectare) and broadacre grazing production¹ (\$101 per hectare). The latter value is likely to be substantially higher than for grazing production on the Project area as it includes grazing on sown pastures and irrigated pastures, and grazing in the higher rainfall areas around Moama and Deniliquin in the eastern part of Murray River LGA.

The average gross value of sheep and wool products is equivalent to \$87 per head across the Murray River LGA.

The value of agricultural production is greatly influenced by seasonal and market conditions and can fluctuate widely from year to year.

Table 4-7
Total gross value of agricultural production

<u>Broadacre crops</u>	
Wheat	\$47,910,573
Barley	\$25,695,119
Rice	\$20,351,940
Other	\$29,584,982
Hay	\$17,884,888
Total - Broadacre Crops	\$141,427,502
<u>Horticulture</u>	
Grapes	\$4,296,408
Fruit and nuts	\$9,945,857
Vegetables	\$36,132,206
Nurseries, cut flowers & cultivated turf	\$11,816,756
Total - Horticultural crops	\$62,191,226
<u>Livestock products</u>	
Wool	\$18,746,290
Sheep and lambs	\$28,888,772
Cattle and calves	\$26,416,517
Milk	\$24,321,360
Pigs	\$13,581,806
Poultry and eggs	\$139,965
Goats and other livestock	\$33,848

¹ Excluding the gross value of milk and pigs.

Total - Livestock products	\$112,128,558
Total – Agriculture	\$315,747,286

4.5.5 VALUE OF AGRICULTURAL PRODUCTION – OTHER MEASURES

Farm surveys data from the Australian Bureau of Agricultural and Resource Economics (ABARES) indicates that the average sheep and wool income of NSW Pastoral Zone (Far West) properties between 2012 and 2021 was \$127 per ewe and \$85 per sheep. The latter amount is similar to the average gross value of sheep and wool product in the Murray River LGA during 2020-21 (Section 4.5.4).

NSW DPI farm enterprise budgets (Attachment 1) include a gross income for a 20 micron Merino ewe breeding flock of \$137 per ewe and \$76 per sheep shorn (including ewes, rams, ewe hoggets and lambs). These amounts are lower than the earlier budget amounts set out in the EIS AIA, and relatively consistent with the ABS and ABARES data.

The enterprise budget for 20 micron Merino wethers reveals a gross income of \$66 per head, which is somewhat lower than the ABS and ABARES data. This is expected as wether income per head is generally lower than for breeding ewes.

4.6 AGRICULTURAL PRODUCTIVITY OF THE PROJECT AREA

4.6.1 FARMING HISTORY

Historically, the Project area has mainly run Merino sheep for meat and wool production.

Property 1

The property that forms 84 per cent of the Project area (Property 1) operates a Merino stud. Some cropping on a share farming basis has been undertaken in the past. This cropping is irregular and reliant on good seasonal conditions. About 710 hectares appears to have been sown with winter cereal crops in the past. About 420 hectares has been cropped three times in the last 20 years, while the remaining 290 hectares has been cropped only once.

The carrying capacity has been 5,500 ewes on approximately 24,000 hectares, although less sheep are carried during poor seasons. Wethers are usually sold as weaners, but some can be retained during good seasons.

The Project area encompasses approximately 15,118 hectares or 63 per cent of this property.

This property has also purchased cattle for finishing during past good seasons, or taken on agistment cattle.

Property 2

The other property (Property 2) which forms 16 per cent of the Project area has only run ewe weaners since about 2008, with adult sheep from the same flock being run on another property. The carrying capacity has been 1,500 ewe weaners on approximately 4,160 hectares, although less sheep are carried during poor seasons. The Project area encompasses approximately 2,881 hectares or 69 per cent of this property.

Cattle have also been purchased for finishing during past good seasons. No cropping has been undertaken.

4.6.2 CURRENT ENTERPRISES

As noted in section 4.6.1, the smaller property (Property 2) runs only ewe weaners. Stocking was approximately 1,230 head at the time of EIS assessment, as numbers were still building up after declining during the drought.

The larger property (Property 1) was also understocked at the time of EIS assessment, with 3,500 Merino ewes and 50 cattle.

5. CONSTRUCTION IMPACTS

5.1 LOSS OF LAND USE

5.1.1 GENERAL COMMENTS

The main impact of the Project on agriculture would be the temporary or permanent removal of areas from production to accommodate the construction of the Project. This impact would not occur over the entire project footprint, as grazing could continue to some degree during construction.

The land use within these areas is mostly grazing of native pastures, plus approximately 540 hectares¹ which has been cropped irregularly. Therefore, the native pastures comprise approximately 17,466 hectares (97 per cent) of the total Project area (18,006 hectares). None of the WTGs or the construction footprint are located on land which has been previously cropped.

The impact on agricultural land use would be limited by the relatively small area directly affected, the continuation of some agricultural enterprises over most of the Project area, and the proposed mitigation measures (refer to Chapter 8).

5.1.2 AREA AFFECTED

The construction footprint would include areas required for permanent works such as WTGs, access tracks, substations, BESS, switchyard and O&M facility as well as temporary areas required for construction (such as construction compounds, concrete batching plants and laydown areas). The construction footprint covers an area of up to 764 hectares. Most of this area is currently used for grazing and includes only a small amount of land previously used for cropping (refer to Table 4-2).

An area of up to 757 hectares would be directly affected during the construction period within Property 1 and Property 2, so that little or no grazing would be possible, as set out in the estimates in Table 5-1. This area would be relatively small in the context of the Project area and the regional agricultural industry.

The estimates in Table 5-1 are mostly based on the project description set out in Section 1.3.1 and Table 1-1.

¹ Approximately 170 hectares of the 710 hectares previously cropped is not within the Project area.

On some of the construction footprint, such as parts of the transmission line easement where construction activities would be of a relatively low intensity, pasture would not be directly affected by construction and grazing could potentially continue on these areas. However, landowners may choose to move livestock away from construction activities. In this case, discussions with the landowners revealed considerable differences in the planned livestock management response to construction.

The landowner operating approximately 84 per cent of the Project area (Property 1) advised that he would destock the whole project area during construction. Therefore, the impact of construction on grazing production on Property 1 would be relatively large.

The other landowner who operates on land totalling approximately 2,870 hectares or 16 per cent of the Project area (Property 2), does not expect significant livestock disturbance during construction, and expects to continue grazing during this period. The impact of construction on grazing production on Property 2 may be relatively small.

The disparity between the expected impacts on the two properties arise from the different type of livestock run on the properties, the higher risk to stud sheep on Property 1, landowner preferences and an apparent contrast in landowner perceptions of the expected impact of construction activities on livestock enterprises.

Table 5-1
Summary of land directly affected by construction

Element	Number	Unit impact (ha)	Total impact area (ha)
Project area			18,006
Disturbance footprint			Up to 764
<u>Direct impacts</u>			
WTG hardstand	114	2.41	274.7
<i>Ancillary infrastructure</i>			
BESS	1	12	12.0
33/330 kV substation	1	6	6.0
132 kV collector substation	2	6	12.0
O&M facility including carpark	1	1	1.0
New 330 kV transmission line (km)	16.21	6	97.3
New 220 kV or 330 kV transmission line (km)	0.7	6	4.2
Underground cables (km)	195.6	0.2	39.1
Switchyard	1	6	6.0
Security huts	2	0.04	0.1
Biosecurity wash bays	2	0.06	0.1
New internal access tracks and drainage (km)	116.5	3	349.5
Permanent meteorological masts	3	0.16	0.5

Temporary Facilities

Concrete batching plants	2	4	8.0
Large laydown areas	2	8	16.0
Medium laydown area	1	6	6.0
Small laydown area	1	4	4.0
Accommodation	1	4	4.0
Carpark	2	4	8.0
Construction compound	2	4	8.0
Temporary meteorological masts	3	0.16	0.5
Total direct impact¹			757²

5.1.3 IMPACT ON INCOME

The degree to which grazing income would be affected by construction activities will be influenced by many factors including:

1. The overall period of construction,
2. The average period of construction at each site,
3. The degree to which construction activity will affect normal grazing patterns of the livestock,
4. The degree to which pasture can be carried over from a period of disturbance to a potential later period of undisturbed grazing, and
5. Landowner attitudes to continued grazing in the Project area during construction activities, as noted above.

Construction is estimated to take about 24 months to complete. However, construction activities would not occur for the full duration at any one location.

The potential loss of gross income during construction is assessed in Table 5-2.

¹ The individual values above add up to over 764 hectares which reflects some overlap in disturbed areas.

² Excludes approximately 7.3 ha of Project area, which is located on public roads outside of Property 1 and Property 2.

Table 5-2
Potential loss of gross grazing income during construction

	Property 1	Property 2	Total
<u>Whole property productivity</u>			
Area of property (hectares)	24,000	4,160	
Likely stocking rate			
Ewe weaners		1,300	
Ewes	4,000		
<u>Project area productivity</u>			
Project area (hectares)	15,118	2,881	17,999 ¹
Likely stocking rate			
Ewe weaners		900	
Ewes	2,520		
<u>Loss of income</u>			
Gross income (\$ per head per year)	\$137	\$66	
Period (months)	18	18	
Proportional loss	100%	15%	
Annual loss of income	\$345,240	\$8,910	\$354,150
Total loss of income (18 months)	\$517,860	\$13,365	\$531,225

The calculations in Table 5-2 consider:

1. The likely sheep stocking rate (productivity) of the subject properties during construction. The likely sheep stocking rate is estimated at a slightly higher rate than the current sheep stocking rates to account for the current understocking of both properties, and to account for the small number of cattle also carried on Property 2.
2. Available information (including discussions with the owners) indicates that the part of the subject properties encompassed by the Project area is of similar productivity to the whole property. Therefore, the likely stocking rate per hectare of the area encompassed by the Project area is assessed at the same stocking rate per hectare of the whole property.
3. The proportional loss on Property 1 is expected to be 100% of expected gross income (Section 5.1.2). It is generally possible to continue grazing during construction, however the owner of Property 1 advises that the entire Project area will be destocked

4. Gross income on Property 1 is assessed at \$137 per breeding ewe based on the NSW DPI enterprise budget amount for Merino ewes (Section 4.5.5).
5. Gross income on Property 2 is assessed at \$66 per ewe weaner which is similar to the ABS and ABARES data, and also similar to the NSW DPI enterprise budget amount for Merino wethers (Sections 4.5.4 and 4.5.5). The latter comparison is valid because the ewe weaner flock on Property 2 and a wether flock are both non-breeding sheep flocks.
6. The gross income amounts (per head) are lower than for the EIS AIA because they are based on updated DPI enterprise budgets which show lower sheep incomes.
7. The proportional loss on Property 2 would be relatively low (Section 5.1.2). It is not expected to be greater than 15% of expected gross income, and this amount is used in the calculations. In assessing this loss, the relatively small area of pasture expected to be directly affected by construction (Table 5-1) is considered.

The estimated annual loss of income during construction (\$354,150) comprises a small proportion (0.11 per cent) of the total gross value of agricultural production across the Murray River LGA in 2020-21 (\$316 million – Section 4.5.4). This loss is a short-term, temporary loss and the loss of agricultural income during operation is expected to be much smaller (Section 6.1.3).

The Project would have little impact on agricultural support services due to the relatively low loss of production on a regional scale, and the short-term, temporary of losses during construction.

The Project would have little impact on processing and value adding industries as these are generally carried out on state-wide or international scale in the sheep and wool industries. For example, there are only three large scale sheep processing plants in NSW, plus several smaller facilities, the closest being at Wagga Wagga approximately 360 kilometres away. Few processing or value-adding activities of wool are carried out in Australia. Any processing is done on a state-wide or national level, with no large-scale processing in the Murray River LGA.

The impact on Project on the sheep and wool industries on a state-wide level is negligible and therefore the impact on sheep and wool processing is also negligible.

The loss of income may be able to be mitigated to a lower amount than that assessed in Table 5-2 if the properties are understocked and some sheep that are displaced from the Project area can be run on other parts of the properties unaffected by construction activities.

The loss of net income (after production expenses are deducted) would also be lower than the gross amount assessed in Table 5-2.

Losses to the host landowners would be offset by extra revenue gained from hosting the Project on their properties.

Complete destocking during construction is usually unnecessary. The decision to totally destock Property 1 mainly reflects the greater biosecurity and disturbance risks to the stud sheep on that property, and the personal preference of the owner. The loss of income could also be mitigated by a large amount if some grazing were to continue on Property 1, either by the existing breeding ewe flock, or by livestock that are less susceptible to biosecurity and disturbance risks, such as retained wethers or cattle.

If the loss could be mitigated on Property 1 to the same level as assessed for Property 2 (that is, 15% of potential income) by a combination of continued grazing and utilisation of spare grazing capacity on other parts of the property, the total gross loss of grazing income on the Project area would be reduced to approximately **\$91,044** over 18 months. This is 17 per cent of the gross loss set out in Table 5-2 (\$531,225).

5.2 BIOSECURITY

The following sections address the potential biosecurity impacts during construction of the amended Project.

5.2.1 GENERAL BIOSECURITY RISKS

There is a risk that animal diseases, plant diseases, feral pests and weeds could be introduced or spread during construction of the Project. A biosecurity breach of this nature is likely to increase costs and decrease income of the host properties and could impact other properties in the vicinity of the Project. Depending on the biosecurity matter, impacts on both costs and income could be short to long term (more than five years).

Increased costs could include expenses associated with monitoring pests, weeds or diseases and implementing control measures; while reduced income could include reduced livestock, crop or pasture production, plus lower quality of produce.

Potential carriers of weed seeds, plant material and diseases include vehicles (especially tyres), machinery and personnel (clothing and footwear). These can transport biosecurity matter over relatively long distances (Animal Health Australia, 2018).

Biosecurity matter also has the potential to be spread by soil and water movements associated with construction works. These movements would generally occur over relatively short distances given the nature of the works and the characteristics of the Project area.

Compared to much of NSW, the Project area is less susceptible to biosecurity risks due to its separation from major populations and intensive agricultural industries, and the semi-arid climate which is challenging for exotic animals, diseases and plants to survive (DPE, 2017).

5.2.2 WEED BIOSECURITY RISKS

Weeds which present a high biosecurity risk of the Project are those:

- which may be spread readily by activities associated with the Project
- that are adapted to the environmental conditions of the region
- that would have a substantial economic impact if they were to spread.

Weeds that are present in the region and present a potential biosecurity threat are discussed in Section 4.2.1.

Weeds such as some cactuses, spiny burrgrass, caltrops, khaki weed, Noogoora burr and Bathurst burr are readily spread by vehicle, machinery and human activity. Some also have a potential high impact on the income and costs of agricultural enterprises. For example, weeds such as blue heliotrope and silver-leaf nightshade are difficult to control, while spiny burrgrass containment

presents a challenge in pastures and crops. Noogoora burr and Bathurst burr are important contaminants which decrease wool quality and prices.

There are numerous other weeds which could potentially have a large impact on the agricultural enterprises, however the risk is moderated by:

- most weeds not being readily spread by activities associated with the Project
- limited adaptability of some weeds to the environmental conditions of the region.

The maximum risk of weed spread associated with the Project would occur during construction due to earthworks, the frequency of vehicle and personnel movements, and increased weed growth due to disturbance of ground cover and soil.

Mitigation measures to limit and manage the weed biosecurity risk are provided Chapter 8.

5.2.3 LIVESTOCK PESTS AND DISEASES BIOSECURITY RISKS

Sheep lice, OJD and ovine footrot are the most important livestock pest and disease risks. These sheep diseases are present in the region and can have large productivity impacts on sheep enterprises.

Footrot is the greatest risk despite its low current prevalence (refer to Section 4.2.3), due to the relative ease of its spread and its high potential economic impact. Virulent footrot is a severe, debilitating disease that causes considerable economic loss from reduced wool growth, lower wool quality, poor ewe fertility, slow growth rates, losses from blowfly strike, and reduced value of sale sheep. In infected flocks, there are also substantial costs associated with the control of the disease.

OJD is a wasting disease of sheep that can result in sizeable economic losses on infected farms due to sheep deaths, lost meat production, fewer lambs and less wool. Under the *Biosecurity Act 2015*, sheep footrot and OJD are notifiable diseases.

Sheep lice cause considerable losses in sheep enterprises due to treatment costs, reduced wool growth and lower meat production.

The risks associated with these diseases are low due to the low probability of spread being caused by Project activities and the low prevalence of disease in the area (refer to Section 4.2.3).

There are many other important diseases of domestic livestock. Some diseases, such as bovine Johne's disease (BJD), leptospirosis, pestivirus and those caused by internal parasites, have the potential to be spread by uncontrolled livestock movements or carried by humans. However, the chance of this arising from activities associated with the Project would be low.

Other diseases, such as anthrax, bovine respiratory disease, cheesy gland, clostridial diseases, ovine brucellosis, pinkeye, three-day sickness, trichomoniasis and vibriosis, are very unlikely to be spread by proposed construction activities.

Foot and mouth disease and lumpy skin disease have been a recent issue in Indonesia and Japanese encephalitis was prevalent in NSW and other states in 2022. Appropriate measures would be implemented if there is any risk of introduction via the Project.

5.2.4 VERTEBRATE PEST BIOSECURITY RISKS

The most important vertebrate pests in the vicinity of the Project area are pigs, foxes, rabbits and kangaroos. Other pest species such as deer, goats, horses and wild dogs have a more restricted distribution and lower overall economic impact. All these pests have economic impacts on agricultural enterprises arising from lamb predation, fence damage or consumption of pasture and crops. The Project is unlikely to significantly change the number or movement patterns of vertebrate pests and therefore the impacts are considered to be very low.

5.2.5 PLANT DISEASE AND PEST BIOSECURITY RISKS

Biosecurity risks associated with plant diseases and pests would be low due to the limited cropping, horticultural and irrigation industries near the Project area. Rangeland pastures are not particularly susceptible to exotic plant diseases and pests, and the semi-arid climate is not conducive to their establishment or spread.

There is a ban on taking grapevines, cuttings, budwood, or soil that has been in contact with grapevine material from a Phylloxera Infested Zone into a Phylloxera Exclusion Zone. The Phylloxera Exclusion Zone covers most of NSW including the Project area. The Project area is also in the Potato Biosecurity Zone which covers all of NSW. The movement of plants belonging to the family Solanaceae and associated matter is banned from entering the zone. However, the risk associated with Phylloxera and potato diseases is very low due to the lack of horticultural crops in the vicinity of the Project.

There are several important crop diseases in the region and pathogens such as rusts can be spread on vehicles, footwear and clothing (Plant Health Australia, 2017). Activity associated with the Project has the potential to result in the spread of crop or pasture diseases or pests, but the risk appears to be low due to the lack of intensive cropping activities on or adjacent to the Project area.

LLS have expressed concern that exotic plant pests (such as khapra beetle or brown marmorated stink bug) could be introduced into Australia. These pests present a greater risk as they can be introduced in materials or packaging required for the Project. Other exotic pests or diseases (such as Xylella) which is spread in food or plant materials should present a lower risk.

5.3 RESTRICTED MOVEMENT

It is unlikely that construction activities would substantially restrict movements of landowners, agricultural workers, their livestock or equipment within the Project area. It is possible that some movement would be affected temporarily due to restricted access to the construction footprint. However, these restrictions would be generally short in duration and in a limited location, and therefore unlikely to markedly affect movements for agricultural purposes.

Property 2 carries a low input ewe weaner flock with limited husbandry activities. Therefore, the scope for disruption to those activities is limited.

The operator of Property 1 intends to destock the project area during construction. Consequently, there should be little or no restriction on agricultural activities.

5.4 ON-GROUND AGRICULTURAL OPERATIONS

Construction activities have the potential to disrupt on-ground husbandry operations such as spraying, cultivation, sowing, slashing and harvesting. However, the presence of low input native pastures and the lack of any cropping area on the project footprint means that such operations would be rare. Therefore, the impact would be very low.

Airborne dust from vehicle movements and construction activities can reduce the yield and quality of pastures. Dust can block stomata, hinder transpiration, reduce photosynthesis, foster pathogens and make pasture less palatable to livestock. The impact of dust generated by construction activities is likely to be minor due to the limited earthworks, the impact being restricted to pasture close to access tracks, the low pasture productivity and the extensive nature of the grazing on the project area resulting in a very high proportion of the pastures being unaffected by dust.

5.5 IMPACTS ON AERIAL AGRICULTURE OPERATIONS

Wind farms have the potential to have substantial impacts on aerial agriculture operations (such as aerial spreading of fertilisers, monitoring and aerial spraying) by aircraft and drones. However, the past and likely future use of aerial agriculture in the Project area is very limited and therefore impacts would be minimal.

5.6 IMPACTS ON LIVESTOCK ENTERPRISES

The main potential impact on livestock enterprises would be disturbance of sheep and cattle caused by noise and vehicle movements. Although livestock habituate to disturbances, the noise and movement of construction vehicles and other construction activities may have an impact on livestock in specific circumstances, especially during sensitive periods such as calving and lambing.

Livestock can be panicked, particularly if they are new to the area near the Project (such as relocated, agisted or newly purchased animals) or if they are not accustomed to human contact. In semi-arid areas such as the Project area, paddocks are large and stocking rates are low so livestock can move a considerable distance away from any source of disturbance. Balanced against this is that livestock in semi-arid areas are often unaccustomed to human contact and therefore more susceptible to noise and vehicle disturbance.

Although there is potential for some disturbance, the effect on productivity is expected to be relatively minor.

Considerable disruption to livestock enterprises (such as livestock deaths, illness and stress; disease spread; mixing of animals and uncontrolled breeding) is possible if stock water pipelines or fences are damaged and not promptly repaired during construction, or if gates are left open.

Grazing management would also be disrupted if construction activities result in paddocks being temporarily unavailable for grazing, or cause a disruption to the grazing pattern of livestock.

While the construction of infrastructure such as access tracks, WTGs, substations, BESS and overhead transmission lines will result in localised impacts on rangeland pasture, no broad-scale modification of pastures (such as cultivation, slashing or herbicide treatment) is proposed.

5.7 STRATEGIC AGRICULTURAL LAND

No BSAL or SSAL is located within the Project area.

5.8 FIRE RISK

Fires have the potential to be started by human activities, equipment and vehicles during construction. Fire risks may involve hot work or the storage and use of dangerous materials.

Fires can cause great damage to livestock, agricultural infrastructure (such as dwellings, stock yards, sheds and fences), pasture, shade and shelter trees, and agricultural equipment.

A bushfire plan would be prepared for the Project and would include mitigation measures applicable to construction activities undertaken during the bushfire danger period. The implementation of this plan is expected to adequately manage the bushfire risk during construction.

Fire risk is discussed in greater detail within the Hazards Analysis report.

5.9 TRAVELLING STOCK RESERVES AND LIVESTOCK ROUTES

There are no travelling stock reserves (TSRs) or livestock highways in the Project area (LLS, 2021). The NSW Department of Industry (2017) defined livestock highways as a key network of livestock routes connecting key agricultural regions within NSW, and with Queensland and Victoria.

There are two contiguous TSRs adjacent to the north west corner of the Project area, and Keri Keri Lake TSR is approximately five kilometres south of the Project area. Neither TSR is used for travelling stock or for stock watering, and are unlikely to be affected by the Project.

6. OPERATIONAL IMPACTS

6.1 LOSS OF LAND USE

Operation of the Project would result in permanent change in some land use where permanent infrastructure would be established (e.g. WTGs, BESS, transmission line structures, permanent access tracks switchyard, O&M facility and substations), from the existing agricultural land use to electrical generation infrastructure. The agricultural production in these areas would be lost during the operational life of the Project.

Grazing operations would be able to continue on other areas of the Project area.

6.1.1 IMPACTS

Some of the area defined as the permanent disturbance footprint would be removed from agricultural production. However, grazing could continue on other parts of the permanent disturbance footprint, such as in the transmission line easements and under the bases of the 220 kV and 330 kV transmission line structures.

Permanent access tracks and WTG hardstands are likely to affect soil characteristics to the extent that these locations would no longer be productive pasture areas. This would greatly reduce agricultural productivity in these locations, but they comprise only a small percentage of the Project area.

6.1.2 AREA AFFECTED

The impact of Project on grazing production would be minimal during operation due to the small area of pasture directly affected relative to total size of agricultural enterprises within the Murray River LGA. Although the permanent disturbance footprint, as defined, within Property 1 and Property 2 totals up to 483.3 hectares, the area of pasture permanently taken out of production is expected to be much smaller. For the purpose of this assessment, conservatively 483.3 ha has been considered.

The estimated area of pasture permanently taken out of production (483.3 hectares) is equivalent to 2.7 per cent of the Project area, and 0.05 per cent of the total agricultural land in the Murray River LGA (885,903 hectares – refer Table 4-5). This area is entirely grazing land, and no cropping land would be affected by the operation of the Project.

Table 6-1
Summary of land directly affected by operation

Element	Property 1 area (ha)	Property 2 area (ha)	Total impact ¹ area (ha)
Project area	15,118	2,881	17,999
Permanent disturbance footprint	373.3	110.0	483.3
Total direct impact	373.3	110.0	483.3

6.1.3 IMPACT ON INCOME

The loss of gross income for Landowner 1 and Landowner 2 during operation, based on a permanent impact on up to 483.3 hectares, is assessed in Table 6-2.

As both properties were understocked at the time of inspection, the loss of gross income during operation is assessed using a likely long term stocking rate which is higher than the stocking rate used in the comparable construction calculations. The long-term stocking rates used in these calculations

¹ Excludes approximately 7.3 ha of Project area, which is located on public roads outside of Property 1 and Property 2.

do not account for adverse seasonal conditions and other circumstances which may result in either full or partial future temporary destocking. Therefore, the calculations may somewhat overestimate the average annual loss.

The estimated loss of income during operation is relatively small at \$14,422 per annum. This is a negligible proportion (0.005 per cent) of the total gross value of agricultural production across the Murray River LGA in 2020-21 (\$316 million – Section 4.5.4). Whilst the estimated loss of income during operation is higher than the \$9,017 per annum considered in the EIS, this is mainly due to considering underground cables and transmission corridors as part of the permanent disturbance footprint in this latest assessment. It is likely grazing could continue on these parts of the permanent disturbance footprint which would further reduce the impacts estimated.

This loss would also have a negligible impact on agricultural support services, processing and value adding industries.

Losses to the host landowners would be offset by extra revenue gained from hosting the Project on their properties.

Table 6-2
Loss of gross grazing income during operation

	Property 1	Property 2	Total
<u>Whole property productivity</u>			
Area of property (hectares)	24,000	4,160	
Likely long-term stocking rate			
Ewe weaners		1,500	
Ewes	5,500		
<u>Permanent disturbance footprint productivity</u>			
Permanent disturbance footprint (hectares)	373.3	110	483.3 ¹
Likely stocking rate			
Ewe weaners		40	
Ewes	86		
<u>Loss of income</u>			
Gross income (\$ per head per year)	\$137	\$66	
Proportional loss	100%	100%	
Annual loss of income (\$)	\$11,782	\$2,640	\$14,422

¹ Excludes approximately 7.3 ha of Project area, which is located on public roads outside of Property 1 and Property 2.

6.2 BIOSECURITY

Any activity during operation (such as inspections, maintenance and repairs) that requires access of personnel, vehicles or machinery to the wind farm or transmission line easement poses a potential biosecurity risk to agricultural operations in the vicinity of the Project.

The biosecurity risks and potential impacts outlined in Section 5.2 in relation to construction are also applicable to the operational phase. The major difference is that vehicle, machinery and personnel activity would be less intense and frequent during operation, and therefore the risk of weed, pest or disease spread would be much lower.

6.3 RESTRICTED MOVEMENT

It is unlikely that the operation of the Project would significantly restrict the movements of landowners, workers, livestock or equipment.

6.4 IMPACTS - ON-GROUND AGRICULTURAL OPERATIONS

The presence of structures on crop and pasture land could disrupt, to some extent, normal on-ground husbandry operations around the structure. However, the prevalence of low input native pastures and the lack of any cropping area in the Project area means that impacts would be very low.

6.5 IMPACTS ON AERIAL AGRICULTURE OPERATIONS

As discussed in Section 5.5, wind farms have the potential to have substantial impacts on aerial agriculture operations.

In addition, transmission line structures and operational transmission lines would restrict drone flight in areas around these structures. Drones are subject to electric and magnetic interference from transmission lines, and it is recommended that they are not flown within approximately 30 to 45 metres of power lines, electrical substations and other electrical equipment (Indiana Electric Cooperatives, 2020). Transgrid guidelines indicate that unmanned aerial vehicles (such as drones) cannot be flown within 60 metres of any transmission line structure, guy wire or conductor (Transgrid, 2022a).

However, as discussed in Section 5.5, the past and likely future use of aerial agriculture in the Project area is very limited and therefore impacts would be minimal.

6.6 IMPACTS ON LIVESTOCK ENTERPRISES

The main potential impact on livestock enterprises would be noise and movement disturbance of sheep and cattle as discussed in Section 5.6. These impacts would be lower during operation due to a lower intensity of personnel and vehicle movements required for operation activities. The potential for damage to fences and other livestock infrastructure and gates being left open, are also lower.

6.7 STRATEGIC AGRICULTURAL LAND

No BSAL or SSAL is located within the Project area.

6.8 FIRE RISK

Fires have the potential to be started by human activities, equipment and vehicles during operation. This risk would be lower than during construction but are dependent on seasonal and weather conditions.

Fires have the potential to also arise from the operation of transmission lines and substations. Mechanical failure of a transmission line (for example, a dropped conductor), or failure of a transmission line to operate correctly under fault conditions (for example, faulty earthing at times of lightning strike), can initiate fire under specific conditions (Transgrid, 2013). Other fire risks may involve hot work, storage and use of dangerous materials, high heat, wind impacts and contact with vegetation.

The Project's WTGs, transmission conductors and transmission line structures may result in safety issues during firefighting operations. There is a risk of contact with this infrastructure by firefighting aircraft. The combination of dense smoke and hot gases generated by a large fire directly under or near a high voltage transmission line can create a conductive path that increases the potential for a 'flashover'. Wires on transmission lines also sag lower in times of high temperature and fires, reducing the ground clearance (Powerlink Queensland 2015). Spraying water at fires near transmission lines is also a safety issue.

This may lead to inefficient firefighting activities due to restriction of activities in the vicinity of WTGs and transmission lines, and the creation of a barrier to movement across a fire ground by transmission lines.

Concerns have also been raised about the increased cost of public liability insurance premiums for neighbouring properties (Australian Energy Infrastructure Commissioner, 2023) to cover potential damage to a nearby wind farm, with fire spread being the most likely cause of substantial damage.

Fire risk is discussed in greater detail within the Preliminary Hazards Analysis report.

6.9 FROST

There is some evidence that WTGs reduce the occurrence of frost on surrounding land (Henschen, et al, 2011). However, this is unlikely to be significant on the Project area due to the relatively low frost incidence (Section 4.1.3), a lack of cropping and the low intensity of pasture production. Crops are generally more susceptible to frosts than pastures.

7. CUMULATIVE IMPACTS

The cumulative impact assessment considers other nearby developments along with the Project and assesses the scale and nature of the cumulative impacts the developments on key matters.

7.1 DEVELOPMENTS

At the time of submitting the EIS, proposed developments which may have been relevant to cumulative impacts were identified as follows.

- Project EnergyConnect
- Baldon Wind Farm
- Bullawah Wind Farm
- Burrawong Wind Farm
- Dinawan Wind Farm
- Mallee Wind Farm

- The Plains Wind Farm
- Wilan Wind Farm
- Yanco Delta Wind Farm
- Currawarra Solar Farm
- Hay Solar Farm
- Keri Keri Solar Farm
- Limondale Solar Farm
- Lang's Crossing Solar Farm
- Southdown Solar Farm
- Tarleigh Park Solar Farm
- The Plains Solar Farm

Brief details and impacts of each of these Projects are set out in Table 7-1 on page 55. This information was obtained from the websites of various proponents, the Australia and New Zealand Infrastructure Pipeline website (infrastructurepipeline.org) and the NSW DPE's Major Projects website (planningportal.nsw.gov.au/major-projects).

7.2 SUMMARY

Cumulative impacts on agriculture in the region arising from the Project being constructed and operated close to other major Projects would be small.

All the projects have relatively little impact on agricultural production, generally allowing agricultural activities to continue across most of the respective project areas. The amount of agricultural land taken out of production is generally small in relation to the total project area, and very small relative to the total regional agricultural area. Consequently, the effect on regional agricultural production would be minimal and no impact on the number of persons employed in the agricultural sector would be expected.

The regional solar farm projects are likely to have a larger impact on agricultural production than transmission lines or wind farms. The solar farms will remove any current arable land from future crop production, although continued grazing is proposed or considered on all solar farms. The area of the solar farms is very small compared to the total regional agricultural area and the cumulative impact is also very small. The Project would have no impact on cropping (Sections 5.4 and 6.4), and there would be no cumulative impact on crop production.

Biosecurity risks are expected to be low once mitigation measures are implemented.

Following submission of the EIS, the following proposed developments have been identified as potentially relevant: .

- Abercrombie Wind Farm
- Argoon Wind Farm
- Balranald Mineral Sands Project
- Booroorban (Saltbush) Wind Farm
- Dinawan Wind Farm
- Euston Wind Farm
- Gol Gol Battery Energy Storage System
- Gol Gol Solar Farm
- Gol Gol Wind Farm
- Junction Rivers Wind Farm
- Koorakee Energy Park
- Mallee Wind Farm
- Pottinger Solar Farm
- Pottinger Wind Farm
- Romani Battery Energy Storage System
- Sunraysia Solar Farm
- Tchelery Wind Farm

However, the majority of the above developments are over 100 km away from the Project and impacts. The cumulative impacts considered at the time of submission of the EIS remains unchanged.

Table 7-1
Summary of cumulative impacts identified at EIS lodgement

Project	Details	Location	Cumulative Impacts
EnergyConnect (NSW – Eastern Section)	The EnergyConnect (NSW – Eastern Section) Project would comprise 375 kilometres of new 330 kV double circuit transmission line and associated infrastructure between the Buronga substation and the proposed Dinawan 330 kV substation, construction of a new 330 kV substation around 30 kilometres south of Coleambally (the proposed Dinawan substation) and about 162 kilometres of new 500 kV double circuit transmission line (operated at 330 kV) and associated infrastructure between the proposed Dinawan substation and the existing Wagga 330 kV substation. Construction of the Project would commence in late-2022, subject to planning approval. The construction of the transmission lines and substation facilities would take around 18 months to complete. The upgraded Wagga 330 kV substation and new Dinawan 330 kV substation are expected to be operational by late-2024. Site decommissioning and remediation would extend around six months beyond the commissioning (operational) phase, with estimated completion in mid-2025.	This project's easement passes across the southern part of the subject Project area. However other parts of this project are distant from the subject Project.	The magnitude of the impacts of this Project on agriculture is limited by: • the relatively low productivity of agriculture in the area • the minor amount of land removed from agriculture • the continuation of agriculture activity despite the construction and operation of the Project • the low biosecurity risks. The impacts of both projects are minor compared to the large scale of regional agricultural activity and the cumulative impact would also be minor. Much of EnergyConnect is distant from the Project and would impact different parts of NSW. Transmission towers can cause cumulative impacts on aerial agriculture operations in association with WTGs. However, use of aerial agriculture in the Project area is very limited and therefore impacts would be minimal.

Project	Details	Location	Cumulative Impacts
Baldon Wind Farm	Baldon Wind Farm would be located approximately 15 kilometres north of Moulamein and 55 kilometres east of Balranald. The project is at an early stage of development, and the proponent is currently preparing the EIS. Construction is expected to occur between October 2024 and December 2026.	Borders the Project to the east.	The land is currently used for sheep grazing. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Bullawah Wind Farm	The proposed Bullawah wind farm will have an installed capacity of up to 1,000 megawatts and a battery facility on site. The project includes 170 WTGs, with a maximum blade-tip height of 300 metres above the ground. It is located approximately 30 kilometres southeast of Hay. A scoping report has been prepared and SEARs have been issued. Construction is expected to occur between 2025 and 2027.	Approximately 95 kilometres east of the Project	The land is distant from the Project and currently used for low intensity grazing. The impacts of this project on agriculture would be low and the cumulative impact on regional agricultural production would also be small.
Burrawong Wind Farm	The project is located approximately 15 kilometres south of Balranald could host up to 107 WTGs. A scoping report has been prepared, and the proponent is currently preparing the EIS. Construction is expected to commence in 2023.	Approximately 21 kilometres south west of the Project	The land is currently utilised for broad scale cropping activities and grazing. It is expected that there would be minimal impact to these activities once the Proposal is in operation. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.

Project	Details	Location	Cumulative Impacts
Dinawan Wind Farm	Dinawan Wind Farm is mainly located west of the road between Coleambally and Jerilderie, around the localities of Gala Vale and Mabins Well. Approximately 250 WTGs are proposed with a generation capacity of approximately 1.5 gigawatts. A scoping report has been prepared and SEARs have been issued. Construction is expected to occur between 2025 and 2027.	Approximately 130 kilometres east of the Project	The land is distant from the Project and is currently used mainly for sheep and cattle grazing plus with some areas of irrigated canola, cotton and cereal crops. It is expected that there would be minimal impact to these activities once the Proposal is in operation. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Mallee Wind Farm	Mallee Wind Farm is located west of Mallee Cliffs National Park, approximately 20 kilometres north east of Buronga. Up to 150 WTGs are proposed with a generation capacity of approximately 1 gigawatt. A scoping report has been prepared and SEARs have been issued. Construction is expected to occur between 2025 and 2028.	Approximately 155 kilometres west of the Project	The land is distant from the Project and is currently utilised for broad scale cropping activities and grazing. It is expected that there would be minimal impact to these activities once the Proposal is in operation. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
The Plains Wind Farm	The Plains Wind Farm proposes up to 240 WTGs up to 280 metres tall. It is located both east and west of the Cobb Highway, approximately 20 kilometres south of Hay. Construction is expected to occur between 2026 and 2028.	Approximately 55 kilometres east of the Project	The land is currently used mainly for grazing plus with some areas of dryland and irrigated crops. It is expected that there would be minimal impact to these activities once the Proposal is in operation. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Wilan Wind Farm	Wilan Wind Farm would consist of around 138 WTGs with a generation capacity of approximately 800 megawatts. It is located approximately 25 kilometres east of Balranald., north	Borders the Project to the north, across the Sturt Highway.	The land is currently used mainly for grazing plus with some areas of dryland and irrigated crops. It is expected that there would be minimal impact to these activities once the Proposal is in operation.

Project	Details	Location	Cumulative Impacts
	of the Sturt Highway. Construction is expected to occur between 2025 and 2028.		The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Yanco Delta Wind Farm	Yanco Delta Farm would consist of up to 225 WTGs with a generation capacity of approximately 1,500 megawatts. It is located approximately 10 to 40 kilometres north west of Jerilderie. The EIS has been publicly exhibited, and the proponent is responding to submissions.	Approximately 135 kilometres south east of the Project	The land is distant from the Project, and the majority of the project area is currently used for low intensity dryland sheep grazing with some mixed dryland grazing and cropping activities. A small area of land is expected to be removed from agricultural production resulting in a relatively small loss of agricultural production. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Currawarra Solar Farm	Currawarra Solar Farm is located around 25 kilometres north east of Deniliquin at Mayrung. The proposal is for a solar farm of around 195 megawatts capacity with approximately 654,200 solar panels. The project was approved in May 2018. Construction is expected to take 18 months, but it has not commenced.	Approximately 130 kilometres south east of the Project	The land is distant from the Project and is currently utilised for broad scale cropping activities. Grazing would continue during the operation phase. This project will reduce regional crop production. However, as the subject Project would have no impact on crop production, there would be no cumulative impact in this regard. The overall cumulative impact on regional agricultural production would also be small.
Hay Solar Farm	The project features a 110 megawatts solar farm with 300,000 panels across approximately 660 hectares. It was approved in 2017 and has a proposed 12-month construction period.	Approximately 85 kilometres north east of the Project	The land is distant from the Project and is currently used for grazing. Grazing would possibly continue during the operation phase. The Hay Solar Farm is relatively small in the context of the total regional grazing area. The impacts of this project on agriculture would be low and therefore the

Project	Details	Location	Cumulative Impacts
			cumulative impact on regional agricultural production would also be small.
Keri Keri Solar Farm	The project features a 400 megawatts solar farm across approximately 1,322 hectares. A scoping report has been prepared and SEARs have been issued. Construction is expected to begin in 2024 for a period of 18-24 months	Within the southern portion of the Project area	The land is currently used for low intensity grazing. Grazing would continue during the operation phase. The Keri Keri Solar Farm is relatively small in the context of the total regional grazing area. The impacts of this project on agriculture would be very low and therefore the cumulative impact on regional agricultural production would also be very small.
Limondale Solar Farm	The project features a 349 megawatts solar farm with 872,000 panels across approximately 900 hectares. The project has been completed and has been operational since late 2021.	Approximately 35 kilometres west of the Project	The land was used for broadacre cropping, including hay. Grazing would possibly continue during the operation phase. This project will reduce regional crop production. However, as the subject Project would have no impact on crop production, there would be no cumulative impact in this regard. Limondale Solar Farm is relatively small in the context of the total regional agricultural area. The impacts of this project on agriculture would be low and therefore the cumulative impact on regional agricultural production would also be small.
Lang's Crossing Solar Farm	The project is located approximately 1.6 kilometres north-east of the town centre of Hay and on an area of approximately 21 hectares. The project has been approved.	Approximately 80 kilometres north east of the Project	The project is very small in the context of the total regional agricultural area. The impacts of this project on agriculture would be very low and therefore the cumulative impact on regional agricultural production would also be very small.
Southdown Solar Farm	The proposed Southdown Solar Farm is a utility-scale renewable energy project of up to 130 megawatts output on	Approximately 120 kilometres south east of the Project	The land is currently used for grazing and cropping. Grazing would be considered during the operation phase. The Southdown Solar Farm is small in the

Project	Details	Location	Cumulative Impacts
	390 hectares, to be located approximately 10 kilometres south of Deniliquin. A scoping report has been prepared and SEARs have been issued. Construction of the Project is expected to take approximately 15 months		context of the total regional grazing area. This project will reduce regional crop production by a small amount. However, as the subject Project would have no impact on crop production, there would be no cumulative impact in this regard. The overall cumulative impact on regional agricultural production would be small.
Tarleigh Park Solar Farm	Tarleigh Park Solar Farm is located 23 kilometres south east of Deniliquin at Blighty and would generate up to 90 megawatts from 290,000 solar panels on 250 hectares. The project was approved in May 2018. Construction is expected to take 12 months, but it has not commenced.	Approximately 140 kilometres south east of the Project	The land is distant from the Project and is currently utilised for irrigated and dryland cropping. Grazing would likely continue during the operation phase. This project will reduce regional crop production by a small amount. However, as the subject Project would have no impact on crop production, there would be no cumulative impact in this regard. The overall cumulative impact on regional agricultural production would also be small.
The Plains Solar Farm	The Plains Solar Farm aims to have a generating capacity of 400 megawatts with approximately 600,000 to 800,000 solar panels. It is located east of the Cobb Highway, approximately 30 kilometres south of Hay. Construction is expected to occur between 2026 and 2028.	Approximately 80 kilometres east of the Project	The land is relatively distant from the Project and currently used for low intensity grazing. The project will allow existing grazing activities to continue. The impacts of this project on agriculture would be low, and the cumulative impacts would also be small.

8. MANAGEMENT OF IMPACTS

The mitigation measures that would be implemented to avoid or minimise potential agricultural impacts are listed in Table 8-1.

Table 8-1
Mitigation measures – agriculture

Impact	Environmental safeguard	Timing
Impact of structures	Permanent structures and temporary construction compounds would be located where possible to avoid or minimise impacts, or as agreed with the affected landowner.	Detailed design and construction
Disruption Impacts	To minimise disruption to agricultural activities: - Landowners and neighbours would be consulted regarding any required adjustments to property infrastructure (fences, access tracks, etc) and the proposed timing and location of construction works, especially where some restriction on vehicular or stock movements would be necessary. Property Management Plans would be developed based on landowner requirements and would be provided to the construction contractor. - Communication protocols between neighbouring landholders and the Applicant would be implemented during construction. - Property infrastructure (such as gates) would be managed in accordance with landowner requirements (provided access is not limited or restricted). - Any damage to property infrastructure caused by construction would be repaired in a timely manner in consultation with the landowner. - Use of existing roads, tracks and other existing disturbed areas would be prioritised. - Where access is required across open spaces, care would be exercised to ensure that minimum damage is caused to the surface by confining vehicular or plant movement, as far as possible, to one route.	Detailed design and construction
Fire	A bushfire plan would be prepared for the Project and would include mitigation measures applicable to construction and operation activities undertaken during the bushfire danger period.	Construction and operation
Rehabilitation	Disturbed areas would be stabilised and appropriately rehabilitated (i.e. back to pre-impacted conditions) as soon as feasible and reasonable following the completion of construction at each location. This would be carried out in consultation with the relevant landowners and neighbours to minimise the impacts to all parties.	Construction
Livestock disturbance	Procedures would be implemented so that potential impacts or conflicts between livestock and construction activities are appropriately managed. Procedures would be developed and	Construction and operation

Impact	Environmental safeguard	Timing
	documented in consultation with affected landowners and would include management of: • noise intensive activities during sensitive periods within the livestock production cycle (such as lambing and calving) • vehicle movements and other activities within the vicinity of livestock • movement of stock away from potential stressors created by construction activities.	
Biosecurity - construction	Landowners and neighbours would be consulted regarding biosecurity risks. Construction activities would conform to the biosecurity protocols of the landowners for people visiting the Project area The Applicant is committed to developing a Pest and Weed Management Plan prior to construction, and implementing measures to reduce biosecurity risks within and between properties. Temporary fencing will be installed around facilities (such as the construction compound, concrete batching plants, materials storage and laydown areas) comprising chain link fencing New or existing infestations of any priority weed or unidentified weed would be reported to the appropriate weeds authority.	Construction
Weed control	Where present, weeds would be managed in consultation with the landowners.	Construction
Access impacts - operation	Fencing and access arrangements, such as locked gates and requirements for opening and closing of gates, would be determined in consultation with landowners. Any damage caused by maintenance activities would be repaired promptly.	Operation
Biosecurity - operation	Project activities would conform to the biosecurity protocols of the landowners including recording of the name, location, date and time of visit for all persons entering the properties, all project vehicles to be washed down prior to entering any agricultural areas, all vehicles to be washed down when moving between paddocks with known weed infestations. Permanent security fencing will be installed around operational facilities including the BESS, operations and maintenance facility and substations. New infestations of any priority weed or unidentified weed would be reported to the appropriate weeds authority.	Operation
Weed management	Where present within the permanent disturbance footprint, weeds would be managed in accordance with the <i>Biosecurity Act 2015</i> and the Murray Regional Strategic Weed Management Plan 2023-2027.	Operation
Decommissioning	The project area will be returned to agricultural use at the end of the Project's operational life. All above-ground infrastructure would be removed. Hardstand surfaces, access tracks and other bare areas surplus to the landowners' requirements would be rehabilitated to	Decommission

Impact	Environmental safeguard	Timing
	native pasture which may include addition of topsoil, restored drainage, and restoration of vegetation. Underground infrastructure (such as cables and footings) would be removed to a depth of 500 millimetres below ground surface, but may otherwise remain. Any contamination or waste would be removed or managed in consultation with the landowners and according to regulations. Weed infestations would be controlled during the decommissioning process, if possible.	

9. CONCLUSION

The impact of the Project on the agricultural activities of the host landowners during construction would be moderate. The magnitude of these impacts would be constrained by the following factors:

- the lack of any impact on cropping land
- the relatively low agricultural productivity of the Project area
- the relatively low biosecurity risk in the Project area, further reduced after mitigation measures are implemented
- the potential for continued grazing on some of the Project area during construction
- the limited time frame (18 month) over which construction would be undertaken
- effective mitigation measures would be implemented to reduce the impacts of the Project on the agricultural industry.

During operation, the impact of the Project on the agricultural activities of the host landowners would be very small for the reasons outlined above, and the following reasons:

- the relatively small amount of agricultural land permanently removed from production compared to the total Project area
- the continued grazing on most of the Project area during operation.

Losses to the host landowners would be offset by extra revenue gained from hosting the Project on their properties.

The impact of the Project on agricultural productivity at a regional scale would be minimal due to the above factors. This loss would also have a negligible impact on agricultural support services, processing and value adding industries.

Cumulative impacts would be small due to the relatively small impact on agricultural production of this Project and other projects in the region. The projects would generally allowing agricultural activities to continue across most of the respective project areas.

10. REFERENCES

- ABS (2024), *Data by Region*. dbr.abs.gov.au/region.html?lyr=lga&rgn=15520. Accessed 1 March 2024.
- ABS (2022a), *Agricultural Commodities, Australia, 2020-21*. AGCDCLGA202021. Agricultural commodity estimates by 2021 Local Government Areas (LGA).
- ABS (2022b), *Value of agricultural commodities produced, Australia, 2020-21*. VACPDCLGA202021 Gross and local value estimates by 2021 Local Government Areas (LGA).
- Agriculture Victoria (2021), *Victorian Resources Online – Soil*. Available at <http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/soil-home>. Accessed 22 November 2022.
- Animal Health Australia (2018), *National Farm Biosecurity Manual - Grazing Livestock Production*. April 2018
- Australian Energy Infrastructure Commissioner (2023), *Commissioner's Observations and Recommendations (updated) - Neighbour Matters*. Available at <https://www.aeic.gov.au/observations-and-recommendations/chapter-2-neighbour-consultation-agreements>. Accessed 2 June 2023.
- BoM (2021), *Rainfall Variability*. Available at bom.gov.au/jsp/ncc/climate_averages/rainfall-variability/index.jsp. Accessed 22 November 2022.
- CSIRO (2016). *The Australian Soil Classification, Second Edition*. Available at clw.csiro.au/aclep/asc_re_on_line_V2_soilhome.htm. Accessed 22 November 2022.
- Department of Industry (2017), *Travelling stock reserves - Interim update*. Published November 2017.
- DPE (2013), *Strategic Regional Land Use Policy (SRLUP) - Strategic agricultural land - biophysical*. Available at datasets.seed.nsw.gov.au/dataset/srlup-salbiophysical. Accessed 22 November 2022.
- DPE (2017). *Western Regional Plan 2036*.
- DPE (2023). *Riverina Murray Regional Plan 2036*.
- DPI (2011), *OJD Prevalence Areas 2011-30 Dec 2012*. dpi.nsw.gov.au/animals-and-livestock/sheep/health/other/ojd/about/historical/ojd-prevalence-areas-jan2011. Accessed 23 November 2022.
- DPI (2013a), *New South Wales Biosecurity Strategy 2013 – 2021*.
- DPI (2013b), *Infrastructure Proposals on Rural Land*. June 2013, Primefact 1063, second edition. Mary Kovac and Glenda Briggs. Resource Planning and Development Unit
- DPI (2021a), *Draft state significant agricultural land map - exhibition*. Available at nswdpi.mysocialpinpoint.com/ssal. Accessed 23 November 2022.
- DPI (2021b), *Biosecurity Information System - Weeds, 2017-2020*. Available at trade.maps.arcgis.com/apps/webappviewer/index.html?id=a62b0f927ca441f1ba60b2dbfde5e9be. Accessed 29 October 2022
- DPI (2021c), *Distribution Maps for Vertebrate Pests*. Available at dpi.nsw.gov.au/biosecurity/vertebrate-pests/publications/distribution-maps-for-vertebrate-pests. Accessed 23 November 2022.
- DPI (2024), *NSW Footrot Program 2023 Report*. NSW Department of Primary Industries, August 2024.

DPI (2023), *NSW Invasive Species Plan 2023-2028*.

DPIE (2020), *NSW Landuse 2017*. Available at data.nsw.gov.au/data/dataset/nsw-landuse-2017. Updated 14 July 2020.

DPIE (2021), *Cumulative Impact Assessment Guidelines for State Significant Projects*, November 2021.

Emery K. A. (1986), *Rural Land Capability Mapping*. Soil Conservation Service of NSW, Sydney.

Henschen, M., Demchak, K., Herrholtz, B., Rudkin, M., Rhudy, L., Larson, E., Doogs, B., Holland, J., and J. Martin (2011). Do wind turbines affect weather conditions? A case study in Indiana. *Journal of Purdue Undergraduate Research*, 1, 22 – 29.

Hulme T., Grosskopf T. and Hindle J. (2002), *Agricultural Land Classification*. AgFact AC.25. NSW Agriculture, Orange NSW.

Indiana Electric Cooperatives (2020), *Drones Pose Electrical Safety Issues*. Available at indianaec.org/2020/05/27/drones-pose-electrical-safety-issues/. Accessed 25 November 2022

LLS (2021), *Travelling Stock Reserves - State Classification Map*. Available at arcgis.com/apps/webappviewer/index.html?id=dd585551cd5c4320bfcd2d671d8f2364. Accessed 24 November 2022.

Murray LLS (2022), *Murray Regional Strategic Weed Management Plan 2023-2027*.

Murray LLS (2024), *Murray Regional Strategic Pest Animal Plan 2024-2028*.

NSW Government (2023), *Land and Soil Capability Mapping for NSW*. Available at: datasets.seed.nsw.gov.au/dataset/land-and-soil-capability-mapping-for-nsw4bc12. Accessed 2 April 2023.

OEH (2012), *The Land and Soil Capability Assessment Scheme (second approximation) – a General Land Evaluation System for New South Wales*. Office of Environment & Heritage, Sydney.

OEH (2013), *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land*. NSW Office of Environment and Heritage, Sydney.

OEH (2017), *Estimated Inherent Soil Fertility of NSW*. NSW Office of Environment and Heritage, Sydney.

Plant Health Australia (2017), *Biosecurity Manual for Grain Producers*. Version 4.1 January 2017.

Powerlink Queensland (2015), *Fire and high voltage transmission line safety*.

Squires H. (2017), *Agricultural Land Use Mapping Resources in NSW - User's guide*. Primefact 1538 first edition February 2017.

Woodward R. (1988), *Rural Land Evaluation: a Manual for Conducting a Rural Land Evaluation Exercise at the local planning level*, revised edition. Department of Planning, Sydney NSW.

Attachment 1
NSW DPI sheep budgets

MERINO EWES (20 micron) - Merino Rams
Farm Enterprise Budget Series - 2024 (ave.wool and sheep price Apr to Sep)

Flock size: 4310 ewes **Farm Size** 1000Ha
Ewe body weight: 59 kgs
DSE rating: 2.32 DSEs/ewe

INCOME

Wool	number	class	kg /hd	\$/kg
Shear	4138	ewes	5.64	\$8.10
	1743	ewe hoggets	5.64	\$8.25
	86	rams	7.50	\$8.12
	1780	ewe lambs	1.18	\$3.26
Crutch	4396	adults	0.40	\$5.30
	1780	lambs	0.30	\$5.30

Sheep Sales	number	class	\$/hd	
	761	CFA ewes	\$91.38	(26.0 kg cwt)
	17	CFA rams	\$57.02	
	1853	weth weaners	\$63.00	(4 months)
	809	ewe hoggets	\$136.00	(16 months)

Fodder	tonnes	type	value per tonne
Graz/fodder crop	0 t	0	\$0 /t

A. Total Income:
VARIABLE COSTS

Replacements	number	class	cost (\$)/hd	reps
	19	rams	\$2,000.00	
cartage	19	rams	\$25.00	

Wool Harvesting & Selling Costs

Shearing	7661	ewes/hogg/lmb	\$9.81	1
	86	rams	\$13.62	1
Crutching	6090	ewes/lamb	\$1.92	1
	86	rams	\$3.31	1

Wool tax			1.50%	\$4,415
Commission, warehouse, testing charges			\$38.22/ bale	\$8,104
Wool - cartage	212	bales	\$16.00	\$3,392
- packs	212	packs	\$14.00	\$2,968

Sheep Health	number	class		
Broadspectrum	4396	adults/hoggets	\$1.59	2
	1816	ewe lambs	\$0.74	3
	1853	wether lambs	\$0.74	1
Narrowspectrum	4396	adults/hoggets	\$0.47	1
	1816	ewe lambs	\$0.24	1
Lice control	7747	adults/Hog/wean	\$1.62	1
Fly control (long acting)	4396	Adults	\$2.39	1
Fly control (short acting)	1780	ewe weaners	\$0.46	1
Vaccination- 6 in 1	4396	Adults	\$0.43	1
	3836	lambs	\$0.43	2
Mark (includes OJD)	3836	lambs	\$6.30	1
Scanning	4310	ewes	\$1.05	1

Livestock Selling Costs

Livestock cartage	3,440	sale sheep	\$1.66	\$5,710
Commission on sheep sales			4.50%	\$13,377
Levies (Yard dues, MLA Transaction levy and LLS rates)				\$9,191

Pasture maintenance	1000 ha	@	\$52 /ha	\$52,000
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Fodder

Ewes/hoggets	4396	3.5 kg/hd/week	\$0.28 /kg	10 weeks	\$42,588
Ewe lambs	1780	2.8 kg/hd/week	\$0.28 /kg	12 weeks	\$16,746
Wether lambs	1853	2.8 kg/hd/week	\$0.28 /kg	0 weeks	\$0
Total feed		211,910 kg	@	\$280	\$59,335
Graz/fodder crop	0 ha	@	\$200 /ha		\$0

B. Total Variable Costs:

GROSS MARGIN (A-B)
GROSS MARGIN /EWE
GROSS MARGIN /DSE
GROSS MARGIN /HA

excl. fodder
\$286,060.67
\$66.37
\$28.61
\$286.08

incl. fodder
\$226,725.99
\$52.60
\$22.67
\$226.74

This budget should be used as a GUIDE ONLY and should be changed by the grower to take account of movements in commodity and input prices, changes in seasonal conditions and individual farm characteristics. Estimated prices are GST exclusive.

ASSUMPTIONS MERINO EWES (20 micron) - Merino Rams

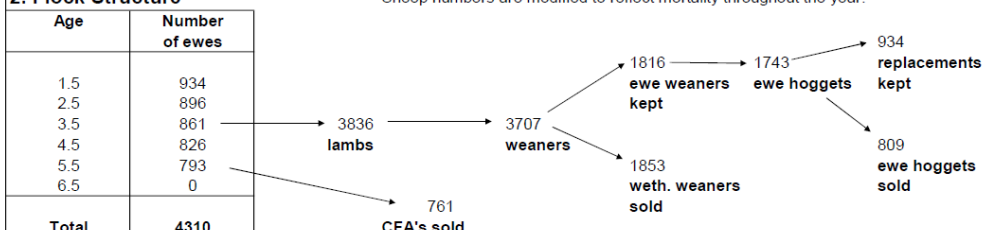
1. Flock Parameters

Flock mortality	4%	Ram %	2%
Productive life	5 years	Marking %	89%
Ewe body weight	59 kg	Weaning %	86%
DSE rating /ewe	2.32	Weaning age	3 months
Stocking rate/ha	10 dse's		

Pasture maintenance = 90kg/ha single super @ \$500t + \$7.00/ha application

2. Flock Structure

Sheep numbers are modified to reflect mortality throughout the year.



3. Wool Prices

Merino Ewe	Micron	AWEX Type	Clean price	Yield	Greasy price	Specifications (all 35n/ktex)	Proportion of Clip
- Fleece GTM	20	MF5B.	\$13.30	65%	\$8.67	1%VMB, 90mm	75%
- Skirtings/bellies	19	MP5B.	\$12.86	56%	\$7.18	4.8%VMB, 80mm	20%
- Cardings	20	MZ2B.	\$6.05	52%	\$3.14	2.9%VMB.	5%
					\$8.10		used in budget

4. Sensitivity Tables - Changes in Gross Margin \$/DSE (includes fodder)

Wool Cut kg/hd	Adult Greasy Wool Price \$/Kg greasy				
	\$4.05	\$6.08	\$8.10	\$10.13	\$12.15
2.82 kg	\$9.15	\$11.48	\$13.81	\$16.13	\$18.46
4.23 kg	\$11.25	\$14.75	\$18.24	\$21.73	\$25.22
5.64 kg	\$13.36	\$18.02	\$22.67	\$27.33	\$31.99
7.05 kg	\$15.47	\$21.29	\$27.11	\$32.92	\$38.74
8.46 kg	\$17.58	\$24.56	\$31.54	\$38.53	\$45.51

Hog. Wool Cut kg/hd	Hogget Greasy Wool Price \$/Kg greasy				
	\$4.13	\$6.19	\$8.25	\$10.31	\$12.38
2.82 kg	\$16.87	\$17.87	\$18.86	\$19.86	\$20.86
4.23 kg	\$17.77	\$19.27	\$20.77	\$22.26	\$23.76
5.64 kg	\$18.68	\$20.68	\$22.67	\$24.67	\$26.67
7.05 kg	\$19.58	\$22.08	\$24.58	\$27.07	\$29.57
8.46 kg	\$20.49	\$23.48	\$26.48	\$29.47	\$32.47

Ewe hoggets \$/Hd	Value of wether weaners \$/Hd				
	\$31.50	\$47.25	\$63.00	\$78.75	\$94.50
\$68.00	\$11.85	\$14.63	\$17.42	\$20.21	\$23.00
\$102.00	\$14.47	\$17.26	\$20.05	\$22.83	\$25.62
\$136.00	\$17.10	\$19.89	\$22.67	\$25.46	\$28.25
\$170.00	\$19.73	\$22.51	\$25.30	\$28.09	\$30.88
\$204.00	\$22.35	\$25.14	\$27.93	\$30.72	\$33.50

CFA ewes \$/Hd	Weaning %				
	43%	65%	86%	108%	129%
\$45.69	\$3.55	\$11.46	\$19.35	\$27.26	\$35.17
\$68.53	\$5.21	\$13.12	\$21.01	\$28.92	\$36.83
\$91.38	\$6.88	\$14.78	\$22.67	\$30.58	\$38.49
\$114.22	\$8.54	\$16.44	\$24.33	\$32.24	\$40.15
\$137.07	\$10.20	\$18.10	\$26.00	\$33.90	\$41.81

Note: The above sensitivity tables vary price and quantities by +/- 25% and +/- 50%.

Crutching \$/hd	Total shearing cost \$/hd				
	\$4.90	\$7.36	\$9.81	\$12.26	\$14.71
\$0.96	\$27.02	\$25.14	\$23.26	\$21.38	\$19.50
\$1.44	\$26.72	\$24.85	\$22.97	\$21.09	\$19.21
\$1.92	\$26.43	\$24.55	\$22.67	\$20.80	\$18.92
\$2.40	\$26.14	\$24.26	\$22.38	\$20.50	\$18.62
\$2.89	\$25.85	\$23.97	\$22.09	\$20.21	\$18.33

Ewes/hoggets kg/hd/wk	Grain price \$/Tonne				
	\$140.00	\$210.00	\$280.00	\$350.00	\$420.00
1.7 kg	\$26.71	\$25.76	\$24.80	\$23.85	\$22.90
2.6 kg	\$26.17	\$24.96	\$23.74	\$22.52	\$21.30
3.5 kg	\$25.64	\$24.16	\$22.67	\$21.19	\$19.71
4.3 kg	\$25.11	\$23.36	\$21.61	\$19.86	\$18.11
5.2 kg	\$24.58	\$22.56	\$20.54	\$18.53	\$16.51

Note: The feeding sensitivity tables vary quantities/cost by +/- 25% and +/- 50%.

Sheep and wool prices thanks to MLA market reporting, AuctionsPlus and AWEX. Wool cuts based on wether trial data

MERINO WETHERS (20 micron)

Farm Enterprise Budget Series - 2024 (ave.wool and sheep price Apr to Sep)

Flock size: 8475 wethers Farm Size 1000Ha
Wether body weight: 59 kgs
DSE rating: 1.18 DSEs/wether

INCOME

	number	class	kg /hd	\$/kg
Wool	8306	wethers	6.06	\$8.17
Shear	1476	wethers 4 month	1.26	\$3.26
Crutch	8390	wethers	0.40	\$5.30

Sheep Sales	number	class	\$ /hd	
	1341	CFA wethers	\$95.53	(26.0 kg cwt)

Fodder	tonnes	type	value per tonne
Graz/fodder crop	0 t	0	\$0 /t

A. Total Income:
VARIABLE COSTS

Replacements	number	class	cost (\$)/hd	
	1476	wethers	\$63.00	(4 months)
Cartage	1476	wethers	\$1.66	

Wool Harvesting & Selling Costs

				reps
Shearing	9782	wethers	\$9.81	1
Crutching	8390	wethers	\$2.02	1
Wool tax			1.50%	
Commission, warehouse, testing charges			\$38.22/ bale	
Wool - cartage	309	bales	\$16.00	
- packs	309	packs	\$14.00	

Sheep Health

Broadspectrum	7000	wethers	\$1.59	2
	1476	weaners	\$0.74	2
Narrowspectrum	8476	wethers	\$0.47	1
Lice control	9782	wethers	\$1.62	1
Fly control (long acting)	8476	wethers	\$2.39	1
Vaccination- 6 in 1	8475	wethers	\$0.43	1

Livestock Selling Costs

Livestock cartage	1341	CFA wethers	\$1.66
Commission on sheep sales			4.50%
Levies (Yard dues, MLA Transaction levy and LLS rates)			

Pasture maintenance	1000 ha	@	\$52 /ha
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Fodder

			Supplementary feed @ \$280 /t	
Wethers	7000	3.5 kg/hd/week	\$0.28 /kg	4 weeks
Wether weaners	1476	2.8 kg/hd/week	\$0.28 /kg	10 weeks
Total feed		138,208 kg	@	\$280
Graz/fodder crop	0 ha	@	\$200 /ha	

B. Total Variable Costs:

	excl. fodder	incl. fodder
GROSS MARGIN (A-B)	\$194,822.96	\$156,124.72
GROSS MARGIN /WETHER	\$22.99	\$18.42
GROSS MARGIN /DSE	\$19.48	\$15.61
GROSS MARGIN /HA	\$194.81	\$156.12

This budget should be used as a GUIDE ONLY and should be changed by the grower to take account of movements in commodity and input prices, changes in seasonal conditions and individual farm characteristics. Estimated prices are GST exclusive.

ASSUMPTIONS MERINO WETHERS (20 micron)

1. Flock Parameters

Cull age	6.5 years	Adult mortality	2%
Replacement age	1.5 years	Body weight	59 kg
Productive life	5.0 years	DSE rating	1.2
Stocking rate/ha	10 dse's		

Sheep and wool prices thanks to MLA market reporting, AuctionsPlus and AWEX. Wool cuts based on wether trial data
Pasture maintenance = 90kg/ha single super @ \$500t + \$7.00/ha application

2. Flock Structure

Sheep numbers are modified to reflect mortality throughout the year.

Age	No. of wethers
0.5	1476 ← 1476 replacements bought
1.5	1456
2.5	1428
3.5	1400
4.5	1372
5.5	1344
6.5	0 → 1341 CFA's sold
Total	8475

3. Wool Prices

	Micron	AWEX Type	Clean price	Yield	Greasy price	Specifications (all 35n/ktex)	Proportion of Clip
Merino Wether							
- Fleece GTM	20	MF5B.	\$13.30	65%	\$8.67	1%VMB, 90mm	80%
- Skirtings/bellies	19	MP5B.	\$12.86	56%	\$7.18	4.8%VMB, 80mm	15%
- Cardings	20	MZ2B.	\$6.05	52%	\$3.14	2.9%VMB.	5%
					\$8.17	→ used in budget	

4. Sensitivity Tables - Changes in Gross Margin \$/DSE (includes fodder)

Wool Cut kg/hd	Wether Greasy Wool Price \$/Kg greasy				
	\$4.09	\$6.13	\$8.17	\$10.21	\$12.26
3.03 kg	-\$13.84	-\$8.77	-\$3.70	\$1.37	\$6.43
4.55 kg	-\$9.25	-\$1.65	\$5.96	\$13.56	\$21.16
6.06 kg	-\$4.66	\$5.48	\$15.61	\$25.75	\$35.88
7.58 kg	-\$0.07	\$12.60	\$25.27	\$37.94	\$50.60
9.10 kg	\$4.52	\$19.72	\$34.93	\$50.13	\$65.33

Crutching \$/hd	Total shearing cost \$/hd				
	\$4.90	\$7.36	\$9.81	\$12.26	\$14.71
\$1.01	\$21.25	\$18.86	\$16.46	\$14.06	\$11.66
\$1.51	\$20.83	\$18.43	\$16.03	\$13.64	\$11.24
\$2.02	\$20.41	\$18.01	\$15.61	\$13.21	\$10.81
\$2.52	\$19.99	\$17.59	\$15.19	\$12.79	\$10.39
\$3.02	\$19.56	\$17.16	\$14.77	\$12.37	\$9.97

CFA wethers \$/hd	Replacement wethers \$/Hd				
	\$31.50	\$47.25	\$63.00	\$78.75	\$94.50
\$47.77	\$14.14	\$11.82	\$9.49	\$7.17	\$4.85
\$71.65	\$17.20	\$14.88	\$12.55	\$10.23	\$7.90
\$95.53	\$20.26	\$17.94	\$15.61	\$13.29	\$10.96
\$119.42	\$23.32	\$20.99	\$18.67	\$16.35	\$14.02
\$143.30	\$26.38	\$24.05	\$21.73	\$19.40	\$17.08

Note: The above sensitivity tables vary price and quantities by +/- 25% and +/- 50%.

M.Weth. Wean. kg/Hd/wk	Feeding Adult Wethers kg/Hd/week				
	1.73 kg	2.60 kg	3.46 kg	4.33 kg	5.19 kg
1.4 kg	\$17.55	\$16.87	\$16.19	\$15.51	\$14.83
2.1 kg	\$17.26	\$16.58	\$15.90	\$15.22	\$14.54
2.8 kg	\$16.97	\$16.29	\$15.61	\$14.93	\$14.26
3.5 kg	\$16.68	\$16.00	\$15.32	\$14.64	\$13.97
4.2 kg	\$16.39	\$15.71	\$15.03	\$14.36	\$13.68

Adult Wethers kg/hd/wk	Grain price \$/Tonne				
	\$140.00	\$210.00	\$280.00	\$350.00	\$420.00
1.7 kg	\$18.22	\$17.60	\$16.97	\$16.34	\$15.71
2.6 kg	\$17.89	\$17.09	\$16.29	\$15.49	\$14.69
3.5 kg	\$17.55	\$16.58	\$15.61	\$14.64	\$13.68
4.3 kg	\$17.21	\$16.07	\$14.93	\$13.80	\$12.66
5.2 kg	\$16.87	\$15.56	\$14.26	\$12.95	\$11.64

Note: The feeding sensitivity tables vary quantities/cost by +/- 25% and +/- 50%.

Attachment 2

Other regional weeds list – Murray LLS

Common name	Scientific name
Bathurst burr	<i>Xanthium</i> spp.
Bear-skin fescue	<i>Festuca gautieri</i>
Bitter stonecrop	<i>Sedum acre</i>
Blue heliotrope	<i>Heliotropium amplexicaule</i>
Box elder	<i>Acer negundo</i>
Buffalo burr	<i>Solanum rostratum</i>
Camel thorn	<i>Alhagi maurorum</i>
Cape tulips	<i>Moraea flaccida</i> and <i>M. miniata</i>
Columbus grass	<i>Sorghum x alnum</i>
Devils claw (yellow-flowered)	<i>Ibicella lutea</i>
Galvanised burr	<i>Sclerolaena birchii</i>
Golden dodder	<i>Cuscuta campestris</i>
Harrisia cactus	<i>Harrisia martinii</i> and <i>H. tortuosa</i>
Himalaya honeysuckle	<i>Leycesteria formosa</i>
Honey locust	<i>Gleditsia triacanthos</i>
Horehound	<i>Marrubium vulgare</i>
Johnson grass	<i>Sorghum halepense</i>
Long leaf willow primrose	<i>Ludwigia longifolia</i>
Pampas grass	<i>Cortaderia</i> spp.
Red rice	<i>Oryza rufipogon</i>
Reed canary grass	<i>Phalaris arundinacea</i>
Reed sweet-grass	<i>Glyceria maxima</i>
Rhus tree	<i>Toxicodendron succedaneum</i>
Scotch & Illyrian thistles	<i>Onopordum</i> spp.
Silk forage sorghum	<i>Sorghum</i> spp. hybrid cv. "silk"
Spanish heath	<i>Erica lusitanica</i>
Spiny burr grass	<i>Cenchrus incertus</i> & <i>C. longispinus</i>
Spiny emex	<i>Emex australis</i>
St Barnaby's thistle	<i>Centaurea solstitialis</i>
St John's wort	<i>Hypericum perforatum</i>
Star thistle	<i>Centaurea calcitrapa</i>
Sweet briar	<i>Rosa rubiginosa</i>
Tamarix	<i>Tamarix ramosissima</i>
Tangled hypericum	<i>Hypericum triquetrifolium</i>
Tree of heaven	<i>Ailanthus altissima</i>
Willows	<i>Salix</i> spp.