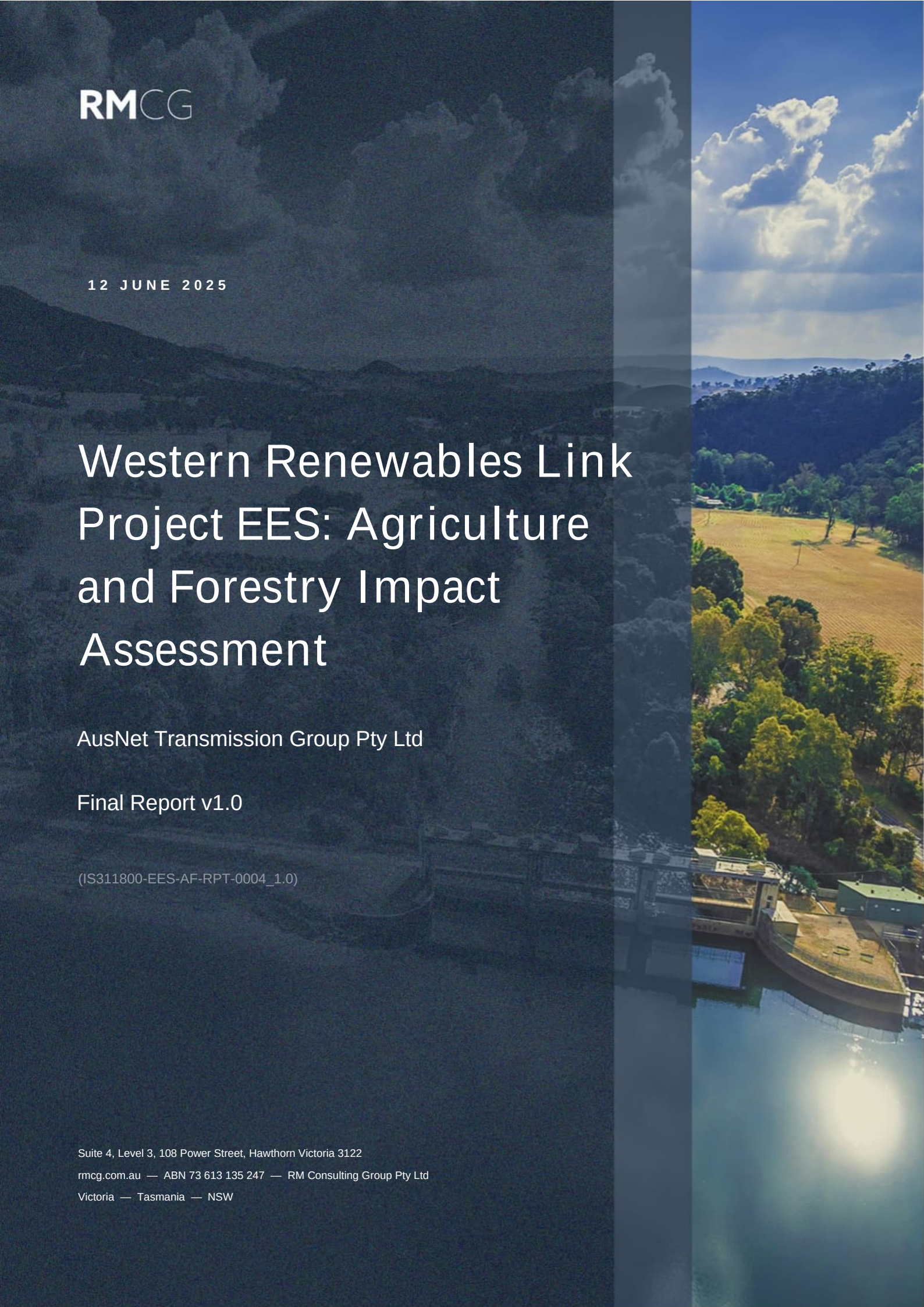
Western Renewables Link

TECHNICAL REPORT

H Agriculture and Forestry Impact Assessment



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Western Renewables Link Project EES: Agriculture and Forestry Impact Assessment

AusNet Transmission Group Pty Ltd

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Suite 4, Level 3, 108 Power Street, Hawthorn Victoria 3122
rmcg.com.au — ABN 73 613 135 247 — RM Consulting Group Pty Ltd
Victoria — Tasmania — NSW

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Glossary

Common terms, abbreviations and definitions for the Project are listed below.

TERM	DEFINITION
Access tracks	Access tracks are required to facilitate the transportation of plant, machinery, equipment, and materials to towers. hardstand areas, stringing pads and for stringing of the transmission line. Existing tracks previously used for farm vehicles and equipment for other projects will be utilised where practical and upgraded where required. The existing tracks will be upgraded by strengthening and widening of the existing tracks. Where there are no existing access tracks that can be utilised, a new 4 to 6m wide all-weather access tracks will be constructed, in bespoke locations the access track may be wider to account for terrain.
Agricultural production	Any form of primary production of renewable commodities. It does not include extractive industry, mineral extraction, or timber production from native forest. (Clause 73 of the Victoria Planning Provisions)
Agroforestry	The integration of trees and shrubs into farming landscapes, enabling farmers to improve the environmental, social, and economic values of their land.
ABS	Australian Bureau of Statistics
AusNet	AusNet Transmission Group Pty Ltd
Biosecurity	Biosecurity is the controls and measures to manage the risk of pests, weeds and diseases entering, emerging, establishing or spreading within Australia (adapted from the National Biosecurity Strategy, 2022. Department of Agriculture, Fisheries and Forestry, Canberra
CEMP	Construction Environmental Management Plan
Conductors	Commonly referred to as ‘power lines’ or ‘transmission lines’, carry electrical energy from point A to point B. The conductors will be made of aluminium alloy as it is lightweight, flexible and has a low electrical resistance.
Conductor heights	Minimum conductor heights from ground (ground clearance) are defined in Electricity Safety (Installations) Regulations 2009 (Victoria)
DEECA	Victorian Department of Energy, Environment and Climate Action, (effective from 1st January 2023, this department has taken on many of the functions of DELWP, with the exception of Planning)
DELWP	Former Victorian Department of Environment, Land, Water and Planning (ceased to exist on 1st January 2023)
Double circuit	Where each steel lattice tower supports two independent electrical circuits, one on each side of the tower.
Dryland	Agricultural land that is not irrigated
DSE	This acronym has two definitions: 1. DSE - former Victorian Department of Sustainability and Environment 2. DSE/hectare – Dry Sheep Equivalents, is a standard unit frequently used in Australia to compare the feed requirements of different classes of stock or to assess the carrying capacity and potential productivity of a given farm or area of grazing land. The unit represents the amount of feed required by a two-year-old, 45 kg (some sources state 50 kg) Merino sheep (wether or non-lactating, non-

TERM	DEFINITION
	pregnant ewe) to maintain its weight. One DSE is equivalent to 7.60 megajoule (MJ) per day.
DTP	Victorian Department of Transport and Planning (has taken on the Planning function from DELWP from 1st January 2023).
e.g.	for example
Easement	Easements provide safe clearances from the transmission line to any object in any direction and a horizontal clearance from the centreline to allow for sway in the transmission line (or power line). An easement is a right to access, occupy and use part of the land owned by another person for a particular purpose. For example, the construction and operation of a transmission line. Easements are usually subject to any conditions negotiated between the grantor and grantee of the easement and are registered on the title to the land affected, creating a public record of the existence of the interest in the land.
EES	Environment Effects Statement, prepared in accordance with the *Environment Effects Act 1978* and the Project-specific EES scoping requirements as issued by the Victorian Department of Transport and Planning.
Environment Effects Act	Victorian *Environment Effects Act 1978*
Enterprise	Category of primary production land use, including cropping, grazing, horticulture, and forestry One agricultural business that may operate across one or multiple property titles.
Environment	The *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978, Eighth edition, 2023* define the 'environment' to be the physical, biological, heritage, cultural, social, health, safety, and economic aspects of human surroundings, including the wider ecological and physical systems within which humans live.
EPRs or Environmental Performance Requirements	A suite of performance-based environmental standards and outcomes that apply to the design, construction and operation of the Project
GIS	Geographical Information Systems
GVAP	Gross value of agricultural production is defined by the Australian Bureau of Statistics (ABS) as 'Gross prices are those realised at the point(s) of valuation where ownership of the commodity is relinquished by the agricultural industry.'1
ha	hectare
HDD	Horizontal directional drilling, a trenchless method to put linear infrastructure underground.
i.e.,	that is
km	kilometre
kV	kilovolt

[1] Value of Agricultural Commodities Produced, Australia methodology, 2020-21 financial year https://www.abs.gov.au/methodologies/value-agricultural-commodities-produced-australia-methodology/2020-21

TERM	DEFINITION
Laydown areas	Sites at which equipment, material and supplies can be stored prior to delivery to the construction areas.
LiDAR	Acronym for Light Detection And Ranging, which is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth. These light pulses, combined with other data recorded by the airborne system, generate precise, three-dimensional information about the shape of the Earth and its surface characteristics.
LGA	Local Government Area
m	metre
MSS	Municipal Strategic Statement, which is a statement of the key strategic planning, land use and development objectives for the municipality, and the strategies and actions for achieving those objectives.
NEM	National Electricity Market
OHTL	Overhead transmission line
PAMP	Property Access and Management Plan
Planning and Environment Act	Victorian *Planning and Environment Act 1987*
Power Transformers	Transfer power between the 220kV and 500kV voltage levels.
Principal Contractor	During the construction stage, there will be multiple principal contractors and sub-contractors involved in the delivery of the different Project components. This EES refers to Principal Contractor as a catch all term for the contractor responsible for the works.
Production system	Refers to the enterprise that is being employed on a property. i.e., prime lambs, potato growing, cereal crops, etc.
Project region	The region outlined by the 11 ABS statistical areas (SA2) that are traversed by the Proposed Route. See Figure 6-1.
Project Area	The Project Area encompasses all areas that would be used to support the construction and operational components of the Project considered in the EES. The Project Area is contained within the Project Land and encompasses the following: • Permanent infrastructure: - Transmission tower structures - Upgrade and connection to the Bulgana Terminal Station - Connection to the Sydenham Terminal Station - An upgrade of Elaine Terminal Station - The new 500kV terminal station near Bulgana - Access tracks required for operation • Temporary construction areas and infrastructure: - Distribution line crossovers - Hurdles - Laydown areas - Stringing pads

TERM	DEFINITION
	- Access tracks - Tower assembly areas - Workforce accommodation facilities.
Project Land	The Project Land encompasses all land parcels that could be used for the purpose of temporary Project construction and permanent operational components. The Project Land corresponds with the extent of the Specific Controls Overlay proposed in the draft Planning Scheme Amendment for the Project. This generally includes the entire land parcel intersected by a Project component.
Proposed Route	The Proposed Route is approximately 100 to 170m wide and encompasses the nominal future easement for the proposed new transmission line (including a buffer either side), and the terminal station areas. The Proposed Route is located within the Project Area.
RPAS	Remotely Piloted Aerial Systems or drones, used to provide a range of services.
Scoping requirements	Document defining the formal requirements of the EES study, issued by the Victorian Department of Transport and Planning in November 2023, 'Scoping Requirements - Western Renewables Link Environment Effects Statement'.
Single circuit	Where each steel lattice tower supports only one electrical circuit. In eight specific locations along the Proposed Route, there will be a pair of towers, side by side, each carrying a single circuit.
SMP	Spoil Management Plan
Study area	The full extent of properties (typically involving multiple parcels) that are directly affected by the Proposed Route, not just the area within the property where the route traverses. The study area was specifically used in impact analysis for this report (Agriculture and Forestry Impact Assessment).
Strain towers	A type of transmission tower. Strain towers have a slightly larger structure compared to suspension towers however they are very similar in appearance. Strain towers are generally used where the transmission line changes direction beyond 10 degrees. These towers need to pull on the wires and are designed to take the tension load (or strain) of the wires.
Suspension towers	A type of transmission tower. Suspension towers are used where the towers are in a straight line or have a very small deviation angle (up to 10 degrees). Suspension towers are relatively light construction, with cross–arms on each side of the upper part of the structure (superstructure) and insulator strings supporting the conductors.
Terminal station	Terminal stations control the flow of power on transmission lines and reduce the voltage for supply to substations and large industrial customers.
The Project	Western Renewables Link (formerly the Western Victoria Transmission Network Project)
Transmission line	A transmission line is a conductor or conductors designed to carry electricity or an electrical signal over large distances with minimum losses and distortion.
Transmission towers	The structures used to carry overhead transmission lines are typically steel lattice towers, however very large poles are also sometimes used. There are two main structure types used for transmission line, suspension towers which are used when the line is straight and strain towers which are used when the line is turning. Referred to as 'towers' throughout.
220kV	220 kilovolt transmission line
500kV	500 kilovolt transmission line

Executive summary

The Western Renewables Link (the Project) proposes a new transmission line starting at Bulgana, near Stawell in Victoria's west, and extending approximately 190km to Sydenham in Melbourne's north-west. The Project will enable the connection of new renewable energy generated in western Victoria into the National Electricity Market and increase the Victorian transmission capacity. The Project is being delivered by AusNet Transmission Group Pty Ltd (AusNet).

This Agriculture and Forestry Impact Assessment forms part of the Environment Effects Statement (EES) for the Project in accordance with the *Environment Effects Act 1978*. This report and the methodology applied in preparing this report, responds to the Project's EES scoping requirements. It identifies Project activities, potential impacts and mitigation measures related to agriculture and forestry production. This report proposes Environmental Performance Requirements (EPRs) that aim to minimise the impacts of the Project on agricultural and forestry.

The study area applied in the assessment was comprised of all properties that will be directly affected by the proposed Project. A property could be made up of multiple parcels of land. The transmission line could intersect just one of those parcels, but the impact extends to the whole property, hence the property is considered to be the study area of this assessment. This approach was adopted so that all direct impacts to agriculture and forestry values were considered.

OVERVIEW

Figure ES-1 illustrates the lifecycle of a transmission line and indicates intensity of activity during each of these stages.

Agriculture is the dominant land use within the approximately 190km Proposed Route. A total of 229 agricultural and plantation forestry properties will be directly impacted by the Proposed Route. Directly affected agricultural and forestry properties range in size from less than 1 hectare to greater than 2,450 hectares, with the median property size being 110 hectares.

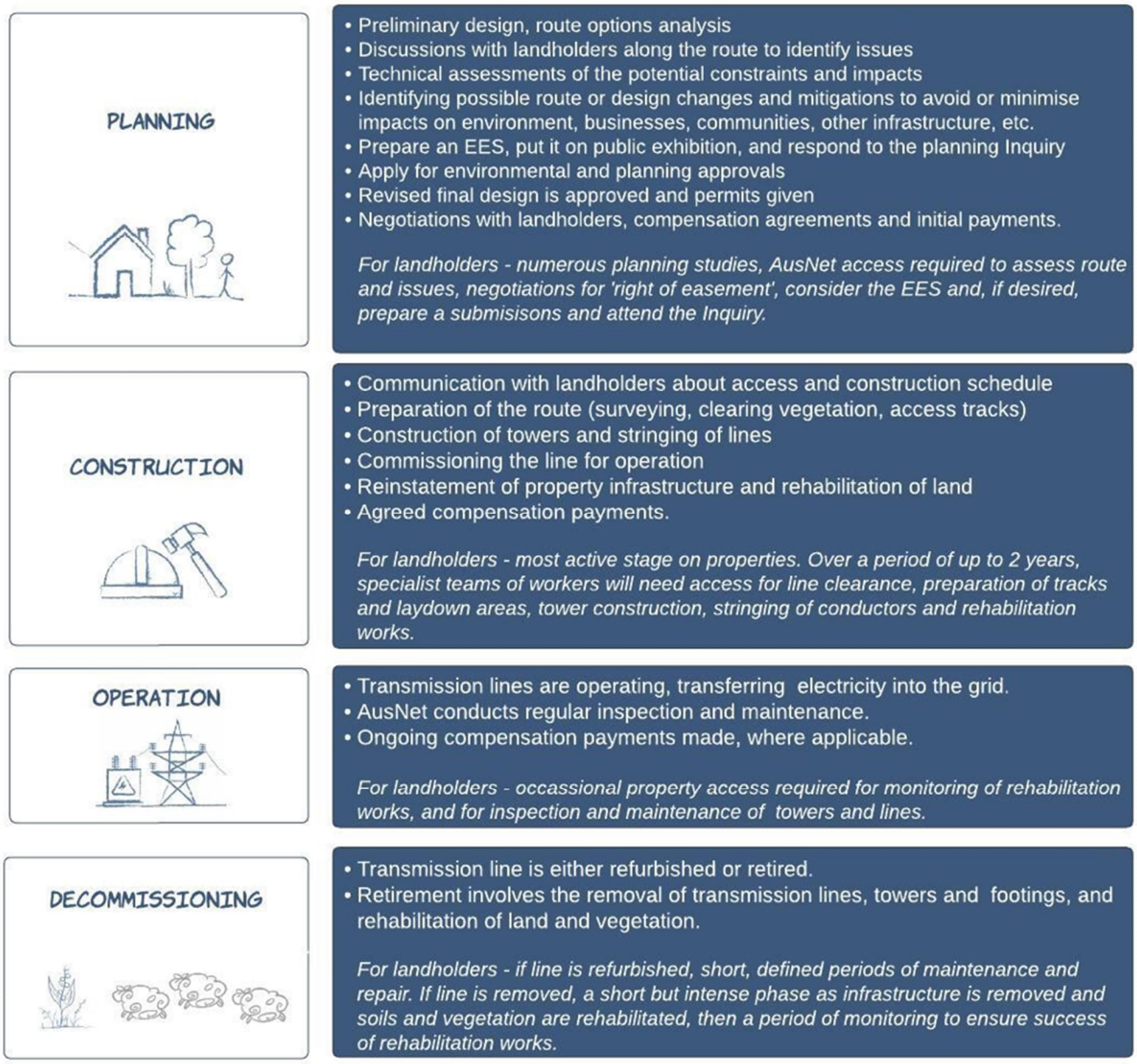


Figure ES-1: The lifecycle of a transmission line

EXISTING CONDITIONS

The existing conditions for agriculture and forestry, at the regional scale, have been examined by reviewing Australian Bureau of Statistics (ABS) agricultural survey data, and reviewing mapping of the land use and natural resource base in the area (Appendix D). The maps reviewed included:

- Satellite image of the region
- Land tenure
- Primary production land uses
- Rainfall
- Local government area boundaries
- Land production potential (Land Systems)
- Water resources
- River basins

- Property sizes
- Enterprise type
- Planning zones
- Weed infestation - serrated tussock.

There is a wide range of agricultural products generated by the farm businesses across the region with the value of those products highly variable. Many farmers operate multiple agricultural enterprises concurrently on their land, producing a range of commodities and rotating the enterprises between paddocks and across seasons to match market requirements, supply quotas, and for other management reasons (including weed, disease, and pest control).

The soils to the east and north of Ballarat are some of the most productive in Victoria and sustain potatoes and other intensive crops with very high value of production per hectare. Less intensive and less economically productive agricultural uses, such as grazing and broadacre cropping, occur along the remainder of the Proposed Route. Nevertheless, all traversed agricultural areas (particularly those close to metropolitan Melbourne) are identified in State and Local policies as being of significant economic and social value.

The most appropriate regional production data[2] available (2020-21 ABS Agricultural Survey) shows the following:

- Pastures for livestock is the dominant agricultural land use in the Project region at 363,106 hectares (67% of the total agricultural area).
- The next major agricultural land use is broadacre cropping at 169,376 hectares (31% of the Project region).
- Although the area of potato production (2,396 hectares) is less than 1% of the total Project region, it is significant at the state level (36% of the total area of potato production in Victoria)
- All other agricultural land uses total < 2% of the total agricultural land in the Project region.

In order to assess the impacts of the Project on agriculture and forestry, this study has categorised primary production land in the study area into four enterprise types, considering current activity and land potential. This was done on the basis that the potential impacts of the Project are likely to be similar within each category. The four enterprise categories are:

1. **Grazing** – refers to any agricultural enterprise that is solely based on grazing livestock such as sheep, cattle, horses, and goats. This includes the production of pasture and supplementary feed.
2. **Cropping** – refers to any agricultural enterprise that practices some form of broadacre dryland cropping and, in most cases, incorporates grazing activity too.
3. **Horticulture** – refers to an enterprise that grows high-value (irrigated) horticultural crops, such as potatoes, other vegetables, or specialist crops like pyrethrum. In most cases, these enterprises also incorporate grazing and some dryland broadacre cropping.
4. **Forestry** – refers to any enterprise that grows trees for timber production and may, or may not, incorporate any of the above enterprises.

There are other primary production and ancillary activities that are not specifically accounted for in these categories. This includes activities such as horse training, horse breeding, firewood harvesting, and boutique agricultural businesses. The potential impacts on these operations have also been considered in this analysis (although accurate economic data on these operations, such as value of production, is very difficult to source).

[2] Regional production data of ABS SA2 regions traversed by the Proposed Route. See Figure 6-1

Table ES-1 provides a summary of:

- The number of affected properties
- The area directly affected by the Proposed Route
- The gross value of production per hectare (GVAP/ha) of each enterprise category.

The figures in this table describe the range of economic values for land under different production systems and an estimate of the number of properties and areas directly affected in each enterprise category.

One of the important features to note in areas of high value agricultural land, particularly where horticultural crops (including potatoes) can be grown, is that farmers aim to utilise all available land. This reflects the high returns per hectare that this land can generate. This means that while the area impacted by the transmission line may appear to be small, it may be very significant for the particular farm business.

Table ES-1: Estimated annual agricultural economic losses by enterprise (construction period)

ENTERPRISE	GROSS VALUE OF AGRICULTURAL PRODUCTION (WEIGHTED AVERAGE PER HA/ PER ANNUM)	NUMBER OF AFFECTED PROPERTIES	AREA DIRECTLY AFFECTED BY PROPOSED ROUTE[3] (HA)
Grazing	$989	76	542
Cropping	$1,183	85	1028
Horticulture	$7,239	65	632
Forestry	$15,000 - $30,000	3	26

CONSULTATION WITH LANDHOLDERS AND INDUSTRY

A range of consultation, engagement and review activities were undertaken to inform this impact assessment.

This consultation focussed on ensuring the full range of farmer and industry concerns were identified and considered, that potential impacts were comprehensively assessed, and mitigation options that are both workable and adaptable were identified. The following specific consultation and engagement activities informed this assessment:

- Online webinars and face-to-face engagement activities (e.g., drop-in sessions) in the Project region
- Fourteen individual landholder interviews across the length of the Proposed Route
- Discussions and meetings with industry representatives
- Reviews, queries, and comments provided by the Technical Reference Group, which included affected local Council representatives and state department representatives
- Detailed discussions with AusNet's landholder liaison and easement management personnel.

RMCG also participated in a range of community consultation activities conducted by AusNet (see Appendix C for details). These events were open to all community members, and therefore represented an additional

[3] The Project Area includes all areas impacted through Project activities (easement corridor, access tracks, hardstands, towers, temporary construction areas, stringing pads, laydown areas and workforce accommodation facilities and terminal station work areas). Areas are not duplicated, i.e., access tracks within easement are not counted twice.

opportunity for landholders to engage. Participants were offered the chance to speak directly to RMCG following these activities, but no one took up this offer.

Landholder interviews were part of this information gathering and consultation process. AusNet provided RMCG with land use information for all affected properties (sourced from the AusNet land team). This information, along with our detailed property by property assessment, was used in the design of our approach to the landholder interviews. A total of 53 landholders who operated a variety of farm types across the Project's full geographic range were invited to participate in interviews with RMCG. This equates to just under a quarter of the total 229 landholders directly affected. Only 14 of the 53 invitees agreed to participate in interviews. This achieved an interview rate of 6% of affected landholders, where an initial target rate of 10% had been envisaged. Because interviews were only one of many different sources of information for the assessment, this relatively low interview rate has not compromised the assessment.

IMPACT ASSESSMENT KEY FINDINGS

It is recognised that agricultural uses of land along the Proposed Route are of significant value and concern to the community, landholders, food and fibre wholesalers and processors, and to the State.

The most significant potential impacts of the whole Project to the agricultural and forestry industries are:

- Short and long-term losses of production on prime agricultural land (particularly land under irrigation)
- Biosecurity breaches which in a worst-case scenario could have long-term, potentially irreversible impacts on market access, production costs, and land and commodity values.

CONSTRUCTION STAGE

The most significant potential impacts on agriculture and forestry ***during the construction stage*** are:

- Loss of land used for grazing, fodder, crops, and trees, resulting in financial loss
- Disruption of livestock, movement and normal farming or forestry activities (including noise, aerial activity, and access to water, yards, and sheds; and access for personnel and machinery to conduct pruning, soil preparation, sowing, spraying, and harvesting)
- Restrictions on irrigation of prime horticultural land, and isolation or redundancy of areas where paddocks are split by construction activity and transmission structures
- Potential for biosecurity breaches (introduction or spread of weeds, pests, disease, or pathogens) on agricultural or forestry land.

The construction stage is the most intensive stage of the Project for landholders. This is the stage when any required short term, long term, or (effectively) permanent changes to farm design, equipment, land management and production activity must be implemented.

Farm-scale and regional production economic impacts

With effective implementation of mitigations and EPRs, the residual economic impacts on agricultural enterprises will be minor during construction. This conclusion is based on the finding that for the majority of cases, the area affected, relative to the whole property, is small, and there are feasible mitigations and compensation available that will minimise or avoid most impacts.

The regional impact of construction on production is minor, being less than one per cent of total regional gross value of production from grazing and cropping and just over three per cent of the gross value of potato production, some of which is likely to be mitigated.

Biosecurity

The likelihood of a biosecurity breach during construction is significantly reduced through the implementation of a Biosecurity Management Plan which is a requirement of EPR EM8 Develop and implement a Biosecurity Management Plan. The Property Access and Management Plan EPR (EM3) also has biosecurity requirements (consistent with the Biosecurity Management Plan) that must be implemented. Some threat nevertheless remains, as it is possible that a single spore, seed, animal, or pathogen could unknowingly be transported between sites. With this in mind, we recommend that the biosecurity plan includes strict compliance monitoring and reporting requirements, to identify and respond to outbreaks quickly.

With the recommended mitigations in place, the residual impact for this issue is considered to be minor because, while the consequence is potentially significant (e.g., potentially widespread, long-lasting and have major effects on farm or forestry production), with effective biosecurity mitigations in place, the likelihood of a biosecurity issue arising is low.

Isolation and redundancy of productive land

With the implementation of proposed mitigations, isolation and redundancy of productive land will be minimised. Residual impacts will be specific to individual properties and will be influenced by the specific enterprise mix, property layout, irrigation specifications and management practices. It is possible to mitigate these impacts in many situations, for example, by adjusting irrigation layouts and / or using different irrigation equipment. At the regional scale these residual impacts are expected to be minor, mainly because it is expected that the mitigations will minimise both the number of situations where this occurs, and the magnitude of the impact where it is unavoidable. However, there may be some properties where it is possible that the residual impacts for that particular property and the associated business, could be more significant. These local issues will be identified and, where possible, mitigated directly through the Agriculture and Forestry Business Mitigation and Support Strategy EPR (AF1), and Specific Property Access Requirements EPR (EM4).

Soil management

With implementation of proposed mitigations, residual impacts relating to soil management are expected to be minor during construction and site rehabilitation of the Project.

Disruption to livestock

With implementation of proposed mitigations, animal disturbance or disruption will, at worst, be negligible, temporary and localised.

Contamination

With the adequate implementation of the mitigations and EPRs set out in the Contaminated Land Impact Assessment, the potential severity of contamination is very low and localised for the Project, therefore the residual impact is rated as minor.

OPERATIONS STAGE

At the conclusion of construction activity, individual agricultural enterprises (each with unique combinations of farm design, production system, products, topography, soils, and climatic conditions) will require different lengths of time to re-establish production to pre-Project levels. Cropping operations and some pasture could be re-established in one year, provided the growing seasons (Spring and Autumn) are favourable. In low rainfall, dryland conditions, re-establishing pasture to full production could take longer (up to two years,

depending on seasonal conditions). Livestock grazing operations can resume under the line once construction activity and rehabilitation is complete.

Due to height restrictions, forest plantations will be excluded from the transmission line easement from the beginning of the construction stage and for the life of the Project.

The most significant potential impacts on agriculture and forestry ***during the operation stage*** are:

- Restrictions within the easement on farm design, or on the development or use of farm infrastructure, machinery and aerial services. These restrictions may result in ongoing financial losses, opportunity costs, or increased production costs (involving time or cash costs)
- Restrictions on irrigation of prime horticultural land that cannot be mitigated, including situations where isolation or redundancy of parts of paddocks cannot be avoided
- Potential for biosecurity breaches
- Exclusion of forestry production due to ongoing restriction from planting trees in the easement.

At the regional scale the residual impacts of the Project are expected to be minor. However, there may be some properties where it is possible that the residual impacts for that particular property and the associated business, could be more significant. These local issues will be identified and mitigated directly through the Agriculture and Forestry Business Mitigation and Support Strategy EPR (AF1), the Specific Property Access Requirements EPR (EM4) and AusNet's existing biosecurity management procedures.

CONCLUSION FOR CONSTRUCTION AND OPERATION STAGES

With effective implementation of mitigations and EPRs, the residual impacts of the Project across the construction and operation stages, have been assessed as minor at the state and regional scale. However, at individual property or enterprise level, there could be some impacts that property owners consider to be more significant (e.g., isolation of areas of their farm or disruptions to their operations). These property-level issues will be identified and mitigated directly through the Agriculture and Forestry Business Mitigation and Support Strategy EPR (AF1), the Property Access and Management Plan EPR (EM3), and the Specific Property Access Requirements EPR (EM4). In situations where impacts will be unavoidable, any losses will be compensated.

DECOMMISSIONING STAGE

The transmission line is designed for a service life of 80 years. Potential impacts during the decommissioning stage are difficult to assess, due to this long life of the Project and the uncertainties about technology, land demand, production values, social values, and relevant regulation at that time. As a basis, it is assumed that activities and impacts will be similar to the construction stage, although land previously constrained will be returned to primary production. The anticipated process of decommissioning is outlined in Chapter 6: Project description, within the EES Main Document. A Decommissioning Management Plan EPR (EM11) will be developed and implemented during decommissioning detailing mitigation measures required to manage the environmental impacts associated with decommissioning and seek to minimise the risk of harm to human health or the environment of all activities associated with decommissioning.

ENVIRONMENTAL PERFORMANCE REQUIREMENTS

Table ES-2 describes the three EPRs have been developed to manage the Project's impact on agriculture and forestry. These EPRs reflect the mitigation measures described in this report.

Table ES-2: Agriculture and Forestry Environmental Performance Requirements

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
AF1	**AF1: DEVELOP AND IMPLEMENT AN AGRICULTURE AND FORESTRY BUSINESS MITIGATION AND SUPPORT STRATEGY** 1. Prior to the commencement of construction, develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy to avoid, minimise and mitigate impacts to agriculture and forestry (such as direct disruptions and disruption to farm and forestry businesses) from the Project, to the extent reasonably practicable. The strategy must be informed by the Communications and Stakeholder Engagement Management Plan (EPR EM5). 2. The strategy must define the process and requirements for: a) Consulting with landholders to discuss their individual business and specific impacts that their business may experience due to the Project. b) Provided the landholder agrees to engage with the Project, identifying, offering and implementing any practicable mitigation measures that could be applied to minimise the impacts of the Project on the individual business (both infrastructure and day to day operations). This includes but is not limited to measures that seek to, where practicable: i. Maintain access for farm operations ii. Maintain water supply for livestock troughs or relocate and re-establish at an agreed location iii. Avoid the disturbance of farm assets such as sheds or relocate and re-establish assets in an agreed location iv. Avoid irrigation systems or if not practicable re-design the system and replace it to enable irrigation of the affected paddock v. Maintain fences and gates or relocate and re-establish to maintain workable paddocks vi. Provide for reinstatement and rehabilitation of construction areas and access tracks c) Documenting the above discussions (a and b) and agreed mitigation measures for individual properties. This document will be provided to the landholder. d) If relevant and requested by the business, the appointment of agricultural or forestry consultant(s) with skills and qualifications relevant to the affected business, to advise the business on mitigation of specific property impacts (e.g., redesign of irrigation systems). e) Providing information to the land title holder as to whether disruptions (e.g., impacts on farm or forestry business infrastructure) will be rectified, rehabilitated or compensated, either under the Options for Easement agreement, or in accordance with the requirements of the Land Acquisition and Compensation Act 1986. f) Documenting areas on a property that should be avoided where reasonably possible and to record and implement any specific property biosecurity requirements as required.	All	Construction, operation

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
	g) Notifying landholders of construction timetable to assist landholder planning. h) A reporting and complaints handling system for landholders and community to use consistent with the Australian Standard AS/NZS 100002: 2014 Guidelines for Complaints Management in Organisations. i) Consulting with neighbouring landholders who have been identified as being indirectly affected and identifying reasonable mitigation measures which could be offered. 3. The Project will provide for engagement with businesses for 24 months following completion of construction of the towers on their property and will implement agreed mitigation measures within that time unless otherwise agreed with the relevant business.		
EM3	**EM3: DEVELOP AND IMPLEMENT A PROPERTY ACCESS AND MANAGEMENT PLAN** 1. Prior to the commencement of construction, prepare and implement an overarching Property Access and Management Plan (PAMP) to minimise impacts to landholders due to land access and occupation required for construction of the Project, so far as reasonably practicable. 2. The PAMP must detail the process and procedures to be followed to access landholders' property for construction of the Project and include process and requirements regarding the following matters: a) That each landholder will have a single point of contact (i.e., case-manager) with the Project for two-way communications. b) Notification procedures to the landholders of Project approvals, construction activities and associated access to the property including provision of a plan showing the indicative positioning and design of temporary and permanent access roads (i.e., any access track, road or path) required to facilitate the Project, including the points of entry. c) Notification to the landholder of the final location of all Project activities to occur on their property including tower locations, temporary fencing, portable toilets and removal of any vegetation. d) Biosecurity requirements including an obligation to: i. Comply with requirements of the Biosecurity Management Plan, including record keeping requirements, as outlined in EPR EM8. ii. Maintain a record of properties that have existing biosecurity risks, issues (e.g., disease, weeds, or contaminant) or management plan(s), and which include any additional matters that must be met, over and above those within the PAMP. e) Process for completing baseline assessment of existing land conditions (including soil, landform, vegetation, infrastructure, etc) within the proposed transmission line easement, any proposed permanent access roads/areas, and any proposed temporary construction areas and proposed temporary access tracks for rehabilitation reference. f) An overview of the protocols and mitigation measures related to:	All	Construction

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
	i. Fire management. ii. Livestock and farming operations, including animal health and safety iii. Soil management and drainage. iv. Reinstatement and rehabilitation of land after works, and inspections to confirm rehabilitation and reinstatement have been achieved. v. Notification, management and documenting of incidents.		
EM4	**EM4: MAINTAIN A RECORD OF SPECIFIC PROPERTY ACCESS REQUIREMENTS (SPAR) AND IMPLEMENT DURING CONSTRUCTION AND OPERATION** 1. Develop and maintain a record of agreed specific property access requirements to be implemented to avoid and minimise impacts to the property and its operations.	All	Construction, operation

The following EPRs relevant to the impact assessment also include:

- EPR EM5 Develop and implement a Communications and Stakeholder Engagement Management Plan
- EPR EM7 Develop and implement a Complaints Management System
- EPR EM8 Develop and implement a Biosecurity Management Plan
- EPR GSL2 Develop and implement a Sediment and Erosion Control Management Plan
- EPR AQ1 Develop and implement an Air Quality Management Plan
- EPR CL2 Develop and implement Contaminated Land Management and Mitigation Measures for Construction
- EPR NV2 Minimise Construction Outside of Normal Working Hours
- EPR EM11 Develop and implement a Decommissioning Management Plan.

1 Introduction

1.1 BACKGROUND

The Western Renewables Link Project (the Project) proposes a new transmission line starting at Bulgana, near Stawell in Victoria's west, and extending approximately 190 km to Sydenham in Melbourne's north-west. The Project will enable the connection of new renewable energy generated in western Victoria into the National Electricity Market and increase the Victorian transmission capacity. The Project is being delivered by AusNet Transmission Group Pty Ltd (AusNet).

The Project was originally referred to the former Minister for Planning under the *Environment Effects Act 1978* (Environment Effects Act) on 9 June 2020 by AusNet and it was determined that an Environment Effects Statement (EES) was required. On 22 August 2023, the Minister for Planning determined that the Project has the potential to cause significant environmental effects and that an EES was required to inform decision-makers in the granting of key approvals for the Project. In summary the key changes in the new proposed Project scope are:

- The urgent Sydenham Terminal Station Rebuild will be assessed and approved separately. A connection into the Sydenham Terminal Station forms part of Western Renewables Link scope
- The 220kV portion of the transmission line is proposed to be uprated to 500kV
- The new terminal station north of Ballarat will no longer be required
- A new 500kV terminal station near Bulgana will be required, including a new 220kV connection to the existing Bulgana Terminal Station.

The Commonwealth Government's Department of Agriculture, Water and the Environment (DAWE) — now Department of Climate Change, Energy, the Environment and Water (DCCEEW) — has also confirmed that the Project is a 'controlled action' and will require assessment and approval under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* (EPBC Act). The Commonwealth has determined that it will use the bilateral assessment agreement and rely on the Victorian Government's assessment process (EES) to inform an approval decision under the EPBC Act.

1.2 PURPOSE

The purpose of this report is to address the EES evaluation objectives by assessing the potential agriculture and plantation forestry impacts associated with the Project, and to define any Environmental Performance Requirements (EPRs) that the Project must meet, which are to be achieved through the implementation of mitigation measures during construction, operation and decommissioning.

The Scoping Requirements (DTP, 2023) specify requirements for Land Use and Socioeconomic aspects of the Project. Drawing on this, the purpose of this agriculture and plantation forestry impact assessment was to:

- Identify and describe the existing agricultural and forestry values of the area traversed by the Project
- Identify and assess the potential impacts of the Project on agriculture or other forms of farming, including constraints on cropping or grazing, spread of weeds or pathogens and restrictions of farming practices and forestry values
- Describe measures, including EPRs, to prevent establishment or spread of agricultural weeds or pathogens
- Outline measures (including EPRs) to monitor the success of commitments to mitigate or manage effects on land use during all stages of the Project

- Describe and evaluate proposed measures (including EPRs) to monitor potential residual land use and economic impacts and describe contingency measures for responding to unexpected impacts
- Contribute to the body of knowledge to be used in refining the Project design.

Agriculture is recognised as the dominant private land use within the study area (see Section 5.2), and along the Proposed Route. It has significant economic and social value for the community (particularly for local, rural communities), for landholders themselves, and for associated industries (such as food and fibre processors and manufacturers, and the agricultural support sector). The construction and operation of overhead transmission lines are of concern to those involved in agriculture in the region, as they have potential to affect food production and profitability of affected farms.

Forestry occurs in the study area largely as a part of agroforestry systems, where forestry is incorporated into farms and used either for private use, commercial purposes or for the benefit of agricultural practices. Forestry, including agroforestry and non-agricultural commercial scale plantation forestry, is not currently a significant private land use within the study area or along the Proposed Route. No public land commercial forestry is traversed by the Project.

This study sought to quantify and assess the potential extent, duration, and magnitude of impacts on existing (and to some extent, potential future) agricultural and forestry activities. It has also sought to identify mitigation measures that avoid or reduce impacts.

1.3 STRUCTURE OF THIS REPORT

This report contains:

- A summary of the EES scoping requirements relevant to agriculture and forestry
- An outline of the Project description and activities
- A summary of relevant legislation, policy and guidelines
- A systematic methodology for this study, including consultation undertaken
- A summary of existing conditions, based on agriculture and forestry related values and activities in the study area, and more specifically, along the Proposed Route
- An assessment of impacts, proposed mitigations and residual impacts
- A cumulative impact assessment
- Summary of mitigation, monitoring, and contingency measures
- EPRs which must be implemented for which compliance against will be required as a condition of the Project's approval
- Conclusions.

1.4 RELATED STUDIES

This report should be read in conjunction with the related technical reports listed in Table 1-1.

Table 1-1: Related Technical Reports

REPORT	DATE	RELEVANCE
Air Quality Impact Assessment IS311800-EES-AQ-RPT-0002 - AB	18 February 2025	This report was used to inform the potential for dust-related impacts during the Project, and how these would be managed to avoid impacts.
Aviation Impact Assessment IS311880-EES-AV-RPT-0002 | T	24 February 2025	Aerial application of fertiliser and chemicals is an important activity on some cropping and horticulture properties, as is aerial reconnaissance for forestry, thus the impact on these aerial activities has been considered. This report notes the Project will affect the ability of both fixed and rotary wing aircraft due to the need to fly around the towers. This could include modifying aerial services in some instances (e.g., use of rotary wing/helicopter in place of fixed wing/plane). It concludes that the Project would not preclude aerial applications on properties. Use of technology such as RPAS (Remotely Piloted Aerial Systems or drones) and robotics is a developing field in agriculture, for the application of fertiliser, herbicide, pesticide, and for harvesting. This technology is also developing in the monitoring of livestock, water, crop and soil conditions. The 'Landholder Guide: Easement Safety and Permitted Activities' (AusNet 2024) notes that drones will be allowed to operate within the easement with a safety assessment and permit from AusNet.
Biodiversity Impact Assessment IS311800-EES-BD-RPT-0005 | U	29 January 2025	This report was reviewed to confirm a consistent approach towards biosecurity management.
Contaminated Land Impact Assessment IS311800-EES-CL-RPT-0003 | S	28 January 2025	Pre-existing contamination of soils has been identified within parts of the study area and could be disturbed and re-mobilised during the Project. Existing contamination is generally associated with historic mining, agriculture, landfill or other waste disposal, and industrial or construction sites. Such contamination may include acid sulphate soils, hydrocarbons, pesticides, herbicides, metals, asbestos, cyanide, arsenic, salinity, explosives, phenols, and per-and polyfluoroalkyl substances (PFAS). Contamination could also be introduced through spills of oil, chemicals or waste during Project construction, operation, or decommissioning. Contamination poses risk to ground and surface water quality, human health (through ingestion, touch, inhalation, etc), ecosystems and to construction materials. This report does not mention contamination posing risks to food (crop) safety and animal health, but proposed mitigations would adequately address these two issues. Mitigations include: ▪ Intrusive contaminated land investigations prior to construction ▪ Development and implementation of a Construction Environmental Management Plan (CEMP) which includes a dewatering plan and a 'contingency and unexpected finds plan' ▪ A Spoil Management Plan (SMP).

REPORT	DATE	RELEVANCE
Climate Change Assessment IS311800-EES-NC-RPT-0002 | S	25 February 2025	Climate change is predicted to deliver generally warmer and drier climatic conditions, with heavier rainfall events, lighter winds, increased storm conditions, and more days of elevated fire risk. It is predicted that in the long term, these changing conditions will alter land use patterns, and by inference, could potentially change the types of crops and livestock grown in agricultural and forestry areas. During construction of the Project, hotter days could potentially lead to drier soils, greater dust generation, increased bushfire risk and a higher dependency on irrigation for crop management. Extreme rainfall events pose the risk of erosion, waterlogging and degradation of Project access tracks and construction sites. Mitigations that deal with these impacts are outlined in other technical reports (Contaminated Land, Groundwater, Surface Water, Geology and Soils, Bushfire) and include the development and implementation of the CEMP and SMP, with responses to waterlogging, access, erosion, drainage and rehabilitation.
Economic Impact Assessment 1-001-PWC-0000-EES-RP-0001	August 2024	This report describes the existing economic conditions in the study area, identifies potential economic impacts of the Project, and proposes management measures to avoid adverse economic impacts, or minimise (to the degree practical) these impacts, where avoidance is not possible. The report found that the Project would increase Australia's Gross Domestic Product (GDP) by $4.5 billion in net present value terms, and the Gross Regional Product (GRP) of the study area by $0.9 billion. This assessment also describes the potential economic impacts of the Project on businesses operating in the study area, at an industry-level (based on ANSZIC industry categories). These categories include Agriculture, forestry and fishing, Accommodation and food services, and Professional, scientific and technical services, which would cover the agriculture service sector, agricultural supply chain businesses, food processing and agri-tourism. Appendix D in the Economic Impact Assessment lists the specific businesses considered in this analysis. This list includes agri-tourism (e.g., farm stays), farm services (e.g., fencing contractor), food processing (e.g., Smeaton Mill). The conclusions from the business impact analysis were that the Project will have a neutral effect for most industries, though there are some potential negative impacts for Accommodation and Food Services during construction and operation (and potentially during decommissioning). This agriculture and forestry study recommends that an Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) be prepared to reduce these potential impacts.
Electromagnetic Interference and Electric and Magnetic Fields (EMI and EMF) Impact Assessment IS311800-EES-EP-RPT-0002 | S	10 February 2025	Landholders raised concerns about the impact of the Project on the use of their Global Positioning Systems (GPS) in their cropping machinery and on the remote operation of their irrigation equipment. The impact has been assessed in the EMI and EMF Impact Assessment which RMCG has considered in undertaking this impact assessment.
Geology and Soils Impact Assessment	28 February 2025	Agricultural productivity is strongly influenced by soils and management of soils is a key focus for farm operations.

REPORT	DATE	RELEVANCE
IS311800-EES-CG-RPT-0001 | X		Requirements regarding management and reinstatement of soil that is disturbed during construction were reviewed as part of this assessment.
Groundwater Impact Assessment IS311800-EES-GW-RPT-0003 | Q	29 January 2025	Groundwater is an important source of irrigation water for horticultural enterprises in the region. This report has been considered when determining the existing conditions and impacts to agriculture.
Land Use and Planning Impact Assessment IS311880-EES-LP-RPT-0002 | P	7 February 2025	This report has informed the understanding of current land use and future local and state strategic planning in areas affected by the Project. It assesses potential impacts on land uses, including agriculture and forestry land use, thus both studies have needed to inform each other in this regard.
Social Impact Assessment 1-001-ANS-0000-EES-RP-0004_1.0	May 2024	The Social Impact Assessment (SIA) is a research process to identify the potential social effects of the Project and to assess the likely impact of these on individuals and social groups. The SIA distinguishes social effects (objectively verifiable changes to a community) and social impacts (the positive or negative experiences of individuals or groups). This report was considered because some impacts identified in our analysis (e.g., disruption to farm operations) have a social dimension as well as their business and economic impacts.
Surface Water Impact Assessment IS311800-EES-SW-RPT-0002 | N	6 February 2025	This report was reviewed to establish whether there were any negative impacts on surface water supplies. These impacts could have flow-on effects to irrigation water supplies – both accessibility and volumes available.

2 EES scoping requirements

The Scoping Requirements – Western Renewables Link Environment Effects Statement (DTP, 2023) set out in detail the matters to be investigated, assessed, and documented in the EES for the Project and are referred to in this report as the EES scoping requirements.

2.1 EES EVALUATION OBJECTIVES

The EES scoping requirements specify evaluation objectives which provide a framework to guide an integrated assessment of environmental effects of the Project, in accordance with the Ministerial guidelines for assessment of environmental effects under the *Environment Effects Act 1978, Eighth edition, 2023*. The Ministerial Guidelines outline the requirement for the EES to address effects on a range of issues, which include the following that relate to agriculture and plantation forestry:

- Continuation of existing land uses and the potential for displacement of land uses taking into account relevant planning scheme provisions
- Opportunities for future land uses supported by strategic land use policy
- Economic aspects including employment, business and industry viability and economic well-being at local, regional and national scales.

The evaluation objectives identify desired outcomes in the context of key legislative and statutory policies, as well as the principles and objectives of ecologically sustainable development and environmental protection, including net community benefit.

The evaluation objective relevant to the agriculture and forestry impact assessment is set out in Section 4.4 (Land use and socio-economic) of the EES scoping requirements:

> *Avoid, or minimise where avoidance is not possible, adverse effects on land use, social fabric of the community, businesses including farming and tourism, local and state infrastructure, aviation safety and to affected and neighbouring landowners during construction and operation of the project.*

To meet the evaluation objective, it is necessary to understand the potential impact of the Project on the functions and values of agriculture and forestry, so that any impacts can be appropriately avoided or mitigated. To understand these impacts, a clear understanding of the existing conditions (i.e., the 'before' case) was established through desktop analysis, site visits, and stakeholder engagement activity. A risk screening was then undertaken, and the most likely risks were assessed.

2.2 ASSESSMENT OF SPECIFIC ENVIRONMENTAL EFFECTS

The EES scoping requirements set out the key issues that the Project proposes to address to meet the evaluation objective, together with the features and values of the existing environment that are to be characterised – these are referred to as the ‘existing conditions’. The scoping requirements also list potential effects of the Project and identify where mitigation measures may be required.

The scoping requirements pertaining to agriculture and forestry are set out in Section 4.4 (Land use and socioeconomic) of the scoping requirements. These are presented Table 2-1 together with directions to the reader as to where these items have been addressed in this report (and other reports as applicable).

Table 2-1: Agriculture and forestry scoping requirements

ASPECT	SCOPING REQUIREMENT	RELEVANT SECTIONS
Existing conditions	Describe the project area of interest and its environs in terms of land use (existing and proposed), land classification and suitability for specific purposes, development, urban areas, townships, residences, farming and other economic activities, forestry, tourism and conservation reserves.	Section 5.2 – Study area Section 6 – Existing conditions
	Identify relevant local, regional and state policies.	Section 4 – Legislation, regulation, policy and guidelines
Key issues	Potential adverse impacts on agriculture or other forms of farming, including constraints on cropping or grazing, spread of weeds or pathogens and restrictions on farming practices.	Sections 7, 8, 9 and 10 – impact assessment sections
Mitigation measures	Outline measures to avoid or minimise potential adverse effects of the Project and enhance benefits to the community and businesses in or near the Project area of interest. Describe measures to prevent establishment or spread of agricultural weeds or pathogens.	Sections 7, 8, 9 and 11 – mitigations are described for each impact assessed.
Likely effects	Identify potential economic effects of the Project, considering direct and indirect consequences on land use, farming and agriculture, other businesses, employment and local and regional economy.	Sections 7, 8, 9 and 10 – potential impacts of the Project are described for the construction and operations stages of the Project.
Performance criteria	Outline measures to monitor the success of commitments to mitigate or manage effects on land use and socioeconomic values during all phases of the Project.	Section 12 – Environmental Performance Requirements
	Describe and evaluate proposed measures to monitor potential residual social, land use and economic impacts and describe contingency measures for responding to unexpected impacts.	Sections 7, 8 and 9 – these measures are included in the mitigations described in this section. Section 11 – summarises recommended mitigation and management measures.

3 Project description

3.1 PROJECT OVERVIEW

The Project aims to address the current constraints of the western Victorian transmission network by providing the additional capacity, reliability and security needed to drive the development of further renewable electricity generation in western Victoria. By doing so, the Project supports the transition from coal-generated electricity to renewables and the efficient connection of renewable electricity into the National Electricity Market.

The Project comprises the construction and operation of a new approximately 190km overhead double circuit 500kV transmission line between Bulgana in Victoria's west and Sydenham in Melbourne's north-west. To support the connection of the new transmission line, the following works are proposed:

- The construction and operation of a new 500kV terminal station near Bulgana, and a 220kV transmission line connection to the existing Bulgana Terminal Station
- Expansion of the existing Bulgana Terminal Station
- Connection works at the Sydenham Terminal Station including the modification of a bay and a bay extension with associated infrastructure
- Upgrade of the existing Elaine Terminal Station, through the diversion of an existing line
- Protection system upgrades at connected terminal stations.

The Project's main features are summarised in Figure 3-1 and the location is shown in Figure 3-2.

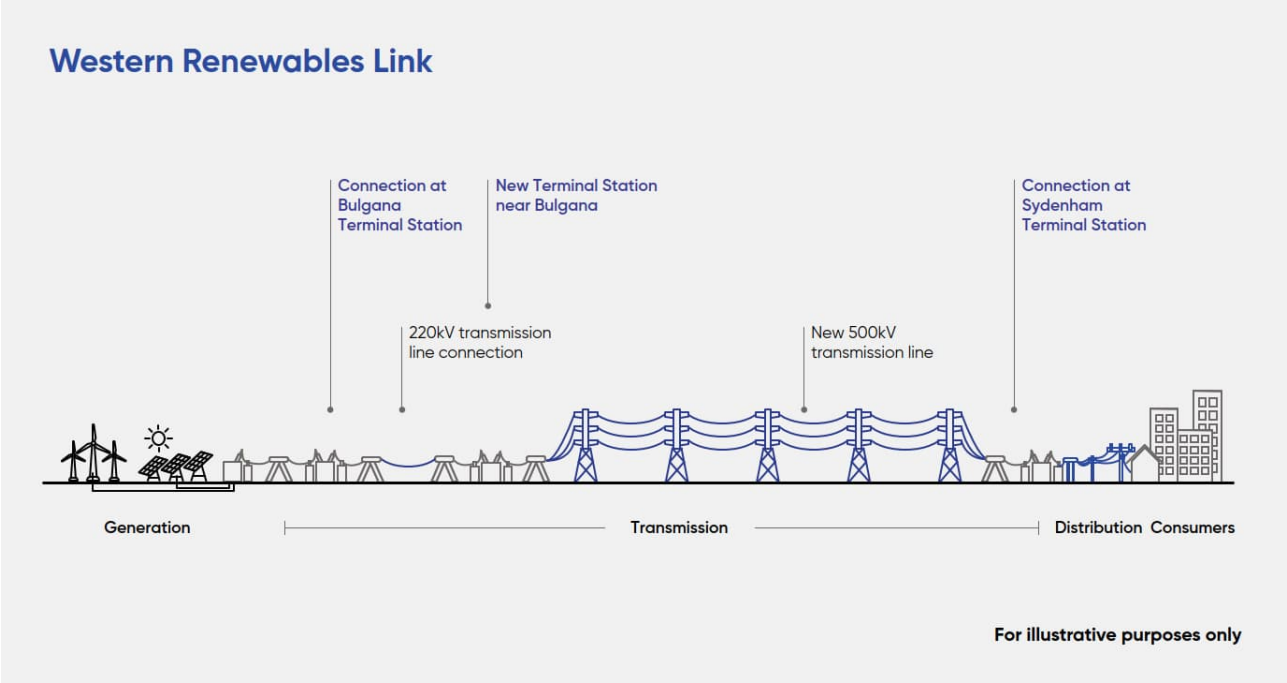


Figure 3-1: Western Renewables Link (Source: AusNet, 2024)

The Project can be described by the following key terms:

- **Project Land:** The Project Land encompasses all land parcels that could be used for the purpose of temporary Project construction and permanent operational components. The Project Land is shown in Figure 3-2.

- **Project Area:** The Project Area is contained within the Project Land and encompasses all areas that would be used to support the construction and operation of the Project. The Project Area is shown in Figure 3-2.
- **Proposed Route:** The Proposed Route is approximately 100 to 170m wide and encompasses the nominal future easement for the proposed new transmission line (including a buffer either side), and the terminal station areas. The Proposed Route is located within the Project Area.

The Proposed Route commences at the existing Bulgana Terminal Station with a 220kV transmission line connection to the new 500kV terminal station approximately 2.3km to the north-east. The Proposed Route then runs from the new 500kV terminal station to the north of the existing Ballarat to Horsham transmission line, where it runs parallel to the existing transmission line for approximately 60km. East of Lexton, the Proposed Route deviates from the Ballarat to Horsham transmission line, passing through the northern section of the Waubra Wind Farm between Mount Bolton and Mount Beckworth. Continuing east, the Proposed Route passes south of the Berry Deep Lead gold mining precinct and north of Allendale and Kingston. North of Kingston the Proposed Route turns south-east to Mount Prospect. From Mount Prospect to near Dean, the Proposed Route is adjacent to the existing Ballarat to Bendigo transmission line. Near Dean, the Proposed Route deviates from the existing transmission line to run south, then east through Bolwarrah, Bunding and Myrniong to Darley. The Proposed Route then continues eastward crossing Merrimu Reservoir north of Long Forest and along the northern boundary of MacPherson Park at Melton, connecting to the existing electricity network at the Sydenham Terminal Station.

The Project crosses six local government areas (LGAs), namely:

- Shire of Northern Grampians
- Shire of Pyrenees
- City of Ballarat
- Shire of Hepburn
- Shire of Moorabool
- City of Melton.

For the purposes of this Agriculture and Forestry Impact Assessment, the study area adopted is based on area of the properties that will be directly affected by the Project. This is further discussed in Section 5.2.

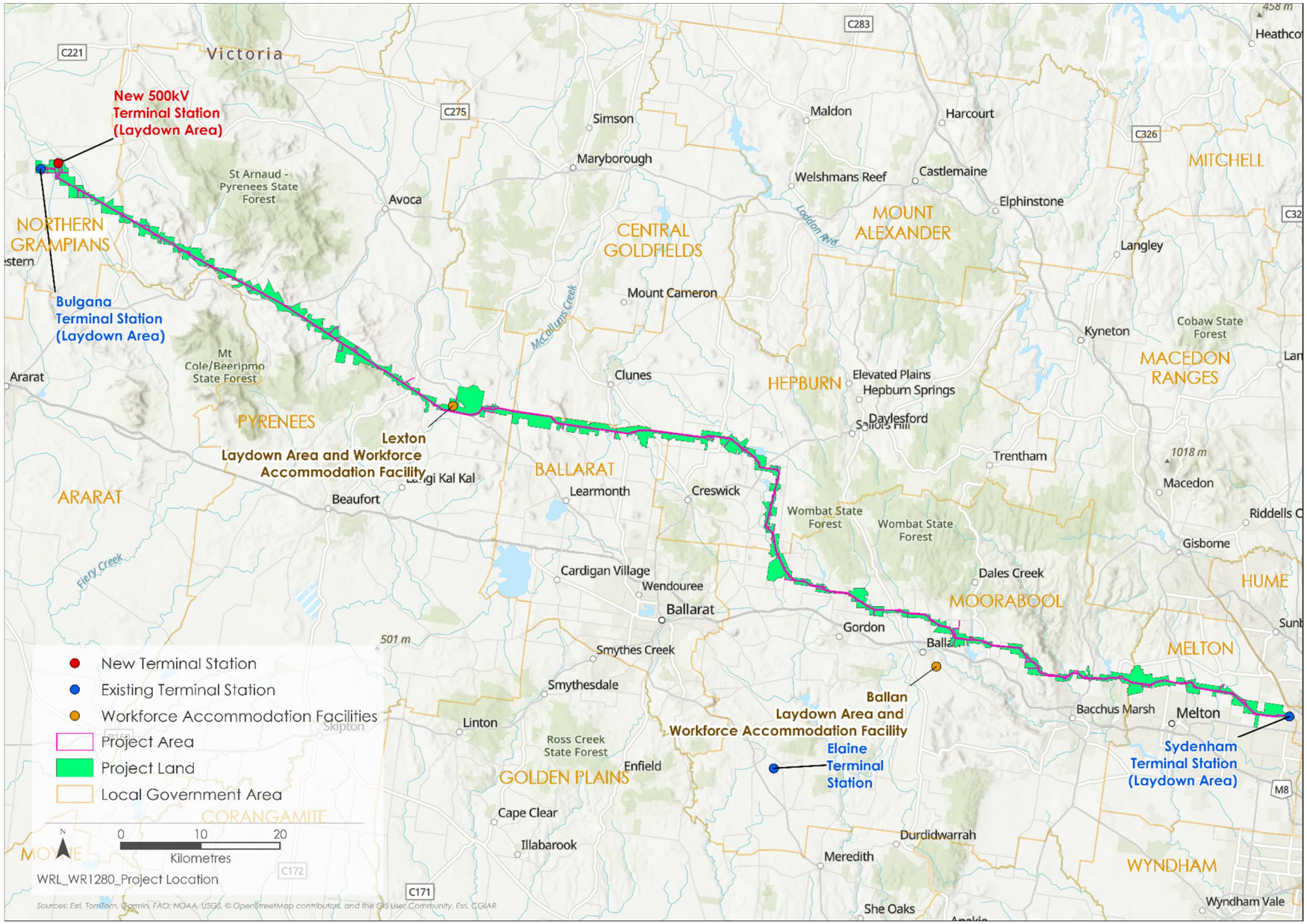


Figure 3-2: Project location (Source: Jacobs 2025)

3.2 PROJECT INFRASTRUCTURE

The Project includes both permanent and temporary infrastructure, as described in sections 3.2.1 and 3.2.2. The Project has been progressively refined from an initial broad area of interest as described in EES Chapter 5: Project development.

3.2.1 PERMANENT INFRASTRUCTURE

The proposed Project includes the construction of infrastructure listed in Table 3-1. Further detail is provided in EES Chapter 6: Project description.

Table 3-1: Project infrastructure – key components*

Double circuit lattice towers	418 double circuit towers
Single circuit lattice towers	36 single circuit towers (18 sets of two side-by-side)
Approximate length of 500kV transmission line route	Approximately 190km, between Bulgana in Victoria's west to Sydenham in Melbourne's north-west.
Approximate length of 220kV transmission line route	Approximately 2.5km, between the existing Bulgana Terminal Station to the new terminal station
Terminal Stations	A new 500kV terminal station and associated infrastructure near Bulgana to be connected to the existing Bulgana Terminal Station via a 220kV connection. Expansion of the existing Bulgana Terminal Station to support connection of the new 500kV terminal station near Bulgana. A connection to the Sydenham Terminal Station, including the modification of a 500kV bay and a new 500kV bay extension with associated infrastructure. Relocation and diversion of existing 220kV transmission lines at Elaine Terminal Station.

***** *Note: These figures are approximate and subject to final detailed design, which will consider further landholder consultation and geotechnical, site and other investigations.*

For the safe and reliable operation of the transmission line, an easement is needed for the operation of the transmission line, and other related infrastructure to protect public safety and to provide access for maintenance and repair purposes. The transmission line easements will be typically between 70 and 100m wide for the Project.

The transmission line design requirements are specified by the Australian standard AS/NZS 7000:2016 Overhead Line Design and AusNet's Electricity Safety Management Scheme. Key assumptions and considerations of the transmission towers that will form part of the Project and have been used as the basis of this report are described below.

- Transmission towers (towers) support the overhead conductors (wires or lines) at the required height above the ground to meet regulations and safety requirements. The preferred tower configuration will be a galvanised steel lattice structure similar to those found elsewhere across Victoria and within the national network. The typical tower height for the Project is between 60 to 80m.
- Each tower has four footings which will typically be 1.8m in diameter and 9m deep. The four footings base width will be between 10 to 17m wide. During construction, ground disturbance around each tower will typically be no greater than 50 by 70m.
- The spacing or span length between each tower is determined by the height from the ground that the conductors need to be to achieve the required ground clearance in the middle of the span. Typical span length is between 450 to 550m for the transmission line. Longer span lengths are possible over sensitive areas or to avoid impacts, however, longer spans require taller towers to provide safe ground clearances and wider easements to allow for greater sway of the conductors. Similarly, where it is

difficult to achieve the required ground clearance in the middle of the span, due to topography or obstacles, the tower span may be reduced.

- Each span comprises 26 conductors, made up of 12 conductors on each side of the tower cross arms and two ground wires across the top of the tower. Each conductor is approximately 32mm thick and made of aluminium wire strands with a steel core.

As part of the Project, the existing Bulgana Terminal Station will be expanded to support the connection of the new 500kV terminal station near Bulgana into the existing 220kV switchyard. The new 500kV terminal station will support the connection of the Project transmission line and future connections. The new terminal station will require additional land to the north-east of the existing Bulgana Terminal Station.

Upgrades required at Elaine Terminal Station will involve the relocation of existing 220kV transmission lines and diversion of an existing 220kV line into the terminal station. The footprint of the terminal station will not change, and all new equipment will be approximately the same height and scale as existing structures and equipment at the Elaine Terminal Station.

Connection works are proposed at Sydenham Terminal Station. The existing Sydenham Terminal Station will be re-built through the Sydenham Terminal Station Rebuild Project, prior to the Project works. The Project will connect into Sydenham through the modification of a 500kV bay and new 500kV bay extension.

3.2.2 TEMPORARY INFRASTRUCTURE

During construction there will be additional work areas, including vehicle access tracks, temporary tower stringing pads, distribution line crossover points, potential hurdle locations, temporary laydown areas and workforce accommodation facilities.

Temporary laydown areas associated with the terminal stations and the transmission line will be used to sort materials, pre-assemble Project components and store equipment, vehicles and other supplies that support construction activities. Temporary fencing, gates, security systems and lighting will also be installed at the laydown areas. The Project will establish five laydown areas; two of which will be located at existing terminal station sites (Bulgana and Sydenham), one at the new 500kV terminal station near Bulgana, and an additional two sites at intermediate locations between the stations south-east of Lexton and south-east of Ballan, respectively. The two intermediate laydown areas are required for the construction of the transmission line. The size of each site (including workforce accommodation facilities) will vary depending on storage requirements. The site south-east of Lexton will be up to approximately 12ha and the site south-east of Ballan will be up to approximately 24ha.

AusNet proposes to utilise temporary workforce accommodation facilities to accommodate construction workforce personnel. Two facilities are proposed; one in each of the western and eastern portions of the Project, co-located with each of the intermediate laydown areas. Each facility will have capacity for up to 350 personnel and will provide individual accommodation units, a communal kitchen and meals area, laundry, gym facilities, mobile and Wi-Fi boosters and serviced cleaning. The layouts of the proposed accommodation facilities will be determined by the Principal Contractor.

3.3 SUMMARY OF KEY PROJECT ACTIVITIES

3.3.1 CONSTRUCTION

Construction of the Project will include preparatory activities (e.g., site investigations, establishment of laydown areas etc.), establishment of temporary infrastructure (such as water and wastewater infrastructure and power supplies), construction of towers and transmission line stringing works; construction works at terminal stations; site rehabilitation works; and pre-commissioning activities.

The overall construction duration of the Project is approximately two years. This schedule is dependent on adjustments required to deliver the Project and the granting of approvals within certain timeframes. For tower assembly and transmission line stringing, work will not be constant, with specialist crews following each other along the route doing specific jobs (clearing, site preparation, tower construction, conductor stringing, site rehabilitation, etc). As each work crew leaves a site (or property) there may be days, weeks, or possibly months of inactivity until the next crew arrives. The cumulative duration of construction work at each tower (i.e., time on each property) will be approximately nine to 22 weeks (over a two year period). Once construction is complete, site rehabilitation will occur and commissioning activities will include final inspections and other safety and pre-operational checks. Construction of the Project is anticipated to commence in late 2026 and be completed by late 2028.

Key activities associated with the construction of towers include:

- Site preparations, including necessary vegetation clearance
- Construction of vehicle access tracks and minor upgrades to existing roads and tracks
- Tower foundation construction
- Tower structure assembly and erection
- Transmission line stringing works
- Commissioning
- Site rehabilitation.

The works proposed at the new 500kV terminal station near Bulgana, the existing Bulgana Terminal Station and Sydenham Terminal Station will be constructed over a period of approximately 20 months, with key activities including:

- Site preparations, access and necessary vegetation clearance
- Earthworks
- Construction of footings, foundations and drainage systems
- Installation of structures and equipment
- Commissioning
- Landscaping and rehabilitation.

Access roads and tracks are required to facilitate the transport of plant and equipment to the transmission towers and temporary hardstand areas. Access tracks are also required to allow for stringing of conductors. Access tracks may be temporary (used only to support construction activities) or permanent (used to support the Project on an ongoing basis). Tracks will typically be 4 to 6m wide (see Figure 3-3) with one metre allowance on either side for drainage and retaining batters, where required. Existing tracks will be used where practicable but new tracks will be required. For the purposes of this assessment, all tracks have been considered to be permanent although it is understood that in the case of temporary track, landholders will be given the option to retain them.

On some properties, access tracks may be constructed specifically to build, maintain and enable emergency access to the transmission line. When designing these tracks, AusNet will work with landholders / managers to minimise impacts on current use and development on the affected land (see Landholder Guide: Easement safety and permitted activities [AusNet, 2024]).

Figure 3-3: Examples of typical access tracks (Source: AusNet, 2021a)

Proposed Route Cable Crossings

Power distribution lines cross over the path of the easement at approximately 70 locations (the final number of these crossovers will be confirmed at the detailed design stage). For safety reasons, distribution lines cannot be located above ground within the easement. These lines must be placed underground or relocated where they cross the Project easement.

Powercor are the asset owner for the distribution lines within the Project Area and are the responsible entity for detailed design The detailed design of each distribution line crossover point with the Project is at the discretion of Powercor.

Where distribution lines cross the easement, the distribution lines will be undergrounded, and an easement created for the distribution lines. Distribution lines will be sited to cross the easement to avoid environmental, heritage, social and visual impacts where possible.

In general, distribution lines will be undergrounded via trenches, with horizontal directional drilling (HDD) used to avoid impacts on sensitive locations, such as waterways and high value ecological areas. Trenches will be approximately 0.6m wide by 1.0m deep. However, including the working area around the trench, a 3 to 4m width is required for installation of the underground line.

3.3.2 OPERATIONS

The operation and maintenance of the transmission line are subject to stringent regulatory controls to ensure public safety and the uninterrupted supply of electricity. All transmission line operators are required to comply with these controls and provide regular reports to the relevant authorities, including Energy Safe Victoria.

The key operation stage activities for the transmission line include:

- Scheduled inspections of the transmission line and easement (either by vehicle patrols or LiDAR / aerial surveys)
- Ongoing vegetation management to maintain safety clearances under the transmission line

- Tower maintenance inspections
- Repairs and maintenance to address issues found in above inspections.

While the terminal stations are operated remotely, staff are present at stations for inspections or maintenance. Routine inspections will occur bi-monthly, with personnel checking the overall condition of the terminal station's assets.

3.3.3 PERMITTED USES AND RESTRICTIONS WITHIN EASEMENTS

For safety reasons, there are restrictions on activities, plantings, and built structures within transmission line easements.

Table 3-2 and Figure 3-4 illustrate general restrictions relating to the Project's 500kV transmission line. Specific property level advice and safety assessments are provided by AusNet so farmers can continue to work and farm safely within the easements.

Table 3-2: Activities permitted and not permitted within 500kV transmission line easements (Source: Landholder Guide: Easement safety and permitted activities (2024))

AGRICULTURAL AND FARMING ACTIVITIES	PERMITTED (500kV)	CONDITIONS / NOTES
Aerial spraying via manned aircraft	No	Aerial crop spraying will not be allowed within 45m of the transmission line conductors (wires).
Aerial vehicles (uncrewed) / drones	Yes (subject to safety assessment)	Drones will be allowed to operate within the easement with a safety assessment and permit from AusNet.
Crops and vegetation	Yes (subject to safety assessment for depths greater than 300mm and involving crop/vegetation greater than 3m tall)	Mature tree and shrub growth of up to 3m in height will be allowed up to 30m from the centre of the tower steelwork. For vegetation above 3m in height, an AusNet safety assessment will be required to ensure that minimum clearances and fuel load densities are maintained. When planting trees and shrubs, they should be scattered or clumped with no more than 10% density of cover over the easement area. Ground-growing crop types will be allowed within the easement without an AusNet safety assessment or permit provided the crop is at least 5m away from the base of any tower steelwork and any associated digging or earth movement is no deeper than 300mm. For earth movement changes greater than 300mm in depth, a Before You Dig Australia enquiry and subsequent safety assessment must be completed.
Dams	Yes	New water storage dams will be subject to sufficient clearances of conductors (15m vertical clearance zone) and towers. Entire coverage of easement by dams will not be allowed. Dams will not be able to be located within 30m of the centre of any tower steelwork. Where a dam is proposed to be located beyond 30m of a tower centre, the top of the earthworks or embankment must continue to maintain the minimum ground clearance of 15m. You will also need to contact your catchment management authority as separate approvals may be required.
Electric fencing	Yes (subject to safety assessment)	Electric fencing will be allowed within the easement. Earth filters may be needed. Metallic non-electrified fences < 3m in height are permitted. AusNet's prior approval (safety assessment) may be required.

AGRICULTURAL AND FARMING ACTIVITIES	PERMITTED (500kV)	CONDITIONS / NOTES
Excavation (including digging and earth moving activities)	Yes (subject to safety assessment for depths greater than 300mm)	Excavation, earth works and related activities up to 300mm in depth will be allowed in the easement without an AusNet safety assessment or permit provided that it is at least 30m from the centre of the tower steelwork. Excavation, earth works and related activities greater than 300mm in depth may be allowed within the easement provided that it is at least 30m from the centre of the tower steelwork and a Before You Dig Australia enquiry and subsequent safety assessment are completed before starting work. Within 30m of the centre of the tower steelwork, excavation of more than 300mm in depth is not permitted without written authorisation from AusNet.
Fencing	Yes (subject to safety assessment)	Non-metallic fencing up to 3m in height will be allowed. Non-electrified, metallic fences, or fences incorporating metallic materials or parts, will need to be suitably earthed and sectionalised, and require AusNet's prior approval.
Global Positioning System (GPS) and Differential GPS (DGPS)	Yes	The flow of electrical energy through the transmission line does not affect GPS signals. There can be a small effect on GPS signals if you are under or right alongside a tower. This is known as multipathing. It is associated with being too close to a steel structure such as a tower, windmill, shed or any other metal structure. The effect is only noticeable within about 3m of the metal object. Regarding DGPS, the EMI and EMF Impact Assessment determined that there is a minor impact of EMI on DGPS correction signals for land navigation directly under the proposed 500kV transmission line in heavy rain conditions. The momentary interruption of DGPS correction signals as mobile agricultural equipment passes under the line will not impact autonomous operations as the existing correction will be utilised under the line and updated once the equipment clears the area under the line. No mitigation was determined as being required.
Grain shifting augers	Yes (subject to a safety assessment for equipment 5m up to 8.6m in height)	Grain shifting augers will be allowed to operate up to 5m in height without restriction or an AusNet safety assessment. Grain shifting augers may be allowed to operate over 5m in height, subject to an AusNet safety assessment, which must be sought prior to operating. Maximum height cannot exceed 8.6m.
Harvesters	Yes (subject to a safety assessment for equipment 5m up to 8.6m in height)	Allowed to operate up to 5m in height without restriction or an AusNet safety assessment. Allowed to operate over 5m in height, subject to an AusNet safety assessment which must be sought prior to operating. Maximum height cannot exceed 8.6m.
Headers with augers extended	Yes (subject to a safety assessment for equipment 5m up to 8.6m in height)	Allowed to operate up to 5m in height without restriction or an AusNet safety assessment. Permitted to operate over 5m in height subject to an AusNet safety assessment which must be sought prior to operating. Maximum height cannot exceed 8.6m.
Indoor growing facilities	Yes (subject to safety assessment)	Poly tunnels and netting will be allowed up to 5m in height; hothouses may be allowed subject to safety assessment (excluding buildings).

AGRICULTURAL AND FARMING ACTIVITIES	PERMITTED (500kV)	CONDITIONS / NOTES
Irrigation – Boom type	Yes (subject to a safety assessment)	Boom type irrigation will be allowed up to 5m in height within the easement subject to an AusNet safety assessment, which must be sought prior to operating. Water streams must be directed away from the transmission line infrastructure. The safety assessment will consider the minimum distance the boom type irrigator must be from the transmission line, depending on the spray distance, how the stream of water breaks into droplets, and volume of water sprayed, etc.
Irrigation – Centre pivot and lateral moving	Yes (subject to a safety assessment for equipment 5m up to 8.6m in height)	Centre pivot and lateral moving irrigation, including end guns, will be allowed to operate up to 5m in height within the easement without restriction or an AusNet safety assessment. Centre pivot and lateral moving irrigation may be allowed to operate over 5m in height, subject to an AusNet safety assessment which must be sought prior to operating. Maximum height cannot exceed 8.6m. Water streams must be directed away from the transmission line infrastructure and should not go higher than the irrigator frame. Irrigators should be earthed with dragging earth wires or chains as required.
Irrigation – large gun-type	No	Large gun-type irrigators will not be allowed to operate within the easement due to safety risks and potential damage to electricity infrastructure.
Lifting wet heads from sunken bores	Yes (subject to safety assessment)	Allowed with an AusNet safety assessment.
Livestock	Yes	No conditions
Loading, unloading and load adjustment of trucks/tippers operating over 5m in height	Yes (subject to safety assessment)	
Market gardens, orchards and horticultural nurseries	Yes	Excluding buildings and subject to relevant height restrictions.
Ploughing	Yes	Ploughing will be allowed up to 5m from the base of the tower steelwork. This safety buffer is in place to ensure machinery does not disturb transmission structure earthing.
Seeders	Yes (subject to a safety assessment for equipment 5m up to 8.6m in height)	Seeders will be allowed to operate up to 5m in height without restriction or an AusNet safety assessment. Seeders may be allowed to operate over 5m in height, subject to an AusNet safety assessment which must be sought prior to operating. Maximum height cannot exceed 8.6m.
Solar pumps	Yes (subject to safety assessment)	Solar pumps will be allowed with a safety assessment at least 30m from the centre of the tower steelwork. Earthing will be required.
Stockpiling and storage of materials	No	Stockpiling and storage of materials, including hay and silage, will not be allowed in the easement.
Vegetation	Yes (subject to safety assessment for tree and shrub	Mature tree and shrub growth of up to 3m in height will be allowed up to 30m from the centre of the tower steelwork. For vegetation above 3m in height, an AusNet safety assessment will be required to ensure that minimum clearances and fuel load densities are maintained. Planting trees and shrubs

AGRICULTURAL AND FARMING ACTIVITIES	PERMITTED (500kV)	CONDITIONS / NOTES
	growth greater than 3m tall)	should be scattered or clumped with no more than 10% density of cover over the easement area.
Vehicles and equipment[#]	Yes (subject to a safety assessment for vehicles and equipment 5m up to 8.6m in height)	Vehicles up to 5m in height will be allowed to travel under the line and operate without an AusNet safety assessment. Vehicles between 5m and 8.6m may be allowed subject to an AusNet safety assessment which must be sought prior to operating. Maximum height cannot exceed 8.6m. Parking of sedan and utility types of vehicles will be allowed. Barriers, of an approved design, may be required to protect towers from damage by vehicles. Large articulated vehicles (such as semi-trailers and B-doubles) should avoid parking under the transmission line due to risk of electric charge (induction) building up as a result of insulation of tyres. When touching a large vehicle, you may get a 'shock' similar to an electric fence. Dragging earth wires or chains can help.

[#] Note: Although not explicitly part of the Landholder Guide, AusNet recommends re-fuelling outside the easement to landholders.

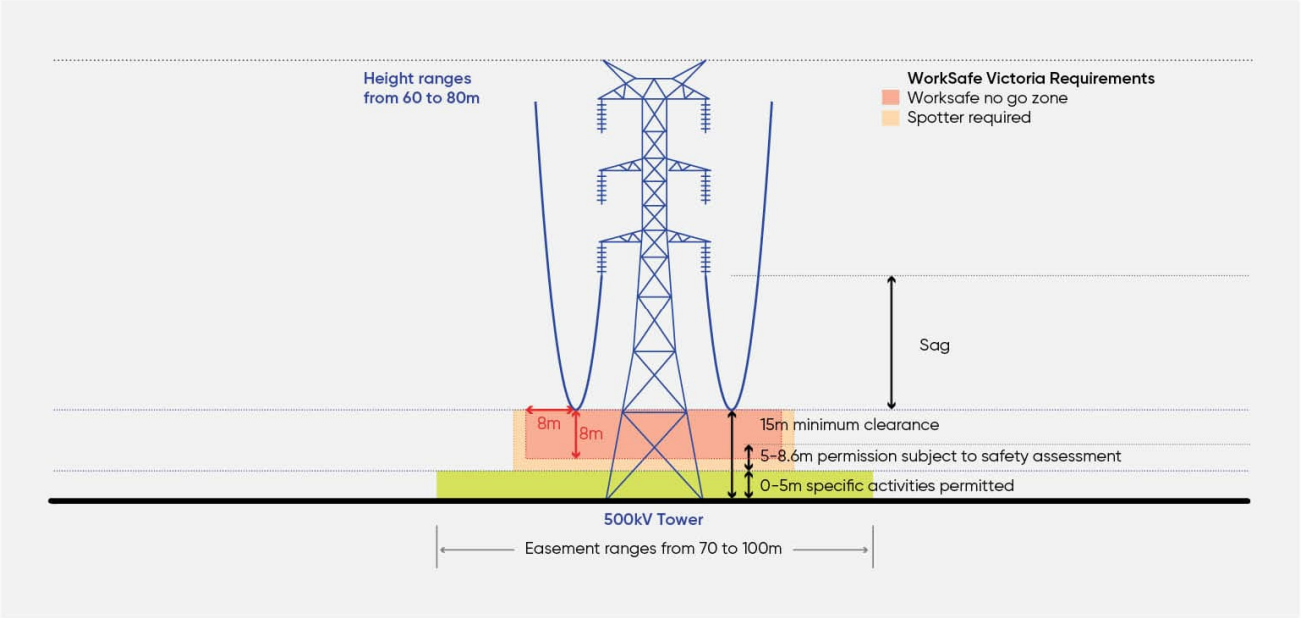


Figure 3-4: WorkSafe Victoria 500kV transmission line safety clearance dimensions for vehicles and equipment *(Source: AusNet, 2025)*

3.3.4 DECOMMISSIONING

- The Project's transmission line is designed for a service life of 80 years, while the terminal station works have been designed for a minimum life of 45 years. The terminal station works will be maintained and upgraded to enable the terminal stations to remain operational for the service life of the transmission line. At the end of the service life of the transmission line, the infrastructure will either be decommissioned or upgraded to extend its service life to maintain the security and reliability of the transmission network as determined by the network planner at that time. In the event of

decommissioning, the key activities may involve: Lowering the overhead transmission line and ground wires to the ground and cutting them into manageable lengths to roll onto drums or reels for disposal as scrap metal

- Removing insulators and line hardware from structures at the site and disposal at an approved waste facility
- Dismantling towers in manageable sections, removing from the site and selling steel as scrap
- Excavation of footings below finish surface level
- Decommissioning and removal of terminal stations
- Easement restoration and rehabilitation, where required.

4 Legislation, regulation, policy and guidelines

This section provides an overview of key Commonwealth (Table 4-1) and State (Table 4-2) legislation relevant to agriculture and forestry matters, including identifying primary and likely secondary approval requirements for the Project. Under the EES scoping requirements, this report also responds to the *Environment Effects Act 1978* (Environment Effects Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

4.1 COMMONWEALTH

In addition to the EPBC Act, the following Federal controls apply.

Table 4-1: Key Commonwealth legislation and strategy relevant to agriculture and forestry

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Australian Weeds Strategy 2017–2027	Outlines the principles that underpin weed management in Australia, including roles and responsibilities, and national priorities for weed management.	Defines high risk weeds that may require specific treatment.
Biosecurity Act 2015	Explains how the Australian government manages biosecurity threats to plant, animal and human health in Australia and its external territories.	Animal and plant disease management requirements including notifiable pests and diseases.

4.2 STATE

In addition to the Environment Effects Act, the following State controls apply.

Table 4-2: Key Victorian State legislation and policy relevant to agriculture and forestry

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Catchment and Land Protection Act 1994 (CALP)	Sets up a framework for the integrated management and protection of catchments; avoidance of land degradation; conservation of soil; protection of water resources; and control of noxious weeds and pest animals. The Act provides the power to declare 'pest animal' species and 'noxious weed' species and defines four categories of noxious weeds: State Prohibited Weeds; Regionally Prohibited Weeds; Regionally Controlled Weeds; and Restricted Weeds. Noxious weed species and the category	The Act defines requirements and obligations of landholders and managers with respect to their land management responsibilities including managing invasive plants and animals. Of particular relevance for this Project, this Act defines requirements to prevent the spread of certain weeds (i.e., regionally controlled weeds).

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
	they are placed in is specific to individual Catchment Management Authority (CMA) regions. Listings of declared weeds and their status is available from https://agriculture.vic.gov.au/biosecurity/weeds. Under the Act, all landholders (or a third party to whom responsibilities have been legally transferred) have legal obligations regarding the management of declared noxious weeds and pest animals on their land.	
Forests Act 1958, Conservation, Forests and Lands Act 1987, Sustainable Forests (Timber) Act 2004, and Code of Practice for Timber Production 2014	Collectively these describe the management of State Forests and operation of forestry activity. The Code of Practice defines environmental management expectations, including: ▪ Vehicle and equipment hygiene ▪ Control actions for the spread of pests / pathogens / weeds ▪ Reporting procedures for suspected new introductions (of pest / pathogens / weeds) ▪ Dealing with specific known pathogens. The code also defines expectations for rehabilitation of land following timber harvest.	Standards for biosecurity; procedures for reporting and managing biosecurity; and standards for site rehabilitation.
Livestock Management Act 2010	Regulates livestock management in Victoria including record keeping of all those entering a farm (biosecurity), and for compliance with livestock traceability systems.	Defines record keeping requirements that affected landholders may be subject to, particularly relating to movement of people on and off the farm.
Livestock Disease Control Act 1994 and Livestock Disease Control Regulations 2017	The key act governing livestock biosecurity in Victoria. The Act provides the legislative framework for the prevention, monitoring and control of livestock diseases and is designed to protect domestic and export markets and public health.	Sets out biosecurity responsibilities with respect to livestock diseases, including prevention and monitoring for diseases. This has implications for farmers monitoring movement of people and vehicles on and off their land.
Land Acquisition and Compensation Act 1986	The Act provides a procedure for the acquisition of land for public purposes and provides for the determination of compensation payable for land acquired.	Compulsory acquisition of easements will be required where voluntary easements have not been able to be negotiated.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Planning and Environment Act 1987 and the Victoria Planning Provisions	Provides the framework for land use and development in Victoria. The Planning Policy Framework includes state, regional and local planning policy. The state-wide Victoria Planning Provisions (VPP) contain standard provisions that apply to all local government planning schemes. These provisions include controls relating to agriculture and forestry. Relevant State planning policy clauses include: 14.01-1S Protection of agricultural land 14.01.01R Protection of agricultural land – Metropolitan Melbourne 14.01-2S Sustainable agricultural land use 14.01-3S Forestry and timber production 14.02-3S Protection of declared irrigation districts	The Planning and Environment Act establishes a framework for planning the use, development and protection of land in Victoria. The VPP is a state-wide reference document from which planning schemes and provisions must be sourced. The VPP is intended to ensure that consistent provisions are in place across Victoria and the construction and layout of planning schemes is always the same.
Planning for Melbourne's Green Wedges and Agricultural Land. Action Plan 2024.	This plan outlines 20 actions to protect Victoria's green wedges and agricultural land. The actions are grouped under six themes: ▪ Protecting Melbourne's food bowl ▪ Planning for future farming ▪ Securing the right to farm ▪ Establishing stronger protections ▪ Adopting smarter land use ▪ Setting tighter controls	This policy influences the long-term future of agriculture in areas close to Melbourne's urban growth boundary and areas within 100km of Melbourne. Changes are primarily driven through the planning schemes in the relevant local government areas. The plan focusses on providing 'opportunity for all agricultural uses and limits non-rural uses to those that either support agriculture or tourism, or that are essential for urban development but cannot be located in urban areas for amenity and other reasons'. Specific advice on the interactions between planning schemes and this Project are part of the Land Use and Planning Impact Assessment (IS311800-EES-LP-RPT-0003) which notes that 'Utility installations and minor utility installations are not a prohibited use.'
Assessment of Agricultural Land Capability in Melbourne's Green Wedge and Peri-urban Areas, Agriculture Victoria Research Final Technical Report	This report details approaches used to assess agricultural land capability for agriculture in the Green Wedge and Peri-urban areas of Melbourne (land within 100 km radius of Melbourne's Central Business District). It presents information and maps covering Land Capability for intensive soil-based agriculture; key soils and landscapes; current intensive (higher-value) soil-based agricultural land uses and groundwater resources.	This report describes the capability of land for intensive soil-based agriculture production. The area covered by this study includes come of the land where the Project will occur. The capability assessment provides information on some of the possible agricultural uses of land that will be affected by the Project.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Updated October 2018.		
Plant Biosecurity Act 2010 Plant Biosecurity Regulations 2016 and other subordinate legislation	This Act specifies that landholders are obligated to manage biosecurity risks. The Act aims to prevent the entry of plant pests and diseases into Victoria; manage and control the spread of plant pests and diseases within Victoria; and ensure plant products meet market 'disease-free' or biosecurity requirements.	Sets out requirements relating to movement of plant material which drives the need to ensure all machinery and equipment, materials, and other items brought on-site do not harbour or transport pathogens, disease, or pests. This includes prevention of the movement of pest and disease between individual properties.
Strong, Innovative Sustainable: a new strategy for agriculture in Victoria 2020	Identifies agriculture as "an engine of growth for the Victorian economy".	Highlights the importance of local agriculture to regional economies.
Victoria's Biosecurity Strategy, 2023	Victoria works within a national system for preventing and managing biosecurity risks, with Australia's border control the first line of defence. Victoria's biosecurity system, as described in the state Biosecurity Strategy, establishes a system-wide approach to preventing and managing harms caused by pests and diseases. This Strategy outlines five strategic goals – partnerships, prevention, response, management and enablers– and the priority actions under each of those areas.	A focus for this Strategy is that biosecurity is a collective effort and therefore projects like this have clear roles and responsibilities to prevent and manage biosecurity. It also sets out expectations for monitoring and reporting (as part of the focus on prevention) and for response in the event of a biosecurity incident.
Victorian Code for Cattle Feedlots, 1995. Victorian Code for Broiler Farms, 2009 plus 2018 amendments. Apiary Code of Practice, 2011 Code of Practice for Timber Production, 2014	Each code of practice provides guidance on the agreed appropriate management of the given issue.	Where there is an operation subject to one of these codes, construction and operation activities need to be consistent with the requirements of the relevant code.
Victorian Forestry Plan, 2021	The Victorian Forestry Plan aims to assist the industry's gradual transition away from native forest harvesting. The 30-year plan includes funding targeted at forestry workers, businesses, and communities to assist their transition. This includes financial assistance, re-employment and re-training support, case management and wellbeing services for any impacted workers.	The Plan highlights the importance of plantation forestry for future timber production in Victoria. This is significant because this Project prevents some land from being used for plantation forestry.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Water Act 1989	The Act provides the legal framework for managing Victoria's water resources with the purpose of promoting the orderly, equitable and efficient use of water resources to make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians. The Act regulates impacts to surface water and groundwater resources.	This Act is important for agriculture as it sets out private rights and the framework for managing water resources (e.g., regulated groundwater and surface water systems). It is relevant to this assessment because of the potential for the Project to impact ground and surface water during both the construction and operation stages.
Water for Victoria, 2016	This is Victoria's key water policy. It sets out how water dependent industries such as agriculture, energy and manufacturing, are supported while also balancing this with the many other demands on the state's water resources.	This policy influences the long-term future of agriculture particularly irrigated agriculture.
Western Region Sustainable Water Strategy, 2011 Central Region Sustainable Water Strategy, 2006	These strategies describe the long-term plans for supply of water in Victoria's regions. They identify threats to water availability and quality and propose policies and actions to manage and respond to those threats.	The long-term availability of water in the region affects investment decisions for farms, particularly irrigation operations. These strategies will influence which areas of the region will be used for irrigated agriculture.

4.3 LOCAL AND REGIONAL

Table 4-3: Local government and regional agency policy and strategy relevant to agriculture and forestry

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Regional agencies		
Central Highlands Regional Growth Plan, 2014	The Central Highlands Regional Growth Plan provides a regional approach to land use planning in the Central Highlands. It covers the municipalities of Ararat, Ballarat, Golden Plains, Hepburn, Moorabool and Pyrenees. Agriculture is the region's second highest value export sector (manufacturing being the highest) and a significant employer. The Plan: ▪ Aims to maintain the viability and productivity of agricultural land	This plan defines the economic value of agriculture to the region, which is critical to assessing the regional impact of the Project.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
	▪ Encourages investment in agriculture by providing certainty regarding future land use within rural areas ▪ Recognises regionally significant rural and agricultural assets, including the areas of highly productive and versatile soils within Moorabool, Ballarat and Hepburn municipalities, and the Bacchus Marsh Irrigation District.	
Wimmera, North Central, and Port Phillip and Westernport Catchment Management Authorities' (CMA) Regional Catchment Strategies	Regional Catchment Strategies bring together organisations, groups and communities that are active in land, water and biodiversity management in their region. There are ten strategies covering Victoria. Each outlines the vision for its region, assesses current condition and sets targets for the future. They outline how work in each region contributes to implementing government policies and achieving statewide targets, whilst also incorporating the knowledge and priorities of local communities.	Each Regional Catchment Strategy features a 'Land' theme. Under this theme, there are medium- and long-term goals set for management of soil and land in the CMA region. These goals typically focus on soil conservation, groundcover, and supporting sustainable agriculture.
Local government		
Ararat Rural City Council Strategic Economic Pathway, 2017-2022	The Strategic Economic Pathway is designed to drive vigorous and sustainable growth in Ararat Rural City. It has a strong people and place focus, and harnesses development of agricultural markets, value adding to products and connectivity as the underpinnings of Ararat's economic future.	The strategy recognises agriculture as an important element of Ararat's economy.
Ballarat Rural Land Use Strategy (RLUS) 2010	The rural areas of the City of Ballarat have an important role to play in the overall viability and liveability of the municipality. In particular, agriculture is an important part of the regional economy and the City of Ballarat includes many areas of high-quality agricultural land. This strategy provides guidance on limitations that may need to be placed on the expansion of residential or rural living development. It also includes recommendations for changes to the planning scheme including: ▪ New or revised zones ▪ Overlays ▪ Planning policy provisions.	This strategy is significant for this Project because it sets out a long-term vision for Ballarat's rural areas and specific provisions for the protection of agricultural land, which has particular significance for the potato growing areas along the Proposed Route.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Fertile Ground Hepburn Shire Economic Development Strategy 2016-2021	The Strategy sets out the next five years of economic development within five pillars – Produce, Trade, Live, Grow, Visit. These pillars of growth describe how a set of projects and initiatives will support existing businesses, residents and visitors so that the Shire continues to be known as a lifestyle destination.	The Strategy notes that the agriculture sector in the Shire has seen the emergence of new innovative business models that enable small scale operators to be very successful. These operations add value to primary produce, with many small-scale producers building the Shire's reputation as a paddock to plate food destination. The Strategy also notes that developing an Agricultural Sector Development Plan is a priority for the Shire.
Moorabool Shire Economic Development Strategy 2023-2027	The Moorabool Shire Economic Development Strategy 2023-2027 has been developed by Moorabool Shire Council to facilitate employment growth, investment attraction and business development in the Shire. The Strategy provides a clear vision and action plan for growing the Moorabool Shire economy.	Agriculture and forestry are noted as key drivers of economic growth in the shire. The Shire aims to identify opportunities to strengthen the agricultural sector to help realise the opportunity for economic growth driven by agriculture.
Moorabool Rural Land Use Strategy (RLUS), August 2024	The Moorabool RLUS provides a strategic framework, and associated policy and guidelines, for decision makers, that aims to ensure decisions are undertaken on the basis of a strategic vision for how rural land will evolve in the Shire over the coming decades. The strategy outlines when and how discretion should be applied in the planning process when a planning permit is required in the rural areas of the Moorabool Shire. This provides rural landholders with a greater certainty to inform their land use decisions. It also aims to better manage land speculation and the demand for rural lifestyle properties, which is a major issue in this shire.	This strategy is significant for this Project because it sets out a long-term vision for rural areas in the Shire. This includes dividing the shire into four 'precinct policy areas', each with a particular focus and 'intent'. The Project intersects with two precincts - Precinct Policy Area 1: High Quality Agricultural Land, and Precinct Policy Area 4: Mixed rural activity. In both areas, the Shire supports and encourages intensive soil-based agriculture and discourages non-agricultural uses.
Local government planning schemes	Identify, zone and protect areas of land in the region that are considered priorities for agricultural and forestry land use and for associated economic development.	Agriculture (and to a lesser extent, forestry) is recognised in planning schemes and policies as a major land use across the study area, and clauses in the schemes demonstrate the extent, significance and variability of agricultural land uses in the region. Agriculture is the predominant land use in the study area, although encroachment of urban development into agricultural areas is a recognised issue within the eastern half of the study area. The diversity in agricultural production and potential holds high economic value for the State. Relevant content of planning schemes is identified and assessed in the Land Use Planning Impact Assessment.

DOCUMENT(S)	SUMMARY	RELEVANCE TO THE PROJECT
Pyrenees Shire Council Towards 10,000: Economic Development Strategy, 2020	The Strategy outlines the activities and actions to be undertaken by Council to achieve a population of 10,000 people by 2030.	The strategy sets out the actions that the council plans to take to support agriculture in the area, in particular transport and water infrastructure.
Western Plains North Green Wedge Management Plan, 2014	The aim of the Plan is to provide a framework to support sustainable land use, land management, and development of the City of Melton's Western Plains North Green Wedge.	Much of the green wedge land is used for agricultural purposes, often in conjunction with rural residential uses. The Plan seeks to consider the sustainable long-term management of the area and the potential future uses of the land within the area, in particular, what land uses may achieve improved land management outcomes.
Industry bodies		
Serrated Tussock Working Party Strategy, 2023	This Strategy details the outcomes and actions that will achieve the vision of reducing the impact of serrated tussock on Victoria's economy, environment, and communities.	Serrated tussock is known to occur along most of the Proposed Route and it has significant negative impacts on both agricultural productivity and native species. Activities associated with both construction and operation of the Project, particularly movement of vehicles and people, have the potential to further spread the weed. The Strategy sets out 17 actions under three strategic outcomes. It is important that Project activities are consistent with those actions and outcomes.
Victorian Farmers Federation's Managing Entry to Farms policy, 2021	Seeks to ensure that the public understand that farms are workplaces and supports the right to farm.	Seeks assurances in relation to the following matters: ▪ Entry to farm (Land Access) Agreements ▪ Biosecurity ▪ Consultation ▪ Compensation ▪ Rehabilitation ▪ Review ▪ Compliance.

5 Method

5.1 OVERVIEW

This section describes the method that was used to assess the potential impacts of the Project on agriculture and forestry. The method involved four steps: existing conditions analysis (including community, landholder, and stakeholder engagement), risk screening, impact analysis (including the quantification of economic impact), and development of mitigation measures and EPRs.

5.2 STUDY AREA

The Agriculture and Forestry Impact Assessment has considered information at four scales:

- The **Project region** which incorporates the 11 ABS statistical areas (SA2) that are traversed by the Proposed Route (see Figure 6-2). The ABS agricultural production statistics for these areas are used to describe the current agricultural production (areas, amount of products and value).
- The **study area** is the area of the properties that will be directly affected by the proposed Project. That is, a property could be made up of multiple parcels. The transmission line could intersect just one of those parcels, but the impact extends to the whole property, which is considered to be the study area of this assessment. This data is used for analysis of property-scale impacts on farming activity.
- The **Project Area** encompasses all areas that would be used to support the construction and operational components of the Project. This data is used to calculate areas of impact during the construction stage.
- The **Proposed Route** (Figure 3-2), which includes only the area of direct impact within affected properties. This data is used to calculate the areas of impact during the operation stage.

These terms are defined in the Glossary at the start of this report.

5.3 EXISTING CONDITIONS

5.3.1 OUTLINE OF ACTIVITIES

Production data has been obtained at a regional scale. Data from 11 statistical regions, defined by the ABS, have been combined to provide the most appropriate data for this assessment, as discussed in Section 6.2.1. These 11 statistical regions cover the length of the Proposed Route.

The existing conditions analysis has incorporated:

- Review of community and agency feedback from the EES scoping stage and other engagement activity
- Collation of baseline and background data (Table 5-1)
- Advice and information from Agriculture Victoria; Western Water; and the Department of Environment, Land, Water and Planning (effective 1st January 2023, DELWP Planning functions transferred to DTP and Environmental and Water functions transferred to DEECA)
- Engagement with other relevant agencies and industry bodies (Section 5.5.1)
- Review of industry and published data
- Desktop spatial and statistical analysis of the region
- Desktop spatial analysis and individual property assessments
- Fieldwork and ground-truthing from public areas (roadside inspection) along the study area (February 2021 and October 2023)

- Ground-truthing, site visits and interviews with a representative sample of landholders (March and December 2022)
- Engagement and knowledge-sharing with the Project's other (relevant) technical reports, including Aviation, EMI and EMF, Surface Water, Land Use and Planning, Economics, and Social (as listed in Table 1-1).

5.3.2 BASELINE AND BACKGROUND DATA

Data sources used in the preparation of the existing conditions report are summarised in Table 5-1.

Table 5-1: Data and information sources

DATA OR INFORMATION	SOURCE
SPATIAL DATA	
Land parcels (cadastre), local government boundaries, planning zones, major infrastructure	Victorian Land Use Information System: ▪ Land Tenure ▪ Land use ▪ Forestry – commercial timber production. Data Vic: ▪ Vicmap Planning (Planning zones) ▪ Vicmap Admin (LGA boundaries and road networks). Agriculture Victoria (2020b) 'Strategic agricultural land and development in Victoria', Final Report September 2020. Department of Environment, Land, Water and Planning May 2020, Planning for Melbourne's Green Wedges and Agricultural Land - Consultation Paper.
Catchment boundaries, water supply protection areas, irrigation districts, groundwater management areas	Vicmap hydro (watercourse network)
Aerial and satellite imagery	Google Satellite VicGrid 94 satellite imagery Aerial imagery taken by AusNet
Geography and digital terrain	Vicmap hillshade and contour
Land production potential	Land Systems of Victoria 1:250,000 Land Capability Ag Vic 2018
Rainfall	Bureau of Meteorology (from 1960 to 1990)
PRODUCTION DATA	
Regional production data	Agriculture Victoria (2020a) Livestock Farm Monitor Project Victoria Annual Report, The State of Victoria Department of Jobs, Precincts and Regions. Australian Bureau of Statistics (2020a) 'Agricultural Commodities, Australia', Statistics on the production of agricultural commodities including cereal and broadacre crops, fruit and vegetables and livestock on Australian farms, accessed 26 February 2021.

DATA OR INFORMATION	SOURCE
Production value data	Australian Bureau of Statistics (2020b) 'Value of Agricultural Commodities Produced, Australia', contains final estimates of gross and local values of production of major agricultural commodities for Australia, states and territories, accessed 26 February 2021.

5.3.3 DESKTOP ASSESSMENT OF THE REGION AND INDIVIDUAL PROPERTIES

A range of spatial data (including satellite and aerial imagery, parcel and property information, and a digital terrain model), and statistical data sourced from the ABS, state government and industry bodies, was used to develop a thorough understanding of the region. The spatial assessment focussed on parcels, understanding that some parcels represented a whole property, while in many cases the parcels assessed were part of a larger property (that consisted of multiple parcels). The term property has been used throughout this report (representing both situations).

The conditions of each individual property within the study area were visually assessed using the desktop data. This was a detailed assessment, undertaken for more than 229 properties (landholders may operate more than one property, so there are fewer landholders than properties). The assessment examined each property directly impacted by the Proposed Route, individually, to develop an understanding of each agricultural and forestry property, their assets and their activities and an estimate of the areas of productive land that could potentially be isolated by the easement and construction activity. Aerial images of each property intersected by the Proposed Route were examined and an assessment of the possible impact on each property was conducted. For each property, the following steps were taken.

1. Identification of property inherent attributes
    a. Location
    b. Perimeter and total area
    c. Shape (e.g., long and rectangular)
    d. Public road access
    e. General nature of activities on neighbouring properties (e.g., agriculture, bush, residential)
    f. Existing public infrastructure (e.g., transmission lines already existing on property).
2. Identification of significant infrastructure on the property
    a. Irrigation
    b. Sheds, houses and other buildings
    c. Fences and laneways
    d. Green infrastructure (e.g., shelterbelts, paddock trees)
    e. Blue infrastructure (e.g., dams, streams)
    f. Orientation of operations (e.g., lateral irrigators that run in parallel, laneway system feeds into one central point).
3. Identification of highest value use for each property (with each property assigned one category)
    a. **Grazing** – refers to any agricultural enterprise that is solely based on grazing livestock, such as sheep, cattle, horses and goats. These properties are only used for grazing and do not involve irrigation. Livestock are produced for meat or fibre (e.g., wool), breeding (e.g., stud stock) and racing or eventing (e.g., horses).
    b. **Cropping** – refers to any agricultural enterprise that practises broadacre dryland cropping. These properties usually include a mix of grazing and cropping. Dryland cropping does not involve irrigation. Crops may include legumes and grains.
    c. **Horticulture** – refers to an enterprise that grows high-value horticultural crops, such as potatoes or pyrethrum. This includes properties that are adjacent to a horticulture enterprise and have the

potential to be used for horticulture. The main horticulture crops are grown using irrigation. Most properties growing horticultural crops also grow broadacre crops and graze livestock. They are differentiated from grazing and cropping enterprises by the presence (or potential) of horticultural crops and irrigation.

d. **Forestry** – refers to any enterprise that grows trees for timber production. Many properties with forestry in the region also grow broadacre crops, graze livestock, and may also be involved in irrigated horticulture production. These enterprises are differentiated from grazing, cropping and horticulture categories by the presence of forestry.

Most properties in the study area are involved in multiple enterprises. For the existing conditions assessment, the highest-value enterprise on each affected property was identified, and the property was assigned to that category (grazing, cropping, horticulture or forestry). This may over-estimate the actual economic value of production, but this was considered more appropriate than a possible under-estimation.

Some primary production activities are not specifically accounted for by these four categories. This includes activities like horse training, horse breeding, commercial firewood harvesting, and boutique agricultural businesses. These operations have been considered in the assessment and, where information has been available, impacts were examined separately.

4. Consideration of the impact of the construction of Project infrastructure on the property
    a. Identification of intersection of Project infrastructure with property
    b. Paddocks divided by access roads
    c. Land disturbance across the length of the easement
    d. Land isolated or made redundant
    e. Permanence of impact
    f. Total land area impacted
    g. Percentage of total land area of property impacted
    h. Impact of Project infrastructure on agricultural activities (e.g., disruption to irrigation path, prevention of aerial spraying).
5. Consideration of the impact of the operation of Project infrastructure on the property
    a. Identification of intersection of Project infrastructure with property
    b. Land isolated or made redundant
    c. Total land area impacted
    d. Percentage of total land area of property impacted
    e. Impact of infrastructure on activities (e.g., disruption to irrigation path)
    f. Consideration of activities that cannot occur within the easement.

This desktop assessment was ground-truthed through two site visits during February 2021 and October 2023 (each visit traversed the entire Proposed Route and relied on visibility from public access points); and during 14 on-property landholder interviews (March and December 2022). Individual property land use information provided by AusNet (September 2022 and October 2023) was also reviewed to refine the uses and potential impacts identified through the RMCG assessment. More detailed information regarding on-property landholder interviews is provided in the next section of this report.

5.4 RISK SCREENING

A risk screening process was undertaken to identify the agriculture and forestry related risks associated with the design, construction, operation, and decommissioning of the Project and to provide for the appropriate level of investigation. The outcomes of the risk assessment identified the key issues that have been taken forward into the impact assessment phase (see Sections 7 to 10).

5.5 STAKEHOLDER, LANDHOLDER AND COMMUNITY ENGAGEMENT

Following the desktop regional and property analysis, a range of stakeholders (including landholders) and the community were consulted to:

- Further understand land use values and risks
- Validate desktop assessments and interpretation of spatial data
- Increase understanding of landholder concerns, perceived impacts and suggestions for effective mitigation measures.

5.5.1 STAKEHOLDERS AND LANDHOLDERS

Stakeholder engagement and feedback processes have included meetings with Councils, industry, Agriculture Victoria and farming groups, as outlined in Table 5-2. Issues raised during these consultations are summarised here and have been used to shape the impacts and mitigations presented in this report.

Table 5-2: Stakeholder engagement

STAKEHOLDER GROUP OR AGENCY	DATE
Hepburn Shire Council	3 September 2021
City of Ballarat	7 September 2021
Northern Grampians Shire Council	7 September 2021
Pyrenees Shire Council	9 September 2021
Moorabool Shire Council	13 September 2021
Melton City Council	17 September 2021
Highland Potatoes and Ag Incorporated (HPAI)	14 October 2021
McCain Foods	14 October and 3 November 2021
Agriculture Victoria policy staff	19 October 2021, November 2023
Victorian Farmers Federation (VFF)	19 October 2021
Agriculture Victoria field staff	4 November 2021
Victorian Serrated Tussock Working Party	November 2021
Council Advisory Group	October 2023
Community information event (on-line)	March 2024
Victorian Farmers Federation (VFF)	June 2024

Landholder on-site interviews

In March 2022, a representative sample of landholders along the Proposed Route were selected for interviews. These interviews aimed to ground-truth and validate the analyses to date and to identify additional issues, mitigation measures and environment performance requirements. The target was to interview a sample that

represented 10% of the total number of landholders affected by the preliminary design (around 30) on the Project Route and provided a representative spread of each enterprise category, property size, and geographic location.

Based on individual desktop assessments, 145 properties with the highest potential impact were selected as potential candidates for on-site interviews. The enterprise type, property size and location were also considered to ensure the sample was representative. The Project's land agents (JLL) then made direct contact with 51 of these landholders, of which 39 declined to be interviewed and 12 accepted the opportunity. The restrictions imposed by Covid-19 may have affected some landholders' interest in participating in the interviews, although all were offered telephone interviews. Nine interviews were completed face-to-face on-farm, and three were completed as telephone interviews.

In December 2022, and in response to requests by community, an additional two interviews were undertaken at equine-related (grazing) properties near Melton. These involved an interview with one horse trainer (whose business provided agistment and training facilities for trotters), and an interview with representatives of Melton Pony Club. These interviews brought the total number of landholder interviews to 14.

As the Proposed Route directly impacts 229 landholders, these 14 interviews undertaken equate to approximately 6% of the landholders along the Proposed Route. This is below the initial target of 10%.

The initial sample of twelve interviewees was stratified by geography, enterprise, and farm size. The two equine interviews were added in acknowledgement of interest from the horse industry.

Table 5-3: Landholder interviews and site visits 'targeted' and 'achieved' (in brackets) (March and December 2022)

	GRAZING	CROPPING	HORTICULTURE	FORESTRY	TOTAL
West	4 (2)	5 (2)	--	1 (1)	10 (5)
Central	- (1)	--	8 (3)	2 (1)	10 (5)
East	7 (2)	4 (2)	--	1 (0)	12 (4)
TOTAL	11 (5)	9 (4)	8 (3)	4 (2)	32 (14)

The three broad geographic areas used for the landholder survey[4] were defined as follows:

- West - Bulgana to Waubra
- Central - Waubra to Gordon
- East - Gordon to Sydenham.

The sample number of interviews that were 'targeted' and 'achieved' (in brackets) is presented in Table 5-3. This data shows that interviews were spread across the intended subsamples, although no forestry enterprises were able to be interviewed in the eastern portion of the route.

Each landholder was interviewed using a written guide to ensure consistency between interviews. The following questions were asked with reference to both construction and operations:

[4] This definition of geographic areas was only used for the landholder survey to assist RMCG achieve a representative sample by geography.

- What do you perceive as the likely risks and impacts of construction / operations of the Western Victoria Transmission Network Development (Western Renewables Link) on your farming in the area traversed by the Western Renewables Link? Why?
- What impacts do you believe this will have on your whole farming business? Why?
- What do you suggest could be done to avoid and / or mitigate this risk or impact? Why?

Most direct interviews were conducted in March 2022 (with an additional two interviews conducted in December 2022). By this time, RMCG's work on the impact assessment had already identified a range of issues and concerns, largely from the discussions with farmers and landholders involved in the industry groups and organisations who were engaged over 2021 (Table 5-2). Information gathered during these discussions has added to the existing body of knowledge about agriculture along the Proposed Route.

The RMCG team comprises agriculture experts who have a good understanding of the types of agricultural enterprises found in this area. Members of the team have worked with farmers and businesses within these regions for many years. Because of this expertise and previous consultations, the key purpose of these interviews was to explore whether there were any issues that had not already been identified. The 14 interviews provided nuance on the understanding of potential impacts to individual properties but did not identify any issues which had not already been documented. Their main value was to confirm the list of issues that needed to be considered in this assessment. A summary of feedback from these interviews is provided in Appendix B.

Therefore, despite the moderately low number of landholders directly interviewed, these interviews achieved their aim of checking existing understanding and adding depth to the knowledge of landholders' concerns and perceived impacts. It was also valuable for the development of effective mitigation measures.

In understanding the role that landholder engagement has played in this assessment, it is important to consider it in context of the full study process. Important aspects include:

- Targeted discussions with industry groups, food processors, and relevant government agencies
- The consultancy's depth of experience and knowledge of agriculture
- Landholder interviews in the Project Area
- In-depth case study interviews for four farming enterprises (refer to Section 5.5.4)
- Agricultural, statistical, and spatial data.

5.5.2 COMMUNITY FEEDBACK

Preliminary feedback from development of the scoping requirements also informed this study. The Project Team has maintained ongoing consultation with affected communities throughout the design, development and EES process. Where deemed relevant, the Project Team has shared feedback with RMCG to inform this study.

In addition to this, RMCG also participated in the community consultation activities coordinated by AusNet, outlined in Appendix C. These sessions have provided both landholder and general community feedback to help inform this study. In relation to agriculture and forestry, many concerns and issues have been raised by farmers, but no new issues have been identified during these community consultation sessions.

5.5.3 PEER REVIEW

Regulatory peer review

This report has been subject to a technical peer review by independent agricultural and environmental consultants engaged by DTP, which has resulted in revisions to the impact assessment. In this section we have summarised the broad issues raised by the peer reviewer. We have also noted how the report has been

adjusted in response to these comments and have explained justification for where the report remains as written. The outcome of the peer review is available in Appendix G.

Method

Use of NSW best-practice Agricultural Impact Assessment (AIA) guidelines – the reviewers recommended consideration of NSW guidelines for the preparation of AIAs for the mining sector, for guidance on the structure and detail of this report. The following documents have been considered – the current and earlier versions of *Guideline for Agricultural Impact Statements at the Exploration Stage,* and *Prime Fact 1063* (2nd ed), produced by NSW DPI in 2013, entitled *Infrastructure Proposals on Rural Land.* As requested by the reviewer, the methods set out in these documents were examined and compared to the method used for this assessment. Of particular note was the eight-step process set out in the Guidelines for Agricultural Impact Statements. We compared our method to these eight steps and found that our method incorporated all eight of those steps, albeit in a different order. Given this alignment, the method appears to be consistent with this NSW-based best-practice guidance for agricultural impact assessments.

Project alternatives

Consider options for underground transmission line – the reviewer requested that the assessment examine the option of undergrounding the transmission line. This was not in scope for this specific assessment but has been addressed in EES Attachment II: *Assessment of feasibility for an underground 500kV transmission line for Western Renewables Link,* which describes a possible underground concept for the Project and the issues that would need to be considered. In addition, an assessment of partial undergrounding is provided in EES Attachment I: *Project development and assessment of alternatives report.*

Existing environment - land uses on the Proposed Route

Property-level information and analysis – the reviewer suggested that the report should include information for each land parcel potentially affected by the Proposed Route, including the specific crop(s) grown and/or livestock produced, harvest and production times, water sources and infrastructure. The reviewers also requested the inclusion of detailed mapping to show the land use and infrastructure on each affected property. Significantly more detail was added to the method section explaining that the desktop assessment that was completed, examined each individual property, including the land use, infrastructure, and other features that could be affected.

Providing individual maps of the 229 affected properties in the report was considered but has not been included in the report because of its potential to be misleading. While the analysis is based on property-level data, the EES scoping requirements state that the assessment must describe impacts of the overall Project at the *'…local, regional and national scales',* not at an individual property scale. In addition, AusNet has a publicly available mapping tool showing all properties intersected by the Project, which provides a current view of every affected property.

This is not suggesting that individual property scale impacts are not important. The report notes that it is possible that the impacts of the Project could be significant for some individual landholders and farm businesses (see Section 7.2.2). , However, mapping would not adequately describe potential property level impacts. This requires discussion with each individual landholder, which will be part of processes to assess financial compensation (under the *Option for Easement Agreement* or *Land Acquisition and Compensation Act*).

Finally, property level maps have not been included in this report because such mapping could be inaccurate and misleading with respect to farming operations and infrastructure, which can both change quickly. For instance, a given farm may not appear to be a cropping enterprise because the

year it was mapped was a non-cropping phase of the rotation. To avoid this risk, the method that has been applied allocated each property to its highest value use by looking at several years of land use on those properties, which may not reflect the land use at the time of the mapping. With regard to infrastructure, the report notes that while the design has avoided fixed infrastructure where possible, it is still likely that some farm-level infrastructure will be affected, much of which would not be evident from mapping (e.g. irrigation equipment and water pipelines). Accurately documenting these property level impacts (and mitigations) is critical for each landholder and is captured through the Agriculture and Forestry Business Mitigation Strategy (EPR AF1) and Specific Property Access Requirements (EPR EM4). This is considered a more appropriate approach to assessing impact rather than presenting potentially out-dated maps of individual properties.

Existing environment

Soil erosion susceptibility – the reviewer requested further justification on the assessment that soils in the region have low susceptibility to erosion particularly given the presence of sodosols. The soils information has been reviewed and corrected to reflect that the available data does indicate that the soils in the area are prone to gully erosion, and that there are dispersive soils which can lead to tunnel erosion.

Description of topography – the reviewer requested a disclaimer be added relating to the scale of the Land Systems mapping that has been included in the report. This has been added to the report, clarifying that since the mapping is 1:250,000 scale, it is appropriate for regional but not property level assessments.

Land and soil capability information – the reviewer requested that the report include more detailed spatial data on soils, land capability, soil management units and topography. The study uses Land Systems mapping for the Project Area. The Land Systems method integrates many features that are often mapped singly, e.g., rainfall, geology, topography, soils and native vegetation. Because of this integrated approach, Land Systems mapping provides greater insight for an analysis like this one, than the individual data sets would. The Land Systems mapping has informed the analysis and has been included in the report.

Land use planning zoning and overlays – the reviewer suggested that a summary of relevant land use planning zoning and overlay information be described. To address this, the suggested details were added (Section 6.2.2) with relevant land use zoning maps also provided in Appendix D.

Engagement and consultation with affected landholders

Extent of consultation – the reviewer noted that there had been challenges with engaging affected landholders and suggested alternative methods to gather feedback. The description of the engagement that had been completed was significantly revised to demonstrate more clearly that there has been engagement and consultation through a range of channels in addition to individual interviews with landholders (e.g., through industry groups, farmer organisations and community events). The aim of the engagement phase of the assessment was to ensure that all of the potential issues and impacts were identified. The later engagement activities (landholder interviews and community meetings) were used to focus on whether there were any gaps or omissions in the lists of issues and impacts that had already been identified. These consultations re-affirmed the list of issues and impacts, with no new matters raised. This led to the conclusion that there had been sufficient engagement to meet the objectives as noted in Section 5.5.1.

Impact assessment

Method used to calculate economic impacts – the reviewer suggested alternative methods to calculate the economic impacts of the Project. In response to this, the description of the method used to calculate economic impact assessment was clarified and revised. The suggested changes to the method included providing more detailed information on the existing conditions at a property level (e.g., values of different crops). The existing conditions at the property level influenced the development of the method used to calculate the economic impacts of the Project. A key step was to allocate each property to the highest value use of three broad categories (grazing, cropping or horticulture in order of value per hectare). This was based on recent land use. This approach is likely to over-estimate the value of production (which flows on to the economic impacts of the Project). The alternative suggested method was not adopted because the method used has been developed, tested and refined through application to many other similar analyses so is considered appropriate for this assessment.

Indirect impacts from the Project – the reviewer noted that the report did not adequately address potential impacts of the Project on agriculture related employment, agri-tourism and support industries. As a result, information on the impacts that the Project could have on food processing, supply chain businesses (e.g., transport), farm services (e.g., machinery suppliers) and agri-tourism was clarified and the findings from the Economic Impact Assessment (which covered these matters) were added to the report.

Mitigation measures

Soil management – the reviewers suggested there should be a commitment to the preparation of erosion and sediment control plans. An additional reference to the Geology and Soils Impact Assessment Technical Report has been included, specifically noting the requirement from this report to develop and implement a Sediment and Erosion Control Management Plan.

5.5.4 AGRICULTURAL CASE STUDIES

To support further understanding of transmission line impacts on farming, a set of agricultural case studies have been prepared and are provided in Appendix A. These studies were developed with direct input from landholders and farmers from around Victoria and they explore the range of issues associated with the overhead transmission line in a variety of agricultural landscapes.

Although each of the case study farms are real, the transmission lines discussed and explored with these farmers are not real; they are hypothetical. Each farmer was visited and interviewed to explore the potential impacts this hypothetical overhead transmission line could have on their farm. The aim was to develop a deeper understanding of farmers' concerns and to explore options for business continuity if a transmission line was to be built on their land.

There are three case studies in this series:

- Grazing – sheep, growing pasture and sheep to produce prime lambs and wool
- Mixed farming – irrigated horticulture (potatoes) plus cereal crops and grazing of prime lambs
- Horticulture – growing irrigated potatoes, garlic and cereal crops, and some dryland crops.

The case study farms are all outside the study area. They were chosen to provide a realistic description of the types of impacts that a project like this could have on agriculture. They complement the other consultation completed for this study, providing a supplementary reference, and an element of 'ground-truthing'.

In Section 11.1 the influence of the case studies on the mitigations and EPRs developed as part of this assessment is described in more detail. Table 11-1 in this section presents the potential impacts of the Project under ten themes (tower heights and position, advance notice, and water supply for example) that were identified in the different case studies. From this, mitigation measures and how they relate to the Project (particularly to the EPRs) are also described.

5.6 IMPACT ASSESSMENT PROCESS

The impact assessment is based on the Project description (Section 3). Existing conditions documented in Section 6 provide the baseline for this study – an understanding of current agricultural and forestry values and assets that could be affected by the Project. A change to existing conditions caused by the Project during any of the stages (construction, operation, or decommissioning) may give rise to a range of impacts, of varying significance.

Following the risk screening process there are three phases of the impact assessment:

1. Determination of the significance of impacts (an analysis of extent, duration, and magnitude), and whether negative or positive (benefit)
2. Identification of a range of mitigations to avoid or minimise negative impacts, and to determine whether any residual impacts remain
3. Where residual impacts are of moderate (or higher) significance, consideration is given to the degree to which implementation of mitigations will reduce the likelihood of those impacts occurring.

This three-staged, structured approach addresses all identified impacts with the most effective mitigations.

5.6.1 IMPACT ASSESSMENT

For the impact assessment, specific factors considered were:

- Current primary production and on-ground (or in-air) activity at property scale
- Current primary production and economic value at regional and state scale
- Duration of Project activities on properties (construction, operation, decommissioning stages)
- Relevant legislation and government policies
- Findings of the Project's other relevant technical reports
- Consideration of direct, indirect, and cumulative effects
- Potential mitigation and management measures and their likely effectiveness.

In general, the method for the Agriculture and Forestry impact assessment included:

- Identifying key issues (as described in Section 5.3) to be addressed in the impact assessment
- Identifying potential impacts of Project construction, operation, and decommissioning including the likely extent, magnitude and duration of changes to agriculture and forestry uses and processes according to the impact ratings developed as summarised below
- Potential impacts of the Project were measured against the existing conditions by assessing the significance of the impacts, taking into consideration mitigation measures (including before and after application of proposed mitigation)
- Identifying any other potential developments that could lead to cumulative impacts when considered together with the Project.
- Prepare EPRs to define the minimum environmental outcomes that Project must achieve. EPRs will form the final requirements as a condition of the Project's approval and will be achieved through the implementation of measures to avoid, mitigate and manage impacts.

- Determining the residual impacts associated with the construction, operation, and decommissioning of the Project, and evaluating their significance in accordance with the criteria described above.

The **significance** of impacts was assessed through consideration of the **extent**, **duration**, and **magnitude** of an effect, and whether it is a potentially negative impact or a potential benefit. This **significance approach** assumes the identified impacts will occur. This conservative method provides a 'worst plausible case' and helps to provide an understanding of all the potential impacts on agriculture and forestry. It encourages early identification of mitigation measures for the full range of potential impacts, including design changes, work controls and management plans and procedures.

The definitions of impact significance ratings as used in this report are provided in Table 5-4.

Table 5-4: Impact significance rating definitions

SIGNIFICANCE RATING	DEFINITION
SEVERE	Occurs when impacts will potentially cause irreversible harm to agricultural or forestry value (or values) across multiple properties. Could have very large and ongoing economic effects at a regional or State level. May trigger significant State or Federal government interventions. Likely to generate significant state or national media attention and widespread community concern. Once impacted, the agricultural or forestry value(s) may be unable to be repaired or reinstated. Viability of significant commercial enterprises or regional/state markets are threatened. Avoidance through significant design responses and/or management through comprehensive and monitored mitigation measures are necessary.
MAJOR	Occurs when impacts will potentially cause long term harm to agricultural or forestry value (or values) on one or a small number of properties. Could have large and/or long-term economic effects at a regional or State level. State government assistance may be required for recovery. Likely to generate regional and state media attention and community concern. Once impacted, the agricultural or forestry value(s) would be difficult or very costly to repair or reinstate and recovery may only be partially successful. Viability of commercial enterprises or regional markets may be challenged. Avoidance through design responses and/or management through comprehensive and monitored mitigation measures are necessary.
MODERATE	Occurs when impacts will potentially cause medium or localised harm to an agricultural or forestry value (or values). Could have a range of short-term, and potentially some long-term economic effects at a local or regional level. Potential to generate short-term community concern and local/regional media attention. Commercial enterprises and regional markets may be affected, but their long-term viability is not challenged. Once impacted, the agricultural or forestry value(s) could mostly be repaired or reinstated. Standard mitigation measures are required.
MINOR	Occurs where an agricultural or forestry value (or values) is of localised importance and/or impacts will be temporary and transient. Changes will not adversely affect the viability of commercial enterprises or regional markets. Standard mitigations are likely to be required.
NEGLIGIBLE	Occurs where an agricultural or forestry value (or values) is of localised, minor importance and/or where agricultural or forestry activity is materially unaffected. Project activity will not adversely affect the viability of any commercial enterprises or markets.

5.6.2 MITIGATIONS AND RESIDUAL IMPACTS

The residual impact assessment is based on considering the effectiveness of proposed mitigation measures. Residual impacts have been identified for all stages of the Project (construction, operation, or decommissioning).

The significance of the residual impacts is measured by considering the same factors used to assess the impacts, namely the extent, duration, and magnitude of an effect, and whether it is a potentially negative or a potential benefit. More specifically, the identification of residual impacts has considered:

- Direct and indirect impacts, and cumulative effects
- Potential mitigation and management measures and their likely effectiveness
- Potential EPRs that can be used to monitor the success of mitigation actions.

5.6.3 LIKELIHOOD

Finally, where the **residual impact** was of moderate (or higher) significance after the effective implementation of mitigations, **likelihood** of occurrence was considered. Given that the significance assessment is a conservative method, this provides a more realistic assessment of potential impacts where their consequence is very high and yet their likelihood is very low.

5.7 QUANTIFYING ECONOMIC IMPACT

Economic value is a critical element of this impact assessment and is of great interest to landholders, stakeholders, and community. The economic impact was calculated as:

(the gross value of production per hectare of the enterprise impacted) x (the area impacted).

The estimates do not include the potential impacts from isolation or redundancy of agricultural land caused by the Proposed Route as it is not possible to provide an accurate estimate of the economic impact of these. The primary production land areas impacted by construction, operation and decommissioning are calculated in the relevant impact assessment chapters later in the report.

Gross value of agricultural production (GVAP) has been used to calculate economic impact as it reflects agriculture's contribution to the economy. A product's gross value of production multiplied by the area of land on which it is grown, is a measure of the value of that production to the economy. This is the recognised standard for measuring the economy-wide value of agriculture and forestry.

However, it is important to acknowledge that this calculation does not indicate the profitability of the enterprise, nor of any individual business. The profitability of farming varies widely from farm to farm and is influenced by many factors. Factors such as choice of enterprise, size of the property, soil, climate, availability of irrigation water and seasonal conditions can all have significant impacts on both costs and returns (and therefore profitability). In addition, the skill and expertise, and management decisions made by individual farmers or farm businesses, and external factors like markets and future trends, all affect farm profitability.

The gross value of production per hectare for each of the four enterprise categories are presented in Table 5-5. They have been calculated using the area and gross value of production of the relevant enterprises in the Project region for 2020-21.

The gross value of production per hectare in the region for 2020-21 for each of the four broad enterprise types was calculated as follows:

- **Grazing** ($989 per hectare) was calculated as the weighted average of the gross value of production of sheep and lambs, wool, and cattle and calves, divided by the area of land mainly used for grazing across the region.

- **Cropping** ($1,183 per hectare) was calculated as the weighted average of the gross value of broadacre crops, cereal crops and hay and silage, divided by the sum of the area of broadacre crops, cereal crops and hay and silage grown in the region.
- **Horticulture** ($24,412 per hectare) was calculated as the weighted average of the gross value of horticulture crop divided by the area under horticulture in the region. This value was refined following consideration of the typical rotations used in the horticulture operations in the region (see section 6.4.4).
- **Forestry** calculations were based on industry estimates and range from $15,000 per hectare for blue gums for pulp production around Lexton to $30,000 per hectare for softwood for timber production near Bungaree. The abandoned and / or regrowth blue gum plantations in the west of the study area would have a substantially lower value and their harvest value may be exceeded by the cost of harvesting.

Table 5-5: Gross value of production per hectare in the Project region for 2020-21 for the four enterprise categories[5]

ENTERPRISE	GROSS VALUE OF PRODUCTION ($,000)	AREA OF PRODUCTION (HA)	GROSS VALUE OF PRODUCTION PER HECTARE ($/HA)
GRAZING			
Livestock products (excluding wool)	11,350	-	-
Livestock slaughtered and other disposals (excluding sheep and lambs)	94,988	-	-
Sheep and lambs	177,980	-	-
Wool	74,844	-	-
GRAZING	**359,162**	**363,106[6]**	**989**
CROPPING			
Broadacre crops (excluding cereal crops)	64,121	49,436	1,297
Cereal crops	103,194	86,837	1,188
Hay and silage	35,213	33,102	1,064
CROPPING	**202,528**	**169,376**	**1,183**
HORTICULTURE			
Fruits and nuts	9,494	411	23,093
Potatoes	60,877	2,396	25,408
Vegetables (excluding potatoes)	15,808	570	21,864
HORTICULTURE	**86,179**	**3,530**	**24,412**
FORESTRY (including plantation and native forest)	**Not applicable**	**4,505**	**$15,000 - $30,000[7]**

[5] ABS Value of Agricultural Commodities Produced, Australia 2020-21 - https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/latest-release#data-download

[6] In the ABS data set, this number corresponds to total area of 'Land mainly used for grazing' across the SA2 areas of interest.

[7] Refer to section 6.3

5.8 ASSUMPTIONS AND LIMITATIONS

This report has been written at a point in time and is based on information provided by AusNet and Jacobs in respect of the Project, and on current agricultural and forestry information available through public government and industry databases. The assessment is based on the Project design issued by AusNet on 26 June 2024. The information provided by others is presumed accurate at the time of writing.

Key assumptions used during this analysis are:

a) Potato cropping is on a four-year rotation, with either livestock or broadacre cropping during the non-potato cropping years.

b) Assessments of losses from livestock farming operations assume that farms are carrying stock at a rate that is close to the maximum carrying capacity of each farm.

c) That in plantation forestry areas all trees will removed at the same time (i.e., none are held over to mature further and generate a higher price) and therefore valuation is based on selling into current markets.

d) That the whole construction area will be excluded from any agricultural use for the full duration of construction at a given property. This includes the area of land that has been identified as potentially affected by construction, which is significantly larger than the easement.

e) That all significant impacts on agriculture and plantation forestry have been identified through the various consultations that have been possible.

f) That all tracks constructed as part of the Project are permanent.

g) That following rehabilitation of areas impacted during construction, these areas will take a maximum of two growing seasons (e.g., a Spring and an Autumn) to return to production.

h) That during the operating life of the Project, areas of farmland under the transmission line will be productive, even if some require modifications to how they are used.

i) That rehabilitation will be completed within a one-year period at an individual property.

j) That mitigations documented in the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1), and Specific Property Access Requirements (EPR EM4) will be fully implemented and will be effective in resolving most isolation and redundancy issues.

6 Existing conditions

6.1 OVERVIEW

To understand the existing conditions, a series of maps were prepared to provide an overview of existing conditions in the study area (Appendix D). These maps depict:

1. Satellite image of the region
2. Land tenure
3. Primary production land uses
4. Rainfall
5. Local government area boundaries
6. Land production potential (Land Systems)
7. Water resources
8. River basins
9. Property sizes
10. Enterprise type
11. Planning zones
12. Weed infestation - serrated tussock.

Agriculture is the dominant land use within the 190km Proposed Route. The range of agricultural products and the value of production are highly variable across this landscape. Agricultural production systems, landholders' choices (such as what mix of outputs to produce), and their associated profitability are determined by a range of factors, including:

- Soil
- Climate and seasonal conditions
- Availability of irrigation water
- Skills and expertise
- Management decisions
- Markets
- Future trends.

Many farmers operate multiple agricultural enterprises concurrently on their land, producing a range of commodities and rotating the enterprises between paddocks and across time to match market requirements, supply quotas, and for other management reasons, including weed, disease, and pest control.

It is noted that the soils in the central section, east of Ballarat, are some of the most productive in Victoria and sustain potatoes and other intensive crops with high values of production per hectare. Less intensive and less productive agriculture occur along the remainder of the Proposed Route. Nevertheless, all traversed agricultural areas (particularly those close to metropolitan Melbourne) are identified in State and Local policies as being of significant economic and social value.

Agriculture is predominantly conducted on private land. Some parcels of public land (including unused road reserves) are also intersected by the Proposed Route. Such parcels of public land are typically small, are licenced and used for agriculture, and (in terms of use) are contiguous with a larger freehold agricultural property.

6.1.1 SOILS AND CLIMATE

The annual rainfall in the study area ranges from 500 to 1,000mm, with the wettest months in late Winter and early Spring. The average maximum temperatures for February (warmest month) are 24 to 26°C, with minimum averages in July (coolest month) of 2 to 3°C. Maps showing the rainfall and production potential of the area are shown in Appendix D.

The central part of the study area has the higher rainfall, 900 to 1,000mm per annum, and the soils in this area (particularly the Ferrosols) tend to be very productive under intensive cultivation systems, such as those required for potato production. This means that the higher value and higher production farming systems are found in this area.

Lower quality soils in the western and eastern ends of the study area, combined with less reliable rainfall, result in lower agricultural productivity per hectare. In these areas the rainfall is generally between 500 to 700mm per annum. The soils (Chromosols and Sodosols) tend to be better suited to pasture or cereal cropping operations.

Land systems mapping (Appendix D, Map 6) brings together a range of the natural features and characteristics (rainfall, topography, soils) to describe the potential a given area has for agricultural use. The Land Systems mapping of the study area shows that it ranges from 9, the highest class, in the areas north-east of Ballarat, to 4 to 5 in the areas on the western and eastern ends of the Proposed Route. These ratings are generalisations based on modelling of biophysical conditions and climate parameters at a regional scale, so are not accurate at the individual land parcel level. It is also important to note that the Land Systems mapping is at 1:250,000 scale which means that it is appropriate for regional level assessments but is not considered appropriate for individual property level assessments.

The soil erosion risk in the Project region was also examined. The Geology and Soils Impact Assessment Technical Report shows that soils along the Proposed Route are subject to gully erosion, with several instances of active gully erosion identified as part of this study. The same study also showed that some areas on the route feature dispersive soils which can lead to tunnel erosion.

Further detail regarding soils within the Project Area are available in the Geology and Soils Impact Assessment Technical Report.

6.2 AGRICULTURE IN THE REGION

6.2.1 STATISTICAL REGION DATA

Agricultural production and value data used in the assessment is aligned to ABS statistical regions. The Project traverses 11 statistical regions (SA2) of Victoria (Figure 6-2), including:

- Avoca
- Bacchus Marsh
- Bacchus Marsh Surrounds
- Beaufort
- Creswick – Clunes
- Daylesford
- Fraser Rise – Plumpton
- Gordon (Vic.)
- Kurunjang – Toolern Vale
- Melton West
- Stawell

The Project is wholly located in the SA2 regions listed above and the Proposed Route takes up less than 1% of the sum of land area of those SA2 regions (Figure 6-2).

Figure 6-1: Images of grazing and cropping typical of the region

The profile of agriculture in the region has been prepared using data from the most recent ABS Agricultural Survey (2020-21, released in July 2022). Land use, production levels and farmgate value vary from season to season, however the ABS data provides a good representation of agriculture in the region intersected by the Project.

The following Sections (6.2.2 to 6.2.4) present comparative data for the region and for the State of Victoria for:

- **Land use** – enterprise by area (hectares and percentage)
- **Agricultural production** by enterprise (tonnes and numbers)
- **Gross value of agricultural production** by enterprise (dollars and percentage).

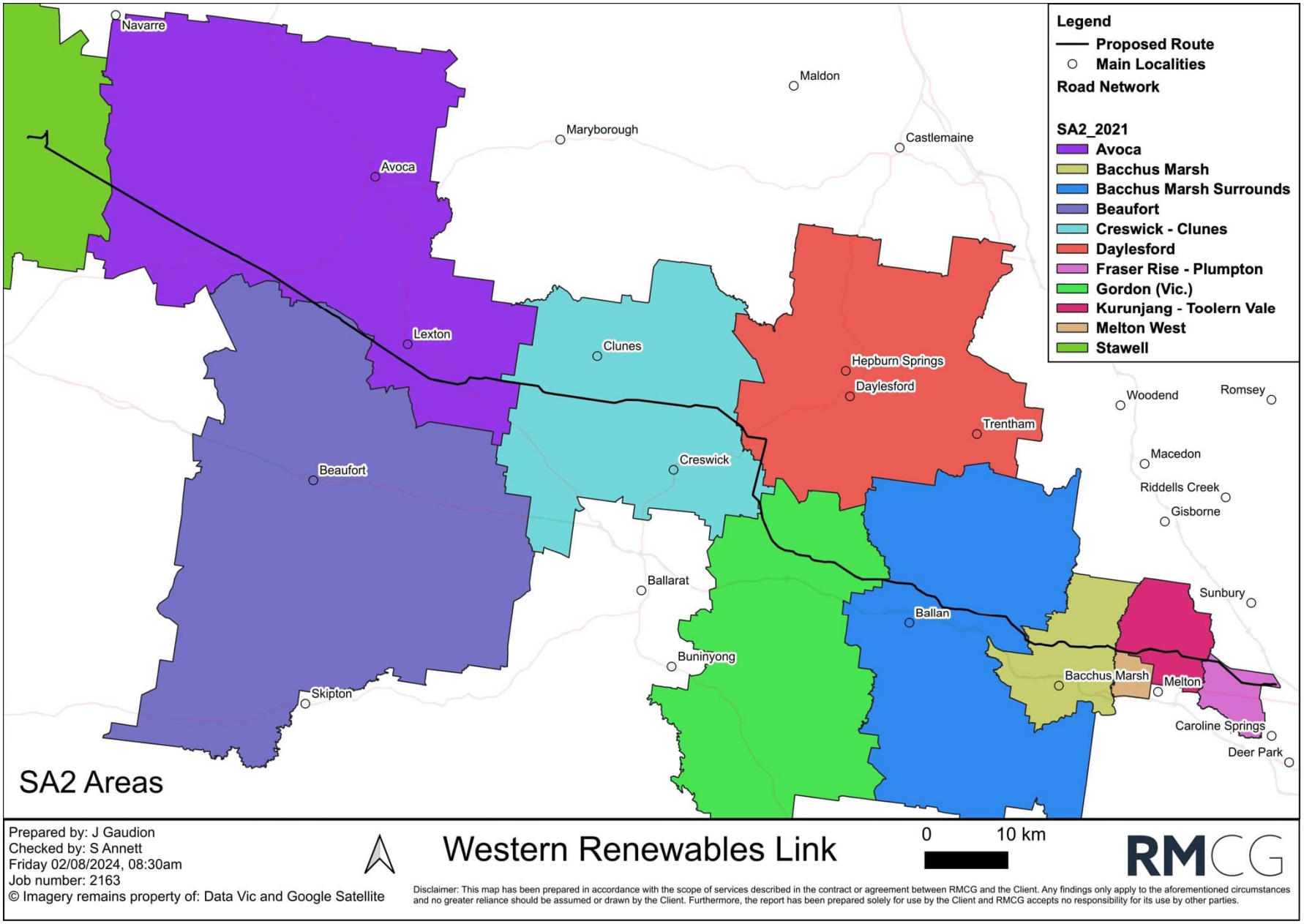


Figure 6-2: Statistical ABS regions (SA2) traversed by the Project

6.2.2 LAND USE

The extent of each major primary production land use in the Project region and in Victoria is presented Table 6-1. For this analysis, the most relevant units were the SA2 regions used by the ABS. The data presented here is based on aggregating eleven SA2 regions to provide estimates of the agricultural production for the Project region. The data shows that land used for agriculture and forestry in the region totals 540,517 hectares, which is 5% of the agricultural and forestry land in Victoria. This 5% figure can be used to highlight the land uses where the region makes a relatively significant contribution at the state level. For example, there are three land uses where the region represents more than 5% of the state's total area of production – grazing (6%), potatoes (36%) and forestry (8%). For other land uses, where the proportion is less than 5%, the region is less significant at the state level.

Another significant feature of land use in the region is that over 98% of agricultural land area in the region is used for grazing or cropping. Potatoes are particularly significant when considered as a proportion of the State's total area of production with over one third (36%) of the land area used to grow potatoes in Victoria occurring within this region. The Planning zones map, included in Appendix D, shows that the vast majority of the Proposed Route falls within the Farming Zone or the Rural Conservation Zone.

Figure 6-3: Image of a forestry plantation in the region

Table 6-1: Land use in the relevant ABS SA2 regions[8]

LAND USE	REGION (HECTARE & %)	VICTORIA (HECTARE & %)	REGION AS A % OF VICTORIA
Grazing	**363,106 (67%)**	**5,825,610 (54%)**	**6%**
Cropping	**169,376 (31%)**	**4,767,275 (44%)**	**4%**
Broadacre crops (excl. cereal crops)	49,436 (9%)	1,160,029 (11%)	4%
Cereal crops	86,837 (16%)	2,575,546 (24%)	3%
Hay and silage	33,102 (6%)	1,031,699 (10%)	3%
Fruits and nuts	**411 (<1%)**	**119,150 (1%)**	**<1%**
Potatoes	**2,396 (<1%)**	**6,583 (<1%)**	**36%**
Vegetables (excl. potatoes & mushrooms)	**723 (<1%)**	**30,550 (<1%)**	**2%**
Forestry (incl. plantation and native forestry)	**4,505 (1%)**	**57,302 (1%)**	**8%**
TOTAL (agriculture and forestry land)	**540,517 (100%)**	**10,575,854 (100%)**	**5%**

6.2.3 PRODUCTION

The production of each major agricultural enterprise in the region, compared to Victoria as a whole, is presented in Table 6-2. As per the land use data, those enterprises which contribute greater than 5% of the State's production are contributing to the State's agricultural production that is large relative to the area of agricultural land available in the region.

Table 6-2: Agricultural production in the region, aggregate of the 11 SA2s[9]

ENTERPRISE		REGION	VICTORIA	REGION AS A % OF VICTORIA
GRAZING				
Sheep and lambs	Number	1,108,810	10,394,167	11%
Poultry and eggs	Number	510,777	27,719,777	2%
Meat cattle	Number	133,775	4,259,639	3%
Pigs	Number	81,911	993,832	8%
Dairy cattle	Number	10,015	2,893,669	<1%

[8] ABS Agricultural Survey, 2020-21 - https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/latest-release

[9] ABS Agricultural Commodities, Australia 2020-21 - https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/latest-release#data-download

ENTERPRISE		REGION	VICTORIA	REGION AS A % OF VICTORIA
CROPPING				
Broadacre crops (excl. cereal crops)	Tonnes	107,988	2,107,584	5%
Cereal crops	Tonnes	351,682	7,853,277	5%
Hay and silage	Tonnes	16,611	1,466,228	1%
HORTICULTURE				
Potatoes	Tonnes	119,257	282,034	42%
Vegetables (excl. potatoes)	Tonnes	1,579	434,542	<1%
Fruit and nuts	Tonnes	13,432	1,368,762	1%

The data shows that sheep and lambs are the dominant livestock in the region, and broadacre crops and potatoes are the dominant crops. From the state perspective, potato production in the region contributes 42% of Victoria's total, whilst the production of sheep and lambs (11%) and pigs (8%) also contribute significantly to Victoria's total production.

6.2.4 VALUE

The GVAP of each major agricultural enterprise found in the region is presented in Table 6-3.

Table 6-3: Gross value of agricultural production (GVAP) in the region[10]

ENTERPRISE TYPE & COMMODITY	REGION ($,000S & %)	VICTORIA ($,000S & %)	REGION AS A % OF VICTORIA
GRAZING	**359,162 (55%)**	**9,378,904 (58%)**	**4%**
Livestock products (excl. wool)	11,350 (2%)	3,084,341 (19%)	<1%
Livestock slaughtered and other disposals (excl. sheep and lambs)	94,988 (15%)	3,678,326 (23%)	3%
Sheep and lambs	177,980 (27%)	1,899,180 (12%)	9%
Wool	74,844 (12%)	717,057 (4%)	10%
CROPPING	**202,528 (31%)**	**4,223,960 (26%)**	**5%**
Broadacre crops (excl. cereal crops)	64,121 (10%)	1,299,769 (8%)	5%
Cereal crops	103,194 (16%)	2,247,818 (14%)	5%
Hay and silage	35,213 (5%)	676,373 (4%)	5%
HORTICULTURE	**86,179 (13%)**	**2,524,558 (16%)**	**3%**

[10] ABS Value of Agricultural Commodities Produced, Australia 2020-21 - https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/latest-release#data-download

ENTERPRISE TYPE & COMMODITY	REGION ($,000S & %)	VICTORIA ($,000S & %)	REGION AS A % OF VICTORIA
Fruits and nuts	9,494 (1%)	1,572,745 (10%)	1%
Potatoes	60,877 (9%)	143,969 (1%)	42%
Vegetables (excl. potatoes & mushrooms)	15,808 (2%)	807,843 (5%)	2%
Total	**647,869 (100%)**	**16,127,421 (100%)**	**4%**

The data shows that:

- The total GVAP of the Project region in 2020-21 was $648 million or 4% of the State's GVAP ($16.1 billion)
- Grazing and cropping represented 86% of this value, compared to 84% of the State's GVAP
- Potato production is also a significant contributor at the regional level (9%), but most importantly, it produces 42% of the total value of potatoes in the State.

Other production

The assessment of the Proposed Route (described in Section 5) aimed to identify all agriculture and forestry related activities that occur along the Proposed Route. The assessment did not identify any agricultural processing and manufacturing facilities, saleyards, or large packing / distribution sheds that would be directly affected by the Project.

The data indicated that there were some properties that run horses, which potentially included breeding. These were included in the assessment as grazing operations. The rationale for this is that they breed and graze animals much like beef and sheep farms do, and the impacts of the Project would be similar.

While this assessment did include engagement with local agricultural product processors, assessing the potential supply chain impacts from the Project is out of scope for this analysis. Similarly, there are tourism business (including agritourism) in the vicinity of the Project but impacts of the Project on these businesses is not in scope for this analysis. Both of these matters are included in the Economic Impact Assessment, in particular the Business Impact Analysis (see Section 8).

There are several agriculture and forestry related issues that have not been addressed directly in this report because they are addressed in more detail in other assessments. These include:

- The potential impacts on traffic and roadways that could affect agriculture and forestry. These are assessed in the Transport Impact Assessment.
- The protection of agricultural land from development is included in the Land Use and Planning Impact Assessment, with this issue noted in the EPRs set out in that report.
- The potential impacts of the Project on employment in the agriculture or forestry sectors is part of the Economic Impact Assessment, in particular the Business Impact Analysis (Section 8). This analysis found that the project will have a neutral effect for most industries though there are some potential negative impacts for Accommodation and Food Services during construction and operation (and potentially during decommissioning).

6.2.5 SUMMARY OF AGRICULTURAL LAND USE, PRODUCTION AND VALUE

The agricultural profile of the region demonstrates:

- **Land use** in the region is dominated by pastures for livestock, with significant contributions from broadacre cropping (including cereal crops) and hay and silage production. However, potatoes, other vegetables and

forestry on private land represent a significant proportion of the State's area of production for each of these commodities, with the area of potatoes in the region representing greater than one third (36.4%) of the potato growing area in Victoria.

- **Agricultural production** in the region is dominated by grazing (particularly sheep and lambs), broadacre crops and potatoes. Potato production in the region represents 42% of the Victorian crop, whilst sheep and lambs (11%) and pigs (8%) are the next most significant contributors to the Victorian agricultural economy.
- With a **GVAP** in 2020-21 of $647 million, agriculture is a significant contributor to the regional economy. While the vast majority (86%) of this value is produced by broadacre grazing and cropping, the value of potatoes produced in the region is also significant, representing 42% of the total value of potatoes in the State.

6.3 PLANTATION FORESTRY IN THE PROJECT REGION

There are approximately 4,505 hectares of plantation forestry in the Project region[11] (Table 6-1). The two main plantation species used for forestry production in the region are:

- Radiata pine (*Pinus radiata*)
- Tasmanian blue gum (*Eucalyptus globulus*).

There are also two types of plantation ownership: corporate forestry and farm forestry.

Corporate growers are typically large-scale plantation growers. The two main corporate growers are HVP Plantations and Midway. HVP Plantations has several large-scale areas of contiguous pine plantations in the Ballarat region, whilst Midway Plantations has smaller-scale blue gum plantation properties scattered across the region.

Corporate growers are normally in the forestry business for the long-term. They manage their plantations with the aim of harvesting similar volumes each year. This is so they can meet regular customer demand for fibre. HVP Plantations has age classes from one-year-old up to 33-years-old. They aim to have about the same area of each age class (known as an even-aged estate) over its entire estate in Victoria. An organisation such as Midway Plantations will typically have age classes from one-year-old to 15-years-old. However, it is unlikely that these corporate growers have an even-aged estate within the region, as it is only a subset of their total Victorian estate.

There was a significant area of blue gum plantations established in the early 2000's driven by managed investment scheme companies. These plantations were normally grown on previously cleared farmland under a lease arrangement. In the rush to find land at that time, some less productive sites were planted. As a result, some blue gum plantations in the region were never harvested and remain today at an age well past their normal harvest age, e.g., 20+ years. Some plantations were also harvested, and the sites handed back to the landholder with the stumps remaining. Some of these plantations also remain today, having regrown from coppice on the original stumps. These types of plantations are usually of lower quality and value.

Farm foresters typically own smaller areas of plantation, often less than 50 hectares, and have only a limited number of age classes. They tend to harvest about once every 10 to 20 years (depending on species, growth rates and available markets) because of their small scale and limited area.

Farm forestry includes radiata pine, Tasmanian blue gum, other hardwood species (such as Sugar gum, Spotted gum and Sydney blue gum) and shelterbelts. Usually farm forestry woodlots are managed similarly to the corporate plantations. Radiata pine is managed over longer rotations with thinning. Blue gum is managed over shorter rotations without thinning. However, sometimes farm foresters may manage their blue gum plantations over longer periods, with products from thinning used for firewood sales.

[11] As for the agricultural data, Project region is based on the ABS SA2 units.

The value of plantations varies with age. Younger-aged plantations are less valuable per hectare, but values increase with plantation maturity. The most valuable plantations are those that are getting close to an age where they can be harvested. Standing trees in young plantations typically vary from $1,500 to $3,000 per hectare in value. Mature pine plantations can be worth more than $30,000 per hectare, whilst mature blue gum plantations can be worth more than $15,000 per hectare. Based on average production data from the Australian forest and wood products statistics (ABARES, 2020) for Victoria, average annual values for hardwoods are estimated to be $2,010 per hectare per annum, and softwoods to be $1,790 per hectare per annum.

There are several large contiguous areas of radiata pine plantations in the region near Creswick (to the west, south and east), around Wilsons Reservoir (near Bullarook), south of Spargo Creek, and between Gordon and Ballan. There are also scattered pine plantations between Lexton and Creswick. Blue gum plantations are located near Gordon, near Moorabool Reservoir at Bolwarrah, and between Waubra and Mount Beckworth, with the largest grouping of plantations located around Lexton. There are very few plantations west of Mount Lonarch.

Shelterbelts are managed differently to plantations for wood production. Normally shelterbelts are established with a variety of species from shrubs to trees. They have multiple benefits to the farm, providing shelter for livestock or crops, slowing runoff, and reducing erosion on the farm (e.g., from wind). They may also include fodder trees that provide supplementary nutrition for livestock. Shelterbelts are grown over long periods of time, usually with no expectation of a commercial harvest of timber (and as such, they are not part of plantation totals in this report).

Although there is significant commercial forestry on public land in the region, detail of it has not been provided here because it is not traversed or impacted by the Proposed Route.

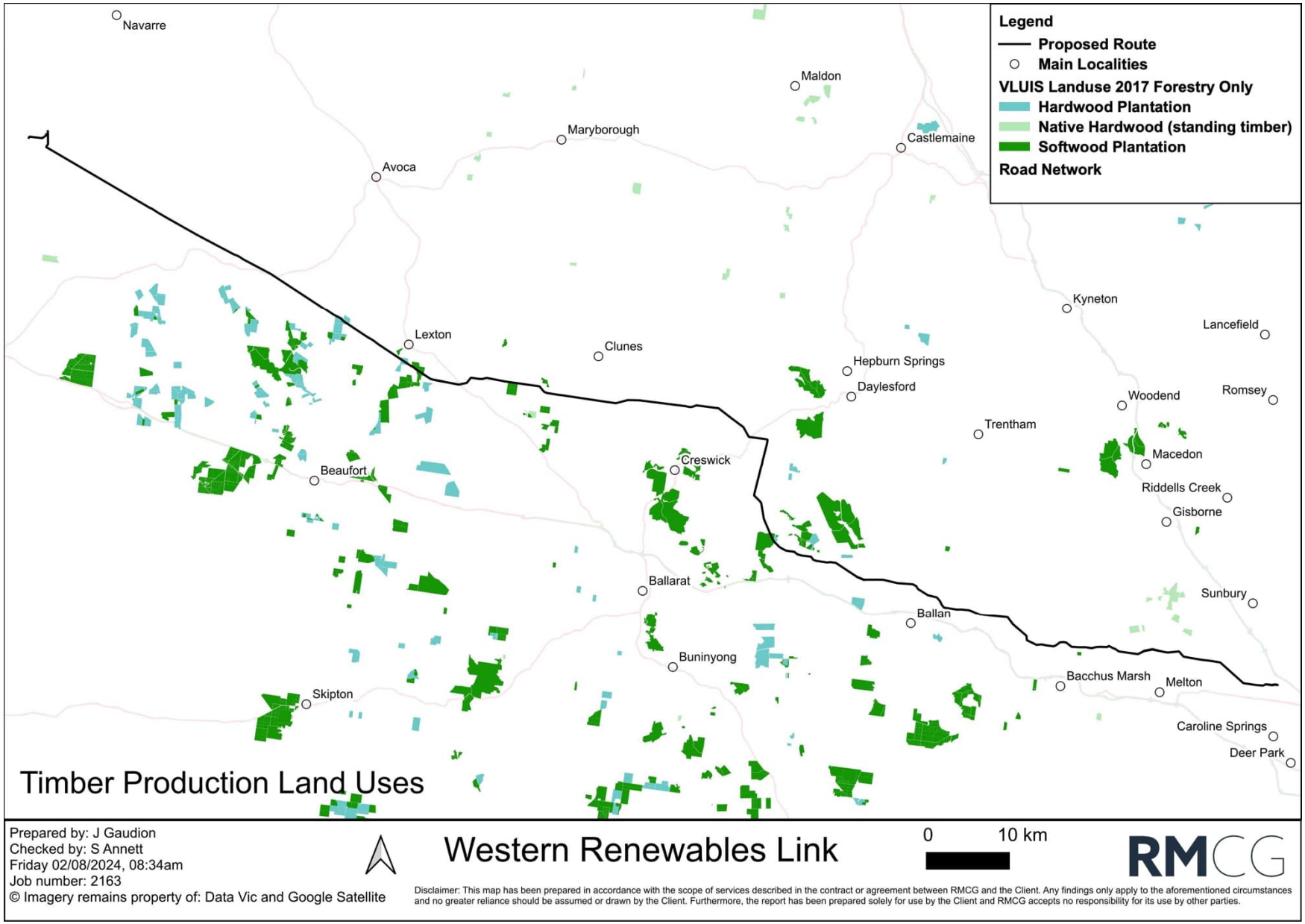


Figure 6-4: Private commercial timber production in the Project region

6.4 AGRICULTURE AND FORESTRY TRAVERSED BY THE PROPOSED ROUTE

While the previous section discussed agricultural and forestry attributes of the region in general, the following section focusses on attributes of the properties in the study area and on the Proposed Route. The study area includes the full extent of properties (typically involving multiple parcels) that are directly affected by the Proposed Route, not just the area within the property that the Project directly affects.

6.4.1 OVERVIEW

There are 229 agricultural and forestry properties on the Proposed Route. A summary is presented in Table 6-4 and the spatial distribution is shown in Figure 6-5. These data show both the area of land directly along the Proposed Route and the area of the properties directly affected. Within these areas properties there will be areas where normal farming activities can continue post-construction, but there could also be indirect effects of the Proposed Route, such as areas isolated from production, or areas where existing systems of production cannot continue. These issues are discussed in Sections 7 and 8, Construction and Operations Impact Assessment.

Table 6-4: Enterprise types on the Proposed Route in relation to the Project region

ENTERPRISE TYPE	NUMBER OF PROPERTIES	AREA AFFECTED BY THE PROJECT (HA)	STUDY AREA: AREA OF PROPERTIES DIRECTLY IMPACTED (HA)	AREA OF LAND USE IN THE REGION (HA)[12]	AREA OF PROPERTIES AS A % OF REGION
Grazing	76	542	10,488	363,106	3%
Cropping	85	1,028	13,982	196,307	7%
Horticulture	65	632	8,880	6,848[13]	n/a
Forestry	3	26	262	4,505	6%
TOTAL	**229**	**2,228**	**33,612**	**570,766**	**6%**

Most properties (85 out of 229) on the Proposed Route undertake mixed farming. For the purposes of this assessment, these properties have been classified as cropping, which is the higher value (per hectare) use. Grazing (76) is the next most dominant enterprise, followed by horticulture (65), and forestry (3). The total area of the properties in the study area is 33,612 hectares or 6% of the agricultural land in the region. Within these properties, a total of 2,228 hectares (0.4% of the regional area) will be directly impacted by the Proposed Route.

The total area of grazing (3%) and cropping (7%) properties in the study area represent relatively small proportions of these and uses in the whole region.

The area of land reported as being used for horticulture (6,848ha) is based on data for a given year (ABS), while the area of directly impacted properties with horticulture (8,880ha) includes all land in the rotation, much of which could be in pasture or other non-horticultural uses in a given year. The latter figure is a more accurate reflection of the true area used for horticulture in the region because it reflects that these crops are grown in

[12] Grazing = pastures for livestock; Cropping = broadacre crops + hay and silage; Horticulture = potatoes + other vegetables; Forestry = hard and softwood plantations.

[13] The total area of horticulture properties directly impacted is greater than the total area of horticulture crops in the region because some of these properties have multiple crops in a single year.

rotations. For example, a four-year rotation would see a paddock sown to the crop (e.g., potatoes) for just one year in four. The other three years, that paddock could be pasture for grazing or perhaps a cereal crop.

Areas directly affected by the Proposed Route (as opposed to full properties traversed) are: 542 hectares of grazing; 1,028 hectares of cropping; 632 hectares of horticulture; and 26 hectares for forestry. Horticulture is analysed in more detail in Table 6-7 and potato production data is provided in Table 6-8.

It is important to note that the size of the properties traversed by the Proposed Route may not represent the total area of the farm businesses. Many small farm businesses have only one land parcel in the study area, but there are also a significant number of farm businesses that operate across multiple land parcels in the region (and beyond) and thus, the size of their business may be significantly larger than the areas reported in the data presented here.

No operating dairies, piggeries, poultry operations or vineyards have been identified as being traversed by the Project Land.

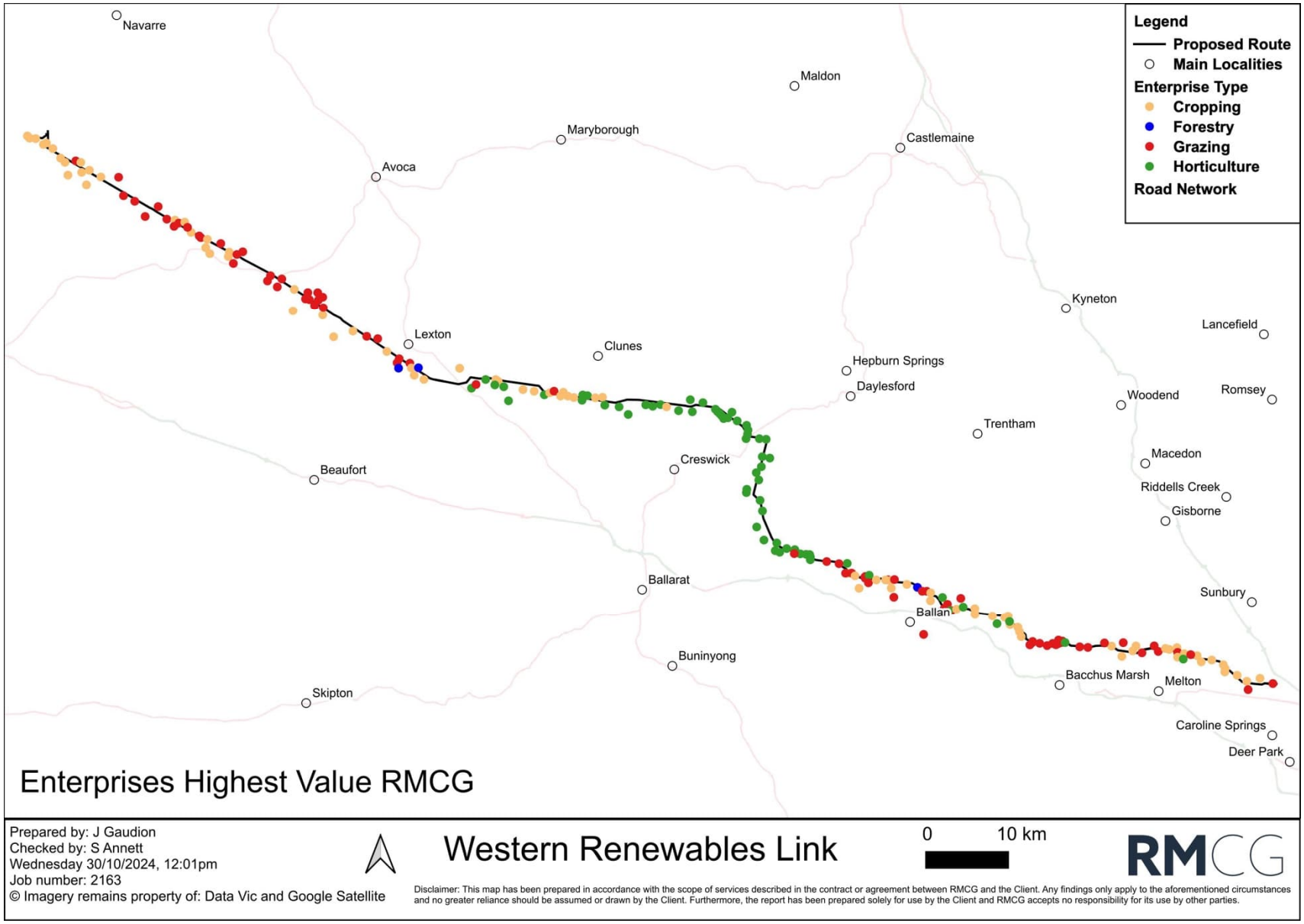


Figure 6-5: Geographic distribution of (highest value) enterprise types

6.4.2 GRAZING

Production

For this assessment, grazing is defined as a commercial enterprise based on animals, such as sheep, cattle, and goats, eating predominantly pasture. Horses are also included, as explained in textbox at end of this section. The main land use described by the ABS for the region is pastures for livestock (refer to Table 6-1) and the main commodities are meat and wool. Most grazing enterprises on the Proposed Route are in the hills near Bacchus Marsh and Ballan, and around and west of Waubra (Figure 6-5).

Table 6-5: Key production statistics for grazing enterprises on the Proposed Route

KEY PRODUCTION STATISTICS	VALUES
Total number of properties (no.)	76
Total area of properties[14] (ha)	10,488
Range of area of properties (ha)	0.1 – 2,451
Median area of properties (ha)[15]	44.5
Range of stocking rates in the (DSE/ha)	6 – 15[16]
Weighted average Gross Value of Agricultural Production (GVAP) per hectare ($/ha)	989[17]

The data show that there are 76 grazing properties on the Proposed Route, which range in size from 0.1 to 2,451 hectares, with a median area of 44.5 hectares and a stocking rate that ranges from 6 to 15 'dry sheep equivalents' or DSE/ha, with an average GVAP/hectare of $989. Properties to the north and west of Ballarat tend to be larger than those east of Ballarat.

Stocking rate strongly influences production and the value of production per hectare. Stocking rates at the lower end of the range occur mainly in the eastern and western ends of the study area with lighter, less fertile soils and lower annual rainfall. Higher stocking rates are more common in the centre of the study area, which has more fertile soils, higher annual rainfall, and access to irrigation water.

Infrastructure and equipment

The key infrastructure required for grazing enterprises include pastures, fencing, access tracks and laneways, stock yards and loading ramps for sheep and / or cattle, hay sheds and shearing sheds (Figure 6-6).

Tractors, sowing equipment, fertiliser spreaders and boom sprays for chemical application may also be necessary. This equipment may not be available on all grazing properties unless cropping is also undertaken.

Large scale grazing properties may operate some or all of this equipment, but smaller scale grazing properties are less likely to operate this equipment and may employ contractors when required. Aerial spreading of fertiliser is also used, especially in the hill country west of Waubra, which may not be trafficable by tractor.

[14] Whole area of properties, i.e., area affected by the easement plus area not affected by the easement
[15] The median area is reported rather than the average, as a small number of very large properties skews the average towards the larger properties.
[16] Estimate based on RMCG experience of grazing properties in the study area.
[17] Refer to Table 5-5

Figure 6-6: Shearing shed adjacent to existing 220kV easement

Typical activities and timing

The key activities and sensitivities on a grazing property include, but may not be limited to:

- Joining (breeding)
- Lambing or calving
- Weaning (separating mother and young)
- Shearing
- Soil preparation, planting of fodder crops, and pasture improvement
- Access to fodder crops for finishing livestock.

The time of lambing or calving is the most time-sensitive activity on a grazing property and is usually the key determinant of the timing of the other activities. Both Autumn and Spring lambing and calving are common in the region, with individual farm businesses choosing the time that fits their business goals, farming system and physical environment. It is important to note that Autumn usually refers to late Autumn (mid-April to May), whilst Spring often includes late Winter (as early as late July and usually completed no later than September).

Key sensitivities

The key sensitivities for a grazing property include, but may not be limited to:

- Time of lambing and calving
- Limiting Disruption of breeding animals pre- and post- lambing and calving to prevent mismothering[18]

[18] Mismothering refers to the failure of an animal to take maternal care of its young, e.g., ewes disturbed post lambing may run from perceived danger and become permanently separated from their lamb, leading to the death of the lamb from cold stress, hunger and/or predation.

- Access to pastures and / or shelter at critical times (e.g., during lambing and calving, or during severe weather)
- Access to infrastructure at critical times (e.g., shearing shed for shearing, loading ramps for stock movements on and off farm, stock yards when animal husbandry activities are required, such as weaning, shearing, drenching, and vaccinating).

Specific timing of these activities varies between properties and between years, depending on management systems, the season and timing of weather events (e.g., rain and wind), and market conditions.

EQUINE / HORSE INDUSTRY

The horse industry in the region is diverse, and includes activities such as horse breeding, horse training (including trotters) and riding schools. Investment in horse facilities can be high, and may include stables, shedding, storage facilities, tracks and covered or uncovered arenas.

Melton is a key area for the trotting industry in Victoria, followed by Ballarat and Cranbourne. There are numerous trotting training tracks on properties within the Project region.

Recreational horse pursuits have not been assessed in this report, although one interview was conducted with the Melton Pony Club to better understand the potential impact of the Project on horse owners and equine activity.

Reliable and relevant statistical data for the equine industry is not available through the ABS. Equine businesses have therefore been considered in the analysis for this report as grazing enterprises. The rationale for this is that they breed and graze animals much like beef and sheep farms do, and the impacts of the Project would be similar.

It is, nevertheless, understood that the value of horse enterprises is highly variable, often depending on the breeding and performance of any one horse. In the trotting industry, a highly successful racing horse can be extremely valuable. Discussion with one landholder valued income for a trotting agistment / training property in the vicinity of $3,000 per hectare per year, but this cannot be held as indicative of all equine properties.

Agistment properties can accommodate many horses at different levels of activity, including those that are currently racing, resting / recovery, growing or breeding.

Trotting tracks are used daily, and interference with track usage for the construction of the transmission line could have significant impact on the individual horses (especially those in racing) and on the property enterprise. Trainers require ongoing access to appropriate length and quality tracks within close vicinity of their horses.

Although trotters (standard-breeds) are generally accustomed to machinery and vehicles, other horses and breeds may not be. The movement of large and noisy machinery, and the use of hovering helicopters in the vicinity of horse paddocks could impact horse behaviour and subsequently create risk for handlers and horses.

Feed for high performance horses is usually closely managed, but grass can often be substituted for a period of time (with grain and hay) if construction activity restricts access to pasture.

6.4.3 CROPPING

Production

For this assessment, cropping is defined as any agricultural enterprise that practises some broadacre dryland cropping, i.e., not irrigated crops or horticulture crops. These properties generally include a mix of grazing and cropping enterprises. The main cropping land-uses described by the ABS are broadacre cropping, and hay and silage. Cropping enterprises are located throughout the region and are the dominant enterprise at the eastern and western ends of the Proposed Route (Figure 6-5).

The key production statistics for cropping enterprises on the Proposed Route are presented in Table 6-6. The data show that there are 85 cropping properties on the Proposed Route, which range in size from 1 to 1,084 hectares, with a median area of 112 hectares and which achieve cereal yields of 2.5 to 7.5 t/ha, with an average GVAP/hectare of $1,183.

Crop yields at the lower end of the range occur mainly in the eastern and far western ends of the study area with lighter, less fertile soils and lower annual rainfall. Higher yields are more common in the centre of the study area, which has more fertile soils and higher annual rainfall.

Table 6-6: Key production statistics for cropping enterprises on the Proposed Route

KEY PRODUCTION STATISTICS	VALUES
Total number of properties (no.)	85
Total area of properties (ha)	13,982
Range of area of properties (ha)	1 - 1,084
Median area of properties (ha)	112
Range of cereal yields (t/ha)	2.5 – 7.5[19]
Weighted average Gross Value of Agricultural Production per hectare ($/ha)	1,183[20]

Infrastructure and equipment

The key infrastructure required for cropping enterprises include all those included in the grazing enterprise for the livestock component of their business, plus storage facilities (e.g., sheds, silos, fuel tanks) for equipment, grain, fertiliser, fuel, and chemicals.

A range of specialist equipment is used to sow, fertilise, spray and harvest crops. This equipment is critical to a cropping enterprise, and while large scale farmers will generally own their machinery, smaller scale farmers may employ seasonal contractors. Specialist services such as aerial spraying are generally undertaken by contractors across broad districts. Business size, production levels and profitability determine a farmer's ability to invest in these 'tools of the trade', often worth hundreds of thousands of dollars each (Figure 6-7).

Cropping is highly time-dependent and has large variable (e.g., fertiliser, seed, fuel) and overhead costs. The ability to use high-efficiency equipment to complete operations in a timely manner is often critical to success. Modern machinery is large and can cover broad areas quickly. Some of these machines use modern guidance systems utilising GPS technology and are most efficient when used in regular, easy-to-use patterns, e.g., driving in straight lines for long lengths.

[19] Estimate based on RMCG experience of cropping properties in the study area.
[20] Refer to Table 5-5.

Figure 6-7: Grain harvester (Source: www.deere.com.au)

Aerial spraying of crops for disease and weed control is common for cropping enterprises, especially for those crops that are susceptible to damage by ground vehicles (e.g., canola), and during winter when ground access is limited due to saturated soils and the risk of damaging soils and crops. As a result, aerial spraying of crops is more common in high rainfall areas, such as the central parts of the study area, around Ballarat.

Typical activities and timing

The key activities on a cropping property include, but may not be limited to:

- Those included in the grazing enterprise for the livestock component of their business (Section 6.4.2)
- Sowing in Autumn, Winter and Spring
- Spraying throughout Winter and Spring
- Harvesting in Spring and Summer.

The timing of the three key cropping activities is critical to the productivity and profitability of a cropping enterprise. The time of sowing is a key determinant of crop yield. The effectiveness of chemical and fertiliser application is determined by timing and the available window of time to apply is limited by crop stage and weather conditions (e.g., rain and wind). This is particularly prevalent in the Ballarat region compared to other cropping regions in Victoria, due to its wet and windy, winter conditions. Finally, the time of harvest can determine the quality and price of the grain produced.

Key sensitivities

They key sensitivities for a cropping property include, but may not be limited to:

- Grazing enterprise for the livestock component of their business (Section 6.4.2)
- Time of sowing, spraying, and harvesting
- Ability to use high efficiency equipment
- Ability to use aerial spraying when ground access is limited.

6.4.4 HORTICULTURE

Production

For this assessment, horticulture is defined as any agricultural enterprise that grows high-value horticultural crops, such as vegetables, fruit and herbs. These crops are grown with irrigation, as rainfall is insufficient to achieve profitable production.

Most properties growing horticultural crops in the region also grow broadacre crops and graze livestock. Thus, they are differentiated from grazing and cropping enterprises by the presence of horticultural crops and irrigation.

The main horticultural-specific land uses and production described by the ABS are vegetables (excluding potatoes) and potatoes. Some other speciality crops, such as pyrethrum, are also grown. This study did not identify any greenhouses, growing tunnels or other horticultural infrastructure on the Proposed Route. Most of the horticulture enterprises in the study area are located between Springbank and Lexton to the north and east of Ballarat (refer to Figure 6-5).

The key production statistics for horticulture enterprises in the study area are presented in Table 6-7. The data shows that there are 65 horticulture properties in the study area, which range in size from 11 to 956 hectares, with a median area of 80.5 hectares and have an average GVAP/hectare of $24,412 on the parts of the property that grow irrigated horticultural crops[21].

Table 6-7: Key production statistics for horticulture enterprises in the study area

KEY PRODUCTION STATISTICS	VALUES
Total number of properties (no.)	65
Total area of properties (ha)	8,880
Range of area of properties (ha)	11 - 956
Median area of properties (ha)	80
Weighted average Gross Value of Agricultural Production per hectare ($/ha)	24,412

Potato production

Potatoes are the most significant crop grown in the region, when measured as a percentage of Victoria's total production (refer to Table 6-2), and therefore a more detailed examination of their production is warranted. In particular, to describe the potential impacts on potato production, it is critical to examine the route and to estimate the area of potato crop in a typical year that could be affected by the Project.

To do this, two factors were examined in more detail. The specific area of potato production on the Proposed Route, and the annual value of potato growing given that they are grown as part of a rotation (i.e., a typical pattern is to have potato crop for one year and then a different use for three years, referred to as a four-year rotation. Rotations vary across the region with some growers using a three-year rotation).

To estimate the area of potato production on the Proposed Route, the desktop assessment (Section 5.3.3) identified those properties that were being used for horticultural production, and measured the potential area on the route that could have been cropped. Through this process, the area of horticultural production was estimated to be 632 hectares. This is likely to be an over-estimate of the total area being used for horticulture in any one year but was considered the most appropriate figure to use for this process.

[21] Properties with horticulture enterprises also grow broadacre crops and graze livestock. Therefore, it can be assumed that the GVAP/hectare achieved on those areas of the property that are not irrigated for the horticulture enterprise would be that described for cropping and/or grazing.

An additional assessment of potato production on land directly affected by the Proposed Route was completed, the results of which are presented in Table 6-8. With this method, the area of potato growing on land directly affected by the Project averages at 130 hectares per year. This is clearly much lower than the 632 hectares estimated through the desktop assessment and confirms that the area used to assess Project impacts is a conservative estimate (i.e., it is likely to over-estimate the actual area of potato cropping in a given year).

The second detail relating to potato production that was examined is the crop rotation. Based on industry information, potato rotations are typically four to six years, though there are many variations on this (including shorter rotations). This is an important factor in calculating the economic impact because it affects the estimated annual value of production. For example, Table 5-5 shows that, based on the ABS data, the annual gross value of production per hectare for potatoes is $25,408. However, this value of production only occurs once during the rotation. For example, one in four years if the farm is using a four-year potato crop rotation. The value of production for the other three years would be far less, likely to be closer to the cropping values ($1,183 per hectare) or the grazing value ($989 per hectare).

Taking these factors into consideration, the data relating to horticulture and potato production show that:

- A total of 632 hectares of horticulture crops, predominantly potatoes, are likely to be affected by the Proposed Route
- While the annual value of horticulture production on the Proposed Route is $24,412 per hectare, the crop rotation needs to be considered in order to produce a more accurate estimate of the average annual value of production
- Using a four-year crop rotation, and presuming the land is used for another crop (e.g., grain, hay or silage) during the non-potato growing years, the annual value of production is estimated at $7,239 per hectare. (Shorter rotations would result in a higher annual value of production).

Infrastructure and equipment

The key infrastructure required for horticulture enterprises include all those identified in the grazing and cropping enterprises (Section 6.4.2 and Section 6.4.3) for the non-horticulture component of their business, plus those specific to irrigated horticulture (e.g., irrigators, dams, bores, pumps, piping). There is also speciality equipment for certain horticulture crops (e.g., potato planters and harvesters, depicted in Figure 6-8). One important characteristic of this equipment is its height, particularly in relation to whether transmission conductors impose new restrictions on the use of existing farming machinery due to height clearance requirements. Since equipment varies widely from farm to farm, it's not possible to determine the exact heights of machinery that may be found in the area. However, most farm equipment is under 8.6 metres so it is either permitted to operate (if up to 5 metres high) or can do so subject to a safety assessment. In conclusion, the farm machinery in common use in this area can continue to be used.

Table 6-8: Area of potato production grown on the Proposed Route, 2019-20 to 2021-22

GROWING SEASON	AREA OF PADDOCKS TRAVERSED BY PROPOSED ROUTE
2019-20	110
2020-21	220
2021-22	60
Total	**390**
Average	**130**

Aerial application of fertiliser, and chemicals for disease and weed control, is critical for horticulture production (particularly potatoes) in the study area. This is because ground access is highly limited due to saturated soils created by irrigation, the presence of irrigation equipment and the risk of damaging the soils and the crop.

Figure 6-8: Potato harvester (Source: https://www.potatopro.com/topics/potato-harvesters)

Irrigation equipment

Irrigation is critical to the profitable production of horticulture enterprises in the study area, as high yields are required to cover the high costs of production and the high price of land in this area. In broad terms there are two types of irrigators used in the area – gun irrigators (known as rain guns or big guns) and overhead irrigators (centre pivot or lateral move). Rotational cropping requires that irrigation equipment is moved from paddock to paddock, both within and between years.

Figure 6-9: Centre pivot irrigation (left) and rain gun (right)

Gun style irrigators use above-ground aluminium irrigation pipes to supply water from dams and / or bores. They are commonly used in this area particularly in areas with uneven topography, or where paddocks are smaller and irregularly shaped.

The use of overhead irrigators (centre pivot and lateral moves) has become more common in the last 10 to 20 years, primarily because of the water and labour efficiencies they provide for the capital investment required.

Consultation with industry suggests that approximately 70% of farmers in the region now use overhead irrigators. These irrigators are very adaptable with their size adjusted by adding or removing sections or spans.

However, most of these farmers still use rain gun irrigators to complement the overhead irrigators. These rain guns help to irrigate parts of the paddocks that overhead irrigators do not reach and / or to irrigate other crops. Overhead irrigators are generally used for potatoes and rain gun irrigators for other crops in the same paddock over time. The key driver being to use the most efficient irrigator on the highest value crop. This means that different irrigators can be used in the same paddock at any time.

Overhead irrigators are also often fitted with end guns and 'rabbit ears' (refer to Figure 6-10). End guns are similar to rain gun irrigators but are fitted to the end point of an overhead irrigator to extend the area it can irrigate and reach hard to service parts of the paddock (such as corners). These end guns can distribute water up to 30m laterally and 10 to 15m to above ground level, depending on the water pressure.

'Rabbit ears' refer to the stabilisers or mechanisms that support an extension of the overhead irrigator beyond their last wheel structure. Such extensions (also referred to as an overhang) are widely used to facilitate the use of overhead irrigators in different sized and shaped paddocks.

'Rabbit ears' are fitted above the irrigator and use wires to 'strain' or hold the overhang in a similar way to guy ropes for a tent, or straining wires for a pole. The 'rabbit ears' can extend up to 7.5m above ground level.

Aerial services

Aerial application of chemicals for weed and disease control and fertiliser for crop nutrition is among the normal practices for cropping and horticulture operations. Aerial application allows access to the paddock when it is too wet to be trafficable, when ground vehicles may cause damage to the crop and subsequent crop losses, and where steep or rough terrain makes control of weed infestations difficult. High value crops, e.g., potatoes, often receive multiple chemical applications aerially per season. Helicopters are sometimes used for their agility in small paddocks and RPAS (drones) are becoming more widely used for application of fertilisers, herbicides, and pesticides.

Controlled traffic farming

The use of controlled traffic farming is increasingly common in cropping and horticulture.

> *Controlled traffic farming (CTF) is a farming system built on permanent wheel tracks where the crop zone and traffic lanes are permanently separated. Implements have a particular span, or multiple of it and all wheel tracks are confined to specific traffic lanes (Western Australian Department of Primary Industries and Regional Development, 2021).*

Farmers use global positioning systems (GPS) to map and align the permanent wheel tracks for their machinery for CTF.

Use of GPS and telecommunications

The alignment and operations of most overhead irrigators are controlled by a combination of mobile telephone, radio signals or GPS, whilst precision cropping machinery uses GPS guidance systems for CTF and variable rate technology (VRT).

> *Variable rate technology (VRT) involves developing a management strategy to target inputs rather than applying them as a blanket rate at paddock scale. It can be used throughout the year from pre-sowing; sowing and in-crop application to maximise profit and efficiency by varying inputs as required (Grains Research and Development Corporation (GRDC), 2021).*

VRT is promoted by industry and government authorities due to the productivity and environmental management benefits it offers, i.e., less and more effective use of fertilisers and chemicals.

During consultations, some landholders suggested that transmission lines and towers can cause other interference, including multipathing. The existence and potential impact of these problems is beyond RMCG's expertise and is dealt with in other technical reports (e.g., the EMI and EMF Impact Assessment).

Typical activities and timing

The key activities on a horticulture property include, but may not be limited to:

- Those included in the grazing and cropping enterprises (Sections 6.4.2 and 6.4.3)
- Planting in Spring (and all tasks related to planting such as creation of raised beds)
- Irrigating throughout the growing season (Spring to Autumn)
- Spraying (herbicide, pesticides, and the like) throughout the growing season (Spring to Autumn)
- Harvesting in Autumn.

Horticulture production, particularly potatoes, is very intensive and each crop will receive multiple applications of chemicals and irrigations. Thus, there is continual activity in each paddock between planting in Spring and harvest in Autumn.

Key sensitivities

The key sensitivities for a horticulture property include, but may not be limited to:

- Those included in the grazing and cropping enterprises (Sections 6.4.2 and 6.4.3)
- Time of planting (including preparation for planting), irrigating, spraying, and harvesting
- Ability to irrigate all of the crop on demand
- Ability to move irrigation infrastructure
- Ability to use aerial spraying
- Ability to access to all times during the growing and harvest seasons.

Figure 6-10: Centre pivot irrigator with 'rabbit ears' and end gun (Source: Central Highlands Water)

6.4.5 FORESTRY

Production

For this assessment, forestry is described as any enterprise that grows trees for timber. Most properties with forestry in the region also grow broadacre crops, graze livestock, and may also be involved in irrigated horticulture production. These enterprises are differentiated from grazing, cropping and horticulture enterprises by the presence of forestry.

The area of forestry for timber production in the region is identified separately by the ABS (Table 6-1). Most of the forestry enterprises in the study area are located near Lexton and to the east of Bungaree, with two located north-east of Bacchus Marsh (refer to Appendix D, Map 3).

The key production statistics for forestry enterprises in the study area are presented in Table 6-9. The data shows that there are three affected properties with forestry enterprises, which range in size from 1 to 140 hectares, with a median area of 121 hectares. The area directly affected by the Proposed Route is 26 hectares.

The value of production of these forestry enterprises (per rotation) ranges from $15,000 per hectare for blue gums for pulp production around Lexton to $30,000 per hectare for softwood for timber production near Bungaree. The abandoned and / or regrowth blue gum plantations in the west of the study area would have a substantially lower value and their harvest value may be exceeded by the cost of harvesting.

Infrastructure and equipment

The key infrastructure required for forestry enterprises include all those included in the grazing and cropping enterprises (refer to Sections 6.4.2and 6.4.3) and potentially the horticulture enterprise (refer to Section 6.4.4) for the non-forestry component of their business.

Specific forestry related equipment includes tree planters, pruners and the equipment required to harvest and remove the trees from the paddock. This equipment is usually provided by the lessee, where the paddock is leased to a forestry producer, or from contractors, as the area of forestry is too small to justify investment in such equipment.

Table 6-9: Key production statistics for forestry enterprises traversed by the Proposed Route

KEY PRODUCTION STATISTICS	VALUES
Total number of properties (no.)	3
Total area of properties (ha)	262
Range of area of properties (ha)	1 - 140
Median area of properties (ha)	121
Gross Value of Production average per hectare ($/ha)	$15,000 - $30,000[22]
Gross Value of Production average per hectare ($/ha/annum) Range from $2,010 for hardwoods and $1,790 for softwoods	$1,900

Typical activities and timing

The key activities on a property with a forestry enterprise include, but may not be limited to:

[22] Refer to section 6.3 and note that this refers to the value of mature quality plantations.

- Those included in the grazing and cropping enterprises (Sections 6.4.2 and 6.4.3), and potentially the horticulture enterprise (Section 6.4.4)
- Pruning intermittently every few years, depending on species, end-product and growth rate
- Weed and pest control throughout the year which could be via aerial services (RPAS or piloted aircraft)
- Harvest when the trees have matured for the intended end-product.

Forestry for pulp or timber production is a multi-year enterprise with only weed and pest control are required each year.

Figure 6-11: Blue gum plantation split by existing transmission line easement (220kV)

Key sensitivities

They key sensitivities for a property with a forestry enterprise include, but may not be limited to:

- Those included in the grazing and cropping enterprises (Sections 6.4.2 and 6.4.3), and potentially the horticulture enterprise (Section 6.4.4)
- The exclusion of trees from the easement
- Access for weed and pest control
- Log truck access for harvest with large machinery to harvest the trees.

7 Construction impact assessment

This section discusses the potential impacts of the Project construction activities, the associated environment performance measures, and example mitigation measures that are proposed to reduce the impacts to as low a level as possible.

7.1 KEY ISSUES DURING CONSTRUCTION

Specific impacts vary between properties and between years, depending on management systems, rotations, the season, timing of weather events (especially extreme events), enterprise mix, and market conditions. In this section, the key issues for the agricultural operations found on the Proposed Route are described. The impacts associated with these issues are then assessed in detail in Sections 7.2 to 7.10.

The assessment of the Project Area (described in Section 5) did not identify any agricultural processing and manufacturing facilities, saleyards, or large packing / distribution sheds that would be directly affected by the Project.

7.1.1 GRAZING

The key issues for grazing properties include:

- Loss of land for growth of pasture or fodder crops, reducing the carrying capacity of properties and consequential financial loss
- Disruptions affecting animal health and breeding success, especially during lambing and calving
- Restricted access to pastures and / or shelter, especially at critical times (e.g., during lambing and calving, or during severe weather events)
- Restricted access to infrastructure, especially at critical times (e.g., water for livestock, shearing shed for shearing, loading ramps for stock movements on and off farm, stock yards when animal husbandry activities are required, such as injury, weaning, shearing, drenching, and vaccinating)
- Biosecurity breaches (introduction or spread of weeds, pests, disease or pathogens).

7.1.2 CROPPING

The key issues for cropping properties include:

- Loss of land for production with consequential financial loss
- Interruption at optimal times for sowing, spraying, and harvesting
- Restrictions on normal farming practices including stubble burning
- Restriction on the use of aerial spraying, especially when ground access is limited (e.g., wet conditions)
- As above, for the grazing component of mixed farming businesses
- Biosecurity breaches.

7.1.3 HORTICULTURE

The key issues for horticultural properties include:

- Loss of land for production with consequential financial loss
- Interruption at optimal times for planting, irrigating, spraying and harvesting
- Loss of the ability to irrigate all of the crop on demand
- Restriction on the movement of irrigation infrastructure
- Restriction on the movement of specialist machinery

- Restriction on the use of aerial spraying (greater reliance than cropping)
- As above, for the grazing and cropping component of mixed farming businesses
- Biosecurity breaches.

7.1.4 FORESTRY

The key issues for forestry properties include:

- Loss of land for production with consequential financial loss
- Restriction on access for weed and pest control
- Restriction on access with large machinery to prune and harvest
- Higher costs for harvesting operations in plantations adjacent to powerlines due to specialised harvesting equipment being required
- Loss of land available for plantation use
- Increased costs for routine weed control in the Proposed Route.
- As above, for the grazing, cropping and horticulture component of mixed farming businesses
- Biosecurity breaches.

7.1.5 OTHER PRIMARY PRODUCTION

Other activities like horse training, horse breeding, private land forestry, commercial firewood harvesting, and boutique agricultural businesses could also be affected. The impacts on each operation would be unique to that business. In broad terms it is likely that these operations could experience:

- Loss of land for production with consequential financial loss
- Interruptions at key times
- Disruptions affecting animal health and breeding success
- Restriction on the movement of specialist machinery
- Biosecurity breaches.

The assessment also considered whether there was any regional agricultural infrastructure (e.g., irrigation infrastructure) affected by the Project. No examples of this type of impact were identified.

7.1.6 OFF-SITE IMPACTS

It is possible that the Project could have impacts on properties adjacent to those directly on the Proposed Route. This could include Disruption and stress of livestock in adjacent paddocks due to machinery or construction activities, and damage to crops from dust (e.g., the quality of food crops like leafy greens can be affected by dust). This impact would commence during the construction stage and continue for the operational life of the Project.

Estimating the extent of these off-site impacts would require extensive engagement with neighbouring properties to identify potential impacts. The extent of these possible impacts has not been investigated in detail as part of this Technical Report but could be addressed as part of discussions with affected and neighbouring landholders that occur in the course of preparing the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) that is included in the EPRs recommended in this assessment.

It is also possible that the Project could have impacts, direct and indirect, on businesses that have a link to agriculture but are ‘beyond the farm gate’. This includes food processing, supply chain businesses (e.g., transport), farm services (e.g., machinery suppliers) and agri-tourism. Assessing the impacts of the Project on these businesses is outside the scope of this assessment but is considered in the Economic Impact Assessment. This assessment describes the potential economic impacts of the Project on businesses

operating in the study area, at an industry-level (based on ANSZIC industry categories). These categories include Agriculture, forestry and fishing, Accommodation and food services, and Professional, scientific and technical services, which would cover the agriculture service sector, agricultural supply chain businesses, food processing and agri-tourism. Appendix D in the Economic Impact Assessment lists the specific businesses considered in this analysis. This list includes agri-tourism (e.g., farmstays), farm services (e.g., fencing contractor), food processing (e.g., Smeaton Mill).

The conclusions from the business impact analysis were that the Project will have a neutral effect for most industries though there are some potential negative impacts for Accommodation and Food Services during construction). This agriculture and forestry study recommends that an Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) be prepared and implemented to reduce these potential impacts during construction.

7.1.7 LAND AREA AFFECTED (PROJECT AREA)

Calculations of the areas affected during construction are provided in Table 7-1. Broken down by enterprise categories, this table shows the number of properties directly affected; the total area affected for each enterprise type and the total study area (the total property size of affected farms). During construction, the total area directly affected, comprising 2,228 hectares, will be spread across 229 agriculture and plantation forestry properties. This total includes all elements of Project construction that result in an area of land being excluded from agricultural or forestry use (e.g., all types of affected areas such as laydown areas, workforce accommodation facilities, terminal stations[23], access tracks, distribution line crossovers). These totals only count overlapping areas once (i.e., access tracks inside or outside the easement).

The easement, with its associated restrictions, will remain in place for the duration of the Project. Some access tracks will remain after construction.

Table 7-1: Areas impacted by construction by enterprise type

CATEGORY	ENTERPRISE				TOTAL
	GRAZING	CROPPING	HORTIC.	FORESTRY	
No. of properties	76	85	65	3	229
Area affected by the Project (ha)	542	1,028	632	26	2,228
Study area (ha)	10,488	13,982	8,880	262	33,612

Within the areas of affected land listed in Table 7-1, there is agricultural land that will be used for laydown areas and workforce accommodation facilities during construction, and for the new Terminal Station near Bulgana (for the duration of the Project). Details of these areas are:

- Lexton laydown area and workforce accommodation - approximately 12 ha of land that is categorised as cropping will be removed from agricultural production during construction. This site represents just under one per cent of the total area of cropping land impacted by the Project.
- Ballan laydown area and workforce accommodation - approximately 24 ha of land that is categorised as grazing will be removed from agricultural production during construction. This site represents just under two per cent of the total area of grazing land impacted by the Project.
- New 500kV terminal station near Bulgana - approximately 63 ha of land that is categorised as cropping will be removed from agricultural production for the life of the Project. This site represents just over six per cent of the total area of cropping land impacted by the Project.

[23] The Elaine Terminal Station has been considered here, although it does not add to the area of agricultural or forestry land affected.

7.2 AGRICULTURAL PRODUCTION LOSS CAUSING FINANCIAL LOSSES

Production and financial losses are of significant concern to the agricultural community along the Proposed Route.

7.2.1 ACTIVITY

The entire 190km of transmission line is estimated to take two years to construct, however construction duration on individual properties will be much less. Agricultural economic and production losses have the potential to occur during construction due to the occupancy of land by construction activities.

Construction stage disruptions (restrictions and construction activities) on any one property may occur intermittently over a period of two years. For tower assembly and transmission line stringing, work will not be constant, with specialist crews following each other along the route doing specific jobs (clearing, site preparation, tower construction, conductor stringing, site rehabilitation, etc). As each work crew leaves a site (or property) there may be days, weeks, or possibly months of inactivity until the next crew arrives. The cumulative duration of construction work at each tower (i.e., time on each property) will be approximately 9 to 22 weeks (over a two-year period).

Project activities, construction method, timing and staging is explained further in Section 3.3.1 and Chapter 6: Project description, within the EES Main Document.

Specific construction activities may include:

- Movement of people, vehicles, and equipment
- Surveying and pegging
- Line clearance and removal of vegetation and infrastructure (such as fences)
- Fencing and creating exclusion areas
- Track and drainage construction
- Construction of tower foundations
- Construction and installation of towers
- Stringing and joining of conductors
- Removal of temporary infrastructure, including access tracks, laydown areas and workforce accommodation facilities
- Rehabilitation of soil
- Resowing of pasture or crops as required.

During construction, removal of land from production, both temporary and long-term, cannot be avoided. Some construction areas may be fenced for the safety of the public, farm workers and stock is maintained. Access tracks may be fenced off, or may remain unfenced for shared farm use, according to safety requirements at each particular site.

7.2.2 POTENTIAL IMPACT

For any one agricultural property, construction can take place over a few weeks or months, and then rehabilitation and re-establishment of pasture and crops can take from one to two further years. Different enterprises, in different geographic locations along the Project Area will require different lengths of time to re-establish production to normal levels. Cropping operations and some pasture could be re-established in one year, provided the growing seasons (Spring and Autumn) are favourable. In low rainfall, dryland conditions, re-establishing pasture to full production could take longer (up to two years, depending on seasonal conditions).

Economic losses will be experienced with any loss of land, reduction in production or farming inefficiencies that are created by the Project. Construction may lead to loss of access to land along and adjacent to the Project Area; untimely scheduling which interferes with optimal timing for stock breeding, crop sowing or harvest; or clearance of land that reduces pasture for stock grazing or reduces crop area and yield. Dealing with construction and access issues can also impact on landholder's productive time, through the need to move stock, alter optimal schedules or make additional movements of machinery and infrastructure. Additional costs with contractors can also accumulate when normal schedules and activities are interrupted.

Calculating Impact

The farm operations along the Proposed Route vary widely and the estimates of the economic impacts of this Project have been based on ABS figures for GVAP per hectare. The impact analysis does not consider best and worst-case scenarios. Rather, the focus is on estimating the plausible likely impact. Assessing impact based on best- and worst-case scenarios would be extremely dependent on individual properties and business conditions.

The annual value of potentially lost agricultural production directly affected by the Proposed Route has been calculated by multiplying the Project Area (land directly affected) on each enterprise by the regional GVAP of that enterprise. Total value of lost production for agriculture during construction is estimated at around $6.3M per annum (Table 7-2). This estimate of agricultural economic loss equates to approximately one per cent of regional (annual) production.

For grazing enterprises, the area directly affected (Table 6-4) could result in total financial losses amounting to $536,000 per annum across the Proposed Route. Assuming that livestock are held at the average carrying capacity of the farm, this impact on grazing land could lead to farmers either purchasing supplementary feed to maintain stocking and production levels, or a reduction in stocking rates, and therefore a drop in production. Vegetation removed as part of construction could also result in the loss of shelterbelts for stock.

For cropping enterprises, it is possible that construction could affect the timing of key operations, specifically sowing, crop spraying and harvesting. It is estimated that the area directly affected would result in losses amounting to $1.216M per annum.

For horticultural enterprises, the area directly affected (Table 6-4) could result in losses with an estimated annual value of $4.575M. This is approximately 5.3% of the total horticultural production from the region and 72% of the total estimated loss of annual agricultural value in the entire study area.

These values of economic loss relate only to the area of land directly traversed by the Proposed Route. Estimates do not include any impacts due to isolation and redundancy of irrigated farmland. An accurate calculation of this impact has not been possible as part of this assessment because it would require very detailed analysis and discussions with the specific properties that could experience this impact. Potential impacts due to isolation and redundancy are further described in Section 7.3.

Table 7-2: Estimated annual agricultural economic losses by enterprise (construction period)

ENTERPRISE TYPE	GVAP PER HECTARE PER ANNUM	AREA ON PROPOSED ROUTE	ESTIMATED LOSS OF PRODUCTION ($'000)	AS % OF REGIONAL TOTAL
Grazing	$989	542 ha	$536	0.2
Cropping	$1,183	1,028 ha	$1,216	0.6
Horticulture	$7,239	632 ha	$4,575	5.3
Total			**$6,327**	**1.0**

For cropping and horticulture, each property will have a different mix of products and the timing of crops will be seasonally determined. If any interruption to production is well-timed and of short duration, economic losses will be reduced. If interruption to production is inconveniently timed, or of extended duration, then these losses will increase significantly. If graziers increase supplementary feed and maintain stocking levels, production losses would also be reduced.

The estimated economic impacts of construction on agriculture are small relative to the total economic footprint of agriculture in the region (approximately one per cent of annual production). The major driver of these economic impacts is the land that is excluded from production during the construction period. Once the construction period ends, most of this land will return to productive use.

For some individual landholders and farm businesses, the economic impacts of the Project could be significant because it could reduce farm production or increase production costs. While the type of impacts will be similar from one farm to another (e.g., areas excluded from production) their significance for an individual landholder will vary greatly. For some they are likely to be minor and easily managed, but it is also possible that there will be properties where any reduction in production or increase in costs, will present a significant challenge to the farm business. To estimate the extent and magnitude of this level of impact would require very detailed analyses of individual businesses which is beyond the scope of this assessment.

The economic impact on secondary industries (e.g., local agricultural suppliers and food processors) is considered as part of the Economic Impact Assessment, in particular the Business Impact Analysis (Section 9). The conclusions from this analysis were that the Project will have a neutral effect for most industries though there are some potential negative impacts for Accommodation and Food Services during construction and operation (and potentially during decommissioning). The study recommends that an Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) be prepared and implemented to reduce these potential impacts.

7.2.3 MITIGATIONS

Economic impacts to agricultural properties and production will be mitigated through project design, where possible, including:

- Avoiding significant farm assets and infrastructure (e.g., overhead irrigators, homes, dams, shelterbelts, sheds, yards)
- Conductor heights that allow vehicles and equipment up to 5m high to operate without restriction or the need for a safety assessment
- Minimising isolation and redundancy of productive land
- Minimising overlap of easement and land under irrigation
- Allowing the conductors to span significant agricultural assets (irrigation areas, shelterbelts)

- Redesign of critical farm infrastructure to better suit farm conditions post construction.

Other measures to mitigate production loss and consequential financial losses relate to the timing and scheduling of construction activities. Construction timelines and schedules could take into account farm operations and attempt to avoid scheduling certain activities during sensitive periods of the year for agriculture. It will also be important to provide landholders with adequate notice of construction activities to avoid the risk of farmers investing in crops or activities that will not reach the point of financial return before construction starts.

An Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) shall be developed well in advance of construction. This strategy will be informed by consultation with landholders[24]. The strategy will identify construction impacts and mitigation actions that will minimise production and financial impacts. Landholder consultation to develop the strategy will be held in good faith by AusNet in accordance with the Project's Communications and Stakeholder Engagement Management Plan (EPR EM5), so that farm activities, assets and values are adequately understood at the farm level, and unnecessary production and financial impacts are avoided.

In high value agricultural areas, where farm irrigation infrastructure is impacted by construction, and where there is the expectation that this impact will continue during the operation stage, an irrigation evaluation may be required. This evaluation will determine if adjustments to paddock layout, adjustments to current irrigation equipment or use of alternative irrigation equipment could significantly reduce production losses. Where feasible, compensation and / or support shall be provided to farmers to adjust or replace irrigation systems and paddock layout.

Economic impacts will be further mitigated through compensation for losses and additional production costs incurred during the construction period (in accordance with the voluntary *Option for Easement Agreement* or the Land Acquisition and Compensation Act). Removal or detrimental alteration to farm infrastructure shall also be compensated. This may also include associated costs (design, planning permit and works approvals, building costs, etc.).

7.2.4 RESIDUAL IMPACTS

With effective implementation of mitigations and EPRs, the residual economic impacts on agricultural enterprises will be minor during construction. This conclusion is based on the finding that for the majority of cases, the area affected, relative to the whole property, is small, and there are feasible mitigations and compensation available that will minimise or avoid production loss and or financial loss. The regional impact of construction on production is minor, being less than one per cent of total regional gross value of production from grazing and cropping and just over three per cent of the gross value of potato production, some of which is likely to be mitigated.

At the individual property level, the significance of Project impacts could be different to regional impacts. Residual impacts will vary according to specific construction activities on each property, effectiveness of mitigations, and the enterprise mix, property size and management practices. Some production and economic impacts will be temporary, but some will be long-term (for at least the duration of the Project). For example, some of the land used for towers and land used for permanent access tracks will not be able to be used for pasture or cropping for the life of the Project (until it is (potentially) reinstated at decommissioning). Some of the impacts on irrigated farm operations, such as reductions in the area of land that can be irrigated, could affect the operation for the duration of the Project. The Agriculture and Forestry Business Mitigation and Support Strategy EPR (AF1) shall identify and require implementation of practical mitigation measures and provision of information on the compensation available for individual properties or businesses.

[24] Some landholders may choose to not engage with the project.

7.3 DISRUPTION / RESTRICTION TO FARM ACTIVITIES

7.3.1 ACTIVITY

The Project has the potential to disrupt normal farm activities in the agricultural areas along the Proposed Route.

7.3.2 POTENTIAL IMPACT

Consultation with landholders confirmed that disruptions are of moderate to high concern to farmers. While some disruptions will be of short duration, some will persist for the life of the Project, including presence of permanent infrastructure such as towers and foundations; terminal stations; limitations on aerial services; and restrictions or exclusions for certain irrigators and operation of some large machinery.

The types of disruption to farm activities may include:

- Requirement to modify irrigation infrastructure in paddocks (or sections of paddocks) traversed by the Proposed Route;
- Alternative routes required to get farm workers, farm machinery and stock from one side of the construction works to the other;
- Alternative routes required for accessing stockyards, sheds, and other key farm infrastructure
- Construction noise, dust and vibration affecting farming activities and livestock
- Restrictions on the use of some farm machinery in and near construction areas
- Partial isolation of some areas of the farm, or sections of paddocks, making grazing and cropping operations less efficient
- Restrictions on the use of aerial services.

The restrictions on the use of aerial services within the easement may increase the cost of chemical application if ground application is required. There is a potential for reduced yields if land application alternatives are not carefully planned for operation in wet soil conditions.

The placement of towers for the Project may interfere with controlled traffic farm layouts. The exact positioning of a tower in relation to the size and shape of the paddock, the width of the wheel tracks used and the specific machines operated, may result in a less regular or less efficient path for farm machinery. This could reduce the area of the farm that can be cropped by controlled traffic farming (CTF) and / or impose an additional cost on cropping and horticultural operations. If this was to occur, affected farmers will need to re-map and realign their wheel tracks.

This assessment has not examined the potential impacts of the Project on the continued access to groundwater and surface-water for irrigation. The Groundwater Impact Assessment notes that groundwater for irrigation is one of the values that must be protected (both access and quality). The key conclusion of the Technical Report (Section 13.1) is that *'the construction, operation, and decommissioning stages of the Project can be managed such that the objective of avoiding and minimising adverse impact to the environmental value of groundwater can be met'*.

The Surface Water Impact Assessment (Section 12.2) noted that construction of towers and installation of the transmission line could alter surface water flows and degrade water quality if unmitigated. These two factors could impact on irrigation water access and quality.

7.3.3 MITIGATIONS

Some disruptions to agricultural businesses will be mitigated through project design. This includes:

- Where practical, avoiding significant farm assets and infrastructure and minimising impacts to farming operations (i.e., homes, dams, sheds, yards)
- Allowing the conductors to span significant agricultural assets (irrigation areas, shelterbelts).

There are also some properties that are traversed but there is no physical infrastructure on-ground within the property.

The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will identify and require implementation of practical mitigations and support for individual businesses. In addition, the PAMP (EPR EM3) and Specific Property Access Requirements (EPR EM4) will outline processes to manage environmental issues, farm access, site rehabilitation, communication, and biosecurity. Where possible, this should be done in consultation with the affected landholder(s). In accordance with the PAMP (EPR EM3), all reasonable endeavours are taken to so that property and farm access, and livestock are not impacted during construction. Discussions with landholders should be held so that activities at an individual farm level are understood such that unnecessary disruptions or restrictions to farming activities can be avoided. They should include (at least):

- Farm or forestry practices that must be discontinued or altered
- Timing of construction
- Effects on property infrastructure, machinery and equipment
- Effects on irrigation infrastructure and systems
- Other disruptions to the farm operation
- Biosecurity risk management (to prevent introduction or spread of weeds, pathogens and pests) processes/ plans.

These negotiations (and adjustments to plans) shall also take into account the greater potential for disruptions during sensitive periods of the year for agriculture, including breeding, lambing / calving, sowing and harvesting.

Measures to mitigate impacts should include (but not limited to):

- Temporary physical crossovers and other workarounds for access to critical farm infrastructure
- Provision of temporary water supplies and distribution systems so that there are no disruptions to water supply for stock or other farm uses
- Temporary fences and gates
- Temporary stock yards and loading facilities.

Where farms are under irrigation, Project construction and operation could disrupt normal farm irrigation operations. This will be identified in the irrigation evaluation identified as a requirement in the previous section.

Ongoing communication with farmers will be important to minimise disruption and to enable forward planning. Farmers shall be given notice of approaching construction activity in accordance with the timeframes outlined in the PAMP (EPR EM3) or other timeframe as identified through consultation for the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) or in accordance with agreed Specific Property Access Requirements (EPR EM4). Appropriate advance notification is important for some landholders so that they do not invest in crops or activity that will not reach the point of financial return before construction starts.

Where practicable, landholders will be able to continue accessing and farming land which is not impacted by construction activities. Financial compensation shall be offered to farmers where disruption to their property and operations occurs as a result of the Project.

7.3.4 RESIDUAL IMPACTS

With the adequate implementation of proposed mitigations, disruptions to agricultural activity will have a minor impact during construction. This is based on the understanding that as construction crews progress along the line, activity and disruption will, at times, be significant but will generally be localised and not long lasting.

Farm or farm business disruptions can result in landholders receiving financial compensation through voluntary (*Option for Easement Agreement*) or legislated (Land Acquisition and Compensation Act) agreements.

At the individual property level, residual impacts will vary according to specific construction activities on each property, effectiveness of mitigations, and by enterprise mix, property size and management practices.

Some disruption impacts will be temporary, and some will be long-term. For example, the land used for the tower footprints and permanent access tracks will be removed from production for the life of the Project until it is (potentially) reinstated at decommissioning. There will also be temporary access tracks created for construction which will be rehabilitated once construction is complete. The extent and duration of disruptions to agricultural activity will differ between locations and properties. With mitigations in place, the residual impacts for most property owners should be minor, while some could be more significant, largely because they will continue for the life of the Project.

7.4 ISOLATION AND REDUNDANCY OF PRODUCTIVE LAND

Based on consultations conducted as part of this Technical Report and other technical reports prepared for the EES, the issue of isolation and redundancy of productive land is a significant concern for landholders. This is particularly so for prime agricultural land and areas where significant investment in irrigation and other fixed agricultural infrastructure has been made.

Isolation and redundancy can occur during construction and operation stages of a transmission line. This is particularly relevant to irrigated land. Some examples during construction include:

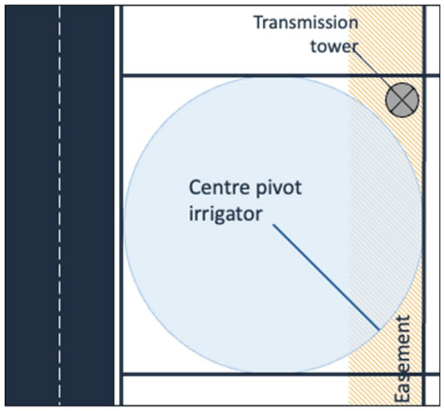
- Where temporary construction activity along the easement imposes restrictions on the farmer's movement of machinery, stock, or irrigation equipment across to other sections of their paddocks or properties. Even short-term disruptions can mean that the farmer misses important seasonal windows on the isolated land (such as planting after rain, or harvesting at optimal time, etc).
- Where a temporary or permanent obstruction (e.g., a tower or fence) is placed within the circle of land irrigated by a centre pivot and creates a 'wedge' of land that cannot be irrigated. If the wedge covers a large proportion of the pivot circle, then the whole area may be unviable for irrigation.
- Where a barrier is placed in the path of a lateral move irrigator (which travels in a line across a rectangular paddock), and the irrigator cannot reach the part of the paddock past the barrier.
- Where very large machinery (harvesters, large boom sprayers) cannot access sections of a paddock due to obstructions or safety restrictions.

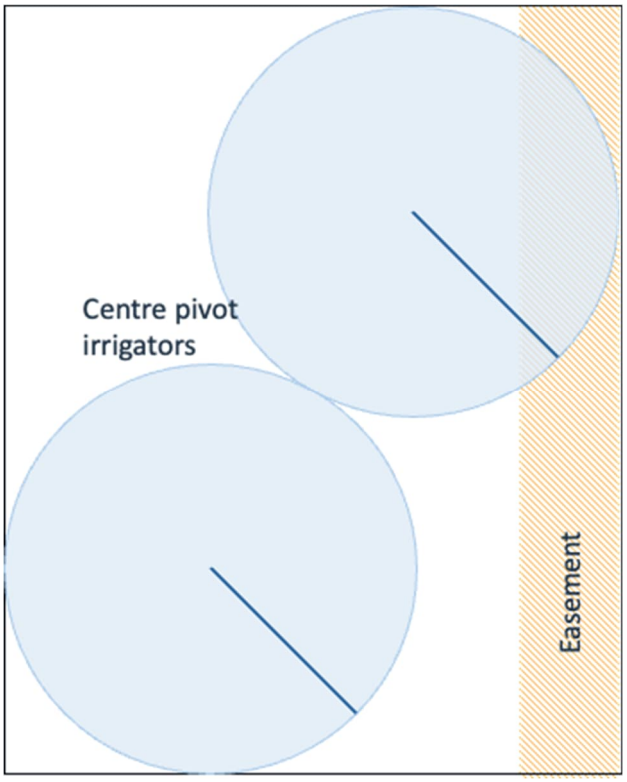
Farms that use large centre pivots and lateral move irrigators are designed in very specific ways to maximise efficient use of this irrigation equipment. Disruption to these layouts by the creation of obstructions can lead to significant parts of the affected farms being isolated and unable to be put to their best economic use.

Figure 7-1 shows some of the possible scenarios where repositioning of irrigation equipment to avoid the easement could be difficult. These are simplified examples included here to illustrate the types of scenarios that could arise. Importantly, this highlights that the impacts can extend beyond the easement itself. The scenarios set out in Figure 7-1 would also have impacts on water supply infrastructure required for each of these irrigation systems.

To describe this issue further, a case study on a mixed farm has been prepared (Agricultural Case Study 2, Appendix A). The risk of isolation or redundancy of farmland on this case study property are discussed along with options to avoid or mitigate this risk.

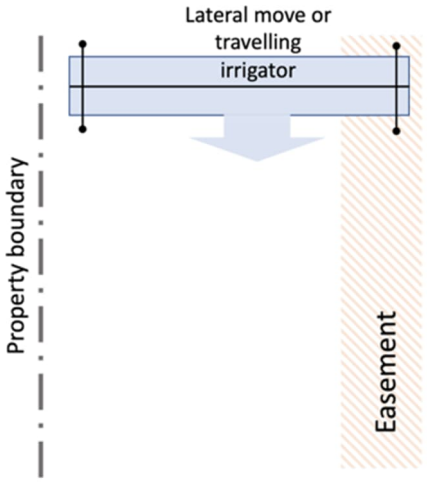
Isolation and redundancy can also occur if barriers obstruct access to the watering point for the irrigation equipment (e.g., access to a groundwater extraction point). This too can affect the ability to irrigate areas of land.

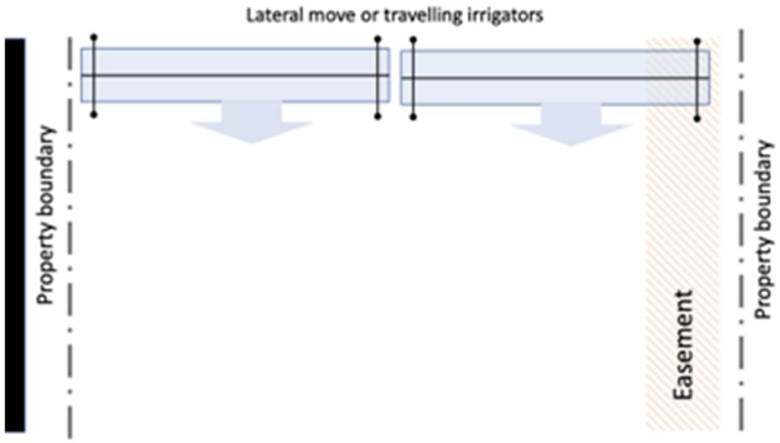




- **Example 1.** Repositioning a centre pivot may be constrained by paddock or farm boundaries. Locating a transmission tower as above should enable the lines to span the pivot arc, potentially enabling continued operation. other land uses – e.g., roads, waterways

- **Example 2.** Repositioning the centre pivot affected by the easement also affects other adjacent centre pivots.





- **Example 3**. Repositioning a lateral move irrigator could be constrained by a property boundary

Example 4. The lateral move irrigator affected by the easement cannot be moved without impacting the adjacent irrigator. The change affects both irrigators.

Figure 7-1: Examples of how the construction area could create difficulties for irrigation layout.

7.4.1 ACTIVITY

Isolation and redundancy of productive land can occur during construction.

The construction of towers and stringing of conductors will restrict movement and use of irrigators and large machinery. Fences, machinery, and equipment will create physical barriers. Access tracks to work sites will also be created through productive agricultural land.

7.4.2 POTENTIAL IMPACT

The Project may cause small portions of land to be isolated and potentially unworkable. These isolated areas may be removed from normal production due to lack of access for cropping machinery and / or irrigators, their small residual size, physical constraint (e.g., insufficient turning space). They may still be able to be farmed, but with additional costs associated with farming them (e.g., the higher cost of ground-based weed control compared to aerial treatment).

Isolated areas may be temporarily removed from production (or have reduced production) during construction or (as discussed in Section 8 – Operation Impact Assessment) may have to be removed from production for the operating life of the Project. Redesign of paddock layout and irrigation infrastructure, or changes to infrastructure or machinery to different specifications may be possible so that areas can continue to be farmed (described further in Section 7.4.3). There will be some isolated areas where such alternatives do not exist.

The scale of the economic impact of these isolated areas is not easily calculated without direct discussions and analysis at the individual farm level. RMCG's initial estimates suggest that these losses could be significant for properties with very specific constraints. In particular, if it is not possible to make sufficient adjustments to irrigation layouts and infrastructure on horticultural and cropping enterprises, this could have a significant impact on that farm business. It is not possible to identify exactly how many properties could have this difficulty because it is likely that the available mitigations (e.g., modifications to irrigation equipment) will often make it possible to reduce or avoid the impact. Therefore, it is anticipated that in most cases, there will be options to reduce or avoid isolation.

The position of the easement and towers in relation to paddock boundaries and irrigator use will largely determine the impact on any individual property. Pivot irrigators swing round a central watering point to create an irrigated circle. If a barrier is created within that circle, a 'wedge' of land can no longer be irrigated. Lateral move irrigators 'slide' across rectangular paddocks. Again, if a barrier is placed within the paddock, the irrigator must stop and cannot reach the other side of the barrier. A section of the paddock remains un-watered, and the size of that section will be determined by the layout of the irrigation infrastructure and paddock. If productive land cannot be irrigated, the area used for crops will decrease, as will production and return on investment.

For grazing, construction activity along the Proposed Route may potentially prevent stock access to pasture, shelter, stockyards and watering points. Alternative access for farm workers to manage their stock and crops may be required. Animals need water daily. In extremes of hot or cold weather, animals also seek shelter, which helps them maintain body temperature and condition, and to protect young. Livestock may need to be moved to yards or sheds for activities such as healthcare, vaccinations, drenching, shearing, weaning, calving / lambing, and transport to market. Being unable to move stock or stock being unable to access fresh pasture, shelter and water can affect their health and lead to poorer production or loss of animals. Graziers are unlikely to use paddocks that lack either pasture, water, or shelter.

Broadacre cropping involves the regular use of large machinery for soil preparation, fertilizing, sowing, spraying for pests and weeds, and harvesting. This equipment generally requires all weather access and timing of some operations can be critical, requiring unrestricted access at all times. Large farm machinery requires space for safe operation and turning. Construction activities may potentially restrict this access and alternatives need to be identified.

7.4.3 MITIGATIONS

The possibility of land becoming isolated and redundant for farm use during construction would be mitigated through project design, where possible, including:

- Route refinement to avoid significant farm assets and infrastructure
- Towers being positioned to allow conductors to span significant agricultural assets and where possible, avoid impacting irrigated areas (see Example 1 in Figure 7-1)
- Where possible, placing the Proposed Route on paddock or property boundaries to avoid bisecting or diagonally crossing paddocks
- Locating access tracks in collaboration with landholders.

Land isolation and redundancy impacts will be further mitigated by using micro-siting of, for example, towers; by redesigning farm layouts; and by irrigation system redesign, including new infrastructure (Figure 7-2). These actions should be used where adjustments could significantly reduce the risk that parts of a property are separated from the main areas of productive land.

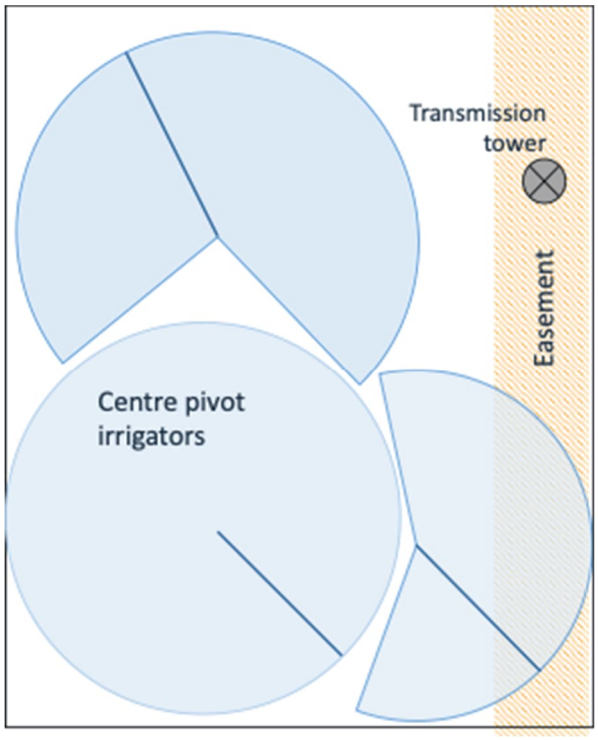


Figure 7-2: From example 2 above, this figure illustrates how adding another centre pivot irrigator and repositioning them could accommodate, in this case, a transmission tower.

Where isolation of parts of the property cannot be avoided during construction, actions must be taken so that stock and critical farm infrastructure are not separated or isolated for significant periods of time. These accessibility requirements must also be identified in the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and Specific Property Access requirements (EPR EM4). This Agriculture and Forestry Business Mitigation and Support Strategy should also identify any other construction conditions and mitigation actions that will minimise isolation and redundancy of productive land.

In high value agricultural areas, where irrigation infrastructure is impacted, and redundant areas are created during construction, compensation for such disruptions will be assessed and offered to landholder. This compensation will be based on the existing land use and an assessment of the construction impact. Where this impact will continue during the operation stage, an irrigation evaluation should be undertaken. This specialist evaluation, prepared in conjunction with the landholder, will determine if a reconfiguration of paddock

layout or irrigation equipment, or alternative irrigation equipment could significantly reduce the impacts. Impacts will be further mitigated through financial compensation (in accordance with voluntary *Option for Easement Agreement* or the Land Acquisition and Compensation Act) for production losses and any additional production costs incurred. This should include compensation and / or support for farmers to adjust irrigation systems and paddock layout such that productive uses that are the same or similar to those present prior to construction, can continue. The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will commit to the provision of information on both the compensation and farm planning support that is available to affected landholders.

7.4.4 RESIDUAL IMPACT

With the adequate implementation of proposed mitigations, isolation and redundancy of productive land will have a minor impact during construction. This is because as construction progresses along the transmission line, many isolated areas will be reinstated, but some impacts will persist. Residual impacts will vary according to specific construction activities on each property, effectiveness of mitigations, the enterprise mix, property layout, irrigation specifications and management practices. Some impacts on cropping (machinery access) and horticulture operations (irrigation layouts) will be temporary and some will be long term. For example, the impact of impediments to the existing flow of operations (e.g., irrigator layout and pathways) due to the towers (and any access tracks that remain) is a long-term impact, as the impediment will be created during the construction stage but will remain throughout the life of the Project (until it is (potentially) reinstated at decommissioning). For some properties where there is a significant impact on irrigation operations, the residual impact from the isolation and redundancy of productive land could be more significant.

Access for large machinery and irrigators may still be restricted in some parts of the farm, meaning that the use of those areas (in terms of both intensity and enterprise) could change. These impacts could require significant adjustments to the farm in order to reinstate production, particularly for irrigation-based operations.

Farm or farm business losses due to land isolation, inaccessibility and redundancy during construction and rehabilitation will be subject to financial compensation (in accordance with the Land Acquisition and Compensation Act). The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will commit to identifying and implementing practical mitigation measures and providing information on the compensation and farm planning support that is available for individual properties or businesses.

Given that it is possible to mitigate many of the impacts (for example, by changing equipment access points, by adjusting irrigation layouts and or using different irrigation equipment), at the regional scale the residual impacts are expected to be minor because they will only occur on a limited number of properties and in a limited area within that property and only for the duration of construction.

7.5 SOIL MANAGEMENT

7.5.1 ACTIVITY

Specific activities are as outlined in Section 7.1, above. Movement of soil and other materials will occur for the construction of access tracks, hardstands, tower foundations, laydown areas and workforce accommodation facilities. Soil shall not be moved onto the farm (from off-site) for construction unless there are no other options (and only with landholder consent). Soil will be removed where not required. Where soil is moved for temporary assets (such as tracks, laydown areas and workforce accommodation facilities), topsoil will be removed and stockpiled on site for later rehabilitation works.

If soil removal and movement is necessary, then biosecurity and contaminated land obligations under the Catchment and Land Protection Act and Environment Protection Act will be considered. Vehicle and machinery movements will occur in defined areas, on tracks, laydown areas, workforce accommodation facilities and hardstands.

7.5.2 POTENTIAL IMPACT

Soil mixing, erosion, rilling, and compaction are interrelated impacts commonly associated with transmission line construction and can greatly affect future crop yields. These may impact agricultural lands by increasing the mixing of soils, eroding topsoils during rain events, and compacting soils. Agricultural soils that have been improperly protected or mitigated may suffer decreased yields for several years after the construction of the transmission line is completed.

There are four potential impact pathways.

- Soil contamination – importation of gravel potentially bringing in pollutants, weeds, pests or pathogens. Soil should be imported only as a last resort and only with landholder consent. If it must be imported then it must be certified as free of pests, disease, and weeds.
- Soil loss – disturbed soil can potentially blow or wash off-site, creating sedimentation in waterways and smothering vegetation or crops. Loss of topsoil, the most organically rich upper layer of soil, reduces soil fertility and production.
- Loss of soil structure – poor soil reinstatement or profiling can lead to long term soil management problems, including subsidence. Soil structure is important to agriculture. It plays a role in ground and slope stability, and in the health of crops and pasture. Construction of tracks and pads, and movement of vehicles and machinery leads to ground compaction, which in turn affects soil management and crop or pasture productivity.
- Dust – indicating a loss of soil. Dust is created by vehicles and machinery moving on dry tracks and surfaces. Dust can smother vegetation and crops, create health problems, and reduce amenity.

7.5.3 MITIGATIONS

The impacts on soil can be mitigated through good soil management practices during construction, through rehabilitation of sites where soil has been disturbed or moved, and through on-going monitoring of these areas.

The construction Principal Contractor will be responsible for ensuring standard techniques for the retention and conservation of soils are used on each property. Where there is soil excavation, these techniques must include the separation of topsoil from subsoil, and stockpiling and protection (covering to protect from wind and water erosion) of those soils, as well as track and site watering to minimise dust (using water tankers).

Dust emission will be managed in accordance with an Air Quality Management Plan (EPR AQ1) which seeks to minimise air quality impacts (including dust impacts) during construction at surrounding sensitive receptors. As part of the plan the main sources of dust will be identified as well as the location of sensitive land uses. Measures will be developed and implemented to minimise dust impacts.

Rehabilitation of sites will include the removal of foreign gravel and base materials, and reinstatement of the soil profile, particularly the topsoil. This must include appropriate aeration, compaction, profiling, and erosion control, prior to re-planting. Post-construction monitoring along the Proposed Route will be undertaken for early identification and management of regrowth problems, erosion, subsidence, compaction, and contamination. This monitoring may be undertaken by landholders and reported to AusNet via their landholder liaison contact. The Geology and Soils Impact Assessment includes the following EPR: **GSL2:** Develop and implement a Sediment and Erosion Control Management Plan as part of the CEMP, which will include the issues noted here.

7.5.4 RESIDUAL IMPACT

With adequate implementation of proposed mitigations, residual impacts relating to soil issues are expected to be minor during construction, site rehabilitation and operation of the Project. This conclusion is consistent with Geology and Soils Impact Assessment Technical Report which found that the residual impacts of construction are negligible if the mitigation measures proposed in that study are followed.

7.6 BIOSECURITY

Biosecurity risk is of significant concern to the agricultural industry and is strongly reflected in State policy and legislation, national animal traceability systems, and in standard farm management practices.

7.6.1 ACTIVITY

The construction stage will involve accessing sections of agricultural land with personnel, vehicles, equipment and machinery, to prepare sites, build access tracks, lay tower foundations, construct towers, and then rehabilitate soil and pasture. Specific activities are outlined in Section 7.1.

Movement of people and equipment has the potential to introduce or spread weeds, pests, fungi and diseases. These threats may be carried in water or soil that is attached to vehicles, shoes and / or equipment, or may be hidden inside packaging, equipment and vehicles.

In some areas, where aerial spraying is vital for control of weeds (including steep landscapes with infestations of serrated tussock), the construction of the transmission line will prevent the use of aircraft.

7.6.2 POTENTIAL IMPACT

In a worst-case scenario, a biosecurity incursion can spread well beyond property boundaries. The impacts of an incursion vary depending on the particular weed, pest or pathogen. There can be major impacts on the individual property, but the consequences will often extend far beyond the property directly involved. There can be regional and industry-wide shutdowns, or state border closures, with impacts on both domestic and export industries. Some disease outbreaks can result in large scale culling of farmed and domesticated animals. The ability of an agricultural industry to access domestic and international markets for their products can be permanently compromised. The natural environment can also be severely degraded with flow-on impacts for native flora and fauna.

The impacts of biosecurity incursions can last for long periods (years or decades), and introductions are often difficult or impossible to reverse. New species can spread via soil, water, wind, and animal vectors, and can eventually affect very large areas. Control and treatment options, if they exist, are often time-consuming and costly. The recent example of fire ant eradication (see text box below) demonstrates the significance and potential cost to community of major pest incursions.

Fire Ant Eradication

In a media release on 22 October 2023, the Federal Treasurer, Dr Jim Chalmers, and the Minister for Agriculture, Fisheries and Forestry, Murray Watt announced an additional Federal investment of **$268 million** for the National Fire Ant Eradication Program over the next four years. These funds are aimed to intensify activities to control and contain this significant pest. This investment builds on the **$411 million** in joint state and federal funding already provided in the past six years.

Significantly, the **Federal Treasurer Jim Chalmers stated that:** "*If they aren't eliminated, these ants will quickly migrate across the country and that would cause economic, health and social impacts in excess of* ***$1.25 billion annually****, forever."*

https://minister.agriculture.gov.au/Watt/media-releases/investment-to-extend-fire-ant-fight

www.fireants.org.au

The risks posed by weeds, pests, pathogens, or diseases vary enormously between enterprises and location. In general terms, biosecurity breaches can lead to serious impacts for the farmer, including:

- Loss of pasture or crop productivity
- Increased treatment and control costs and time
- Ill-health or death of livestock
- Reduced production of meat, milk, crops and fodder
- Restriction on movement or sale of produce
- Breeding restrictions
- Reduced prices for produce
- Loss of export market contracts.

Agriculture Victoria provide authoritative and up-to-date resources on the range of biosecurity risks in Victoria (*https://agriculture.vic.gov.au/biosecurity*). This includes lists of declared weeds, pest animals and notifiable diseases (*https://agriculture.vic.gov.au/biosecurity/protecting-victoria/legislation-policy-and-permits/consolidated-lists-of-declared-noxious-weeds-and-pest-animals*), along with descriptions of legislative and regulatory controls, and management guidelines. This should be an important reference for biosecurity planning relevant to each enterprise and property.

High numbers of people and machinery moving through farms, excavation of soil and the movement of machinery and equipment from outside the local region are actions that all increase the biosecurity risk. Many agricultural biosecurity threats are not easily visible and so transmission into, and between properties often occurs without those involved being aware. Seeds, pests, diseases, and pathogens can be transmitted in mud underneath vehicles, on the soles of workers' boots, in excavation equipment or in imported soil and consumables.

Figure 7-3: Most commercial farms have a tailored biosecurity plan to protect their assets and business

There are some particular biosecurity threats that are of current concern and relevance to this area and the Project. This includes:

- Potato cyst nematode (PCN) (Globodera rostochiensis) is a declared notifiable pest under Section 17 of the *Plant Biosecurity Act 2010*. PCN has not been detected in the Project Area but it is one of the most serious threats to potato production worldwide and can cause devastating yield loss in susceptible crops.
- Bacterial wilt is caused by a soil-borne bacterium named *Ralstonia solanacearum* (formerly known as *Pseudomonas solanacearum*). Bacterial wilt of potatoes does not occur in the potato growing area affected by this Project, but has been found in almost all other potato districts in Victoria. It is major crop disease, that virtually wipes out crops and can force producers out of the industry.
- Ovine Johnes disease (OJD) which is caused by infection with the bacteria, *Mycobacterium paratuberculosis*. It is spread via manure and contaminated areas such as such as sheep campsites and swampy or wetter areas of the farm. It can persist for 12 months or more in these areas (and under favourable conditions). OJD is a notifiable disease under the *Livestock Disease Control Act 1994* which means that both confirmed and suspected cases of OJD must be reported to Agriculture Victoria within 7 days of identification.
- Varroa mite (*Varroa destructor*) is a serious, exotic parasite of adult European honeybees and their brood. It weakens and kills honeybee colonies and can also transmit honeybee viruses. Varroa mite has not been found in Victoria.
- Giant Pine Scale (*Marchalina hellenica*). It is known to be present in metropolitan Melbourne but is not yet in commercial radiata pine plantations in Australia. It is a serious threat to Australian pine plantations. It can cause branch dieback, gradual desiccation, and tree death.
- Fire Ants (*Solenopsis invicta)* are an emerging risk in Australia, currently identified in southern Queensland and northern NSW. They can have high environmental, economic, health, social and lifestyle impacts, and an eradication program is currently underway in Australia.

Depending on the species involved, the availability of vectors, the timing and volume of the pest, disease or weed, impacts can be localised and of limited duration, or can spread to become regionally significant.

In order to meet industry standards, farms are required to keep biosecurity records (including records of people and stock moving onto and off the farm).

In the event of a serious uncontained biosecurity incursion, the consequences could be major because of the potential scale, magnitude and duration of the effects on farm or forestry production.

7.6.3 MITIGATIONS

A Project-wide approach to biosecurity management must be developed, documented and implemented. This requirement is included in EPR EM8 (Develop and implement a Biosecurity Management Plan) for construction of the Project. The key mitigations are:

- All vehicles, plant and equipment must have any visible soil removed and be washed down with a suitable sanitiser when they move from one property to the next (i.e., cleaned before entering each property). Vehicle washdown facilities should be to (at least) the standard detailed by Plant Health Australia (‘*Effective farm wash down facilities’*, Plant Health Australia, Grains Biosecurity Factsheets).
- Personnel must clean their footwear, removing any visible soil and using a footbath with a suitable sanitiser before entering each property.
- Record keeping covering breach detection, incident management procedures and reporting, and compliance monitoring.
- Records of vehicles, plant and equipment movement and treatment must be kept (e.g., washdowns), as well as people entering and leaving each property.
- Following construction of access tracks, movement of vehicles and construction equipment onto and off farming properties shall only occur within approved access corridors and along formed tracks. No vehicles or construction equipment shall cross paddocks unless along formed tracks and within an approved access route.

Regular monitoring of the Proposed Route and the original farm access corridor after rehabilitation is completed will also enable quick detection and eradication of emerging weeds (spraying, etc.). This monitoring is most likely to be done by the landholder but any AusNet personnel or contractors who are on the Proposed Route over time should also monitor and report any signs of weeds, pests, fungi or diseases. A system for reporting issues identified must be established.

In areas where weed control relies on aerial services (e.g., steep inaccessible country), and the aerial services are affected by the Project (construction and operation), the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will commit to identifying and implementing practical mitigation measures and providing information on the compensation available for individual properties or businesses. This will include options for continued weed management, specifically, cost-effective ways to achieve the same control levels.

7.6.4 RESIDUAL IMPACT

The likelihood of a biosecurity breach during construction is significantly reduced through the implementation of a Biosecurity Management Plan (EPR EM8). Some threat nevertheless remains, as it is possible that a single spore, seed, animal, or pathogen could unknowingly be transported between sites. With this in mind, the biosecurity plan shall include strict compliance monitoring and reporting requirements, to identify and respond to outbreaks quickly. With mitigations in place, the residual impact for this issue is considered to be minor because, while the consequence is potentially significant (can be widespread, long-lasting and have major effects on farm or forestry production), with effective biosecurity mitigations in place, the likelihood of a biosecurity issue arising is low.

7.7 DISRUPTION TO LIVESTOCK

7.7.1 ACTIVITY

The construction stage will involve accessing properties with personnel, vehicles, equipment and machinery, to prepare sites, build access tracks, lay tower foundations, construct towers, and then rehabilitate soil and pasture. Specific activities are outlined in Section 7.1.

Movement of machinery is a normal part of farming, but during the peak of construction, the volumes of traffic, types of machinery and noise will be different to normal. Helicopters will also be used in some construction tasks.

During the construction stage, disruptions are only likely to be experienced by livestock in paddocks immediately adjacent to the easement, laydown areas, workforce accommodation facilities or access tracks. Disruption is likely to be of short duration (totalling days to weeks) and intermittent, while construction works are actively occurring at the site.

7.7.2 POTENTIAL IMPACT

Livestock may become distressed due to unusual activity, noise and disruption to routines. Distress in animals can translate into altered feeding patterns, erratic behaviour, accidental harm, slower growth and reduction in milk production. Anxious livestock can make handling tasks more dangerous for farm workers (tasks such as vaccinating, shearing, pregnancy testing, loading, etc.). During lambing and calving, disruption can lead to problematic birthing, and rejection or abandonment of lambs and calves by their mothers (referred to as mismothering).

7.7.3 MITIGATIONS

Disruption to animals can be minimised or avoided through early communication with landholders. Landholders will be advised of impending construction activity, so that adequate time is given for sensitive livestock to be moved prior to works commencing. It is anticipated that on most properties, stock can be moved sufficiently far away to be unaffected during construction. The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will address the issue of livestock disruption, including how sensitive locations (e.g., stock yards) or timings (e.g., lambing) can be managed to meet landholder requirements and constraints.

In general, all construction vehicles on farms must travel at slow speed, drivers remain aware of their surroundings, give way to livestock and leave gates how they found them (leave open if found open, leave closed if found closed). Helicopter use will be avoided or minimised over paddocks holding livestock.

7.7.4 RESIDUAL IMPACT

With the implementation of proposed mitigations, animal disruption will, at worst, be minor, temporary and localised.

7.8 CONTAMINATION OF SOILS OR WATER

7.8.1 ACTIVITY

The Project construction stage will involve a range of vehicles, machinery and equipment on farm properties and at laydown areas and workforce accommodation facilities, and these will utilise a variety of chemicals, lubricating materials, fuels and oils (and possibly herbicides).

7.8.2 POTENTIAL IMPACT

Activities such as refuelling and weed spraying create a potential risk of contamination. Spills and incidents can lead to localised contamination, lost production and clean-up costs. Livestock accessing or consuming contaminants (either in storage or if spilled) can suffer health impacts, leading to illness, loss of condition, withholding periods for sale, or death.

Significance and duration of impacts are dependent on materials being used. With the volumes and types of chemicals anticipated for this Project, potential impacts are likely to be minor, localised and of short duration.

7.8.3 MITIGATION

A Contaminated Land Impact Assessment has been completed and addresses the impacts noted in the section above. The Contaminated Land Impact Assessment includes mitigations and EPRs that address management, storage and use of chemicals, fuels and hazardous materials during construction and operation. They also address mitigation measures for leaks and spills, as well as monitoring and reporting requirements.

7.8.4 RESIDUAL IMPACT

With the implementation of the mitigations and EPRs set out in the Contaminated Land Impact Assessment, the potential severity of contamination is minor and localised for the Project, therefore the residual impact is rated as minor.

7.9 PLANTATION FORESTRY ECONOMIC IMPACTS

7.9.1 ACTIVITY

A key provision of the easement for the transmission line is that the area cannot be used for tall trees (therefore plantation forestry). During construction, all plantation timbers in the easement will be removed.

7.9.2 POTENTIAL IMPACT

When constructed, the easement shall exclude plantation forestry production. This will result in direct economic impacts for affected landholders.

The Proposed Route impacts directly on 26 hectares of forestry as shown in Table 6-4. This represents less than one per cent of regional production, based on a regional forestry resource of 4,505 hectares. The detailed method used to calculate the economic impact is described in Appendix E.

Production data from ABARES (2020) provides values of production for hardwood and softwood for Victoria. The average annual value of forestry production is $1,900 per hectare. For the area of plantation forest that intersects with the easement, this equates to a total annual value of $49,400 (26-hectare x $1,900/hectare).

As the trees in the easement must be removed for the life of the Project, their value at construction is based on their full value. From Geddes & Parsons (2023), the average standing tree value of mature radiata pine plantations is $27,500 per ha, and the average standing tree value of mature Tasmanian blue gums plantations is $12,350 per hectare. Approximately 12.8 hectares of radiata pine and 4.9 hectares of Tasmanian blue gum plantations will need to be removed for the transmission line. On this basis, using average values of mature plantations, the value of impacted pine plantation is $352,000 (i.e., 12.8 hectares x $27,500/ha) and the value of impacted blue gum plantations is $60,515 per hectare (i.e., 4.9 hectares x $12,350/hectare). This provides a total forestry value of $412,515 plus the annual value of $49,400, totalling $461,915. This is an indicative value and is not a value for use in compensation.

While any plantations in the transmission line corridor must be removed, they can be harvested in advance of construction. It should be noted there are significantly higher costs when harvesting small scale plantations.

This is due to a number of reasons including construction of roads to allow log truck access, the cost of moving expensive specialised harvesting equipment for only a relatively small harvest volume and finding markets from small volumes of logs.

Forestry operations could also be subject to higher costs for harvesting operations in plantations adjacent to powerlines. Often permits are required, and these can take months to arrange. Power authorities sometimes require specialised harvesting equipment so that trees do not fall near the powerlines.

Weed control in the easement is likely to be more expensive as aerial treatments are prohibited. Further, for any plantations which have been partly cleared to make way for the transmission line, the plantation remaining on individual properties will have more edges where firebreak maintenance costs can be higher.

Commercial firewood operations

It is possible there are commercial firewood operations in forested areas along the Proposed Route. This could include plantation owners supplying firewood either to sell to a firewood merchant or to sell direct to end-use customers. These operations, while minor with respect to the regional forestry industry, could represent a significant income for individuals. Given their small scale, the Project is unlikely to significantly disrupt these operations.

7.9.3 MITIGATIONS

Forestry operators should be given adequate notice of approaching construction activity so that they can harvest at the optimal time for their operations. This process and requirements are established through all four of these EPRs: AF1 Agriculture and Forestry Business Mitigation and Support Strategy; EM3 Property Access and Management Plan; EM4 Specific Property Access Requirements and EM5 Communications and Stakeholder Engagement Management Plan.

Plantation forestry operators shall receive compensation commensurate with production losses experienced during construction. The compensation offered to landholders for economic loss during construction shall be calculated as the difference between the mature tree value (estimated value but for the Project) and the harvested value (estimated value at harvest).

7.9.4 RESIDUAL IMPACT

With implementation of mitigations and appropriate compensation, the residual impact of excluding some plantation area from production is likely to be minor (less than one per cent of the regional production).

7.10 DISRUPTION TO PLANTATION FORESTRY OPERATIONS AND INFRASTRUCTURE

7.10.1 ACTIVITY

Construction of the transmission line in forestry areas assumes that trees have been removed. Construction equipment and personnel will require access to and from the easement.

7.10.2 POTENTIAL IMPACT

Construction activities will remove 26 hectares of forestry land from production. It may also affect access to nearby plantation areas, and could impact adjacent tree health, with reduced growth and productivity if roots and canopies are damaged, or where soil disturbance and compaction leads to reduced infiltration of rain.

After removal of trees from the easement, the secondary impacts from construction activities are anticipated to be minor.

7.10.3 MITIGATIONS

An overarching Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1), PAMP (EPR EM3) and Specific Property Access Requirements (EPR EM4) will be prepared and implemented. Where possible, this should be done in consultation with the affected landholder(s). Together these documents will identify how construction activities can be arranged to minimise disruption to plantation operations. These negotiations should enable that activities at an individual property level are understood such that unnecessary disruptions to forestry activities can be avoided. The negotiations should include (at least) consideration of property entry and exit points; biosecurity risk management (to prevent introduction or spread of weeds, pathogens and pests); limits of work area and access; hours of operation; dust, soil and spoil management including dust suppression. These negotiations (and adjustments to plans) shall also take into account the greater potential for disruptions during sensitive periods of the year for forestry such as planting and harvesting.

Where disruptions cannot be avoided, the Strategy and/or Plan shall describe how they will be mitigated through measures including (but not limited to) temporary physical crossovers and other workarounds for access to critical areas.

Ongoing communication with plantation operators will be important to minimise disruption and to enable forward planning. Financial compensation shall be negotiated with landholders for disruptions that will result in additional costs to the forestry business.

7.10.4 RESIDUAL IMPACT

With appropriate communications in place, residual impacts on plantation forestry operations are likely to be minor.

8 Operation impact assessment

This section discusses the potential impacts of operating the transmission line, and associated mitigation measures and environmental performance measures that aim to reduce impacts to as low a level as possible.

8.1 KEY ISSUES DURING OPERATION

Specific impacts vary between properties and between years, depending on management systems, enterprise mix, and market conditions.

8.1.1 GRAZING

The key issues for grazing properties include, but may not be limited to:

- Disruption affecting animal health and breeding success, especially during lambing and calving
- Continued access for stock to graze
- Structural obstacles (e.g., footings and towers)
- Introduced biosecurity risks
- Interference with GPS due to multipathing.

8.1.2 CROPPING

The key issues for cropping properties include, but may not be limited to:

- Long term loss of land for production with ongoing financial loss and / or change in enterprise mix
- Restriction on the use of high-efficiency equipment
- Restriction on the use of aerial spraying, especially when ground access is limited (e.g., wet conditions)
- Structural obstacles (e.g., footings and towers)
- As above, for the grazing component of mixed businesses
- Introduced biosecurity risks
- Interference with GPS due to multipathing.

8.1.3 HORTICULTURE

The key issues for horticultural properties include, but may not be limited to:

- Long term loss of land for production with ongoing financial loss and / or change in enterprise mix
- Loss of the ability to irrigate all productive land (including ongoing isolation of some areas)
- Restriction on the movement of irrigation infrastructure
- Restriction on the use of aerial spraying, especially when ground access is limited (e.g., wet conditions)
- Structural obstacles (e.g., footings and towers)
- As above, for the grazing and cropping component of mixed businesses
- Introduced biosecurity risks
- Interference with GPS due to multipathing.

8.1.4 FORESTRY

The key sensitivities for a property with a forestry enterprise include, but may not be limited to:

- Loss of land for timber production and loss of canopy space (inverted triangle) with consequential financial loss for the life of the Project

- Restrictions on access for large trucks and machinery to harvest nearby trees
- As above, for the grazing, cropping and horticulture component of mixed businesses
- Introduced biosecurity risks.

8.1.5 LAND AREA AFFECTED

Calculations of the areas affected during construction are provided in Table 7-1. Broken down by enterprise categories, this table shows the number of properties directly affected; the area of the Proposed Route; the remaining area of the affected farms that is not directly impacted by the Proposed Route; the total size of the affected farms; and areas impacted outside of the easement area (access tracks, laydown areas etc).

Once construction is complete, 2,202 hectares of farmland and 26 hectares of plantation forestry land will be subject to the operation conditions of the Project

8.2 AGRICULTURAL ECONOMIC LOSSES

8.2.1 ACTIVITY

Operation of the transmission line involves the ongoing monitoring and maintenance of infrastructure (including towers and conductors across agricultural properties). This may involve:

- Restrictions on the positioning and operation of agricultural machinery and infrastructure within the easement (including aerial services, vegetated shelterbelts, sheds and buildings, irrigators, large harvesters, etc.)
- Tower footprints excluded from agriculture, with the exception of grazing
- Access tracks and land used for terminal station excluded from agriculture
- Regular vehicle and personnel access to tower sites, for safety inspections and maintenance
- Helicopter or drone / RPAS traverse of the transmission line and easement for safety inspections
- Occasional vehicle, machinery, and personnel access along Proposed Route for maintenance tasks and for the clearance of vegetation.

A significant range of agricultural activity can continue under the transmission line, including grazing, and many forms of cropping and horticulture. There are some normal farming activities that will be restricted or prohibited in and around the easement. The most significant of these is aerial spraying (of fertilisers, herbicides, and pesticides) although alternative application techniques are possible.

8.2.2 POTENTIAL IMPACT

Monitoring and maintenance activities will have minor impact on normal farm practices and no discernible economic impact. They do pose a risk to biosecurity because they involve movement of people, equipment and vehicles between properties.

Restrictions on the placement and use of infrastructure and machinery in the easement will have impacts on the farm for the life of the Project (80 years design life). For example, it is possible that machinery purchased by a farm business may not be able to be used as intended (due, for example, to placement of a tower or reconfiguration of a property).

The Project comprises 454 towers, with an average base dimension of 18 by 18m. Each tower has an additional 5m machinery exclusion buffer, meaning that the total area affected by each tower is 784 square metres (28 by 28m). Impacts of the machinery exclusion buffer vary according to the land use. For example, grazing can occur within the five-metre buffer, however cultivation for cropping and horticulture could not.

The area that could be affected by the towers and buffer area is 35 hectares across the entire Proposed Route (Table 8-1). This is likely to be an over-estimate of the area of agriculture and forestry land impacted by the towers because not all 454 towers are located on land used for agriculture or forestry.

Access tracks and terminal stations will also result in land being excluded from agricultural production for the life of the Project. As noted earlier, landholders will be given the option of retaining any tracks that were built in the construction stage. Those not retained will be rehabilitated and returned to agricultural use. Because it is not possible to predict which tracks will be retained, the calculations here assume that all tracks will be permanent. This means that across the Proposed Route 132ha of tracks and 72 hectares for terminal stations will be excluded from agriculture for the life of the Project. As for the towers, this will be an over-estimate because not all tracks will be located on agricultural land, and some will be rehabilitated and returned to agricultural use.

In summary, across the Proposed Route there will be 239 hectares of land excluded from agriculture for the life of the Project. Table 8-1 also shows that the agricultural production from this area is valued at just over $561,000 per annum across the 229 affected properties.

The disruption to irrigation infrastructure has the potential to be more significant than this.

Table 8-1: Areas of agricultural production by enterprise type that are impacted for the life of the Project

TYPE	TOWERS (HA)	ACCESS TRACKS (HA)	TERMINAL STATIONS (HA)	TOTAL (HA)	VALUE OF PRODUCTION LOST (ANNUAL)
Grazing	9	55	-	**64**	$63,296
Cropping	16	39	72	**127**	$150,241
Horticulture	10	38	-	**48**	$347,472
Total	**35**	**132**	**72**	**239**	**$561,009**

Once construction and rehabilitation are completed, normal grazing activity can be resumed along the remainder of the easement, and the economic impact on grazing will be minor.

Ongoing impacts to horticultural and cropping properties will persist, as restrictions within the easement affect the ability to use and manoeuvre large machinery to prepare the soil, seed, harvest, spray and irrigate (refer to Section 6.4.3 for discussion of the cropping and irrigation infrastructure and equipment used). These restrictions also include aerial spraying.

It is assumed for this (operation stage) impact assessment that in most locations, micro-siting of towers to reduce impacts, irrigation modifications (including supported changes to irrigation equipment where suitable) and changes to paddock layouts (also supported by the Project), during the construction stage will resolve many of the impacts on irrigation on high value horticultural and cropping enterprises. In some situations, where construction impacts cannot be resolved sufficiently, landholders may be forced to change their enterprise mix to maximise profitability of their land. Where these changes are necessary, they could have long-term financial implications for farm businesses.

During construction, total value of lost production for agriculture was estimated at around $6.3M per annum (Table 7-2). This estimate of agricultural economic loss equates to less than one per cent of regional (annual) production. An estimate of the ongoing economic impact cannot be accurately predicted, as the extent of mitigation during construction and the ability of each property to ameliorate production losses or modify practices is highly variable. On each property, the mitigation of economic impacts is strongly influenced by:

- The enterprise mix
- Previous investment and assets

- Soil and climatic conditions
- Individual farm management systems, capability, and capacity.

Economic losses are not limited to land directly within the easement. Indirectly affected land includes areas which are isolated and made redundant due to access issues, small residual size, or increased costs of production. For some properties there will be an inability to use irrigation equipment on or across the easement, so isolated land is only suitable for dryland activity. All irrigated properties will be affected by this, unless the easement runs adjacent to the property boundary (i.e., outside the boundary) so that there are no redundant areas created in the property.

8.2.3 MITIGATIONS

The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and Specific Property Access Requirements (EPR EM4) will identify operation conditions, and mitigation actions that will minimise production and financial impacts. These mitigations will be aimed at addressing economic impacts due to areas being removed from production (e.g., transmission tower bases) and from disruptions to normal operations (e.g., restrictions on grazing or cropping areas, or restrictions on the use of aerial spraying). Mitigations will include considering how alternative technologies can be employed to reduce impacts (e.g., use of all-weather vehicles in place of aerial spraying). Economic impacts will be further mitigated through financial compensation for losses and additional production costs incurred during the operation period (in accordance with the Land Acquisition and Compensation Act).

8.2.4 RESIDUAL IMPACT

With implementation of mitigations and EPRs, the residual economic impacts on agricultural enterprises will be minor to negligible during operation. This conclusion is based on the finding that for the majority of cases, the area affected, relative to the whole property, is small, and there are feasible mitigations available that will minimise or avoid production loss and or financial loss. In situations where farm or farm business losses during operation cannot be fully mitigated, they will be subject to financial compensation (in accordance with the Land Acquisition and Compensation Act).

8.3 BIOSECURITY

Biosecurity risk is of significant concern to the agricultural and forestry industries and is strongly reflected in State policy and legislation, national animal traceability systems, and in standard farm management practices.

8.3.1 ACTIVITY

The operation stage will involve minimal access through agricultural land. As described for the construction stage in Section 7.6, the movement of people, vehicles and equipment for the purpose of monitoring and maintenance has the potential to introduce or spread weeds, pests, fungi and diseases. These threats may be carried in water or soil that is attached to vehicles, shoes and equipment, or may be hidden inside packaging, equipment and vehicles. These activities pose a biosecurity risk both between properties and from distant sources.

In some areas, where aerial spraying is vital for control of weeds (including steep landscapes with infestations of serrated tussock), the presence of the transmission line will prevent the use of aircraft within the easement.

8.3.2 POTENTIAL IMPACT

The impact of weeds, pests, pathogens, or diseases can last for long periods (years or decades), and introductions are often difficult or impossible to reverse. Although the volume and frequency of visitation to farms will be low during the operation stage, people, vehicles, and machinery moving through farms, and the use of machinery and equipment from outside of the local region increase the biosecurity risk. Many agricultural

and forestry biosecurity threats are not easily visible. This means that movement onto, and between, properties often happen without the people involved being aware.

In addition, prevention of weed infestations and weed spread may be hampered by the presence of the transmission line. This is particularly the case in areas where aerial spraying is used to control of weeds (such as steep landscapes with infestations of serrated tussock) and the control of weeds without aerial spraying will be difficult and more costly.

With much lower levels of activity during the operation stage, the risk of a biosecurity breach is significantly reduced.

8.3.3 MITIGATIONS

During operation, AusNet's existing procedures for biosecurity management within its HSEQ Management System will be implemented and followed for all affected properties. The AusNet biosecurity processes are a minimum requirement and a landowner may require additional biosecurity measures to be undertaken in addition to the AusNet biosecurity processes. The Specific Property Access Requirements (EPR EM4) will contain these property-specific protocols and requirements for biosecurity management, where required.

In accordance with AusNet's existing procedures, all works during operation must be planned appropriately to enable biosecurity risks to be understood and managed with appropriate controls implemented to prevent harm to persons or the environment. A plan for the specific works would be prepared if there is an existing weed or disease issue (which may require a detailed assessment), and if any proposed works could create additional issues.

The key mitigations in AusNet's existing procedures are that all vehicles, plant and equipment and footwear must have any visible soil removed and be washed down, including use of biosecurity chemical wash and decontamination where required, when they move from one property to the next (i.e., cleaned before entering each property). All vehicles must contain biosecurity kits that are maintained and replenished where required. Where a new biosecurity risk and/or specific access requirements are identified, it must be recorded and entered into AusNet's incident management system and any environmental impact during Project works must be reported to the landowner and the emergency Animal Disease Watch Hotline (if required). Records of vehicles, plant and equipment movement and treatment (e.g., washdowns) must be kept, as well as people entering and leaving each property.

Following construction of access tracks, movement of vehicles and construction equipment onto and off farming properties shall only occur within approved access corridors and along formed tracks. No vehicles or construction equipment shall cross paddocks unless along formed tracks and within an approved access route.

Monitoring of the Proposed Route during operation stage will also enable quick detection and eradication of emerging weeds (spraying, etc.). This monitoring is most likely to be done by the landholder but any AusNet personnel or contractors who are monitoring the Proposed Route over time, should report any signs of weeds, pests, fungi or diseases to the landholder. A system for reporting issues identified must be established.

In areas where weed control relies on aerial services (e.g., steep inaccessible country), and the aerial services are affected by the Project (construction and operation), the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will commit to identifying and implementing practical mitigation measures and providing information on the compensation available for individual properties or businesses. This will include options for continued weed management, specifically, cost-effective ways to achieve the same control levels.

8.3.4 RESIDUAL IMPACT

The likelihood of a biosecurity breach during Project operation is significantly reduced through the implementation of biosecurity management procedures and associated mitigation measures. Some threat

nevertheless remains, as it is possible that a single spore, seed, animal, or pathogen could unknowingly be transported between sites. To identify and respond to outbreaks quickly, AusNet's existing biosecurity management procedures require that where a new biosecurity risk and/or specific access requirements are identified, it must be recorded and entered into AusNet's incident management system and any environmental impact during Project works must be reported to the landowner and the emergency Animal Disease Watch Hotline (if required).

With mitigations in place, the residual impact for this issue is considered to be minor because, while the consequence is potentially significant (can be widespread, long-lasting and have major effects on farm or forestry production), with effective biosecurity mitigations in place, the likelihood of a biosecurity issue arising is low.

8.4 ISOLATION AND REDUNDANCY OF PRODUCTIVE LAND

Isolation and redundancy of productive land is of significant concern to the agricultural community along the Proposed Route, particularly for prime agricultural land and areas where significant investment in irrigation and other fixed agricultural infrastructure have been made.

8.4.1 ACTIVITY

Isolation and redundancy of productive land (described in Section 7.4) would have occurred during construction stage. The transmission line and easement could create a barrier that is present for the life of the Project.

8.4.2 POTENTIAL IMPACT

In some cases, the separation of a small portion of productive land can make it unworkable (for reasons of cost, efficiency, physical constraint, or safety restrictions on the movement and use of machinery and irrigators). This impact is described in the construction stage (Section 7.37.4), and on some properties, this impact can permanently change the farm operation.

The likelihood and significance of this isolation of land will vary according to land use. It would be more significant in high value, infrastructure-intensive horticultural areas. In contrast, because access under the lines will be reinstated once construction and rehabilitation cease, the risk of isolation and redundancy on grazing properties is much lower.

8.4.3 MITIGATIONS

This impact has been noted in the construction stage (Refer to Section 7.4.3) along with mitigation actions, in particular an irrigation evaluation. This is also reflected in the requirement that the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) must define the process that will be used to identify impacts that landholders will experience. The same EPR also notes that landholders must be advised whether the identified impacts will be rectified, rehabilitated or compensated.

It is assumed that these requirements will be fully implemented, which will minimise both the number and impact of any isolation and redundancy issues (for the life of the Project).

8.4.4 RESIDUAL IMPACT

With the implementation of proposed mitigations, isolation and redundancy of productive land shall be minimised. Residual impacts will be specific to individual properties and will be influenced by the effectiveness of mitigations, enterprise mix, property layout, irrigation specifications and management practices. Given that it is possible to mitigate these impacts in many situations (for example, by adjusting irrigation layouts and / or using different irrigation equipment), at the regional scale these residual impacts are expected to be minor,

mainly because of their longevity (they will continue for the duration of the Project). However, there may be some properties where the residual impacts for that particular property and the associated business, are more significant. The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and Specific Property Access requirements (EPR EM4) will provide for tailored mitigations for these and other impacts as far as practicable.

8.5 DISRUPTION TO FARM OPERATIONS

8.5.1 ACTIVITY

The operation stage will involve occasional inspections, monitoring, and maintenance of the transmission line infrastructure, involving a small number of vehicles and personnel or aerial services (RPAS or helicopter).

The presence of transmission towers and footings creates a long-term obstacle for farming activity. During operation, the transmission line produces electro-magnetic frequencies (or EMF). The height of the transmission line above the ground has the effect of preventing EMF interference. A separate EMF impact assessment has been conducted (EMI and EMF Impact Assessment).

It is possible that transmission towers could interrupt GPS and telecommunications systems used to control irrigators and cropping machinery. AusNet's 'Landholder Guide - Easement safety and permitted activities' (2024) states that:

> *There can be a small effect on GPS signals if you are under or right alongside a tower. This is known as multipathing. It is associated with being too close to a steel structure such as a tower, windmill, shed or any other metal structure. The effect is only noticeable within about 3m of the metal object.*

8.5.2 POTENTIAL IMPACT

Livestock will be unaffected by the presence of and day-to-day passive operation of the towers and conductors. However, when access is required for routine maintenance stock may become distressed due to unusual activity, noise, and disruption to routines. Distress in animals can translate into altered feeding patterns, erratic behaviour, accidental harm, slower growth and reduction in milk production. Anxious livestock can make handling tasks more dangerous for farm workers (tasks such as vaccinating, shearing, pregnancy testing, loading, etc.). During lambing and calving, Disruptions can lead to problematic birthing, and rejection or abandonment of lambs and calves by their mothers (referred to as mismothering).

Movement of machinery is a regular part of farming, so normal vehicle movements are unlikely to disturb livestock. Helicopter use will be infrequent, but can be disruptive, especially in sensitive periods (calving, lambing, handling, etc.).

EMF will not have any measurable impact on livestock or workers at ground level.

The EMI and EMF Impact Assessment Technical Report notes that there 'is a risk of interference to the DGPS correction signals for land navigation directly under the 500kV transmission line in heavy rain conditions only' (Section 9.2.2.7). These conditions would be rare and during such conditions farmers will often not be conducting cropping activities. As noted above, it is also possible for there to be a small effect on GPS signals when under or alongside a tower.

Such interference could lead to inconsistent sowing, harvesting and application of irrigation water, as well as disruption to the use of VRT, all of which may impose additional costs on cropping and horticultural operations. However, even if it was to occur, the area affected would be very small given that the effect only occurs directly under the line.

The Surface Water Impact Assessment determined that operation of the Project was considered to have only limited interaction with surface waters. Overall, the potential impacts were considered negligible, or minor based on existing conditions, the Project description and the EPRs proposed.

8.5.3 MITIGATIONS

The implementation of both the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and Specific Property Access Requirements (EPR EM4) will address the issue of livestock disruption during operation of the Project.

More specifically, disruption to animals can be minimised or avoided through early communication with landholders. Landholders will be advised well in advance of any activities that require entry to the property. This is intended to allow for stock to be moved to avoid impacts. All vehicles entering the property must travel at slow speed, drivers remain aware of their surroundings, give way to livestock, and leave gates how they found them (open if found open, closed if found closed). Helicopter use will be minimised over paddocks holding livestock.

The EMI and EMF Impact Assessment Technical Report (Section 9.2.2.7) states ‘there is a risk of interference to the DGPS correction signals for land navigation directly under the 500kV transmission line in heavy rain conditions only. This may require higher transmitted DGPS signal strength or repositioning of the reference stations to eliminate the risk’.

8.5.4 RESIDUAL IMPACT

With the implementation of proposed mitigations, the residual impacts on livestock will be negligible and localised.

8.6 PLANTATION FORESTRY ECONOMIC IMPACT

8.6.1 ACTIVITY

A key provision of the easement is that for the life of the Project (design life 80 years), the area cannot be used for plantation forestry because of safe clearance limits. During construction, all plantation timbers in the easement shall be removed or harvested, whether mature or not.

8.6.2 POTENTIAL IMPACT

The economic impacts, mitigations, and residual impacts of the Project on plantation forestry have been described in Section 7.9. Given that the restrictions on forestry extend for the life of the Project, the impacts described in the construction stage are also applicable to the operation stage.

On 23 May 2023, the Victorian Government announced that harvesting of native forest timber in State Forests will end on 31 December 2023. Prior to that announcement, logging was permitted in native forests. Australia has insufficient sawlog production from existing plantations and native forests and in order to supply timber for building and house construction, relies to some extent on imported timber. This early shutdown of harvesting in Victorian State Forests has increased the emphasis on sawlog production from plantations (including *Radiata* pine plantations), and the need to avoid further losses of productive plantation area.

8.6.3 MITIGATION

Plantation forestry operators will receive compensation for being excluded from the easement for the Project life.

8.6.4 RESIDUAL IMPACT

With appropriate compensation, impacts from the areas excluded from production are likely to be small at the regional and state scale. Given that the area excluded is less than one per cent of the regional total, the residual impact of the Project on plantation forestry in the region is minor.

8.7 PLANTATION FORESTRY OPERATIONS

8.7.1 ACTIVITY

Operation of the transmission line in forestry areas assumes that trees have been removed.

Regular monitoring and maintenance of the transmission line infrastructure will be undertaken by vehicle or by air (helicopter or RPAS). Transmission lines are a hazard for aerial forestry operations, including normal silvicultural operations (herbicide spraying and fertiliser applications) as well as firefighting, particularly with fixed wing aircraft. Plantations located near transmission lines have higher management costs because of aircraft safety distances and require more expensive land-based application methods.

8.7.2 POTENTIAL IMPACT

The easement may also affect forestry operations in the areas immediately adjacent. This could be in the form of impacts on health of trees in the immediate vicinity due to roots and canopies being exposed to excessive heat or erosion, or where soil disturbance and compaction leads to reduced infiltration of water. Restrictions associated with the easement could also affect some forestry operations such as machinery access for thinning or harvesting operations.

Monitoring and maintenance of the transmission line could also interfere with forestry activity adjacent to the easement, including planting, spraying, pruning and harvesting.

8.7.3 MITIGATIONS

The implementation of the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and Specific Property Access Requirements (EPR EM4) should identify how operation activities will be arranged (e.g., timing of construction, placement of tracks) in order to minimise disruption to plantation operations.

8.7.4 RESIDUAL IMPACT

With the implementation of proposed mitigations, residual impacts on forestry operations will be minor.

9 Decommissioning impact assessment

All transmission line infrastructure will be dismantled and removed in its entirety upon decommissioning. The towers and conductors have a design life of 80 years.

It is proposed that towers and conductors will be dismantled and removed, tower and terminal station footings will be excavated. Tracks, and disturbed areas will be rehabilitated (although tracks may be retained at landholder request). Decommissioning activities will respond to conditions and regulation at that time.

Decommissioning activity and impacts are likely to be similar to the construction stage, though with less ground disturbance. However, with such long lifespans, it is difficult to accurately predict impacts of decommissioning. There are uncertainties about the level of technology available, ground conditions, social expectations and priorities, legislation, and policy, agricultural or forestry activity and economic value so far into the future.

For these reasons, decommissioning impacts cannot be accurately estimated.

The main pathways of risk and impact are through legacy events and issues. Legacy issues could affect both agricultural and plantation forestry landholdings, and include:

- Abandoned infrastructure (above or below ground)
- Contamination (including pollutants, waste, or biosecurity breaches which have led to introduction or spread of weeds, pests, pathogens, and diseases).

Due to the long project life and ‘future unknowns’, decommissioning impacts and mitigations are difficult to define. Nevertheless, if appropriate mitigations as outlined in construction and operation stages are implemented successfully, then legacy and disruption impacts at decommissioning stage will be minor. However, if pollution or biosecurity breaches have led to uncontrolled or ongoing impacts, these could have medium, long-term impact on farming or plantation forestry futures for any particular property.

Dismantling and removing decommissioned infrastructure and all costs associated with doing so, including any costs associated with land rehabilitation and biosecurity management, will be the responsibility of AusNet.

10 Cumulative impacts with other projects

This section provides an assessment of cumulative impacts with other existing and proposed developments in the region. For agriculture and forestry, there are two scenarios where cumulative impacts could arise. The first, at the individual property level, is when other projects are traversing the same farms or plantation forests that are affected by this Project. The second is when other projects affect large areas of agricultural or plantation forest land in the region, and thereby impact farm and forestry businesses or production in the region. For example, if a project led to large areas of farmland being converted to non-agricultural uses, this could add further pressure on those remaining farms, which could affect their viability.

Some 70 projects were noted as occurring in the broad area of the Project. From this list, a subset of 23 were identified based on their stage of development, and the potential for a spatial and temporal link between them and the Project. As part of this agriculture and forestry assessment ten of these 23 projects were considered to have potential for cumulative impacts, based on the timing (e.g., construction occurs in a similar timeframe), the location of affected land (e.g., close to the Project), and that there is an impact on agriculture and or plantation forestry. Table 10-1 provides more details on the potential cumulative impacts of the Project for each of the ten identified projects. This assessment found that there are no significant cumulative impacts on agriculture or forestry in the Project region. Appendix F describes the other infrastructure or construction projects considered for this assessment but determined not to pose potential for cumulative impacts.

Table 10-1: Cumulative impacts for other projects impacting agriculture and forestry in the region

PROJECT	PROJECT DESCRIPTION	RELEVANCE TO THIS ASSESSMENT
Beaufort Bypass (Western Highway)	A new 11-kilometre duplicated section of the Western Highway to bypass Beaufort, linking completed sections of the Western Highway duplication to the east and west of Beaufort.	The bypass is likely to affect agricultural land (typically grazing). The area of interest is within 15km of the Project At the property level, this separation means it is unlikely that any single property will be affected by both projects. At the regional level, the cumulative impact of this project would be minor for two reasons. The land is predominantly used for livestock grazing (a relatively low value per hectare use), and the total area of agricultural land affected will be low given that not all affected land is used for agriculture.
Brewster Wind Farm	A proposed windfarm consisting of up to six wind turbine generators with a total height of up to 247m, and a total combined capacity of up to 42 megawatts (MW). The wind farm will connect into the national electricity grid via an existing 66kV transmission line which runs along the Western Highway directly adjacent the site.	This project is located between the Western Highway and Trawalla Road, Brewster, and is approximately 14km south of Project Land. The wind farm is likely to affect agricultural production on the participating area. At the property level the distance from the Project means it is very unlikely that any properties would be affected by both projects. At the regional level, the cumulative impact of this project would be minor. While the land is used for cropping and livestock, the project is only seven turbines and uses existing transmission lines, so the area of land affected will be low.
Elaine Solar Farm	A proposed solar farm consisting of a 150MW solar project and a 250MWh battery. The project covers two sites, a 65-hectare site north-east of the Midland Highway and a 158-hectare site south-west of the highway. The project	This solar farm is located on farmland south-east of Ballarat and approximately 20km south of the Project. It involves 223 hectares of farmland that is used for grazing, and the proponent is planning to resume sheep grazing underneath the panels.

PROJECT	PROJECT DESCRIPTION	RELEVANCE TO THIS ASSESSMENT
	includes 60,636 PV modules and a substation that will connect to the neighbouring Elaine Terminal Station.	At the property level the distance from the Project means it is very unlikely that any properties would be affected by both projects. At the regional level, the cumulative impact of this project would be minor, particularly since the proponent plans to continue grazing sheep.
Navarre Green Power Hub	A wind turbine project with a planned 102 wind turbines covering an area of 18,404 hectare directly north of Navarre. The area disturbed is estimated at 411 hectares with the remaining 17,993 hectares of the Project Area is proposed to be avoided during construction, operation and decommissioning of the Project. The land is predominately used for grazing and cropping. It will also involve a Battery Energy Storage System (BESS) with a total capacity of up to 600MW. It will require the installation of approximately 28km of a 220kV transmission line to connect to the Bulgana Terminal Station. The project is at the referral phase.	This project is located approximately 30km north of the Project Land. The agricultural production on the Navarre Green Power Hub site will be affected however, with the exception of the direct footprint of the turbines, access tracks and BESS, agricultural production will be able to continue on the site during the operational stage of the project. At the property level the distance from the Project means it is unlikely that any properties would be affected by both projects. At the regional level, the cumulative impact of this project would be minor. A reduction in agricultural production is possible during construction but it would be small and confined to the construction period.
Nyaninyuk Wind Farm	A proposed windfarm consisting of up to 58 wind turbine generators with a total combined capacity of up to 330MW.	This project, currently in its feasibility stage, is located between Evansford, Clunes and Waubra and intersects with Project. The establishment of wind turbines and the Project transmission line mean that there is likely to be some cumulative impacts. At the property level, there is the potential for directly affected properties to experience moderate to high impacts if, for example, the construction periods were to coincide. At the regional level, the cumulative impact of this project would be minor for several reasons. The land is predominantly used livestock grazing (a relatively low value per hectare use), the likely area of agricultural land permanently affected will be low (tracks and tower footprints) and it will be possible to continue to use the affected areas for grazing (post-construction).
Outer Metropolitan Ring Road / E6 (OMR)	Development of a new four-lane (bi-directional) freeway, linking Werribee with Thomastown, via Melton, Tullamarine, Craigieburn, and Epping. The proposal includes a freight and high-speed passenger rail line in the median strip.	Detailed design of the Outer Metropolitan Ring Road/E6 (OMR) is not yet finalised but will likely intersect and displace agricultural land on some of the same properties affected by this project. If a property is affected by both projects, the impacts could be moderate to high because the road project will result in permanent loss of agricultural land. At the regional level, the improved transport connectivity could positively impact agricultural and forestry industries. At the regional level, the cumulative impact of this project would be minor for two reasons. The land is not used for high value production and the likely area of land affected will be low (relative to the regional agricultural sector).

PROJECT	PROJECT DESCRIPTION	RELEVANCE TO THIS ASSESSMENT
Toolern Vale Solar Farm	This proposed solar farm comprises 34,076 solar panels for a 12.5MW of generation with battery storage of 25MW. It is proposed to have a 30-year life. The property involved is 39.8 hectares and is in the Green Wedge Zone.	This solar farm will be located between Diggers Rest and Melton, directly adjacent to the Project Land. Although adjacent, the land involved in this solar farm is separate to the property being used for the Project. At the regional level, the cumulative impact of this project would be minor. The area affected is small and its current use is low intensity grazing, which is expected to continue following the installation of the panels.
Victoria to New South Wales Interconnector West (VNI West)	A proposed future transmission line connecting clean, low-cost renewable power from renewable energy zones (REZs) in New South Wales and Victoria to the Project. VNI West will connect to the Western Renewables Link Project at the new 500kV terminal station at Bulgana.	This preferred option for this project connects with the Project at Bulgana. There is currently insufficient detail publicly to assess the cumulative impacts with respect to individual properties. However, it is possible that the VNI West transmission line could intersect some of the same properties affected by the Project. If this occurs, there could be cumulative impacts on those businesses that could affect their agricultural production. In this situation, the cumulative impact for the property could be significant. At the regional scale any cumulative impact is expected to be minor because the scale of the impact would be small (likely to be small areas on only one or two properties).
Watta Wella Renewable Energy Project	The proposed Watta Wella Renewable Energy Project consists of three co-located renewable energy projects - a wind farm, solar farm and battery energy storage facility. The proposed location for the Project is approximately 16 kilometres north-east of Stawell, in north-west Victoria. The combined site is approximately 5,200 hectares of farmland predominately used for cropping and sheep grazing. The majority of the land will form part of the wind farm project. Approximately 170 hectares will make up the solar farm and approximately 10.5 hectares will make up the battery energy storage facility.	This project is located at 465 Vineyard Road, Concongella, approximately 6km from the western end of the Project Land. At a property level, this distance means that it is very unlikely that any properties would be affected by both projects. The agricultural production on the Watta Wella site will be affected by their project but the reductions in agricultural production would not be significant at a regional scale, and therefore the cumulative impact would be minor. At the regional level, the cumulative impact of this project would be minor. While the land is used for cropping and livestock, and a significant area is involved, the majority of the 5,200 hectares will be wind farm, which means that it can continue to be used for agricultural production.
Western Irrigation Network (WIN) Scheme – Recycled Water Supply Infrastructure Project	A large-scale irrigation project that will deliver Class C recycled water for irrigation of farmland in the Parwan-Balliang agricultural district south-east of Bacchus Marsh.	This project intersects with the Project Proposed Route between Bacchus Marsh and Melton. The construction of Western Irrigation Network could have some short-term negative impacts on agriculture in the area, but the overall impacts will be positive for agriculture. At the property level it is likely that there will be properties affected by both projects. Given the strong positive benefits to agriculture from the WIN, it is unlikely that there will be any significant cumulative negative impacts. At the regional level, the cumulative impact from the two projects would be negligible to positive. The area affected negatively by the Project will be small, particularly relative to the positive impacts of the irrigation project.

Cumulative impacts on plantation forestry

Native timber harvesting from Victoria's State Forests ended in January 2024. This change will see plantation forestry grow in importance for the state's forestry sector. The plantation estate, made up of mainly radiata pine and southern blue gum, covers 382,600 hectares state-wide. The Project region includes approximately 3,280 hectares , or around one per cent, of the state's total area of plantation forestry. This assessment has found that the Project impacts directly on 36.7 hectares of forestry, meaning that production from that area is lost for the life of the Project.

While the loss due to this Project is small, there are many similar infrastructure projects underway across the State. It is possible that, at a State level, and considering all these infrastructure projects in conjunction with the native timber ban on public land, there could be a significant cumulative impact and pressure on the plantation forestry industry.

11 Summary of mitigation, monitoring, and contingency measures

11.1 CASE STUDIES AND MITIGATIONS

The three case studies presented in Appendix A generated information that has informed the mitigations and EPRs developed as part of this assessment. The ten specific themes (and associated mitigation measures) derived from the case studies are presented here in Table 11-1.

Table 11-1: Description of the findings from the three case studies and their contribution to informing the mitigations and EPRs for this study

THEMES AND MITIGATION MEASURES IDENTIFIED IN CASE STUDY	WESTERN RENEWABLES LINK APPLICATION
Tower Heights and Position	
Sheep Grazing ▪ Raise tower heights or position towers to avoid impact on shelterbelts and revegetation areas. ▪ Position the towers to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with fences and keeping clear of shearing shed, dams, etc.	The development of the Proposed Route and positioning of towers for the Project has aimed to avoid or minimise impacts on productive or valuable land, critical farm infrastructure, shelterbelts and vegetated areas. To minimise impacts to properties, the easement and towers are aligned with property boundary fences where possible. There are minimum electrical safety distances that must be provided between conductors and the ground and any objects that may traverse the ground underneath. The clearance from conductor to ground allows vehicles and equipment between 5m in height (without a permit) and up to 8.6m in height (with a permit) to be used within the easement. To provide or increase the clearance to avoid shelterbelts and vegetated areas, tower heights can be increased up to a maximum of 80m and spans between each tower can be adjusted. Landholders have further opportunity to provide feedback on the design provided to them on the indictive landholder property plans as part of the consultation process to negotiate *Option for Easement agreements*. The EPRs that have been developed to manage these impacts include: ▪ EPR AF1 - Develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy: ▪ EPR EM3 - Develop and implement a Property Access and Management Plan ▪ EPR EM4 – Maintain a record of Specific Property Access Requirements (SPAR) and implement during construction and operation In addition to the PAMP required by EPR EM3 which will be implemented on all properties, landholders can also nominate additional ‘Specific Property Access Requirements’ as per EPR EM4 to avoid and minimise disruption to properties and
Mixed Farming ▪ Raise tower heights to allow large farm machinery to be used subject to safety assessments. ▪ Consult with the landholder to understand their business and impacts that their business will experience; and determine any practicable mitigation measures that could be applied to lessen the impacts of the Project (both infrastructure and day to day operations). ▪ Position the towers and easements to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with existing structures or on boundary fences between different landholders (which are less likely to change compared with internal fences). Keep clear of irrigation systems, machinery sheds, dams, etc.	
Horticulture and Cropping ▪ Raise tower heights and position towers and easements to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with existing structures or on boundary fences between different landholders (which are less likely to change compared with internal fences). Alternatively, position towers and raise tower heights over undulating land to maintain necessary separation distances between irrigators	

THEMES AND MITIGATION MEASURES IDENTIFIED IN CASE STUDY	WESTERN RENEWABLES LINK APPLICATION
or large machinery and the transmission line, thereby enabling irrigated farming to continue. Avoid siting tower footings in current production areas and keep clear of other significant infrastructure (machinery sheds, dams, etc.).	lifestyle. These requests could include identifying important areas or infrastructure and requesting they be avoided i.e., sheds and dams.
Advance Notice	
Sheep Grazing ▪ Provide the farmers with maximum advance notice (weeks to months) of upcoming construction activity to enable adaptation of rotations or modification to other practices.	Landholders can submit 'Specific Property Access Requests' when a voluntary *Option for Easement agreement* is in place. Requests for different notice periods to those provided for in the PAMP can be made. AusNet will provide advance notice (up to 12 months before construction) of indicative construction start date. EPR EM3 - Develop and implement a Property Access and Management Plan includes a requirement to notify of the construction timetable to assist landholder planning.
Mixed Farming /Horticulture and Cropping ▪ Provide the farmers with maximum advance notice (if possible, 6 to 12 months) of upcoming construction activity to allow landholders time to make appropriate arrangements (e.g., avoid planting crops in areas that are to be disturbed, alter rotations, or renegotiate supply contract with their processor).	
Water Supply	
Sheep Grazing ▪ Maintain water supply to all livestock paddocks and troughs, installing temporary supplies or pipelines if necessary.	The development of the Proposed Route and positioning of towers for Project has sought to avoid or minimise impacts on productive or valuable land and critical farm infrastructure, including irrigation systems. EPR AF1 - Develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy, is relevant for issues related to water supply. It includes a requirement to provide a process of identifying and mitigating impacts to infrastructure including water supply for livestock, paddocks, troughs, shelterbelts and irrigated areas outside the construction area.
Mixed Farming ▪ Maintain water supply to all paddocks and install temporary supplies or pipelines and pumps if necessary. Avoid constraints to the use of the lateral move irrigation system.	
Horticulture and Cropping ▪ Maintain water supply to all potato and garlic paddocks and install temporary supplies or pipelines and pumps, if necessary. Avoid constraints to the use of the central pivot irrigation system.	
Farm Access	
Sheep Grazing/Mixed Farming ▪ Maintain farm access and laneways, or provide workarounds for farmers and livestock.	Landholders can make specific property access requests under the voluntary *Option for Easement agreement*. Contractors must use the dedicated access routes and consult with landholders about scheduling and other matters. EPR AF1 - Develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy includes a requirement to use all reasonable endeavours to consult with the landholder to determine how to best avoid and minimise impact on livestock and farming operations.
Horticulture and Cropping ▪ Maintain farm access and tracks or provide workarounds for the farmers and adhere to traffic management requests. Avoid traffic conflict and accidents	

THEMES AND MITIGATION MEASURES IDENTIFIED IN CASE STUDY	WESTERN RENEWABLES LINK APPLICATION
through coordinating with the farmer for movement scheduling, providing integrated radio communication system, or establish dedicated access routes.	EPR EM3 - Develop and implement a Property Access and Management Plan , includes General Access Protocols to provide the landholder with a description of the work program and timing and type of activities conducted to avoid conflicts between farming operations and construction activities. EPR EM4 - Maintain a record of Specific Property Access Requirements (SPAR) and implement during construction and operation
Construction Schedule	
Sheep Grazing ▪ Schedule noisy or heavy construction activity outside sensitive periods (such as lambing and shearing) and discuss this timing with the farmer as early as possible to allow them time to make appropriate arrangements (e.g., move stock or confirm shearers).	EPR EM5 - Develop and implement a Communications and Stakeholder Engagement Management Plan (CSEMP) includes establishing arrangements for specific communication and engagement with landholders including a dedicated 'case manager' for each landholder. The CSEMP also requires communication of a staging plan that demonstrates reasonable endeavours will be made to avoid sensitive periods. This plan is updated and made available to landholders monthly. An additional relevant EPR is EPR NV2 - Minimise Construction Outside of Normal Working Hours. This EPR provides the normal work hours and requires a process for notification of any 'Unavoidable Works' to potentially affected landholders. Landholders will have the opportunity to request specific protections for livestock or farming activities in the specific property access requirements that are part of the voluntary *Option for Easement agreement*.
Mixed Farming ▪ Schedule noisy or heavy construction activity outside sensitive periods (such as when soils are waterlogged, during potato harvesting, or during lambing).	
Horticulture and Cropping ▪ Schedule heavy construction activity outside sensitive periods (such as when soils are waterlogged, or during harvesting).	
Fire Training	
Sheep Grazing ▪ Provide Project workforce with adequate fire safety training and protocols.	EPR EM3 - Develop and implement a Property Access and Management Plan includes fire management measures and requires all on-site personnel to be trained in the basic inspection, safe-use and operation of all relevant fire-fighting equipment.
Biosecurity	
Sheep Grazing ▪ Work with the landholder so that high biosecurity standards are maintained during construction, operation, and decommissioning stages. Adequately train and monitor all contractors and prevent all off-track vehicle/machinery access. Enforce compliance with the farmers' biosecurity management plan for their property. Use the farmers' trusted contractors for rehabilitation (e.g., soil works, replanting, fencing) where possible.	Landholders can nominate specific biosecurity requirements as part of the voluntary *Option for Easement agreements*. EPR EM3 - Develop and implement a Property Access and Management Plan includes biosecurity requirements that will be applied across all properties including: ▪ an obligation for cleaning (by removing visible soil) and sanitation of footwear, vehicles and plant and equipment ▪ an obligation to maintain a register that identifies properties with existing biosecurity management plans which include any additional matters that must be met over and above those within the PAMP
Mixed Farming/Horticulture and Cropping	

THEMES AND MITIGATION MEASURES IDENTIFIED IN CASE STUDY	WESTERN RENEWABLES LINK APPLICATION
▪ Work with the landholder so that biosecurity standards are maintained during construction, operation, and decommissioning stages. Implement a project-wide, stringent biosecurity management plan and protocols, adequately train and monitor all contractors, and prevent all off-track vehicle and machinery access. Enforce compliance with the farmers' biosecurity management plan for their property. Use the farmers' trusted and local contractors for rehabilitation (e.g., soil works, replanting, fencing) where possible.	▪ an obligation to maintain a register that identifies any properties that have specific areas with a known biosecurity risk or issue (e.g., disease, weeds or contaminant) and any additional actions (or restrictions) that are required to be addressed to prevent further spread
Compensation	
Sheep Grazing ▪ Take all necessary measures to provide stock security and safety during all construction works. If there are unavoidable and substantiated production impacts, they will need to be assessed as part of payments to be made as part of the process.	EPR AF1 - Develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy includes a requirement to determine any practicable mitigation measures that could be applied to lessen the impacts of the Project on the business. It also includes the requirement that landholders are advised as to whether disruptions (e.g., impacts on farm or forestry business infrastructure) would be rectified, rehabilitated or compensated, either under the Options for Easement agreement, or pursuant to the requirements of the Land Acquisition and Compensation Act.
Mixed Farming ▪ Work with the landholder to identify water supply points to all livestock paddocks and troughs and all irrigated areas to avoid impacts as far as practicable. If there are unavoidable impacts, they will need to be assessed as part of payments to be made as part of the process. This could result, for example, in an irrigation redesign to optimise irrigated cropping growing areas.	
Horticulture and Cropping ▪ Provide early notice to farmers of construction commencement to enable alternative farming arrangements to be made to minimise loss. If there are unavoidable impacts, they will need to be assessed as part of payments to be made as part of the process.	
Avoidance of Vulnerable Land	
Sheep Grazing ▪ Where possible, avoid construction on areas prone to erosion, take steps so that minimal soil is disturbed, and audit that land and pasture rehabilitation works achieve, as close as reasonably practical, the pre-construction conditions.	EPR EM3: Develop and implement a Property Access and Management Plan includes the rehabilitation requirements to be implemented on all properties. The PAMP also includes a requirement to collect baseline information at the commencement of construction activities so that the rehabilitation/reinstatement is to the condition set out in the existing land (baseline) conditions documentation (or as close as reasonably practicable) and in accordance with the Construction Environmental Management Plan (CEMP) and all applicable laws and approval requirements. An additional EPR – GSL2 - Develop and implement a Sediment and Erosion Control Management Plan – sets out the investigation and management requirements to minimise erosion and sedimentation during construction.
Mixed Farming/ Horticulture and Cropping ▪ Where possible, avoid construction on waterlogged soils, take steps so that minimal soil is disturbed, and audit that land and pasture rehabilitation work achieve, as close as reasonably practical, the pre-construction conditions.	

THEMES AND MITIGATION MEASURES IDENTIFIED IN CASE STUDY	WESTERN RENEWABLES LINK APPLICATION
Safety Assessment	
Mixed Farming ▪ Provide safety assessments to determine where the safe operation of irrigation equipment and large machinery can continue, and work to enable that the farmers ability to use their large machinery is optimised.	There are minimum electrical safety distances that must be provided between conductors and the ground and any objects that may traverse the ground underneath. AusNet has designed the Project with a minimum clearance from conductor to ground which allows vehicles and equipment between 5m in height (without a permit) and up to 8.6m in height (with a permit) to be used within the easement.

11.2 SUMMARY OF MITIGATIONS

In this section, mitigation measures from the construction, operation and decommissioning stages are brought together from Sections 7, 8, and 9, and complemented by the findings from the case studies. Table 11-2 summarises the mitigation measures proposed to avoid, mitigate, or manage agriculture and plantation forestry impacts associated with the Project. Because these mitigations were instrumental in developing the EPRs, references to the specific EPRs relevant to the mitigations have been included in the table.

Table 11-2: Mitigation measures relevant to agriculture and plantation forestry

STAGE	MITIGATION MEASURE
Construction	**Agricultural economic losses** Economic impacts to agricultural properties and production will be mitigated through project design, where possible, including: ▪ Avoiding significant farm assets and infrastructure (e.g., overhead irrigators, homes, dams, sheds, yards) ▪ Minimising isolation and redundancy of productive land ▪ Minimising overlap of easement and land under irrigation ▪ Allowing the conductors to span significant agricultural assets (irrigation areas, shelterbelts). Other measures to mitigate economic impacts that will also be required, relate to the timing and scheduling of construction activities. Construction timelines and schedules will be required to consider farm operations and to, for instance, avoid scheduling certain activities during sensitive periods of the year for agriculture, including breeding, lambing/calving, sowing and harvesting. It will also be critical to provide landholders with adequate notice of construction activities to avoid the risk of farmers investing in crops or activities that will not reach the point of financial return before construction starts. An Agriculture and Forestry Business Mitigation and Support Strategy (AF1), Property Access and Management Plan (EM3) and Specific Property Access Requirements (EPR EM4) will be developed and implemented for all affected farm properties. The Strategy requires consultation with landholders to identify conditions and mitigation actions that will minimise production and financial impacts on a property basis. Consultation by AusNet to implement the strategy

STAGE	MITIGATION MEASURE
	will be completed so that farm activities, assets and values are adequately understood at an individual farm level, and unnecessary production and financial impacts are avoided and mitigated/ compensated. In high value agricultural areas, where farm irrigation infrastructure is impacted by construction, and where there is the expectation that this impact will continue during operation stage, an irrigation evaluation shall be undertaken. This evaluation will determine if adjustments to paddock layout, adjustments to current irrigation equipment or use of alternative irrigation equipment could significantly reduce production losses. Where feasible, compensation and / or support shall be provided to farmers to adjust or replace irrigation systems and paddock layout. Economic impacts will be further mitigated through financial compensation for losses and additional production costs incurred during the construction period (in accordance with the Land Acquisition and Compensation Act). Removal or detrimental alteration to farm infrastructure shall also be compensated. This may also include associated costs (design, planning permit and works approvals, building costs, etc.).
Construction	**Disruption / restriction to farm activities** Some disruptions to agricultural businesses have been mitigated through project design. This includes: ▪ Avoiding significant farm assets and infrastructure (homes, dams, sheds, yards) ▪ Allowing the conductors to span significant agricultural assets (irrigation areas, shelterbelts). There are also some properties that are traversed but there is no physical infrastructure on-ground. For each affected property, an Agriculture and Forestry Business Mitigation and Support Strategy (AF1) should be prepared. Where possible, this should be done in consultation with the affected landholder(s). This Strategy should identify how construction activities can be arranged in order to minimise disruption to farm practices, schedules and production. These negotiations shall be held in good faith by AusNet in accordance with the Project's Communications and Stakeholder Engagement Management Plan (EPR EM5), so that activities at an individual farm level are understood such that unnecessary disruptions or restrictions to farming activities can be avoided. The negotiations should include (at least) maintenance of property entry and exit points; biosecurity risk management (to prevent introduction or spread of weeds, pathogens and pests); limits of work area and access; hours of operation; dust, soil and spoil management including dust suppression. These negotiations (and adjustments to plans) shall also take into account the greater potential for disruptions during sensitive periods of the year for agriculture, including breeding, lambing / calving, sowing and harvesting. Where disruptions cannot be avoided, the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) should describe how they will be mitigated through the use of measures including (but not limited to) temporary physical crossovers and other workarounds for access to critical farm infrastructure, provision of temporary water supplies and distribution systems so that there are no disruptions to water supply for stock or other farm uses; temporary fences and gates; temporary stock yards and loading facilities. Where farms are under irrigation, Project construction and operation could disrupt normal farm irrigation operations. This will be identified in the irrigation evaluation identified as a requirement in the previous section. Actions required to avoid or minimise this disruption should be part of the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1). Ongoing communication with farmers will be important to minimise disruption and to enable forward planning. Farmers shall be given notice of approaching construction activity as early as possible so that they do not invest in crops or activity that will not reach the point of financial return before construction starts, and they can plan their grazing rotations accordingly. Financial compensation shall be negotiated with farmers for disruptions that will result in costs to the farm business or time impositions on the farmer. If construction ceases or pauses for an extended period, access for farming activities should be re-instated as much as feasible.

STAGE	MITIGATION MEASURE
Construction	**Isolation and redundancy of productive land** The possibility of land becoming isolated and redundant for farm use would be mitigated through project design, where possible, including through: ▪ Route refinement to avoid significant farm assets and infrastructure ▪ Towers being positioned to allow conductors to span significant agricultural assets and where possible, avoid impacting irrigated areas ▪ Where possible placing the route on paddock or property boundaries (i.e., avoid bisecting or diagonally crossing paddocks) ▪ Overhead lines reduce the barriers to farming activity during construction, as a linear trench is not required through each property. With overhead lines, some properties are traversed with no physical intervention or restriction. Land isolation and redundancy impacts will be further mitigated by using micro-siting of, for example, towers. This should be used where adjustments could significantly reduce the risk that parts of a property are separated from the main areas of productive land. Where isolation of parts of the property cannot be avoided during construction, actions must be taken so that stock and critical farm infrastructure are not separated or isolated for significant periods of time. In high value agricultural areas, where irrigation infrastructure is impacted and redundant areas are created during construction, and where there is the expectation that this impact will continue during the operation stage, an irrigation evaluation should be undertaken. This evaluation will determine if adjustments to paddock layout, adjustments to current irrigation equipment or use of alternative irrigation equipment could significantly reduce the impacts of isolation and redundancy. Impacts will be further mitigated through financial compensation (in accordance with the Land Acquisition and Compensation Act) for production losses and any additional production costs incurred. This should include compensation and / or support for farmers to adjust irrigation systems and paddock layout such that productive uses that are the same or similar to those present prior to construction, can continue. These requirements must be identified during consultation required by the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1). This strategy should also identify any other construction conditions and mitigation actions that will minimise isolation and redundancy of productive land.
Construction	**Soil management** Impacts on soil can be mitigated through good soil management practices during construction, through rehabilitation of sites where soil has been disturbed or moved, and through on-going monitoring of these areas. The construction Principal Contractor will be responsible for ensuring standard techniques for the retention and conservation of soils are used on each property. These techniques must include the separation of the topsoil and subsoil, and stockpiling and protection (covering to protect from wind and water erosion) of those soils, and track and site watering to minimise dust (using water tankers). Rehabilitation of sites will include the removal of foreign gravel and base materials, and reinstatement of the soil profile, particularly the topsoil. This must include appropriate aeration, compaction, profiling and erosion control, prior to re-planting. Post-construction monitoring along the Proposed Route will be undertaken for early identification and management of regrowth problems, erosion, subsidence, compaction and contamination. This monitoring may be undertaken by landholders and reported to AusNet via their landholder liaison contact. The Geology and Soils Impact Assessment includes EPR GSL2 – Develop and implement a Sediment and Erosion Control Management Plan and the Air Quality Impact Assessment includes EPR AQ1 – Develop and implement an Air Quality Management Plan which addresses the impacts and mitigations noted here.

STAGE	MITIGATION MEASURE
Construction	**Biosecurity** Biosecurity management must be documented in the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1), Property Access and Management Plan (PAMP) (EPR EM3), Specific Property Access Requirements (EPR EM4) and a Biosecurity Management Plan (EPR EM8). The key mitigations are that all vehicles, plant and equipment must have any visible soil removed and be washed down with a suitable sanitiser when they move from one property to the next (i.e., cleaned before entering each property). Vehicle washdown facilities should be to (at least) the standard detailed by Plant Health Australia ('Effective farm wash down facilities', Plant Health Australia, Grains Biosecurity Factsheets). In addition, personnel must clean their footwear removing any visible soil and using a footbath with a suitable sanitiser before entering each property. Records of vehicles, plant and equipment movement and treatment must be kept, as well as people entering and leaving the properties. Following construction of access tracks, movement of vehicles and construction equipment onto and off farming properties shall only occur within approved access corridors and along formed tracks. No vehicles or construction equipment shall cross paddocks unless along formed tracks and within an approved access route. Regular monitoring of the Proposed Route after rehabilitation is completed will also enable quick detection and eradication of emerging weeds (spraying, etc.). This monitoring is most likely to be done by the landholder but any AusNet personnel or contractors who are within the Proposed Route over time should also monitor and report any signs of weeds, pests, fungi or diseases. A system for reporting issues identified must be established. In areas where weed control relies on aerial services (e.g., steep inaccessible country), and the aerial services are affected by the Project (construction and operation), the Agriculture and Forestry Business Mitigation and Support Strategy EPR (AF1) will commit to identifying and implementing practical mitigation measures and providing information on the compensation available for individual properties or businesses, This will include options for continued weed management, specifically, cost-effective ways to achieve the same control levels.
Construction	**Disruption to livestock** Disruption to animals can be minimised or avoided through early communication with landholders. Landholders will be advised of impending construction activity, so that adequate time is given for sensitive livestock to be moved prior to works commencing. It is anticipated that on most properties, stock can be moved sufficiently far away to be unaffected during construction. In general, all construction vehicles on farms must travel at slow speed, drivers remain aware of their surroundings, give way to livestock and leave gates how they found them (open if found open, closed if found closed). Helicopter use will be minimised over paddocks holding livestock. The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1), the Property Access and Management Plan (PAMP) (EPR EM3) and Specific Property Access Requirements (EPR EM4) will consider landholder requirements and constraints.
Construction	**Contamination of soils or water** Contaminated Land Impact Assessment (IS311800-EES-CL-RPT-0003) has been completed and addresses the impacts noted in the section above. This assessment includes mitigations and measures that address management, storage and use of chemicals, fuels and hazardous materials during construction (EPR CL2) and operation. These measures also address leaks and spills.
Construction	**Plantation forestry economic impacts** Forestry operators should be given adequate notice of approaching construction activity so that they can harvest at the optimal time for their operations. This would be part of EM3, the Property Access and Management Plan (PAMP) and EPR EM4, Specific Property Access Requirements.

STAGE	MITIGATION MEASURE
	Plantation forestry operators shall receive compensation commensurate with production losses experienced during construction. The economic loss at construction should be calculated as the difference between the mature tree value and the harvested value. This would be part of the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1).
Construction	**Disruption to plantation forestry operations and infrastructure** Ongoing communication with plantation operators will be important to minimise disruption and to enable forward planning. Financial compensation shall be negotiated with landholders for disruptions that will result in additional costs to the forestry business. An overarching PAMP (EPR EM3) will be prepared and complimented by Specific Property Access Requirements for each affected property (EPR EM4). Where possible, this should be done in consultation with the affected landholder(s). These should identify how construction activities can be arranged in order to minimise disruption to plantation operations. These negotiations shall be held in good faith by AusNet in accordance with the Communications and Stakeholder Engagement Management Plan (EPR EM5), so that activities at an individual property level are understood such that unnecessary disruptions to forestry activities can be avoided. The negotiations should include (at least) consideration of property entry and exit points; biosecurity risk management (to prevent introduction or spread of weeds, pathogens and pests); limits of work area and access; hours of operation; dust, soil and spoil management including dust suppression. These negotiations (and adjustments to plans) shall also take into account the greater potential for disruptions during sensitive periods of the year for forestry such as planting and harvesting. Where disruptions cannot be avoided, the PAMP and/or Specific Property Access Requirements should describe how they will be mitigated through the use of measures including (but not limited to) temporary physical crossovers and other workarounds for access to critical areas.
Operation	**Agricultural economic losses** The Agriculture and Forestry Business Mitigation and Support Strategy (AF1) will identify operation conditions and mitigation actions that will minimise production and financial impacts for affected properties. Economic impacts will be further mitigated through financial compensation for losses and additional production costs incurred during the operation period (in accordance with the *Option for Easement* agreement or the Land Acquisition and Compensation Act).
Operation	**Biosecurity** During operation AusNet's existing biosecurity management procedures within its HSEQ Management System will be implemented for all affected properties. If any affected properties have additional requirements these must be identified during consultation pursuant to the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and recorded as site specific requirements (EPR EM4). The key mitigations in AusNet's existing procedures are that all vehicles, plant and equipment and footwear must have any visible soil removed and be washed down, including use of biosecurity chemical wash and decontamination where required, when they move from one property to the next (i.e., cleaned before entering each property). All vehicles must contain biosecurity kits that are maintained and replenished. AusNet's existing biosecurity management procedures require that where a new biosecurity risk and/or specific access requirements are identified, it must be recorded and entered into AusNet's incident management system. Further, any environmental impact during Project works must be reported to the landowner and the emergency Animal Disease Watch Hotline (if required). Records of vehicles, plant and equipment movement and treatment must be kept, as well as people entering and leaving each property. Following construction of access tracks, movement of vehicles and construction equipment onto and off farming properties shall only occur within approved access corridors and along formed tracks. No vehicles or construction equipment shall cross paddocks unless along formed tracks and within an approved access route.

STAGE	MITIGATION MEASURE
	In areas where weed control relies on aerial services (e.g., steep inaccessible country), and the aerial services are affected by the Project (construction and operation), the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will commit to identifying practical mitigation measures and information on the compensation available for individual properties or businesses. This will include options for continued weed management, specifically, cost-effective ways to achieve the same control levels.
Operation	**Isolation and redundancy of productive land** It is assumed that the proposed mitigations during construction stage as detailed in Section 7.4 and captured in the Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will be fully implemented and will be effective in resolving many isolation and redundancy issues (for the life of the Project).
Operation	**Disruption to livestock** The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) and the Specific Property Access Requirements (EPR EM4) will address the issue of livestock disruption during operation of the Project. Disruption to animals can be minimised or avoided through early communication with landholders. Landholders will be advised well in advance of any activities that require entry to the property. This is intended to allow for stock to be moved to avoid impacts. All vehicles entering the property must travel at slow speed, drivers remain aware of their surroundings, give way to livestock and leave gates how they found them (open if found open, closed if found closed). Helicopter use will be minimised over paddocks holding livestock.
Operation	**Plantation forestry economic impact** Plantation forestry operators will receive compensation for loss of production on the easement land.
Operation	**Plantation forestry operations** The Agriculture and Forestry Business Mitigation and Support Strategy (EPR AF1) will require AusNet to consult with operators to identify operation activities in order to minimise disruption to plantation operations.

11.3 MONITORING AND CONTINGENCY MEASURES

The monitoring and contingency measures that are proposed to assess agriculture and plantation forestry impacts associated with the Project are summarised in Table 11-3. These particular impacts have been included in this monitoring plan because they have the highest residual risk.

Table 11-3: Monitoring and contingency measures relevant to agriculture and plantation forestry

STAGE	MONITORING OR CONTINGENCY MEASURE
Construction and operation	**Soil and rehabilitation** Post-construction monitoring along the Proposed Route should be undertaken for early identification and management of regrowth problems, erosion, compaction, and contamination. This monitoring may be undertaken by landholders and reported to AusNet. AusNet should establish a complaints process for landholders (consistent with the Australian Standard AS/NSZ 10002:2014 Guidelines for Complaint Management), with a commitment that a responsible person will respond within a reasonable timeframe and repair any damage or bring the rehabilitated land up to standard. AusNet should also monitor that rehabilitation is performed to agreed standards, and that the outcomes are fair to landholders.
Construction and operation	**Biosecurity** Regular monitoring of the Proposed Route that is carried out through the construction and operation stages (as part of AusNet annual inspections) should also enable quick detection and eradication of emerging weeds (spraying, etc.) and other pests and diseases. This monitoring is most likely to be done by the landholder, but any AusNet personnel or contractors should also monitor and report any signs of weeds, pests, fungi or diseases. The Biosecurity Management Plan (EPR EM8) should include records of the movement of people and vehicles on and off the affected properties during construction as part of biosecurity monitoring and record keeping requirements.

12 Environmental Performance Requirements

EPRs set out the environmental outcomes to be achieved through the implementation of mitigation measures during construction, operation and decommissioning. While some EPRs are performance based to allow flexibility in how they will be achieved, others include more prescriptive measures that must be implemented. Compliance with the EPRs will be required as a condition of the Project's approval.

To meet the EES evaluation objective of avoiding and/or minimising impacts to agriculture and forestry, the EPRs outlined below are recommended.

Table 12-1: Agriculture and Forestry Environmental Performance Requirements

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
AF1	**AF1: DEVELOP AND IMPLEMENT AN AGRICULTURE AND FORESTRY BUSINESS MITIGATION AND SUPPORT STRATEGY** 1. Prior to the commencement of construction, develop and implement an Agriculture and Forestry Business Mitigation and Support Strategy to avoid, minimise and mitigate impacts to agriculture and forestry (such as direct disruptions and disruption to farm and forestry businesses) from the Project, to the extent reasonably practicable. The strategy must be informed by the Communications and Stakeholder Engagement Management Plan (EPR EM5). 2. The strategy must define the process and requirements for: a) Consulting with landholders to discuss their individual business and specific impacts that their business may experience due to the Project. b) Provided the landholder agrees to engage with the Project, identifying, offering and implementing any practicable mitigation measures that could be applied to minimise the impacts of the Project on the individual business (both infrastructure and day to day operations). This includes but is not limited to measures that seek to, where practicable: i. Maintain access for farm operations ii. Maintain water supply for livestock troughs or relocate and re-establish at an agreed location iii. Avoid the disturbance of farm assets such as sheds or relocate and re-establish assets in an agreed location iv. Avoid irrigation systems or if not practicable re-design the system and replace it to enable irrigation of the affected paddock v. Maintain fences and gates or relocate and re-establish to maintain workable paddocks vi. Provide for reinstatement and rehabilitation of construction areas and access tracks c) Documenting the above discussions (a and b) and agreed mitigation measures for individual properties. This document will be provided to the landholder. d) If relevant and requested by the business, the appointment of agricultural or forestry consultant(s) with skills and qualifications relevant to the affected business, to advise the business on mitigation of	All	Construction, operation

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
	specific property impacts (e.g., redesign of irrigation systems). e) Providing information to the land title holder as to whether disruptions (e.g., impacts on farm or forestry business infrastructure) will be rectified, rehabilitated or compensated, either under the Options for Easement agreement, or in accordance with the requirements of the Land Acquisition and Compensation Act 1986. f) Documenting areas on a property that should be avoided where reasonably possible and to record and implement any specific property biosecurity requirements as required. g) Notifying landholders of construction timetable to assist landholder planning. h) A reporting and complaints handling system for landholders and community to use consistent with the Australian Standard AS/NZS 100002: 2014 Guidelines for Complaints Management in Organisations. i) Consulting with neighbouring landholders who have been identified as being indirectly affected and identifying reasonable mitigation measures which could be offered. 3. The Project will provide for engagement with businesses for 24 months following completion of construction of the towers on their property and will implement agreed mitigation measures within that time unless otherwise agreed with the relevant business.		
EM3	**EM3: DEVELOP AND IMPLEMENT A PROPERTY ACCESS AND MANAGEMENT PLAN** 1. Prior to the commencement of construction, prepare and implement an overarching Property Access and Management Plan (PAMP) to minimise impacts to landholders due to land access and occupation required for construction of the Project, so far as reasonably practicable. 2. The PAMP must detail the process and procedures to be followed to access landholders' property for construction of the Project and include process and requirements regarding the following matters: a) That each landholder will have a single point of contact (i.e., case-manager) with the Project for two-way communications. b) Notification procedures to the landholders of Project approvals, construction activities and associated access to the property including provision of a plan showing the indicative positioning and design of temporary and permanent access roads (i.e., any access track, road or path) required to facilitate the Project, including the points of entry. c) Notification to the landholder of the final location of all Project activities to occur on their property including tower locations, temporary fencing, portable toilets and removal of any vegetation. d) Biosecurity requirements including an obligation to: i. Comply with requirements of the Biosecurity Management Plan, including record keeping requirements, as outlined in EPR EM8.	All	Construction

EPR #	ENVIRONMENTAL PERFORMANCE REQUIREMENT	PROJECT COMPONENT	STAGE
	ii. Maintain a record of properties that have existing biosecurity risks, issues (e.g., disease, weeds, or contaminant) or management plan(s), and which include any additional matters that must be met, over and above those within the PAMP. e) Process for completing baseline assessment of existing land conditions (including soil, landform, vegetation, infrastructure, etc) within the proposed transmission line easement, any proposed permanent access roads/areas, and any proposed temporary construction areas and proposed temporary access tracks for rehabilitation reference. f) An overview of the protocols and mitigation measures related to: i. Fire management. ii. Livestock and farming operations, including animal health and safety iii. Soil management and drainage. iv. Reinstatement and rehabilitation of land after works, and inspections to confirm rehabilitation and reinstatement have been achieved. v. Notification, management and documenting of incidents.		
EM4	**EM4: MAINTAIN A RECORD OF SPECIFIC PROPERTY ACCESS REQUIREMENTS (SPAR) AND IMPLEMENT DURING CONSTRUCTION AND OPERATION** 1. Develop and maintain a record of agreed specific property access requirements to be implemented to avoid and minimise impacts to the property and its operations.	All	Construction, operation

Other EPRs relevant to the agriculture and forestry impact assessment include:

- EPR EM5 Develop and implement a Communications and Stakeholder Engagement Management Plan
- EPR EM7 Develop and implement a Complaints Management System
- EPR EM8 Develop and implement a Biosecurity Management Plan
- EPR GSL2 Develop and implement a Sediment and Erosion Control Management Plan
- EPR AQ1 Develop and implement an Air Quality Management Plan
- EPR CL2 Develop and implement Contaminated Land Management and Mitigation Measures for Construction
- EPR NV2 Minimise Construction Outside of Normal Working Hours
- EPR EM11 Develop and implement a Decommissioning Management Plan.

It is noted that the EPRs do not apply to establishment of the laydown areas (i.e., only their use during construction once established) or the development of the workforce accommodation facilities. the conditions of the draft Incorporated Document will apply for these activities. This includes the requirement for the workforce accommodation facilities to develop and implement a Construction Environmental Management Plan (CEMP) that includes consideration of agriculture and forestry.

13 Conclusions

Construction, operation and decommissioning of the Project will have a range of impacts on agriculture and forestry production. At a state and regional production scale, these impacts are assessed to be minor, but impacts on some individual properties or enterprises may be more significant. It is noted that the lengthy and iterative design process of the Project has aimed to minimise fragmentation and disruption to farming land. Mitigations and EPRs have been developed that, when fully implemented, should be effective in minimising the impacts of the Project on landholders and primary production levels.

Agriculture is the dominant land use within the 190km Proposed Route. For the purposes of this assessment primary production land uses have been categorised as four enterprise types, considering current activity and land potential:

1. Grazing
2. Cropping
3. Horticulture
4. Forestry.

The range of agricultural products and the value of production are highly variable across the Project landscape. Many farmers operate multiple agricultural enterprises concurrently on their land, producing a range of commodities and rotating the enterprises between paddocks and across time to match market requirements, supply quotas, and for other management reasons (including weed, disease, and pest control). The soils east of Ballarat are some of the most productive in Victoria and sustain potatoes and other intensive crops with very high value production per hectare. Less intensive and less productive agricultural uses occur along the remainder of the Proposed Route. In broad terms, properties north-west of Ballarat tend to be larger in comparison to areas east of Ballarat.

13.1 CONSTRUCTION STAGE IMPACTS

It is recognised that agricultural uses of land in the Proposed Route are of significant value and concern to the community, landholders, food and fibre wholesalers and processors.

With effective implementation of mitigations and EPRs, the residual impacts of the Project across the construction stage have been assessed as minor at the state and regional scale. However, at individual property or enterprise level, there could be some impacts that property owners consider to be more significant (e.g., isolation of areas of their farm or disruptions to their operations).

The construction stage is the most intensive stage of the Project for landholders. This is the stage when any required short term, long term, or (effectively) permanent changes to farm design, equipment, land management and production activity must be implemented. Landholders must allow for the access of construction crews and to accommodate the new structures (with their inherent physical presence and their imposed safety restrictions).

The most significant impacts on agriculture and forestry during construction include:

- Loss of agricultural production from restrictions on grazing and cropping and loss of just over three per cent of the gross value of potato production, some of which is likely to be mitigated.
- Restrictions on irrigation of prime horticultural land, and isolation or redundancy of areas where paddocks are split by construction activity and transmission structures. Overall loss of land for grazing, fodder, crops, and trees, resulting in financial losses is estimated at:
  - $536,000 per annum for grazing enterprises

  - $1,216,000 per annum for cropping enterprises
  - $4,575,000 per annum for horticulture enterprises
  - $461,915 of forest products for the life of the Project
- Changes to normal farming or forestry activities to accommodate project activities.
- Disruption of livestock due to Project activities.

13.2 OPERATION STAGE IMPACTS

At the conclusion of construction activity, individual agricultural enterprises (each with unique combinations of farm design, production system, products, topography, soils, and climatic conditions) will require different lengths of time to re-establish production to normal levels. Cropping operations and some pasture could be re-established in one year, provided the growing seasons (Spring and Autumn) are favourable. In low rainfall, dryland conditions, re-establishing pasture to full production could take longer (up to two years, depending on seasonal conditions). Livestock grazing operations can resume under the transmission line once construction activity and rehabilitation is complete.

The most significant potential impacts on agriculture and forestry during the operation stage are:

- Restrictions within the easement on farm design, or on the development or use of farm infrastructure, machinery and aerial services. These restrictions may result in ongoing financial losses, opportunity costs, or increased production costs (involving time or cash costs)
- Restrictions on irrigation of prime horticultural land that cannot be mitigated, and isolation or redundancy of areas where paddocks are split by the easement or tower structures
- Exclusion of forestry production due to ongoing restriction from planting trees in the easement.

With effective implementation of mitigations and EPRs, the residual impacts of the Project during operation stages, have been assessed as minor at the state and regional scale. However, at individual property or enterprise level, there could be some impacts that property owners consider to be more significant.

13.3 DECOMMISSIONING STAGE IMPACTS

Potential impacts during the decommissioning stage are difficult to assess, due to the 80-year timeframe of the Project and the uncertainties about technology, production values, social values, and relevant regulation at that time. At a state and regional production scale, these potential impacts have been assessed as minor, but at individual property or enterprise level they could be more significant.

13.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

Based on the assessments summarised here, three EPRs have been developed to manage the Project's impact on agriculture and forestry. Those requirements cover:

1. Preparing and implementing an Agriculture and Forestry Business Mitigation and Support Strategy for affected properties.
2. Developing and implementing a Property Access and Management Plan (PAMP), which incorporates procedures for landholder communication and notification, biosecurity, fire prevention and management, soil and drainage management, livestock health and safety, rehabilitation, etc.
3. Maintaining a record of Specific Property Access Requirements and implementing during construction and operation

Other EPRs relevant to the agriculture and forestry impact assessment include:

1. Developing and implementing a Communications and Stakeholder Engagement Management Plan (CSEMP) which incorporates processes for communication that is tailored to the needs of affected landholders.
2. Developing and implementing a process for recording, managing, and resolving complaints received from affected stakeholders as part of the Communications and Stakeholder Engagement Management Plan.
3. Developing and implementing an Air Quality Management Plan to minimise air quality impacts during construction at surrounding sensitive receptors, including identifying the main sources of dust and how the Project will control dust.
4. Developing and implementing a Biosecurity Management Plan to avoid and minimise impacts on landholders, businesses and biodiversity values.
5. Developing and implementing a Sediment and Erosion Control Management Plan which incorporates drainage, erosion and sediment control measures and stockpile management from industry guidelines.
6. Developing Contaminated Land Management and Mitigation Measures for Construction to mitigate potential contamination of soils or water.
7. Minimising Construction Outside of Normal Working Hours to mitigate potential noise impacts.
8. Developing a Decommissioning Management Plan to mitigate potential impacts during the decommissioning stage of the Project.

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Appendix A Agricultural Case Studies

INTRODUCTION

The following set of case studies has been developed by RMCG, with direct input of landholders and farmers, to explore the issues associated with overhead transmission line (OHTL) in Victoria's agricultural landscapes. At a farm level, the potential impacts of overhead transmission lines are complex and vary greatly for each farm business, production system and property.

Although each of the case study farms are real, all farms are located outside of the study area and the transmission line discussed and explored with these farmers are not real projects, they are hypothetical.

There are three case studies in this series:

- Agricultural Case Study 1: Sheep farm: Grazing – sheep, growing pasture and sheep to produce prime lambs and wool.
- Agricultural Case Study 2: Mixed farming – irrigated horticulture (potatoes) plus cereal crops and grazing of prime lambs.
- Agricultural Case Study 3: Horticulture and cropping – growing irrigated potatoes, garlic and cereal crops, and some dryland crops.

PURPOSE

The purpose of the case studies is to illustrate some of the possible impacts an overhead transmission line could have on agriculture, and how these impacts can be avoided or minimised. Each of the case studies is based on a real Victorian farm business. A hypothetical transmission line has been used to explore a range of possible impacts on these farms. These case studies also help to demonstrate the range of actions that AusNet can take to avoid or minimise impacts on farms.

These case studies cannot fully describe every farm detail, nor can they cover every potential impact. The case study farms are unique businesses, with their own unique set of landscapes, weather, infrastructure, products and markets, and farming practices. These studies help to show that farmers run diverse and sometimes complex businesses, which must respond to a variety of environmental, technological, regulatory and market pressures.

Agricultural Case Study 1: Sheep farm

SHEEP ENTERPRISE - CASE STUDY

This case study focuses on a 600-hectare sheep grazing operation in Western Victoria that has a strategic business approach to land and sheep management. The property sits in a moderate rainfall area and has some erosive soils. Livestock management and rotational grazing practices for around 7,000 sheep are finely tuned to optimise land-use and profitability. The farmers have long term, ongoing programs for soil and pasture regeneration, and have a strong personal connection to the land. They sell wool and prime lambs.

If an overhead transmission line was to be constructed on this property, the farmers raised concerns that it could impact their business in the following ways:

- Disruption to farming activity. Particularly during the construction stage. If access was restricted to any of the grazing paddocks, it would affect planned grazing rotations and preparation of pasture. Access would also have to be maintained (or alternatives put in) for stock water, sheds, and laneways.
- Disruption of livestock by construction activity and machinery, including helicopters. The most sensitive times are at lambing, shearing, and during general movement and handling of sheep.
- Increased biosecurity risk. Movement of people, vehicles and equipment onto the property increases the risk of introduction of harmful pests, weeds, and diseases.
- Damage to, **or removal of natural assets** (soil, water, and vegetation). Any movement of soils, loss of native vegetation, or interruption to natural drainage could reduce the quality of the farmland and reverse years of progress made to regenerate soils, waterways, vegetation, and pasture. Loss of native vegetation could also impact on existing contractual agreements for land rehabilitation and biodiversity.

If a transmission line was planned for this property, there are a range of things that could be done ('mitigations') to avoid or minimise impacts on this farm business. If the farmers discuss issues with AusNet early in the planning phase, mitigations may include changes to the planned location of towers, lines, and tracks. Compensation payments cover a variety of impacts, including production losses.

Farming of sheep can continue during operation of a transmission line, in accordance with certain safety restrictions and any physical constraints imposed by tower footings and overhead lines.

There have been 76 grazing properties identified along the Western Renewables Link Proposed Route.

A SHEEP GRAZING FARM FOR WOOL AND MEAT

This farming business is a sheep grazing operation in western Victoria. This is a family business that is actively managed and efficient, with aims for long term improvement of soils, pastures, animal genetics, and profitability. It uses a 'regenerative approach', to enrich soils, improve the water cycle, restore landscape function, produce healthy food, and increase farm profitability. The farm is being progressed toward potential organic certification.

The farm carries around 7,000 sheep on 600 hectares (ha). Around 70% of the sheep are Merino (predominantly for wool) and 30% are first cross ewes (for prime lambs).

Most sheep farms in this region use ‘set stocking’, where mobs (hundreds or thousands) of sheep are left for long periods (weeks, months or permanent) in large paddocks (tens, hundreds, or thousands of hectares). Rotations are infrequent or non-existent. (A ‘rotation’ means alternating use or resting of a paddock to improve soil health, optimise pasture growth and minimise risk of pests and disease.).

Using a ‘regenerative approach’, these farmers have an unusual, and a far more intensive management style. Sheep are kept in very large mobs (thousands) and are rotated quickly (several days) through a series of small paddocks (a few hectares), based on the length of the pasture. Over time, this regenerative approach helps to improve soils and increase business profitability but requires very intensive management and frequent movement of sheep.

Set stocking means less management time for the farmer but it supports fewer sheep and usually requires a longer period of supplementary feeding over summer.

On this case study farm, sheep are grazed in mobs of 1,000 to 3,000 animals across 70 paddocks. Most grazing paddocks are small, only 3 to 5 hectares. A mob of sheep is put in a paddock for 1 to 4 days, then they are moved on in the rotation. The paddock is then given 30 to 60 days (depending on conditions, feed requirements and growth rates) to recover and for the pasture to build up before sheep return.

Across the 600ha, this farm has critical infrastructure that includes shearing and machinery sheds; fences and gates; trees and shelterbelts; plantings for shelter, biodiversity, and erosion prevention; dams; water troughs, underground water pipes; laneways, tracks, and associated drainage. A large dam and two smaller dams are fenced off to stock. Solar pumps extract and send dam water to two header tanks, which then gravity feed across the property to water troughs in every paddock.

The farmers use working dogs and motor vehicles to move their sheep. Working dogs are highly trained and of great value to the farmers.

This case study farm is in a moderate rainfall area in south-western Victoria, with an average annual rainfall of 565mm (Australian Bureau of Meteorology). This rainfall and the farms soils and topography make it too wet for sustainable cattle grazing or cropping. The property is undulating, with a range of soil and vegetation characteristics. These include light silty soils on the rises, wet slopes and creeks, scattered native vegetation and revegetation areas, improved pasture, erosion, and some soil rehabilitation areas. The silty soils in this area are highly erosive, particularly following clearing, over-grazing, machinery disturbance or heavy rainfall.

The farmer's approach to revegetation and strict pasture management works to minimise erosion. Many shelterbelts and nitrogenous fodder trees have been planted. Trees are planted with consideration of prevailing wind direction, with low plants at the front rising to taller trees at the rear to provide better shelter and growth. Some of these plantings have been achieved with government grants that carry contractual obligations through organisations such as Landcare.

With regenerative agriculture, these landholders focus heavily on soil health, using dung beetles to work the soil and using bio-organic fertilisers. Apart from commercial drench (to kill intestinal worms) they do not use other chemicals or pesticides. They use grazing management to supress and eradicate weeds. Due to the erosive nature of the soils, they aim for 100% pasture cover throughout the year, using deep-rooted, perennial grasses. These grasses are kept relatively long to enable pasture retention (no bare ground) and to reduce the likelihood of worm infestation from grazing close to the soil surface. Short but intensive rotational grazing of the sheep means their manure is trodden into the soil and pasture cover is maintained and improved.

These farmers have been working for many years to develop genetic lines that improve animal health and productivity. They now have lines of high-quality wool and meat sheep. These farmers do not buy sheep into their flocks, to avoid the introduction of diseases. Breeding and genetic improvement is achieved through the purchase of stud rams. Rams are carefully chosen for genetics, are cleared of disease, and are quarantined before joining the flock. These farmers are accredited and sell their wool with the Responsible Wool Standard (RWS), for which they must meet rigorous animal welfare, land management and social requirements.

Merino sheep are shorn every 7-8 months and first cross ewes are shorn annually. Prime lambs are sold at around 5 months of age. Old ewes are sold as mutton at 9-10 years of age or when they do not meet farm requirements.

Table A1-1: Annual calendar for the case study sheep farm

SUMMER	AUTUMN	WINTER	SPRING
Grazing and pasture management ▪ Rotational grazing where mobs of sheep (between 1,000 and 3,000 animals) graze across 70 paddocks (each 3 to 5 hectares) over three rotations ▪ Sheep are in each paddock for 1 to 4 days, then moved on ▪ Rest paddocks for 30 – 60 days **Breeding** ▪ Join rams with ewes (A sheep pregnancy is around 20 weeks)	**Grazing and pasture management** **Drench sheep** ▪ Occurs twice a year (normal practice can be 5 to 6 times a year) **Lamb sales** ▪ Sell around 1,800 prime lambs per year (around $150/lamb)*	**Grazing and pasture management** **Pregnancy and lambing** ▪ Scan ewes for pregnancy diagnosis, check for singles/twins and provide a long-acting drench capsule ▪ Crutch all ewes for lambing ▪ Lambing occurs over 5 weeks from 1 June ▪ If supplementary feed is required for nutrition of ewes with twins, barley is purchased from certified sources.	**Grazing and pasture management** **Drench sheep** **Mark lambs** **Shearing** ▪ Merino sheep are shorn every 7 to 8 months, which averages as three shearings every two years ▪ First cross ewes are sheared annually

These farmers need assurance that their intensely managed business, with strict accreditation for biosecurity, animal welfare and environmental sustainability, would be able to withstand a large construction project. Their priorities include the welfare of their sheep, protection of accreditation, and long-term improvement of topsoil.

* These values are based on average sales from this farm in recent years (data obtained in 2022)

In addition, the farmers on this property described their deep connections to the land, given they spend every day working with the water, soil, vegetation and livestock.

POTENTIAL IMPACTS OF AN OHTL ON THIS FARM

If overhead transmission line were to be constructed on this sheep grazing property, a range of potential impacts and concerns were raised by the farmer. The ways in which AusNet could mitigate (to avoid or reduce) these impacts are outlined in the next section.

Importantly, AusNet has made a corporate commitment to supporting the health, safety and welfare of people and animals. For example, AusNet commits to maintaining essential services (such as access, water, and power) for homes and livestock. This could include the provision of alternative sources of access, water, and power.

DISRUPTION TO FARM ACTIVITY

LOSS OF GRAZING AREAS

Construction of transmission line across grazing areas will remove some areas from production for a period of time. On this sheep farm, finely tuned rotations cannot be maintained on a reduced area. On a farm with set-stocking, this may not be as critical, as stocking rates are generally lower and grazing areas are larger.

For example, if a two-week construction period prevented access to a section of this farm, it would be a major disruption. There are 70 grazing paddocks on the farm. If 7,000 sheep are moved in 4 separate mobs, every 2 days for a full two weeks, each mob would be moved 7 times. Over those 2 weeks, the sheep would consume pasture in 28 (or 40%) of the farm's 70 paddocks. Each paddock requires around 5 weeks recovery after it has been grazed, so by the time the sheep have rotated around all the farm's paddocks (5 weeks to rotate 100% of the farm), the initial paddocks have regrown and are ready to be grazed again, Construction of a transmission line through the property could restrict access to several paddocks at a time. Given the farmers' tight rotations, there is no spare pasture to graze while construction work is restricting paddocks for the fortnight of construction.

To manage the disruption, there are three options available to the farmer:

9. **Maintain stock numbers but graze more heavily** – If sheep numbers were maintained on a smaller area, this could lead to overgrazing and degradation of pastures and soils. These farmers conscientiously avoid overgrazing as it has far greater impact than just the immediate lack of feed. Overgrazing in this regenerative system would affect soils, microbes, fungi, and beneficial insects; affect the nutritional value of that pasture; and potentially impact the health and welfare livestock (higher worm risk, poorer nutrition), potentially for months or years. Supplementary feeding could slow the rotations and would require a sacrificial feeding paddock that would need to be renovated afterwards. Supplementary feed (barley) is occasionally purchased but is only available from a few select sources due to this farm's biosecurity controls, accreditation, and transition to an organic system.
10. **Reduce stock numbers** – If sheep numbers were reduced, this would affect the numbers of lambs born, the volume of wool produced, and would impact the farmers' long term genetics program. The number of genetically developed breeding ewes would reduce, and these could take several years to replace whilst still producing lambs for sale (i.e., some lambs would have to be retained rather than sold, in order to replace the breeding ewes, and would take around two years to mature to breeding age).
11. **Move stock to an alternative location** – Agistment of sheep on another property or purchasing sheep as replacements are not viable options for this farm due to their RWS accreditation, high biosecurity standards and non-chemical production system.

These choices could affect the farm in five ways: profitability, pasture and soil condition, accreditation, biosecurity risk, and/or the genetic base of the business.

FIRE

The farmers on this property avoid using machinery during summer due to high fire risk, and sheep are only moved between paddocks very early in the morning. The farmers are concerned that construction activity would not follow equivalent restrictions, thereby increasing risk of fire. They are also concerned that contractors may not be adequately trained and equipped to respond to a fire.

ACCESS AND WATER

Laneways and tracks throughout the farm are required for land management activities, moving sheep, and accessing critical farm infrastructure. Water is connected into paddock troughs through a network of underground pipes from header tanks. Construction of tracks, towers, laydown areas and workforce accommodation facilities for the OHTL could impact the stock watering network. Farmers are concerned that loss of underground pipes or restriction of access to water troughs could affect animal health and welfare, farm management activity, and the ability to maintain grazing rotations.

SHEARING

Shearing occurs twice a year and is a critical activity for this farm. During shearing (and other husbandry activities such as mustering, marking, and drenching), access to the yards and shearing shed must be unconstrained. Value of wool is based on condition and length, so shearing time is critical and affects profitability. Shearers are also highly sought-after, and farmers must book them with long lead times to enable their availability. Any change to the shearing schedule can mean the shearers are not available and shearing is missed, which impacts sheep welfare, wool quality and farm income.

DISRUPTION TO LIVESTOCK

Some transmission line construction activity (particularly sudden/loud noises or helicopters hovering overhead) could cause stress in sheep. Stress and Disruption can cause sheep to flee, and potentially injure themselves in fences, in a crush, or by stumbling over rough ground. Stressed animals make handling difficult for the farmer, such as when mobs are being moved between paddocks, in yards or at the shearing shed. Stressed animals can also lose condition and experience lower conception and lambing rates. Ewes disturbed during or immediately after birthing can separate from their lambs, which often leads to lamb death. Construction and maintenance activities for the OHTL have the potential to cause stress and affect sheep behaviours.

BIOSECURITY

This property has a strict biosecurity plan that must be followed by anyone entering the property. This includes restricting movement of people and vehicles on their property, and apart from carefully selected and screened rams, livestock are not brought onto the property from elsewhere. Contractors who currently work on the property uphold strict biosecurity procedures, including record keeping and use of on-farm vehicles (or off-farm vehicle/machinery washdowns and inspections).

Movement of transmission line construction (or operation) crews, vehicles, equipment, and machinery onto this farm increases biosecurity risks through the potential for introduction of disease, pests, or weeds. If diseases or pests are inadvertently brought onto the property, they could impact on its accreditation and potentially affect marketability of lambs and wool. Biosecurity breaches could lead to ongoing weed, pest, or disease management requirements for the farmers which has the potential to undermine profitability and long-term viability of the farm.

These farmers are very concerned that non-local contractors will not understand or uphold the high level of biosecurity management that their farm business requires.

SOIL, WATER, AND VEGETATION MANAGEMENT

These farmers have a commitment to sustainably managing their land. This includes legal agreements and responsibilities for revegetated areas of their farm that go above and beyond standard farming practices. Any changes to how the land are managed or complete removal of trees could compromise existing biodiversity outcomes in nearby or connected habitats and the wider region. For example, damage to remnant native vegetation on their properties could lead to a breach of management agreements that they have signed to secure funding. This can include covenants (on the land title) as well as agreements under programs like Land for Wildlife or grants to protect native vegetation.

On this property, soil erosion is a risk whenever soil is disturbed. With high rainfall events, this risk is exacerbated. It has taken many years for these farmers to protect and improve their soils, improve groundcover, and manage drainage. Loss of topsoil and risk of erosion are of concern for any construction activity on this property.

OHTL MITIGATIONS AND BEST OUTCOMES

If an overhead transmission line was planned for construction for this property, there are a range of mitigations to enable the farm continues to produce and be profitable, so that the farmers' long-term efforts to improve the agricultural land are supported.

AusNet can adapt the transmission line design and construction schedules if landholders engage with the planning team early to describe their property, their farm business activities, and their concerns.

This sheep grazing operation can continue under an overhead transmission line, with the following actions (mitigations) to minimise impacts on the affected farm:

- **Position the towers** to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with fences and keeping clear of shearing shed, dams, etc.
- Provide the farmers with **maximum advance notice** (weeks to months) of upcoming construction activity to enable adaptation of rotations or modification to other practices
- **Maintain water supply** to all livestock paddocks and troughs, installing temporary supplies or pipelines if necessary
- **Maintain farm access** and laneways or provide workarounds for farmers and livestock movements
- **Raise tower heights or micro-site towers** to avoid impact on shelterbelts and revegetation areas
- **Relocate shelterbelts**, or adjust the species mix and planting density in the shelterbelt to <3m height (and less than 10% density at this height) where lines cross. Take steps so that any disturbance to revegetated areas does not impact on contractual obligations to grant funding providers (and offset or reinstate if required).
- **Schedule noisy or heavy construction activity** outside sensitive periods (such as lambing and shearing) and discuss this timing with the farmer as early as possible to allow them time to make appropriate arrangements (e.g., move stock or confirm shearers)
- Provide project workforce with **adequate fire safety training and protocols**.
- Work with the landholder to so that **high biosecurity standards** are maintained during construction, operation, and decommissioning stages. Adequately train and monitor all contractors and prevent all off-track vehicle/machinery access. Enforce compliance with the farmers' biosecurity management plan for their property. Use the farmers' trusted contractors for rehabilitation (e.g., soil works, replanting, fencing) where possible.

- **Take all necessary measures to provide stock security and safety** during all construction works. If there are unavoidable and substantiated production impacts, then they will need to be assessed as part of payments to be made as part of the land compensation process.
- Where possible, **avoid construction on areas prone to erosion**, take steps so that minimal soil is disturbed, and audit that land and pasture rehabilitation works achieve, as close as reasonably practical, the pre-construction conditions.

CAN THIS PROPERTY STILL BE FARMED?

Grazing of livestock can continue under transmission lines. Grazing enterprises like this will experience some disruptions and restrictions and may need to modify activities and grazing rotations during the construction period. Some of these disruptions will result in production losses and a requirement for soil and pasture rehabilitation. Little interruption is expected during the operation stage with the transmission line easement on the property.

AusNet provides a guide for landholders who have OHTL on their land. (*A Guide to Living with Transmission Line Easements*) and can provide safety assessments and advice on request.

During the short but intensive construction stage, there could be disruptions and some restricted areas on this farm. Most of the land (especially given the large property size) can continue to be grazed by sheep and the rotational grazing schedule maintained. Some paddocks which are more important to the operation than others (due to factors such as location, sheds/yards, or pasture quality) need to be identified to AusNet during Project planning, so that access to these critical areas can be maintained wherever possible.

In an option for easement agreement, there are potentially several compensation payments. For example, landholders can be paid for providing their agreement to an 'option for easement', a construction licence fee, and for the easement being on their land. Where losses or disruptions cannot be prevented, farmers could receive additional compensation. Based on the Victorian transmission line compensation announced in May 2023, and where applicable, farmers could receive ongoing payments at the rate of $8,000 per year for each kilometre of easement on their property, for a period of 25 years (a maximum payment of $200,000/km). (https://www.westernrenewableslink.com.au/assets/resources/Landholder-guide-Land-access-easements-and-compensation-June-2022.pdf)

At the end of construction, and in accordance with the project's environmental and planning approvals, temporary access tracks and hardstand work areas will be removed (unless the farmer has requested to keep them), farm infrastructure will be reinstated, and the land and soils will be rehabilitated to defined standards that are as close as reasonably practical to pre-construction conditions.

During operation of the overhead transmission line, there is generally little impact on the operation of a grazing property. Transmission line inspection and maintenance will be conducted according to documented property access protocols. This might include bi-annual inspections by vehicles and personnel onto the property, or inspection by helicopter where appropriate. Farmers will receive advance notice of these activities and operational teams will abide by strict access and biosecurity protocols.

During decommissioning, the transmission line will be removed, and land rehabilitated to as close as reasonably practical to pre-construction conditions. After removal of the overhead transmission line and rehabilitation of soils and vegetation, this entire property can be returned to farming.

Agricultural Case Study 2: Mixed farming (horticulture, cropping, grazing)

A MIXED FARMING ENTERPRISE FOR POTATOES, CROPS, MEAT, WOOL AND HAY

MIXED FARMING ENTERPRISE (HORTICULTURE, CROPPING GRAZING)

This case study focuses on a mixed farming business in South-Western Victoria which produces potatoes for processing (into chips/crisps), sheep for meat and wool markets, a range of horticultural crops, and hay for supplementary feed. The property has high quality soils and access to groundwater for irrigation. The farmer has invested heavily in large machinery and specialised equipment to run this diverse farm business.

If an overhead transmission line was to be constructed on this property, the farmer raised concerns that it could impact their business in the following ways:

- Disruption to farming activity. Particularly during the construction stage. Restricted access to productive land, particularly the valuable potato production areas, could affect planned grazing and cropping rotations, and time-critical tasks such as planting, spraying, or harvesting. Temporary restrictions on use of the lateral irrigation system could reduce crop health and productivity.
- Isolation or redundancy of productive land. Long term presence of towers and overhead lines could reduce the productive use of high-quality land, restrict farm design and adaptability, reduce effectiveness of irrigation equipment and large machinery, and limit the introduction of efficient technologies such as robotics.
- Increased biosecurity risk. Movement of people, vehicles and equipment onto the property increases the risk of introduction of harmful pests, weeds, and diseases. It also increases the likelihood of contaminants (litter, construction waste), which could create problems with harvest and the quality assurance of crops.
- Damage to, or removal of natural assets (soil and water). Any movement or compaction of soils or interruption to natural drainage could reduce the quality of the farmland and productivity.

If a transmission line was planned for this property, there are a range of things that could be done (mitigations') to avoid or minimise impacts on this farm business. If the farmers discuss issues with AusNet early in the planning phase, mitigations may include changes to scheduling or to the planned location of towers, lines, and tracks. Compensation payments cover a variety of impacts, including production losses.

Farming of potatoes, crops and sheep can continue during operation of a transmission line, in accordance with certain safety restrictions and any physical constraints imposed by tower footings and overhead lines.

There have been 65 horticultural operations identified along the Western Renewables Link Proposed Route.

This mixed farming business in south-western Victoria produces potatoes, various crops (oats, rye, maize, chicory, clover, ryegrass), and sheep (for meat and wool). The farm business spans across four separate properties, covering almost 700 hectares in total. The properties possess a range of good quality agricultural soils. This case study will focus on the main 100-hectare property, which produces potatoes for processing (into packet chips/crisps), crops and sheep across eight irrigated paddocks.

The main property is intensively farmed due to its highly productive, free-draining soils. Potatoes are grown in a paddock once every 3 years. To prevent the development of harmful potato diseases, the farmer then rotates other crops or grazes sheep on each paddock for two years before a potato crop returns.

This farmer sources and buys certified potato seed so that the crop is free of severe diseases. Across this property's 8 paddocks, potatoes are grown in 2 to 3 paddocks at a time, on a three-year rotation. Rotations include a variety of crops in response to market demands and prices, and the grazing of lambs. This diversified approach results in optimal production and financial returns, as well as making best use of available land. The opportunistic purchase of lambs for fattening can provide good profit margins in this mixed production system.

This farmer is contracted to supply potatoes to one of Australia's largest processors and, as part of their supply contract, must meet strict quality assurance standards and harvest deadlines.

Critical infrastructure for this farm includes large storage sheds for machinery and potatoes; a large (refrigerated) cool room for storage of seed potatoes; farm tracks and associated drainage; fences and gates; storage dam; a lateral move irrigation system with fixed water connection points; water bore; a dam; underground water pipes; and trees (some in shelterbelts).

This farmer has invested heavily in appropriate machinery to conduct a large scale, mixed farming business. This includes an assortment of large machinery for cropping and potato production. The farmer uses a front-end loader, tractors, planter, harvester, grader, 4 furrow plough (30cm depth), 3m wide rotary hoe, 18m wide linkage boom spray (which folds to a height of 4m when the spray booms are not in use). Farm gateways are 7.2m wide to accommodate large machinery. Some of this machinery is imported and expensive, with a harvester costing between $400,000 and $1million, and a planter costing around $200,000.

LATERAL MOVE IRRIGATION

The farm has three lateral move irrigation systems, each is 100 metres wide and travels up and down rectangular paddocks. Each paddock is approximately 400m long and each run of the irrigator takes around 8 hours, although the speed that the irrigator moves can be adjusted to the crop needs, and to weather and soil conditions. All the irrigated paddocks are connected to a central water supply dam through a network of underground pipes.

The irrigator is driven by a diesel generator, and stops at each end of the paddock, where the farmer hauls in and re-sets the water hose for the return run. This pause allows the soil to dry a little before being watered again, thereby preventing waterlogging. This farm's irrigation system and fencing are designed for the irrigator to be moved between paddocks. Maintaining permanent fence-lines allows rotations that include the grazing of sheep.

This farm's design allows the farmer to use as much land as possible for irrigation and production. Optimisation of highly productive land in this region is important to both this farmer's business, and to the food markets that they supply. Farmers must see financial returns on the very significant capital investments (large machinery and infrastructure) that horticulture and cropping require.

Lateral move irrigation systems are effective and can reach every corner of a rectangular paddock, but they are more labour-intensive than pivot irrigators, as the farmer must re-set the hose to allow a change in direction at the end of each run. Pivot irrigators work from a fixed central watering point and do not need to be re-set at the end of each round. However, as centre pivot irrigators work in a circle, they can't reach into the corner of a paddock (unless they use an end gun), and this can affect overall productivity per hectare.

This highlights one trade-off for this farmer's business: they have invested in the more labour intensive (lateral) irrigation system, but in doing so, get higher production from their available land. While this farmer acknowledges that a centre pivot irrigation system would be easier to operate, for them, the set-up costs to change the system are prohibitive, and their ability to fully utilise such highly valuable land would be reduced.

The property has an existing 66kV power line that crosses the property. This line currently impacts on the use of irrigation equipment and large machinery. In response, the farmer has designed their farm layout and production activities to work around the power poles. The farmer also notes that there are inconveniences and dangers associated with manoeuvring large machinery around fixed structures in the middle of paddocks (especially the risk of collision).

POTENTIAL IMPACTS OF AN OHTL ON THIS FARM

If OHTL were to be constructed on this mixed farming property, there are a range of potential impacts. Some of the key concerns and impacts identified by the farmer are explained below.

Importantly, AusNet has made a corporate commitment to supporting the health, safety and welfare of people and animals. For example, they commit to maintaining essential services (such as access, water, and power) for homes and livestock. Impacts that could adversely affect human and animal welfare will be avoided. This could include the provision of alternative sources of access, water, or power.

Table A1-2: Annual calendar for the case study mixed farm

SUMMER	AUTUMN	WINTER	SPRING
CROPPING / HORTICULTURE			
Harvest ▪ Staggered potato harvest as per supply contract ▪ Processor collects potatoes daily, as required. Orders set weekly **Prepare paddocks for next rotation** **Fertiliser** ▪ Spread fertiliser on growing potatoes as needed	**Potato harvest** ▪ Staggered potato harvest as per supply contract ▪ Processor collects potatoes daily, as required. Orders set weekly **Store seed** ▪ Receive certified seed potatoes and store in cool room on-site **Soil preparation & sowing of crops** ▪ cultivation of soil ▪ planting of oats, maize, chicory, clover, ryegrass.	**Store seed** ▪ Store certified seed potatoes in cool room on-site **Spray-off** ▪ Spray and clean paddocks for next crop of potatoes (or other rotation) **Fertiliser** ▪ Apply fertiliser to crops **Hay production** ▪ remove stock from hay paddocks in late winter or early spring **Machinery maintenance**	**Cut hay** ▪ Cut, bale and store hay in late spring or early summer ▪ Broadcast fertiliser on pasture during early spring **Pre-planting for potatoes** ▪ Plough soil **Planting for potatoes** ▪ Staggered as per potato supply contract ▪ Fertiliser is applied concurrently with planting
LIVESTOCK			
	Purchase sheep, ▪ 1500 to 2000 sheep per year (crossbreed) ▪ Sometimes carry lambs all year **Shearing** Once or twice per year **Drenching**	**Grazing and pasture management** **Drenching** **Shearing** ▪ Once or twice per year	**Destock** ▪ Sheep are sold ▪ Some paddocks are used for hay production

DISRUPTION TO FARM ACTIVITY

LOSS OF ACCESS TO PRODUCTION AREAS

Construction of transmission lines across horticultural cropping areas will remove some areas from production for days, weeks or possibly months. Crop production activities are often time-sensitive or seasonally fixed. Disruptions to the farmer's existing schedule could affect the ability to grow a quality product for processor contracts or for specific markets. For example, if a two-week construction period prevented full or partial access to an irrigated paddock, it could delay watering, planting, fertilising, weed spraying, or harvesting. These activities are often weather-dependent, and windows of opportunity are important to get the most out of the crop (e.g., finishing the planting of a crop prior to seasonal or significant rains). A full season's crop could be lost or damaged by a short delay in time-sensitive farm activity.

Horticultural crops (including potatoes) are valuable commodities. Based on Australian Bureau of Statistics data from 2020-21, horticultural crops on average generate between $7,000 and $12,000 per hectare each year for the farmer. However, the high-quality soils in this region and new varieties of potatoes can result in higher than average yields. This farmer (in 2023) is harvesting around 50 tonne of potatoes worth

approximately $25,000 per hectare. Comparatively, grazing (not including dairy) generates less than $1,000/ha/year, and other crops less than $1,500/ha/year. It is therefore financially important for the farmer to minimise disruption to horticultural land and crops.

To manage disruption during transmission line construction, there are three options available to the farmer:

12. **Alter production schedule** – This can only be achieved if sufficient notice (i.e., 6 to 12 months) is provided to the farmer, to enable them to adjust their choice of crop, align planting and harvesting times, and select appropriate rotations.
13. **Move horticultural production to another location –** The high-quality soils on this property are key to profitable horticultural and potato production. Moving production to another location could mean less favourable conditions such as: poorer quality soils, reduced planting area, limited access to water for irrigation, additional costs for lease of land (estimated between $2,500 and $5,000/hectare per year), and more difficult access for machinery and equipment. This farmer has access to other properties within his business, but these areas are not all set up for irrigation.
14. **Reduce production and renegotiate contracts –** Farmers are often locked into strict ongoing contracts with potato processors, and they operate in a highly competitive market. This can mean it is difficult to renegotiate a contract. With advance notice, farmers can try to alter their contract to plant fewer potatoes, although this would be at the discretion of the processor and would be a last resort.

Any of these choices would reduce the farm's overall profitability.

After construction, there could be other, longer-term disruptions to this farm:

- **Rehabilitation of disturbed land** (such as the removal of construction access tracks, reinstatement of topsoil, repair of compaction or other soil damage) could mean that farm production in some areas is reduced for much longer than the actual construction activity, and this impact can last for months or years.

- The presence of towers and overhead lines would have ongoing effects on the **design and operation of the farm**. Easement and infrastructure restrictions could reduce the ability for this farmer to adapt their production areas (by altering farm and/or irrigation system designs) to take advantage of changing market demands and prices. Transmission lines could also limit the farmers uptake of new and efficient technologies and machinery (such as the use of robotic harvesters and drones for spraying).

IRRIGATION

Irrigation infrastructure is large and difficult to move to accommodate construction activities. Lateral move irrigation provides some flexibility, and this farmer could adjust their irrigation patterns (by changing the width of the irrigator or the length of the runs) to minimise disruption to production, but this would depend on how the transmission line dissected the property. Gun sprinklers could be used near the transmission towers (outside the easement), but they are costly to run, less efficient and lead to variable crop quality.

CROP MANAGEMENT AND HARVESTING

Horticultural crops (such as potatoes) require very large machinery to prepare soils, spray, fertilise, plant, harvest, and grade. While most farm machinery will be able to be used under transmission towers and lines there are some height restrictions that need to be considered. Depending on the size and capacity of the transmission line (220kV or 500kV), use of large machinery may require a safety assessment. In many instances, machinery up to 4.6m tall can operate under the lines, and in some cases, machinery up to 8.6m can continue to operate (with appropriate safety assessments conducted). Transmission towers also create a risk of collision when operating large machinery and production paddocks are usually free of obstacles for this reason.

CONTRACTURAL OBLIGATIONS

During harvest, the farmers must meet strict weekly deadlines for the potatoes to be collected from the farm, with only one day's notice provided for the pick-up time. If transmission line construction delays harvest or restricts movement of critical farm machinery, the pick-up driver will not wait. As a result, the farmer could face penalties from the processor or risk losing the contract completely. Once lost, supply contracts are filled by other growers and are difficult to reclaim.

DISRUPTIONS TO LIVESTOCK

This business supports sheep for wool and meat, usually on other nearby properties, but with rotations on this site. If transmission line construction activity was to impact on grazing paddocks, sheep production would require adaptive management and potentially temporary exclusion fencing. Disruption at lambing time can lead to a loss of production, as mothers are more nervous and can be separated from their lambs.

Biosecurity and quality assurance

The movement of OHTL construction (or operation) crews, vehicles, equipment, and machinery onto this farm presents a range of biosecurity risks through the potential for introduction of disease, pests, or weeds. This risk applies for all movements onto the farm, including from neighbouring properties, roads, other regions, and interstate.

This farmer sources certified seed potato and implements strict biosecurity procedures to limit the introduction of harmful pests such as potato cyst nematode, and diseases including rhizoctonia and powdery scab. If diseases or pests are inadvertently brought onto the property during construction activities, they can have immediate impacts on crop yields and quality, and the farmer's ability to meet supply contracts. It can also lead to ongoing weed, pest, or disease management requirements for the farmer, which has the potential to undermine profitability and long-term viability of the farm. If a serious disease is bought onto the property, the farm could be shut down and an exclusion zone put up around the outbreak affecting many farms in the area.

There is also potential for foreign material such as construction waste or large gravel to be left in paddocks post-construction. Both foreign materials and introduced disease have the potential for long term effects on the farm's quality assurance accreditations and supply contracts.

OHTL MITIGATIONS AND BEST OUTCOMES

If an overhead transmission line was planned for construction for this property, there are a range of mitigations to ensure the farm continues to produce and profit, and to ensure that the farmers' long-term efforts to improve the agricultural land are supported.

AusNet can adapt the transmission line design and construction schedules if landholders engage with the planning team early to describe their property, their farm business activities, and their concerns.

This mixed farming operation can continue under an overhead transmission line, with the following actions (mitigations) to minimise impacts on the affected farm:

- **Position the towers** and easements to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with existing structures or on boundary fences between different landholders (which are less likely to change compared with internal fences). Keep clear of irrigation systems, machinery sheds, dams, etc where possible in the design.
- **Provide the farmers with maximum advance notice** (if possible, 6 to 12 months) of upcoming construction activity to allow landholders time to make appropriate arrangements (e.g., avoid planting

crops in areas that are to be disturbed, alter rotations, or renegotiate supply contract with their processor).

- **Maintain water supply** to all paddocks and install temporary supplies or pipelines and pumps if necessary. Avoid constraints to the use of the lateral move irrigation system.
- **Maintain farm access** and laneways or provide workarounds for the farmer.
- **Raise tower heights** to allow large farm machinery to be used subject to safety assessments
- **Consult with the landholder** to understand their business and impacts that their business will experience; and determine any practicable mitigation measures that could be applied to lessen the impacts of the Project (both infrastructure and day to day operations).
- **Schedule noisy or heavy construction activity** outside sensitive periods (such as when soils are waterlogged, during potato harvesting, or during lambing).
- **Ensure biosecurity standards are maintained** during construction, operation, and decommissioning stages. Implement a project-wide, stringent biosecurity management plan and protocols, adequately train and monitor all contractors, and prevent all off-track vehicle and machinery access. Enforce compliance with the farmers' biosecurity management plan for their property. Use the farmers' trusted and local contractors for rehabilitation (e.g., soil works, replanting, fencing) where possible.
- Work with landholders to identify water supply points to all livestock paddocks and troughs and all irrigated areas to avoid impacts as far as practicable. If there are unavoidable impacts, then they will need to be assessed as part of payments to be made as part of the process. This could result, for example, an irrigation redesign to optimise irrigated cropping growing areas.
- **Provide safety assessments** to determine where the safe operation of irrigation equipment and large machinery can continue, and work to ensure the farmers ability to use their large machinery is optimised.
- Where possible, **avoid construction on waterlogged soils, ensure minimal soil is disturbed**, and ensure/audit that land and pasture rehabilitation works achieve, as close as reasonably practical, the pre-construction conditions.

CAN THIS PROPERTY STILL BE FARMED?

Farming can continue under transmission lines. Given the complexities surrounding mixed farming enterprises, businesses like this are likely to experience some disruptions and restrictions. The farmer may need to modify farm design and/or activities to operate through the construction period and to continue farming with an overhead transmission line easement on the property. Where possible, AusNet will consider farm-specific issues during project planning, so that adjustments can be made to the transmission line design, and to construction activity, allowing the farmer to continue with minimal disruption.

AusNet provides a guide for landholders who have OHTL on their land. (A Guide to Living with Transmission Line Easements) and can provide safety assessments and advice on request.

During the short but intensive construction stage, there would be disruptions and some restricted areas on this farm. Paddocks used for potato rotations are critical to farm profitability and set production schedules cannot be easily adjusted. Planning and early advance notice can help minimise disruption to this business.

Height limitations apply under operating transmission lines. This could impact the large machinery used in potato production (e.g., harvester). Depending on the size and capacity of the transmission line (220kV or 500kV), use of large machinery may require a safety assessment. In many instances, machinery up to 4.6m tall can operate under the lines, and in some case, machinery up to 8.6m can continue to operate (with appropriate safety assessments conducted). Lateral move irrigators may be able to continue to operate, but irrigators cannot be parked under the lines. Some of the farms irrigation infrastructure and design may need

to be modified where tower locations affect paddocks. Vehicles and machinery cannot be re-fuelled or parked within the easement. Fences that run through the easement will also need to be adequately earthed and sectioned.

In an option for easement agreement, there are potentially several compensation payments. For example, landholders can be paid for providing their agreement to an ‘option for easement’, a construction licence fee, and for the easement being on their land. Where losses or disruptions cannot be prevented, farmers could receive additional compensation. Based on the Victorian transmission line compensation announced in May 2023, and where applicable, farmers could receive ongoing payments at the rate of $8,000 per year for each kilometre of easement on their property, for a period of 25 years (a maximum payment of $200,000/km). (https://www.westernrenewableslink.com.au/assets/resources/Landholder-guide-Land-access-easements-and-compensation-June-2022.pdf)

At the end of construction, and in accordance with the project’s environmental and planning approvals, temporary access tracks and hardstand work areas will be removed (unless the farmer has requested to keep them), farm infrastructure will be reinstated, and the land and soils will be rehabilitated to defined standards that are as close as reasonably practical to pre-construction conditions.

During operation of the overhead transmission line, inspection and maintenance will be conducted according to documented property access protocols. This might include bi-annual inspections by vehicles and personnel onto the property, or inspection by helicopter where appropriate. Farmers will receive advance notice of these activities and operational teams will abide by strict access and biosecurity protocols.

During decommissioning, the transmission line will be removed, and land rehabilitated to as close as reasonably practical to pre-construction conditions. After removal of the transmission line and rehabilitation of soils and vegetation, this property could resume uninterrupted farming, for horticulture (including potatoes), hay production and grazing of livestock.

Agricultural Case Study 3: Horticulture and cropping (potatoes, garlic, cereals)

HORTICULTURE & CROPPING - CASE STUDY

This case study focuses on a 2,670-hectare, mixed farming business in Australia which produces potatoes and garlic under irrigation, as well as irrigated and dryland cereal crops (wheat, barley, and canola). This property has well drained soils and access to (licenced) river water for irrigation. The farmer has invested heavily in specialised machinery and equipment to run this diverse farm business.

If an overhead transmission line was to be constructed on this property, the farmer raised concerns that it could impact their business in the following ways:

- Disruption to farming activity. Particularly during the construction stage. Restricted access to productive (especially irrigated) areas could affect planned rotations, and time-critical tasks such as planting, spraying, or harvesting. Temporary restrictions on use of the pivot irrigation systems could reduce crop health and productivity. Towers or overhead lines could also limit the use of important aerial spraying services.
- Isolation or redundancy of productive land. Long term presence of towers and overhead lines could reduce the productive use of high-quality land, and isolate areas from irrigation. This farm and its infrastructure have been designed for optimum use of the land using 50ha and 32ha pivot irrigators.
- Increased biosecurity risk. Movement of people, vehicles and equipment onto the property increases the risk of introduction of harmful pests, weeds, and diseases. This farm's isolation is one of its biosecurity strengths (in comparison to more intensely farmed potato growing areas around Ballarat and Thorpdale).

If a transmission line was planned for this property, there are a range of things that could be done (mitigations') to avoid or minimise impacts. If the farmers discuss issues with AusNet early in the planning phase, mitigations may include changes to scheduling, or to the planned location of towers, lines, and tracks. Compensation payments cover a variety of impacts, including production losses.

Farming of potatoes, garlic and cereals can continue during construction of the transmission line, and disruption will be minimised if AusNet is able to provide advance notice (6-9 months) for the farmer to adjust production schedules and rotations. Some modifications to farm design and production systems could be required. Pivot irrigation systems may be able to continue, and in accordance with certain safety restrictions. Aerial spraying is not permitted within the easement so alternative treatment methods would be required.

A HORTICULTURE AND CROPPING FARMING ENTERPRISE FOR POTATOES, GARLIC, AND CEREALS

This horticulture farming business produces potatoes and garlic in rotation with cereal crops. The farm is large, covering almost 2,670 hectares (6,600 acres). Potatoes are by far the most valuable crop to the farmer. The land has undulating topography and well-drained soils. The farm is mostly cleared of vegetation, with some fence-line shelterbelts, isolated large trees, and scattered patches of remnant vegetation. The combination of warm climate, good soils, and availability of water for irrigation means that much of the land surrounding this farm is used to grow grapes, fruit, and other valuable horticultural crops.

This property is intensively farmed, and potatoes are grown in three-year rotations with garlic and winter crops (wheat/barley/canola) grown for the intervening years. This reduces the risk of disease, particularly for the valuable potato crop. This farmer grows their own potato seed on a longer (1 in 5 year) rotation, rather than sourcing seed from an external provider. Potatoes and garlic are grown under irrigation, using towable pivot

irrigators that work in large circles from fixed watering points. Cereal crops are less reliant on irrigation. In some seasons, natural rainfall is enough, and some areas of the farm do not have easy access to irrigation. This is called ‘dryland’ farming. Cereals are planted in Autumn and harvested in spring/summer. When beneficial, harvested grain can be stored on-farm for up to a year in large grain bags, and then sold when prices are at their best.

This farmer has a potato supply contract with a large processor and, as part of that contract, must meet strict quality standards and harvest agreed volumes of potatoes at set times throughout the year.

The pivot irrigators are the most critical piece of infrastructure on this farm. These are described in detail, below. Other important infrastructure includes water pumps, pipes, and a dam; large storage sheds for machinery; seed potatoes and harvesting bins; access tracks and associated drainage; fences and gates; and trees (some in shelterbelts).

The farmer has invested heavily in equipment and machinery for irrigated potato and garlic, and for dryland and irrigated crop production. This includes a 40m wide, self-propelled boom spray, tractors, planter, combine and potato harvesters, and tillage equipment.

At such a large scale, the infrastructure and machinery for this farm is expensive. The boom spray alone is valued at around $900,000. The farmer has made a significant investment in establishing irrigation infrastructure, with larger pivot machines each costing around $250,000. Establishment cost for a farm of this scale is significant.

The farmer has ongoing requirements to spray their potato and garlic crops to manage pests, weeds, and diseases throughout the year. They use the self-propelled sprayer/boom spray and rely on aerial services (fixed wing aircraft and helicopters) when the ground is too wet for large machinery. Aerial contractors are in high demand during critical spraying times.

Weeds are not a significant issue in these potato crops as the ground is well covered by the plant's leaves. Most weeding of potatoes can be done by mechanical disturbance. In contrast, the garlic and cereal crops require herbicide applications throughout the year until harvest, particularly during Autumn to Spring.

Distribution power lines have existed on this farm for a very long time. The farmer has designed their whole farm layout, invested in fixed infrastructure, and planned their production activities to avoid these power lines. The farmer recognises that there are inconveniences and dangers associated with manoeuvring large machinery around fixed structures in the middle of paddocks (especially the risk of collision) and has avoided this conflict through farm design.

CENTRE PIVOT IRRIGATION

Critical infrastructure on this farm includes 26 large, centre pivot irrigation sites, where irrigation occurs in circles that are either 32ha or 50ha. There are fixed water connection points (hydrants) in the centre of each irrigation site, and underground pipes that connect these points to the water supply. Pivot irrigators are towed from site to site, and connected to a central hydrant, depending on crop rotations and watering requirements.

Each of the pivot irrigators have numerous spans, supported and separated by sets of wheels. The bigger the area to irrigate, the more spans. The farmer considers the 50ha centre pivot as the ideal size. A 50ha pivot works a circle of 400m radius (800m diameter) and has 8 spans of around 50m each. It takes 16 hours to complete a full circle and provides around 10mm over the entire area each 24 hours. The irrigator is driven by a diesel motor and has the capacity to move over undulating country.

The geometry of a pivot system means that there are some areas not able to be reached by the irrigators. A 50ha irrigator works in a circle that fits into a 60ha square of land. The corners of this land, around 10 ha or 20%, cannot be reached by the irrigator.

This farmer has optimised the farm design by offsetting pivot circles, to fit as many as possible on the land. This tight design also minimises the length of underground pipes to deliver water into the system. As a result of this fixed infrastructure and optimisation, the farm layout would be difficult and expensive to alter. This farmer also uses sprinklers (not end guns) at the end of the pivot span to increase irrigation reach and maximise production. Areas outside of the irrigated circles are either sown to dryland crops or left unutilised.

Compared with lateral move irrigation systems which could cover the entire area in rectangular blocks, the pivot is far less labour intensive for the farmer, and can operate over very large, undulating areas, 24 hours a day. Lateral move irrigators need to be re-set at the end of each run and are not designed for use on highly undulating land.

This farm uses around 7.5ML of water per ha per year for irrigation of crops. The water is sourced from a nearby river. Water access is dependent on annual allocations from water entitlements that are either owned or leased. A large pump extracts water from the river and delivers it to a centrally located, 250ML storage dam. Water is pumped from the dam to each irrigator through a network of underground pipes. Pipework associated with centre pivot irrigation is very expensive to install ($10,000 + per kilometre).

PRODUCTION ACTIVITY AND VALUE

Irrigators require constant monitoring, and ongoing maintenance and repair. Specialist contractors are called in for much of this work. Ground preparation for crops involves spraying out pasture or the previous crop, then fertilising, ripping, or furrowing, and seeding. This preparation work involves large machinery and multiple operators over several weeks. Potatoes have a growing time of around 4 months. Garlic has a growing time of around 7 months. Cereal crops have a growing time of around 8 months. Planting and crop

management activities are happening across the farm all year round. Potatoes can be harvested all year round, as the Australian market has a constant demand.

Table A1-3: Annual calendar for the case study farm

SUMMER	AUTUMN	WINTER	SPRING
Harvest ▪ Potatoes (summer crop) **Plant potatoes** ▪ Soil preparation for winter crop **Spray crops** ▪ Spray boom or aerial application (weather dependent)	**Plant garlic and cereal crops** ▪ Soil preparation **Spray crops** ▪ Spray boom or aerial application (weather dependent)	**Harvest** ▪ Potatoes (winter crop) **Spray crops** ▪ Spray boom or aerial application (weather dependent)	**Harvest** ▪ Potatoes ▪ Garlic ▪ Cereals/grain **Plant potatoes** ▪ Soil preparation for summer crop **Spray crops** ▪ Spray boom or aerial application (weather dependent)

POTENTIAL IMPACTS OF AN OHTL ON THIS FARM

If OHTL were to be constructed on this farming property, there are a range of potential impacts. Some of the major concerns and impacts identified by the farmer are explained below.

Disruption to farm activity

LOSS OF POTATO AND GARLIC PRODUCTION AREAS

Construction of transmission lines across irrigation areas could remove areas from production for days, weeks or possibly months. Given the intensive and time-critical nature of production, any disruptions to the existing schedule may have significant impact on the farm's productivity. For example, if a two-week construction period prevented full or partial access to an irrigated paddock, it could delay watering, planting, fertilising, weed spraying, or harvesting. These activities are sequenced and often weather-dependent, and windows of opportunity are important to get the most out of the crop (e.g., finishing the planting of potatoes or cereal crops prior to seasonal or significant rains, or aerial spraying of crops when the ground is too wet for land-based machinery). A crop could be damaged or lost by a short delay in time-sensitive farm activity.

To manage disruption during transmission line construction, there are four options available to the farmer:

1. **Alter production schedule**. This can only be achieved if sufficient notice (i.e., 6 to 12 months) is provided to the farmer, to enable them to adjust their choice of crop, align planting and harvesting times, and select appropriate rotations.
2. **Reduce production and renegotiate contracts.** Farmers are often locked into strict ongoing contracts with potato processors, and they operate in a highly competitive market. This can mean it is difficult to renegotiate a contract. With advance notice, farmers can try to alter their contract to plant fewer potatoes, although this would be at the discretion of the processor and would be a last resort.
3. **Move production to another location.** The farmer has invested extensively in centre pivot systems to irrigate their potato and garlic crops and have optimised their farm design and layout to make the most of the available land. Moving production to another location could mean less favourable growing conditions such as: poorer quality soils, reduced planting area, limited access to water for irrigation, and difficult access for machinery, equipment, and storage of harvest. This is generally not a realistic option.

4. **Grow dryland crops instead of irrigated crops in highly impacted areas.** This may be possible in areas where transmission line construction mean that irrigators temporarily cannot operate.

Any of these choices would reduce the farm's overall profitability.

After construction, there could be other, longer-term disruptions to this farm:

- **Rehabilitation of disturbed land** (such as the removal of construction access tracks, reinstatement of topsoil, repair of compaction or other soil damage) could mean that farm production in some areas is reduced for much longer than the actual construction activity, and this impact can last for months or years. Any large gravel retained in the soil from access tracks or excavations can impact on potato and garlic harvesting and operation of machinery.

- The presence of towers and overhead lines could have ongoing effects on the **design and operation of the farm**. Easement and infrastructure restrictions could exclude the use of aerial spraying.

IRRIGATION

Irrigation infrastructure is large, expensive, and difficult to move to accommodate construction activities. Construction of a transmission line may cause several types of interference to the pivot irrigation system.

Restriction of pivot irrigators to enable transmission line construction activity is detrimental to production. An irrigator must complete a full 360° rotation without interruption for the crop to receive the right amount of water. If irrigation is halted for any significant period, the crop may deteriorate and may not meet quality standards for harvest. Inappropriate intervals between each pass of the irrigator can mean that the soil either dries out or becomes waterlogged, both of which affect crop health.

Centre pivot irrigation infrastructure has fixed watering points and is large and difficult to adjust to accommodate construction activities. While the centre pivot systems are all towable, relocating them to alternative areas (if there was land available), would have significant time and cost implications given the need for high volume water supply and underground pipes. Without irrigation, valuable horticultural crops (potatoes and garlic) cannot be grown in this region.

Use of irrigation in the easement can often continue, with an AusNet safety assessment. However, given the undulating nature of this farm, and depending on the precise tower locations, tower heights and sag in the lines, the pivot irrigators could exceed height limitations. These limits are in part determined by the size and capacity of the transmission line (220kV or 500kV).

TRAFFIC CONFLICT

Due to the undulating landscape of this farm, there is risk of collision between farm machinery or vehicles and construction traffic as they come over the crest of hills. Under normal conditions, the farmer and their contractors use scheduling and radio communications to avoid traffic conflict.

CROP MANAGEMENT AND AERIAL SPRAYING

Potato growing (in particular) involves very large machinery to prepare soils, fertilise, plant, harvest and grade the crop. Overhead transmission lines may limit the use of this large machinery due to height restrictions and in-paddock obstacles (towers). While most farm machinery will be able to be used under transmission towers and lines there are some height restrictions that need to be considered. Depending on the size and capacity of the transmission line (220kV or 500kV), use of large machinery may require a safety assessment. In many instances, machinery up to 4.6m tall can operate under the lines, and in some cases, machinery up to 8.6m

can continue to operate (with appropriate safety assessment). Transmission towers also create a risk of collision when operating large machinery and production paddocks are usually free of obstacles for this reason.

Transmission lines prevent the use of aerial spraying services, which are required on this farm during wet conditions. If spraying cannot be conducted during wet conditions when ground-equipment cannot be used to spray the crop, plant health and productivity could be affected.

CONTRACTURAL OBLIGATIONS

This farmer is contracted to supply a certain tonnage of potatoes at specific times of the year (i.e., summer harvest and winter harvest). The contract is ongoing, but the harvest schedule and volumes are adjusted annually. If the contract is lost because of interruptions to farming and a subsequent inability to supply, those contracts are quickly filled by other potato farmers and are difficult to reclaim. Given the competitive market, farmers invest time and effort in finding opportunities to provide additional tonnage that can fill any gaps in the market and ensure they maintain their market share. This farmer would prefer to find alternative growing sites and equipment rather than lose market share. However, the opportunity to find alternative growing sites would be limited and may not be feasible.

Biosecurity and quality assurance

The movement of transmission line construction or operation crews, vehicles, equipment, and machinery onto this farm presents a range of biosecurity risks through the potential for introduction of disease, pests, or weeds. This risk applies for all movements onto the farm, including from neighbouring properties, roads, other regions, and interstate.

This farmer currently has strict biosecurity procedures that minimise risk of introduction of harmful pests such as potato cyst nematode, and diseases including *Rhizoctonia* and powdery scab. Farming in more intensive areas (such as Ballarat and Thorpdale) brings higher risk due to the number of potato farms in close proximity.

This farmer also grows their own seed potatoes to prevent the introduction of pests and disease. The seed potato crops are particularly susceptible to biosecurity risks, as the health of the crop underpins the quality of the potatoes that will ultimately be sent to the processor.

This farmer is concerned that transmission line contractors may be unfamiliar with the region and may therefore not appreciate the significance of site-specific biosecurity controls. Lack of local knowledge and respect for specific biosecurity issues increases the risk of introduction and spread of harmful pests, diseases, and weeds.

If diseases or pests are inadvertently brought onto the property during the construction or operation of a transmission line, there can be immediate impacts on crop yields, quality assurance certifications, and the farmers' ability to meet supply contracts. It can also prevent several years of crops and rotations in the infected areas, and present ongoing weed, pest, or disease management requirements for the farmer, which has the potential to undermine profitability and long-term viability of the farm.

There is also potential for foreign material such as construction waste or large gravel to be left in paddocks post-construction. Both foreign materials and introduced disease have the potential for long term effects on the farm's quality assurance accreditations and supply contracts.

Financial losses

Potato crops are valuable. Based on Australian Bureau of Statistics data from 2020-21, horticultural crops (including potatoes) on average generate between $7,000 and $12,000 per hectare each year for the farmer. The value of potato production in this area would be on the higher end of this range, so it is important for this farmer's finances that disruption to potato rotations is minimised.

Intangible losses

This farmer found it important to explain the intangible losses if a transmission line was built on the farm. The farmer feels connection to the land, both in a heritage and a personal sense. This property has generations of connection for the farmer.

The other element of loss relates to the fact that not all land is suitable for farming, and that if impacted significantly, finding an alternative place to farm like this may not be possible.

OHTL MITIGATIONS AND BEST OUTCOMES

If an overhead transmission line was planned for construction for this property, there are a range of mitigations to ensure the farm continues to produce and be profitable, and to ensure that the farmers' long-term efforts to improve the agricultural land are supported.

AusNet can do their best to understand and adapt the transmission line design and construction schedules if landholders engage with the planning team early to describe their property, their farm business activities and their concerns.

This horticultural and cropping operation can continue under an overhead transmission line, with the following actions (mitigations) to minimise impacts on the affected farm:

- **Raise tower heights and position towers and easements** to avoid or reduce impact on productive or valuable land and critical farm infrastructure. For example, aligning towers with existing structures or on boundary fences between different landholders (which are less likely to change compared with internal fences). Alternatively, position towers and raise tower heights over undulating land to maintain necessary separation distances between irrigators or large machinery and the transmission line, thereby enabling irrigated farming to continue. Avoid siting tower footings in current production areas and keep clear of other significant infrastructure where possible in the design (machinery sheds, dams, etc.).
- Provide the farmers with **maximum advance notice** (if possible, 6 to 12 months) of upcoming construction activity to allow them to make appropriate arrangements, such as, avoid planting crops in areas that are to be disturbed, alter rotations, or renegotiate supply contract with their processor.
- **Maintain water supply** to all potato and garlic paddocks and install temporary supplies or pipelines and pumps, if necessary. Avoid constraints to the use of the central pivot irrigation system.
- **Maintain farm access** and tracks or provide workarounds for the farmers and adhere to traffic management requests. Avoid traffic conflict and accidents through coordinating with the farmer for movement scheduling, providing integrated radio communication system, or establish dedicated access routes.
- **Schedule heavy construction activity** outside sensitive periods (such as when soils are waterlogged, or during harvesting).
- **Ensure biosecurity standards are maintained** during construction, operation, and decommissioning stages. Implement a project-wide, stringent biosecurity management plan and protocols, adequately train and monitor all contractors and prevent all off-track vehicle and machinery access. Enforce compliance with the farmers' biosecurity management plan for their property. Use the farmers' trusted contractors for rehabilitation (e.g., soil works, replanting, fencing) where possible.

- Provide early notice to farmers of construction commencement to enable alternative farming arrangements to be made to minimise loss. If there are unavoidable impacts, then they will need to be assessed as part of payments to be made as part of the process.
- Where possible, **avoid construction on waterlogged soils, ensure minimal soil is disturbed** and ensure/audit that any land and soil rehabilitation work achieve, as close as reasonably practical, the pre-construction conditions.

CAN THIS PROPERTY STILL BE FARMED?

Farming can continue under transmission lines. Given the complexities involved in large scale horticultural and cropping enterprises, businesses like this will experience some disruptions and restrictions. The farmer may need to modify farm design and/or activities to operate through the construction period and to continue farming with an overhead transmission line easement on the property. Where possible, AusNet will consider farm-specific issues during project planning, so that adjustments can be made to the design, or to construction activity, allowing the farmer to continue with minimal disruption.

AusNet provides a guide for landholders who have OHTL on their land. (*A Guide to Living with Transmission Line Easements*) and can provide safety assessments and advice on request.

Best outcomes will be achieved if the transmission line design avoids centre pivot irrigated areas and avoids placement of tower footings in all large-scale production areas.

During the intensive construction phase, there could be disruptions and some restricted areas on this farm. Paddocks used for potato and garlic rotations are critical to farm profitability and set production schedules cannot be adjusted at short notice. Planning and early advance notice will help to minimise disruptions to the farm operation.

Some areas could be impacted permanently by restrictions to key activities such as irrigation under the transmission lines. Some of the farms irrigation infrastructure and design may need to be modified. If areas are permanently removed from irrigation, they may still be useful for dryland cropping but will have significantly reduced financial returns. Although not used on this farm, in other regions, pivot irrigators often have a large gun sprinkler at the end to reach further into the edges of paddocks. These end guns need to have safety assessments to be used in an overhead transmission line easement as the spray could exceed separation limits.

Height limitations apply under operating transmission lines. This could impact the large machinery used in potato production (e.g., harvester). Depending on the size and capacity of the transmission line (220kV or 500kV), use of large machinery may require a safety assessment. In many instances, machinery up to 4.6m tall can operate under the lines, and in some case, machinery up to 8.6m can continue to operate (with the appropriate safety assessments). Vehicles and machinery cannot be re-fuelled or parked within the easement. Fences that run through the easement will also need to be adequately earthed and sectioned.

Aerial spraying with fixed wing aircraft and helicopters cannot be undertaken in the easement. This affects the farm's requirements for aerial spraying during wet conditions and could result in loss of production.

In an option for easement agreement, there are potentially several compensation payments. For example, landholders can be paid for providing their agreement to an 'option for easement', a construction licence fee, and for the easement being on their land. Where losses or disruptions cannot be prevented, farmers could receive additional compensation. Based on the Victorian transmission line compensation announced in May 2023, and where applicable, farmers could receive ongoing payments at the rate of $8,000 per year for each kilometre of easement on their property, for a period of 25 years (a maximum payment of $200,000/km).

(https://www.westernrenewableslink.com.au/assets/resources/Landholder-guide-Land-access-easements-and-compensation-June-2022.pdf

At the end of construction, and in accordance with the project's environmental and planning approvals, temporary access tracks and hardstand work areas will be removed (unless the farmer has requested to keep them), farm infrastructure will be reinstated, and the land and soils will be rehabilitated to defined standards that are as close as reasonably practical to pre-construction conditions.

During operation of the OHTL, transmission line inspection and maintenance will be conducted according to documented property access protocols. This might include bi-annual inspections by vehicles and personnel onto the property, or inspection by helicopter where appropriate. Farmers will receive advance notice of these activities and operational teams will abide by strict access and biosecurity protocols.

During decommissioning, the transmission line will be removed, and land rehabilitated to as close as reasonably practical to pre-construction conditions. After removal of the transmission line and rehabilitation of soils and vegetation, this property could resume uninterrupted farming, for irrigated or dryland horticulture and cropping.

FURTHER INFORMATION

This case study has been prepared by RMCG on behalf of AusNet Services. RMCG is an agricultural and environmental consultancy, with offices across regional Victoria.

ACKNOWLEDGEMENTS

RMCG and AusNet would like to thank all the farmers and landholders who provided their time and expertise in the development of this case study series. Their willingness to share their profound knowledge of agricultural practices and businesses has been extremely valuable. These farmer's knowledge will assist AusNet's transmission line teams and other non-farmers develop greater understanding and sensitivity to rural and farming communities.

DISCLAIMER

These case studies are illustrative and cannot depict the entirety of any one farm business or the entire agricultural sector. The transmission line projects discussed are hypothetical but represent the features of a real 220kV or 500kV overhead transmission line project. These case studies highlight a range of issues relevant to many different types of farming. It is nevertheless acknowledged that farming practice can change, and farmers are constantly adapting to environmental conditions, market forces, technology, and contractual and economic drivers. This case study series was researched and created in 2022 – 2023.

Appendix B Individual consultation feedback

Table B-1 provides a summary of individual consultation feedback.

Table B-1: Summary of individual consultation feedback

	PERCEIVED IMPACTS	SUGGESTED MITIGATIONS
Grazing	▪ Disruption to operations, e.g., joining, lambing or calving, weaning, shearing, access to fodder crops or water sources ▪ Additional costs, e.g., purchase of additional fodder, temporary fencing ▪ Economic losses, e.g., lost grazing, reduced lambing or calving ▪ Helicopter disturbance to livestock	▪ Develop a construction plan to avoid major farm activities ▪ Locate towers to minimise impact from construction ▪ Construction Principal Contractor training on grazing etiquette, i.e., how to minimise impact of contractor presence such as ensuring gates are closed, etc. ▪ Temporary fence construction area to allow grazing to continue in the balance of the paddock ▪ Advance warning of helicopter activity to allow livestock to be moved
Cropping	▪ Disruption to operations, e.g., sowing, spraying, harvesting ▪ Additional costs, e.g., duplication of operations like spraying, employment of additional contractors ▪ Economic losses, e.g., lost yield, increased costs of operations, loss of timeliness and efficiency ▪ Soil compaction ▪ Disruption to hydrology ▪ Disruption to crop rotation ▪ Inability to use existing and / or future harvesters and spray vehicles due to height restrictions ▪ Limitations on the use aerial application of chemicals in the easement, leading to non-spraying and / or duplication of equipment ▪ Disruption to crop layout for controlled traffic farming ▪ Interference with GPS and telecommunications equipment	▪ Develop a construction plan to avoid Disruption of major cropping activities ▪ Locate towers to minimise impact on cropping layout ▪ Deep rip and apply gypsum to areas impacted by construction ▪ Investment in more GPS ground stations to improve the accuracy of GPS in the area ▪ Compensate for investment in new machinery required due to height restrictions ▪ Increase the height of the towers and the maximum permissible height for machinery
Horticulture	▪ Disruption to operations, e.g., planting, spraying, irrigating, harvesting ▪ Additional costs – as per cropping ▪ Economic losses – as per cropping ▪ Damage to water supply assets, such as pipelines and bores ▪ Soil compaction ▪ Disruption to hydrology ▪ Disruption to crop rotation	▪ Develop a construction plan to avoid major farm activities ▪ Locate towers to minimise impact on irrigation layout and infrastructure location ▪ Deep rip and apply gypsum to areas impacted by construction ▪ Develop a plan to redesign the irrigation system on each property

	PERCEIVED IMPACTS	SUGGESTED MITIGATIONS
	▪ Inability to use existing irrigation equipment and layout within and adjacent to the easement ▪ Inability to use existing harvesters and spray vehicles due to height restrictions ▪ Limitations on the use aerial application of chemicals in the easement, leading to non-spraying and / or duplication of equipment ▪ Disruption to crop layout for controlled traffic farming ▪ Interference with GPS and telecommunications equipment	impacted to minimise the reduction in irrigable area ▪ Compensate for the investment in new irrigation equipment and infrastructure to implement the irrigation plan ▪ Increase the height of the towers and the maximum permissible height for machinery
Forestry	▪ Loss of forestry production within the easement ▪ Loss of benefits to agriculture that forested areas provide, such as windbreaks or shelter for stock	▪ Timing of construction to maximise economic yield from the area prior to clearing ▪ Siting of easement to maximise economic yield

Appendix C Community consultations

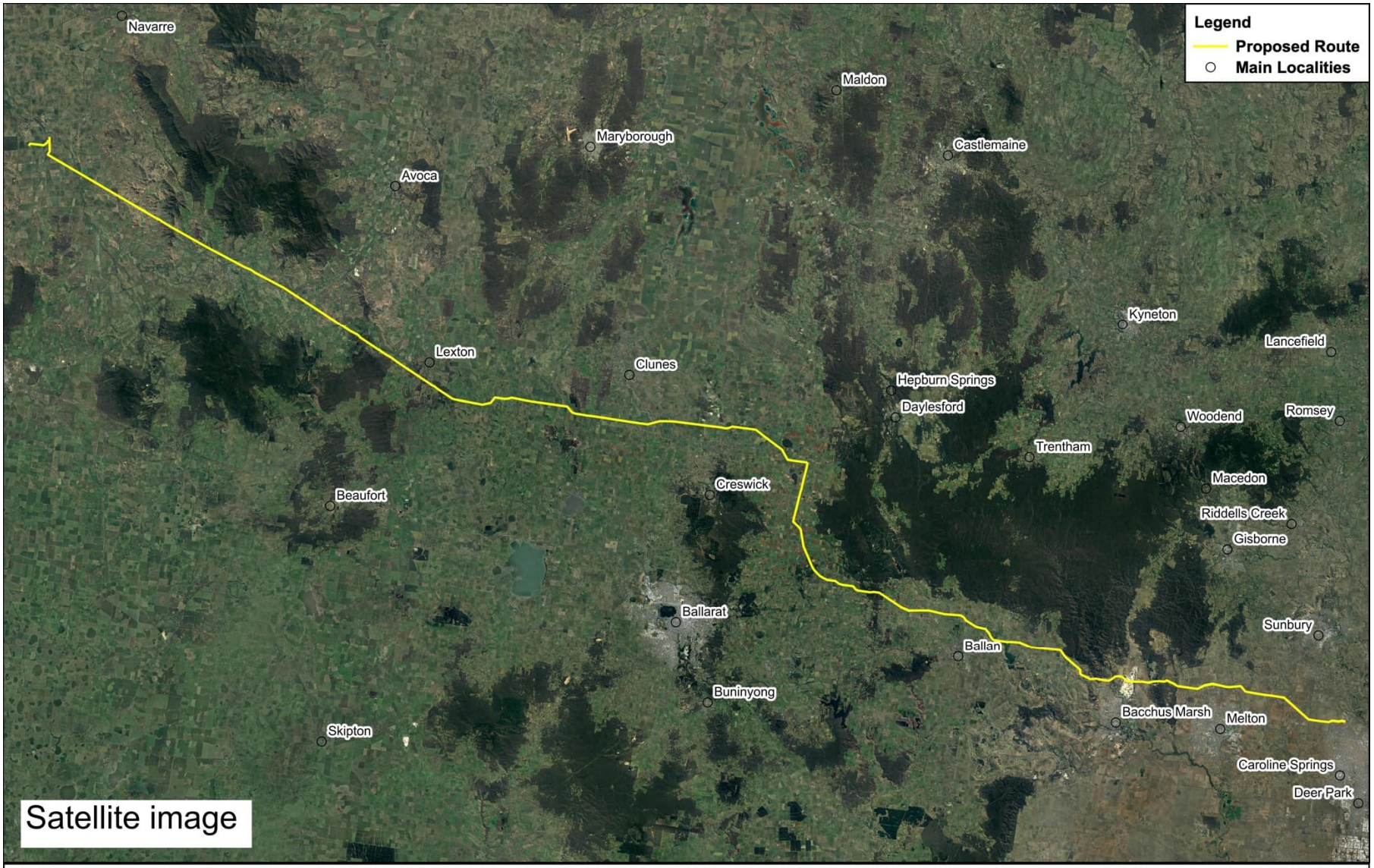
RMCG participated in the following community consultation activities conducted by AusNet:

- Agriculture webinar – 29 September 2021
- Eight online sessions for one-on-one meetings – October 2021
- Three community information sessions at Waubra (6 December 2021), Miners Rest (7 December 2021) and Ballarat (12 December 2021)
- Update – Council Advisory Group – 18 October 2023.
- Community Information Webinars – 2 and 28 November 2023
- Community engagement event (on-line) – 18 March 2024
- Victorian Farmers Federation – 17 June 2024.

Appendix D Existing conditions maps

The following maps were used in the course of preparing this assessment:

D1. Satellite image of the region
D2. Land tenure
D3. Primary production land uses
D4. Rainfall
D5. Local government area boundaries
D6. Land production potential (Land Systems)
D7. Water resources
D8. River basins
D9. Property sizes
D10. Enterprise highest value
D11. Planning zones
D12. Serrated tussock infestation areas
D13. Cumulative impact assessment projects.


Legend
Proposed Route
Main Localities
Navarre
Maldon
Maryborough
Castlemaine
Avoca
Kyneton
Lancefield
Lexton
Clunes
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Satellite image
Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 09:10am
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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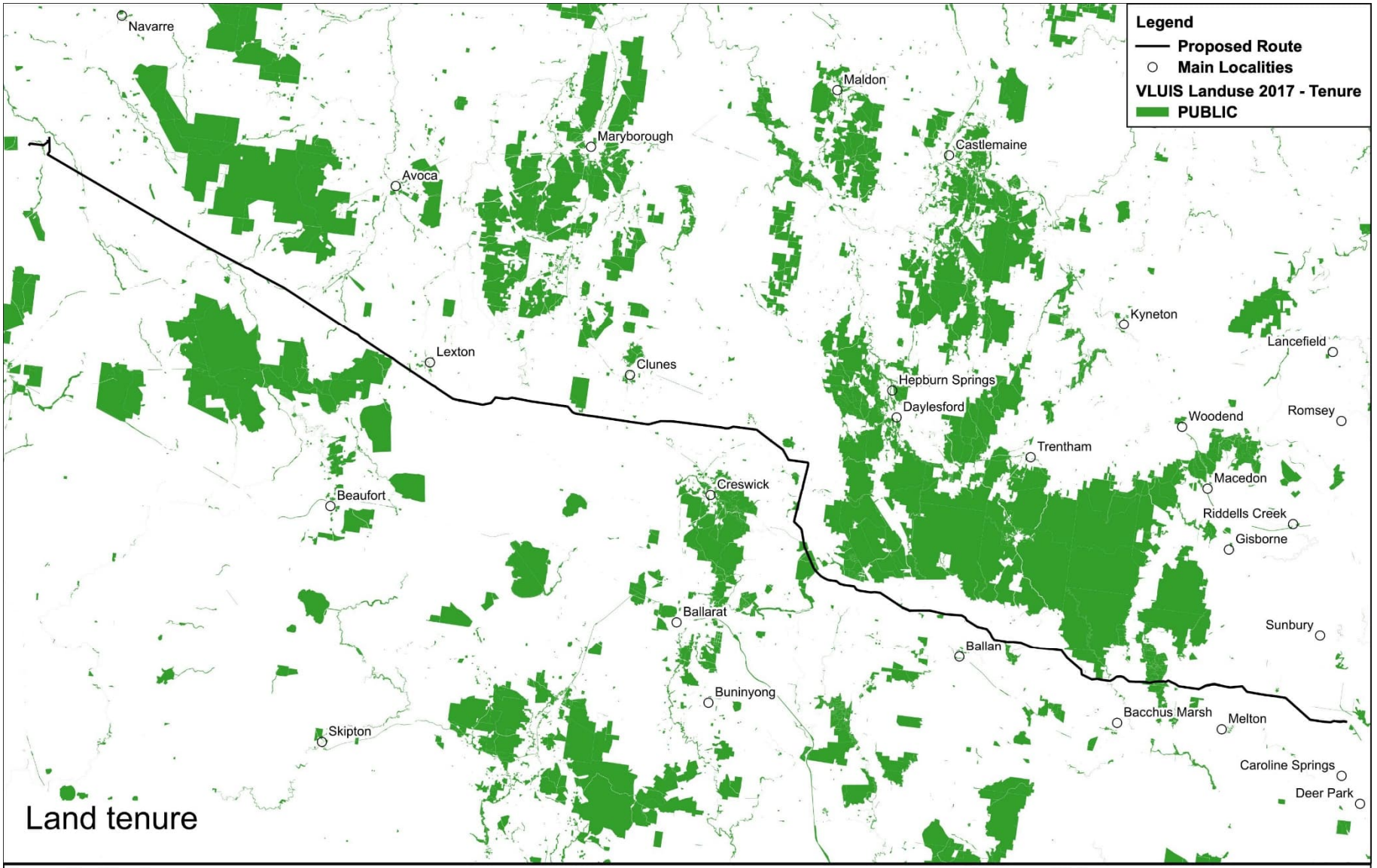
Legend
Proposed Route
Main Localities
VLUIS Landuse 2017 - Tenure
PUBLIC
Navarre
Maldon
Maryborough
Castlemaine
Avoca
Kyneton
Lancefield
Lexton
Clunes
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Creswick
Macedon
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Land tenure
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Western Renewables Link
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10 km
RMCG
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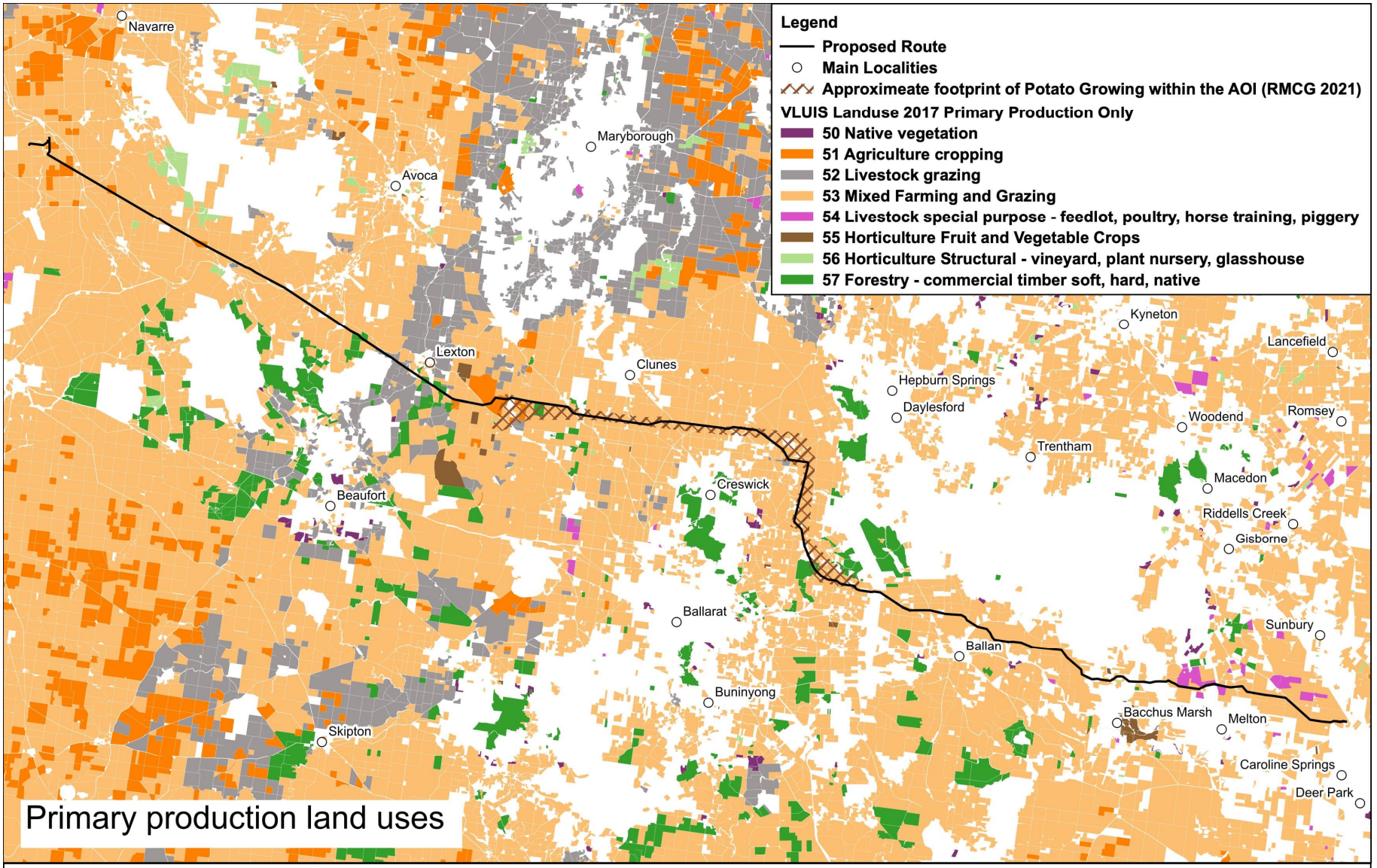

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Checked by: S Annett
Friday 02/08/2024, 09:20am
Job number: 2163

Western Renewables Link

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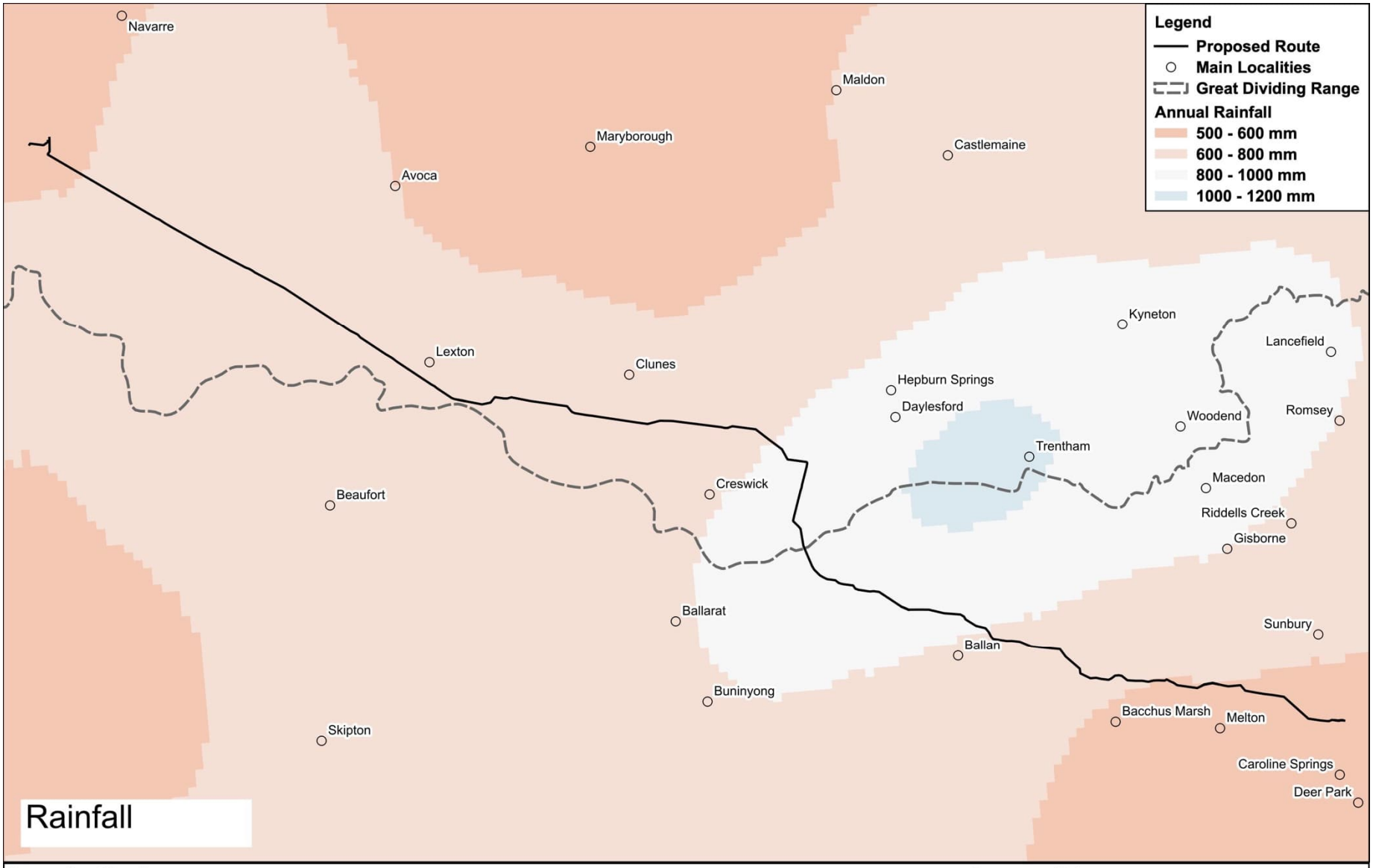
RMCG



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Western Renewables Link

0 10 km

RMCG

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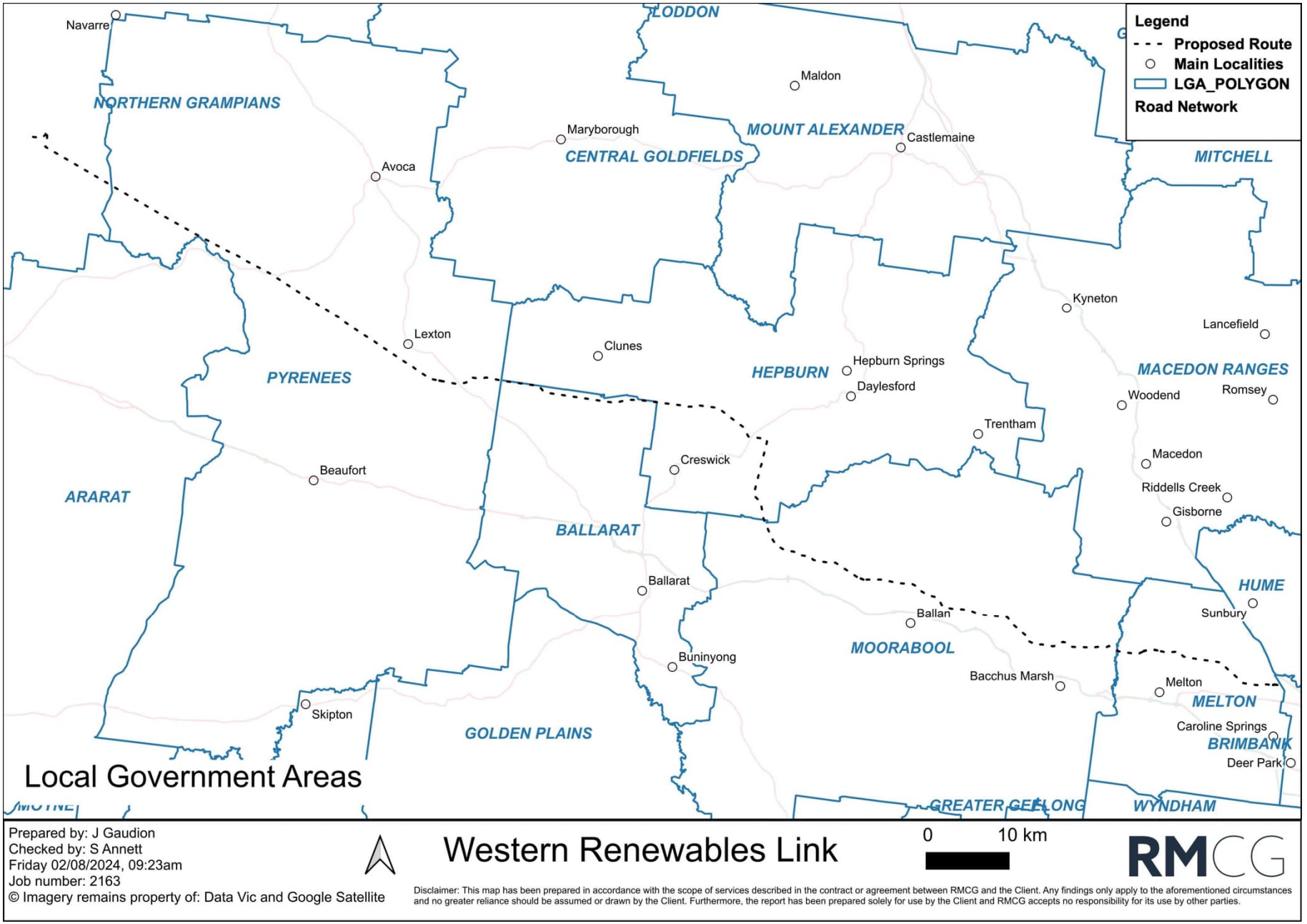
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Road Network
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LODDON
Maldon
NORTHERN GRAMPIANS
Maryborough
MOUNT ALEXANDER
Castlemaine
CENTRAL GOLDFIELDS
MITCHELL
Avoca
Kyneton
Lancefield
Lexton
Clunes
HEPBURN
Hepburn Springs
Daylesford
PYRENEES
MACEDON RANGES
Woodend
Romsey
Trentham
Creswick
Macedon
Beaufort
Riddells Creek
ARARAT
Gisborne
BALLARAT
HUME
Ballarat
Sunbury
Ballan
MOORABOOL
Buninyong
Bacchus Marsh
Melton
MELTON
Skipton
Caroline Springs
GOLDEN PLAINS
BRIMBANK
Deer Park
GREATER GEELONG
WYNDHAM
Local Government Areas
Prepared by: J Gaudion
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Friday 02/08/2024, 09:23am
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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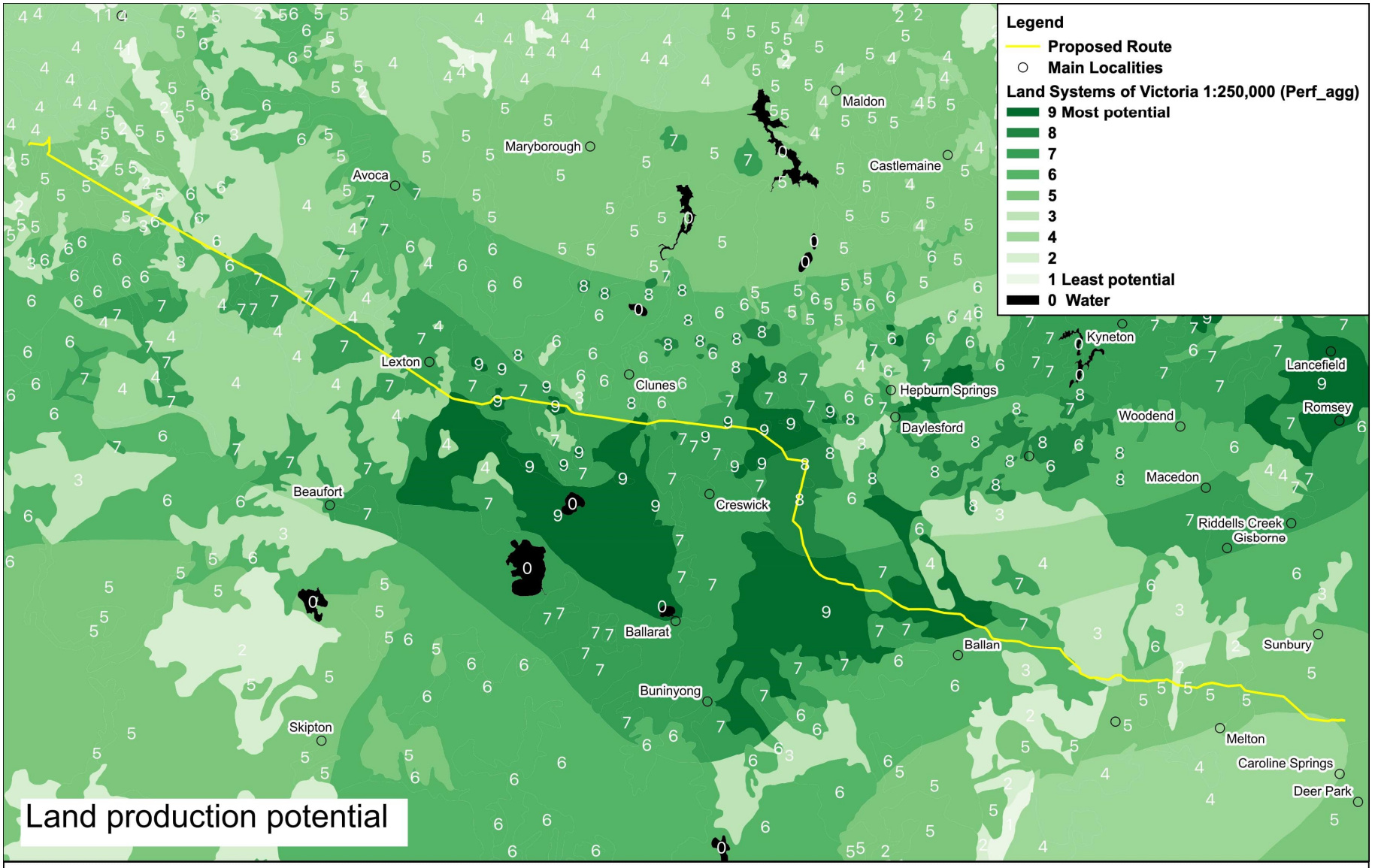

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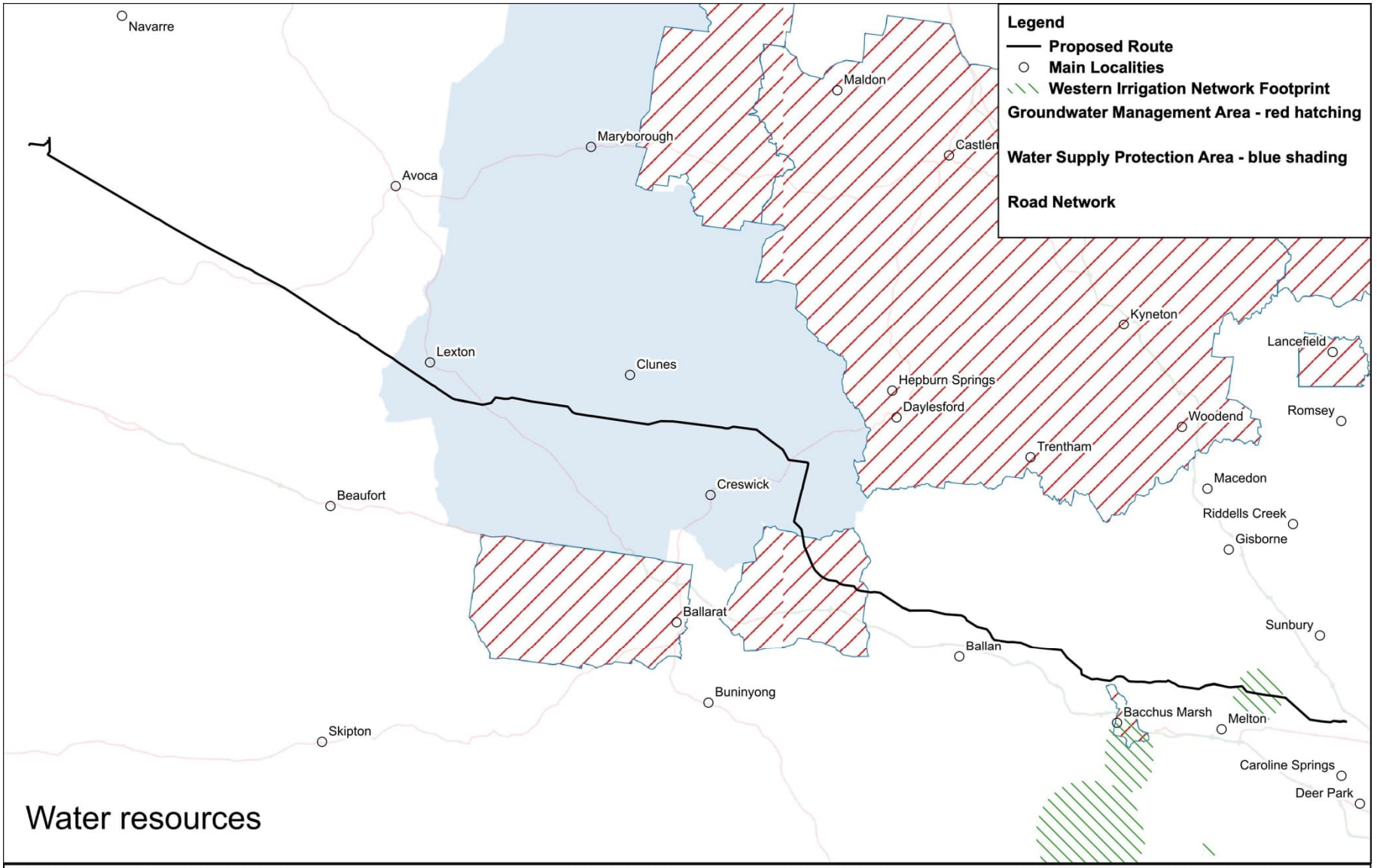
Checked by: S Annett
Friday 02/08/2024, 01:07pm
Job number: 2163

Western Renewables Link

0 10 km

RMCG


Navarre
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Maryborough
Castlemaine
Avoca
Kyneton
Lancefield
Lexton
Clunes
Hepburn Springs
Daylesford
Romsey
Woodend
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Legend
Proposed Route
Main Localities
Western Irrigation Network Footprint
Groundwater Management Area - red hatching
Water Supply Protection Area - blue shading
Road Network
Water resources
Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 01:05pm
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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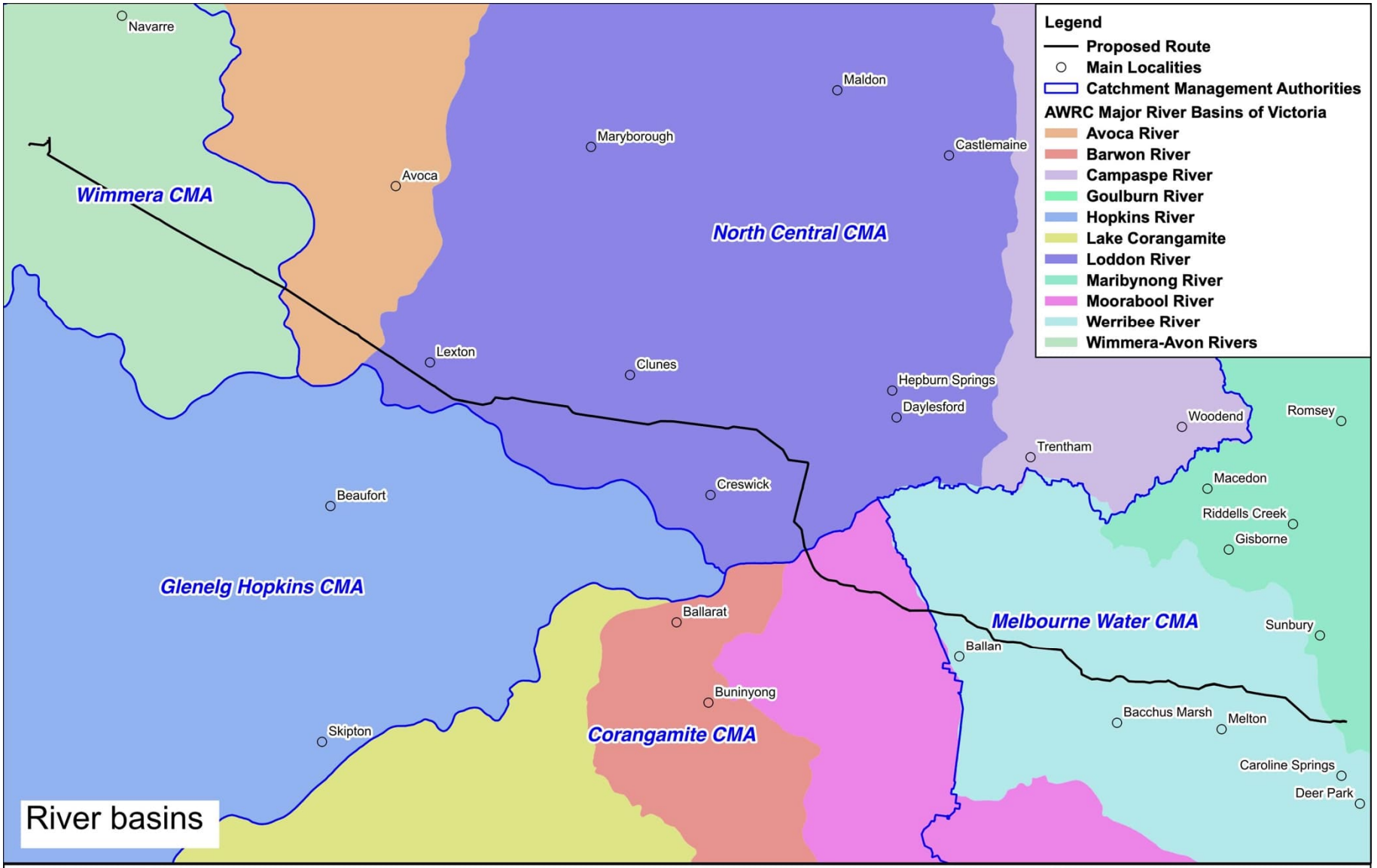
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Maldon
Maryborough
Castlemaine
Avoca
Wimmera CMA
North Central CMA
Lexton
Clunes
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Glenelg Hopkins CMA
Ballarat
Melbourne Water CMA
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Corangamite CMA
Caroline Springs
Deer Park
Legend
Proposed Route
Main Localities
Catchment Management Authorities
AWRC Major River Basins of Victoria
Avoca River
Barwon River
Campaspe River
Goulburn River
Hopkins River
Lake Corangamite
Loddon River
Maribynong River
Moorabool River
Werribee River
Wimmera-Avon Rivers
River basins
Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 01:09pm
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Western Renewables Link
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10 km
RMCG
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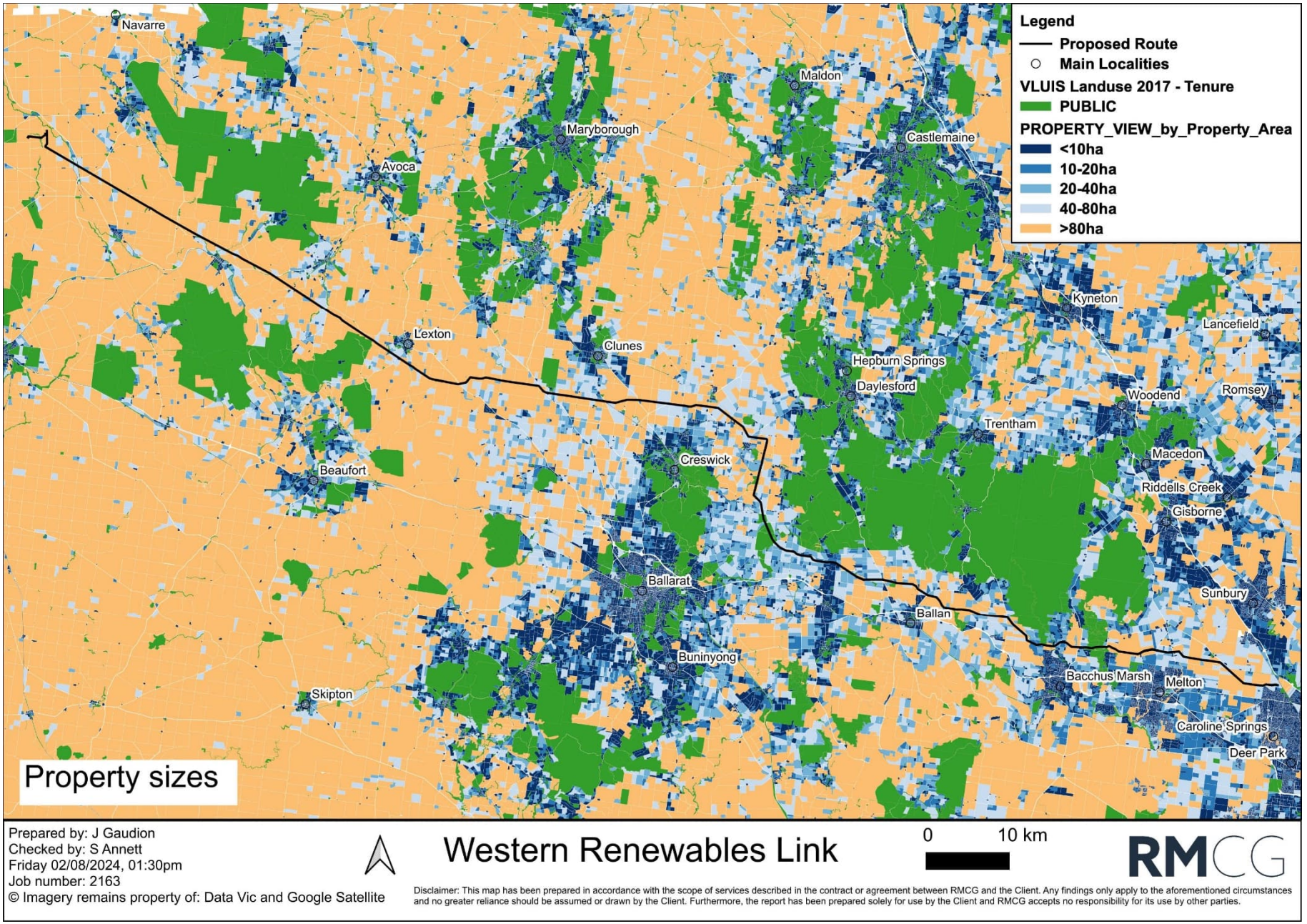
Legend
Proposed Route
Main Localities
VLUIS Landuse 2017 - Tenure
PUBLIC
PROPERTY_VIEW_by_Property_Area
<10ha
10-20ha
20-40ha
40-80ha
>80ha
Navarre
Maldon
Maryborough
Castlemaine
Avoca
Kyneton
Lancefield
Lexton
Clunes
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Property sizes
Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 01:30pm
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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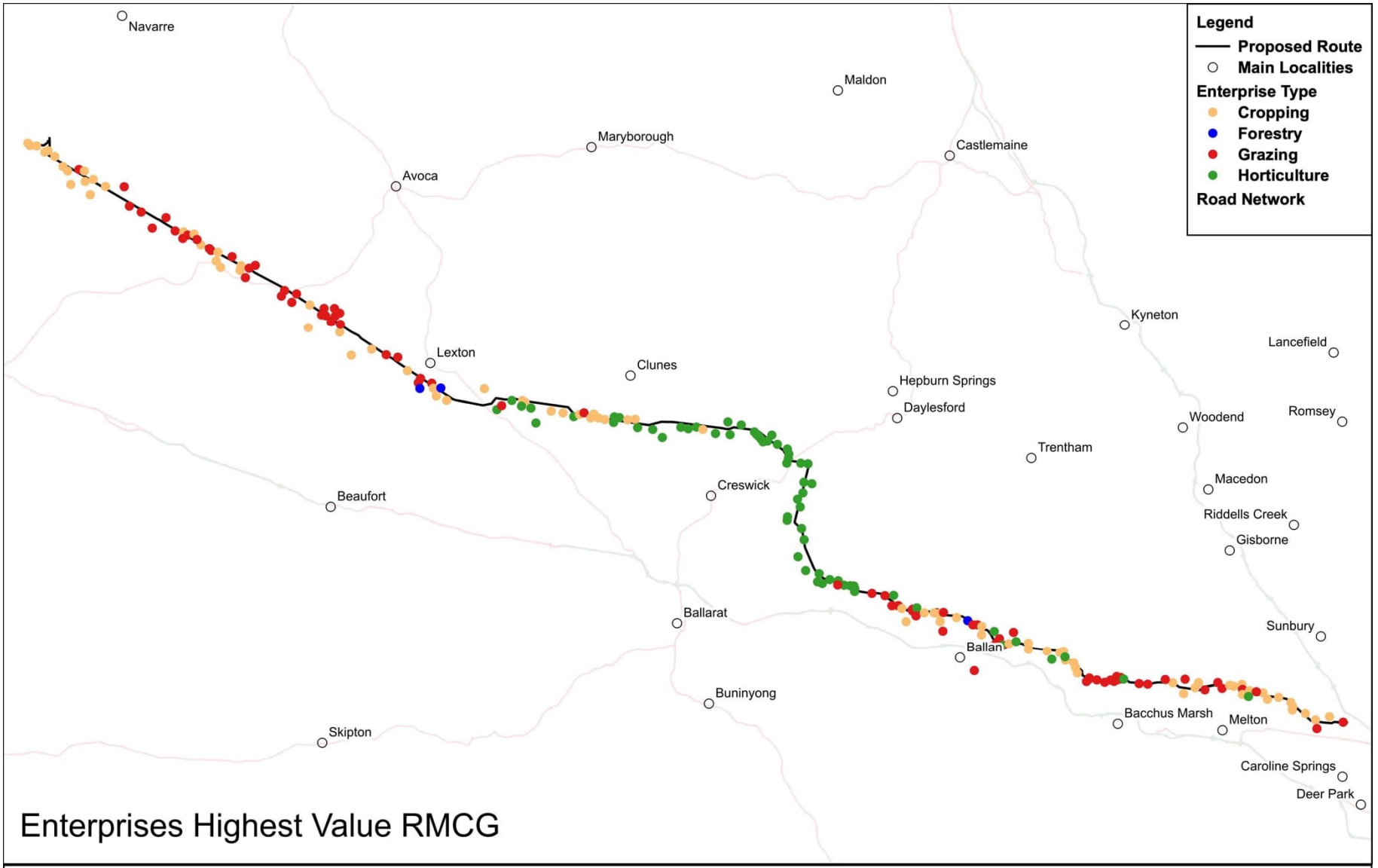
Navarre
Maldon
Maryborough
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Kyneton
Lancefield
Lexton
Clunes
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Legend
Proposed Route
Main Localities
Enterprise Type
Cropping
Forestry
Grazing
Horticulture
Road Network
Enterprises Highest Value RMCG
Prepared by: J Gaudion
Checked by: S Annett
Wednesday 30/10/2024, 12:01pm
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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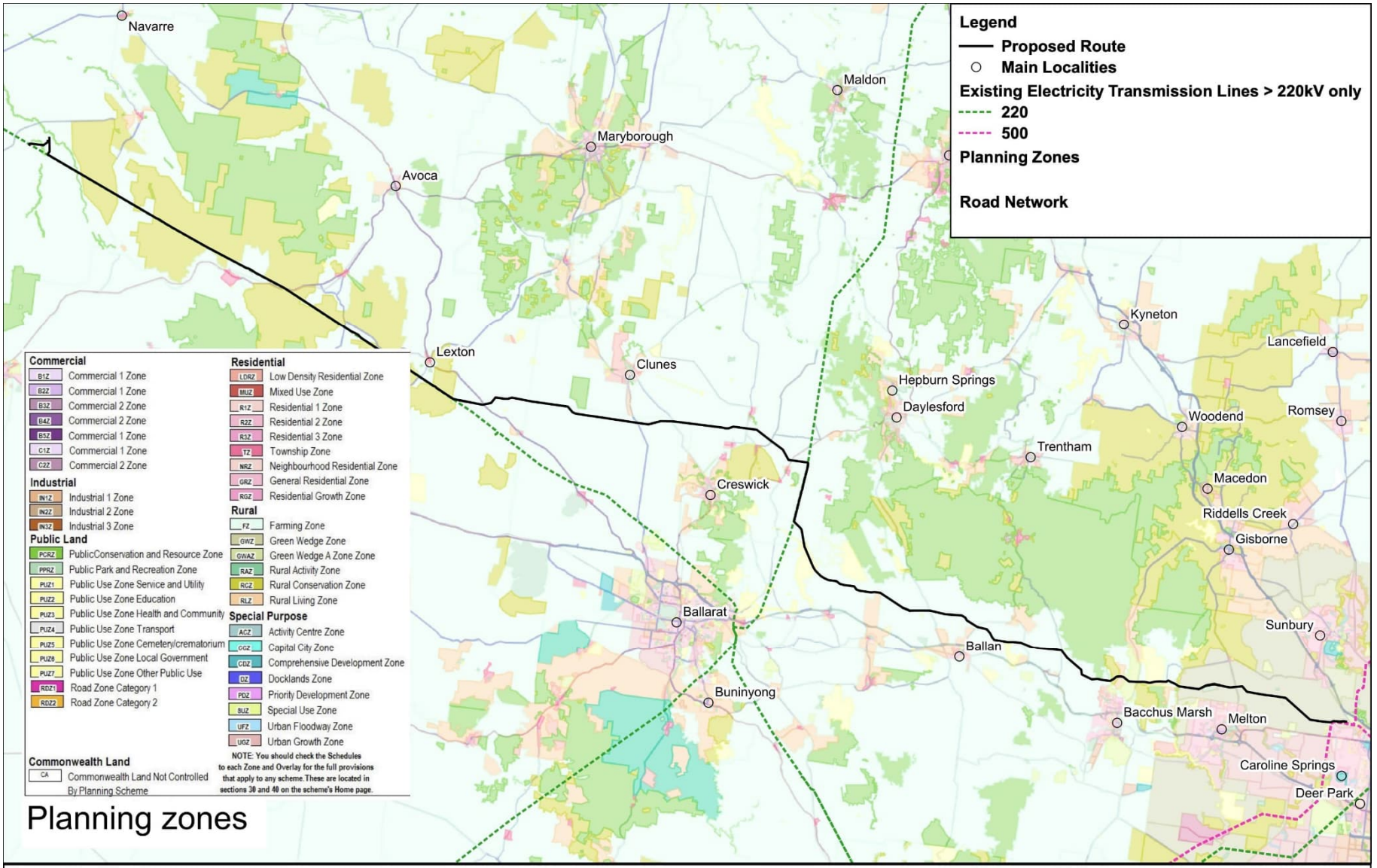

Planning zones

Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 01:36pm
Job number: 2163

Western Renewables Link

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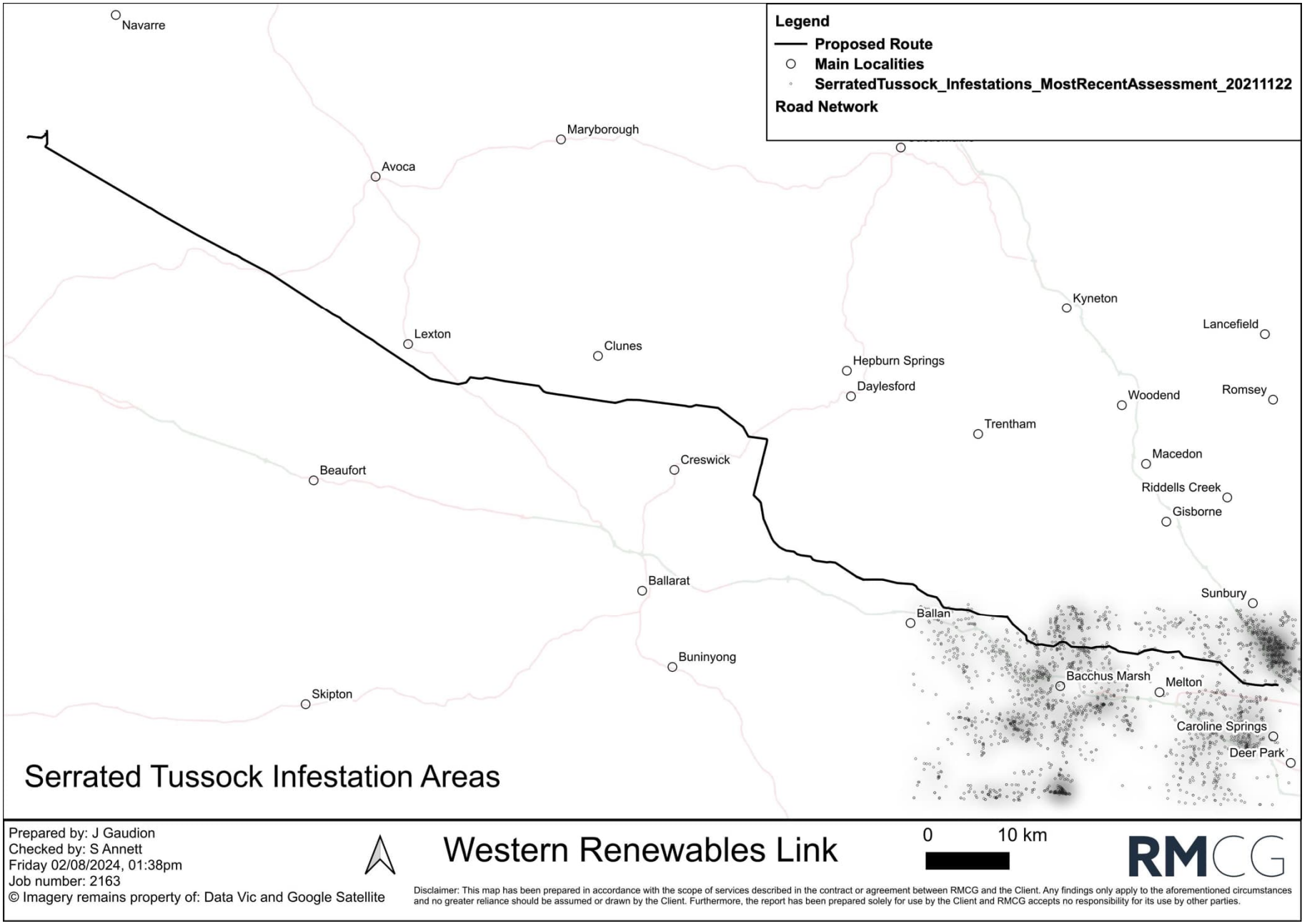
RMCG


Legend
Proposed Route
Main Localities
SerratedTussock_Infestations_MostRecentAssessment_20211122
Road Network
Navarre
Maryborough
Avoca
Lexton
Clunes
Kyneton
Lancefield
Hepburn Springs
Daylesford
Woodend
Romsey
Trentham
Macedon
Creswick
Beaufort
Riddells Creek
Gisborne
Ballarat
Sunbury
Ballan
Buninyong
Bacchus Marsh
Melton
Skipton
Caroline Springs
Deer Park
Serrated Tussock Infestation Areas
Prepared by: J Gaudion
Checked by: S Annett
Friday 02/08/2024, 01:38pm
Job number: 2163
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Western Renewables Link
0
10 km
RMCG
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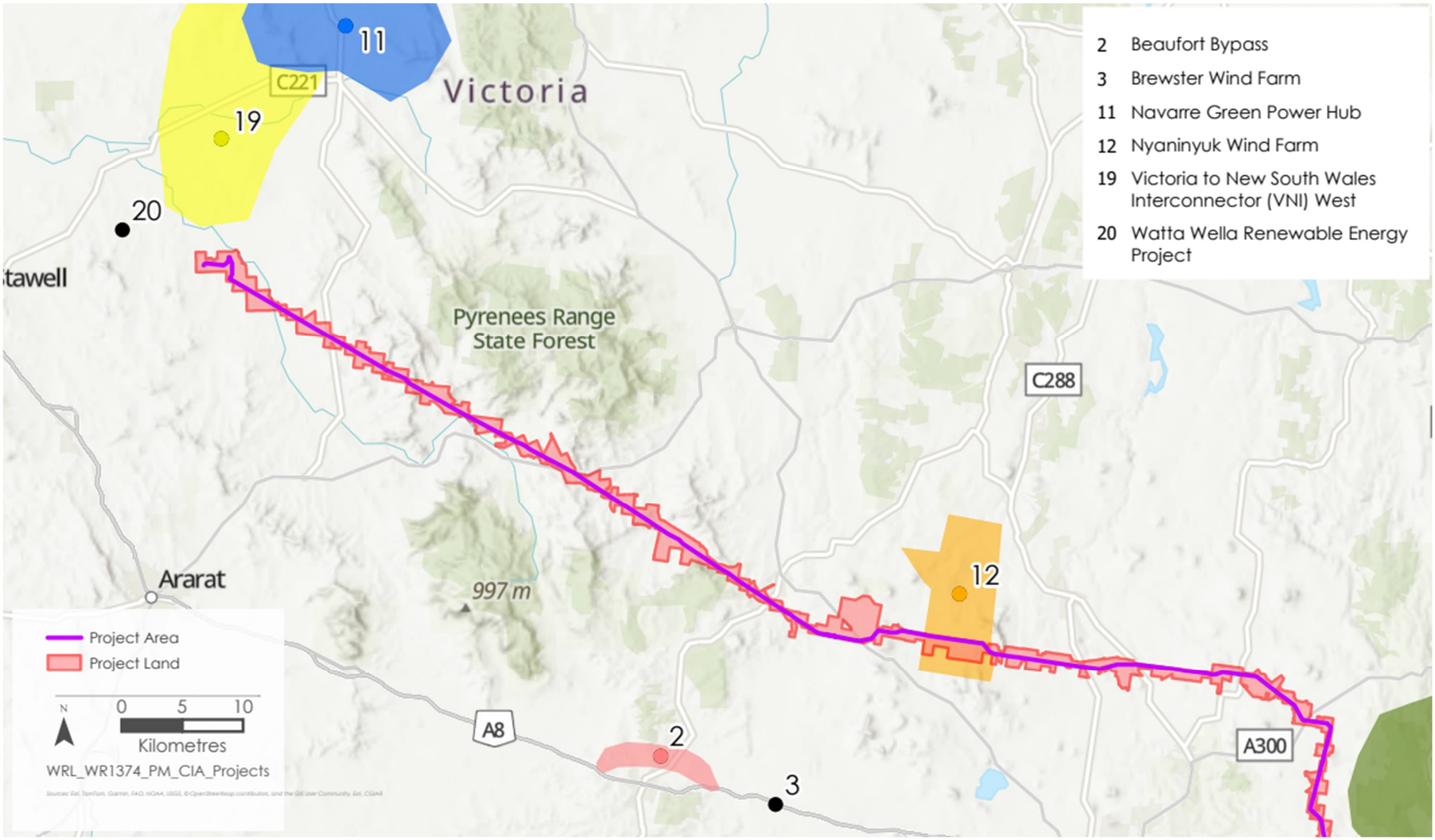
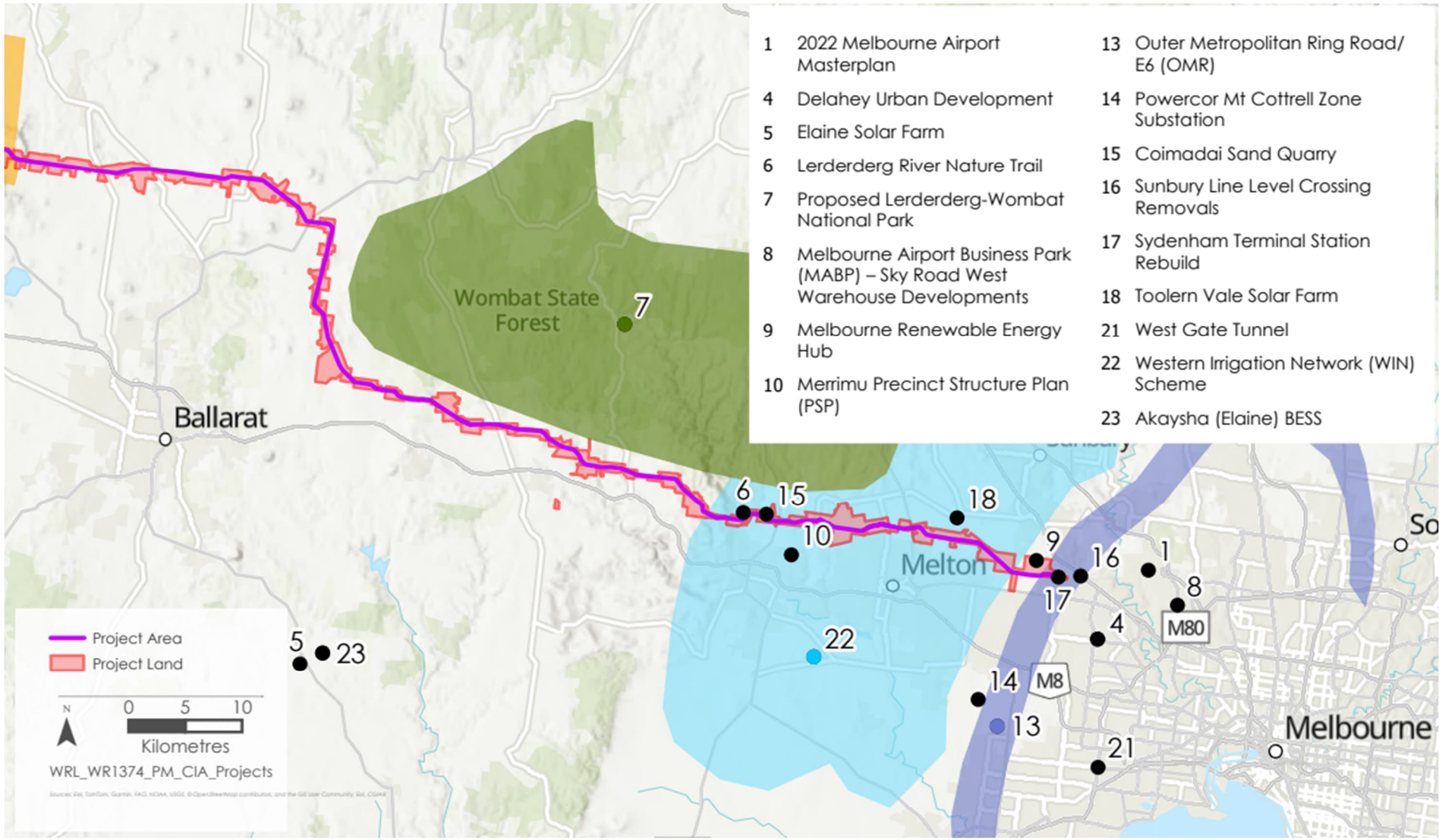

2 Beaufort Bypass
3 Brewster Wind Farm
11 Navarre Green Power Hub
12 Nyaninyuk Wind Farm
19 Victoria to New South Wales Interconnector (VNI) West
20 Watta Wella Renewable Energy Project
Victoria
C221
11
19
20
tawell
Pyrenees Range State Forest
C288
12
Ararat
997 m
A8
2
3
A300
Project Area
Project Land
N
0 5 10
Kilometres
WRL_WR1374_PM_CIA_Projects


1 2022 Melbourne Airport Masterplan
4 Delahey Urban Development
5 Elaine Solar Farm
6 Lerderderg River Nature Trail
7 Proposed Lerderderg-Wombat National Park
8 Melbourne Airport Business Park (MABP) – Sky Road West Warehouse Developments
9 Melbourne Renewable Energy Hub
10 Merrimu Precinct Structure Plan (PSP)
13 Outer Metropolitan Ring Road/ E6 (OMR)
14 Powercor Mt Cottrell Zone Substation
15 Coimadai Sand Quarry
16 Sunbury Line Level Crossing Removals
17 Sydenham Terminal Station Rebuild
18 Toolern Vale Solar Farm
21 West Gate Tunnel
22 Western Irrigation Network (WIN) Scheme
23 Akaysha (Elaine) BESS
Wombat State Forest
Ballarat
Melton
Melbourne
M80
M8
Project Area
Project Land
N
0 5 10
Kilometres
WRL_WR1374_PM_CIA_Projects

Appendix E Forestry evaluation method

There are various methods that can be used to value the standing trees, depending on the maturity of the plantation.

For young plantations, typically less than two-years-old, the cost-based method can be used. It requires the accumulation of costs to provide an estimate of value. Options include historical costs (sum of all costs to develop the plantation), current costs (takes into account inflation factors of historical costs) and replacement costs (plantation value calculated as the sum of costs compounded forward from time of occurrence to the present day. Taking into account costs of site preparation, pre-plant weed control, seedlings, planting, fertiliser, post-plant weed control, pest control (vertebrate pests and insect pests) and supervision, typical replacement costs of young pine and blue gum plantations are about $2,000 per hectare. It is possible to calculate value on a replacement cost basis for older plantations. The fundamental weakness of this cost-based valuation approach is that cost generally does not equal value. A high-cost forest does not necessarily equal a high value forest and conversely a low-cost forest does not necessarily mean a low value forest. Cost is generally a function of soil physical properties, terrain, location relative to base, current vegetation, and weed competition. Value is generally a function of site productivity, rainfall, soil nutrient status, location relative to markets, and growth rates. Examples are known where forest established on expensive land produces high productivity forest for low establishment costs compared with forest established on cheaper land that requires greater cost inputs to create only a poor productivity forest.

For mature plantations, the lump sum-based valuation approach (sometimes called the liquidation value) is appropriate. It assumes all trees are cut down on the day of the valuation and are sold into current markets. Forest value is calculated by determining the stumpage value of standing merchantable volume, less any costs. Any cost expenditure prior to the valuation date is not included. While maturity varies with plantation productivity, radiata pine plantations are normally mature between 30 and 35-years-old, while Tasmanian blue gum plantations are usually mature between 12 and 15-years-old.

For plantations that are not less than two-years-old and are not mature, the most appropriate valuation method is the expectation-based approach (also known as the present value method). This is the most commonly used valuation method in Australian plantations. Future log or woodchip volume is forecast based on some underlying silvicultural management and harvesting strategy. Log volumes are multiplied by log prices to give forecast revenue. Costs are subtracted from these revenues to give future net cash flows. These are discounted to give forest value. Any cost expenditure prior to the valuation date is not included. The optimum harvest age can be calculated, or the harvest age may reflect expectations about when the stand will be harvested to fit in with broader estate considerations. The approach requires determination of an appropriate discount rate.

Stumpage is the forestry term for the return a grower receives from the sale of logs and takes into account the price paid by the processor less the costs of harvest and transport of logs to that processor. Harvesting costs vary depending on plantation productivity. For high volume per hectare harvests, the harvesting costs per tonne are less than for low volume per hectare harvests. This is because a mechanical harvesting machine can process a large volume log in virtually the same time as a lower volume log. Harvesting costs / tonne are less on flat terrain than on steeper terrain. Transport costs depend on the road haulage distance to the log purchaser.

Radiata pine plantations are managed to produce high quality sawlog with small knots, which is suited for production of quality structural timber. This is achieved by thinning plantations up to three times prior to clear fell. First thinning produces mostly pulp log, but with each subsequent thinning there are increasing percentages of sawlog in the product mix. There is a range of markets for small diameter logs from first thinning. These markets include:

- Roundwood that meets strict diameter and straightness criteria is treated with preservation chemicals for outdoor and in-ground use. Preservation products include posts, rails, strainers and poles to service the local viticulture, horticulture and agricultural industries.
- Straight logs with a small end diameter greater than 12cm can be processed in sawmills.
- Logs that do not meet the strict straightness criteria for preservation or sawlogs, can be exported as pulp logs.

Logs from second thinning, third thinning and clear fell are either exported or sold to local sawmills. The largest-scale sawmill in Victoria is AKD's mill at Colac. The most common export log sizes sold from radiata pine plantations are A-grade (greater than 20cm small end diameter), K-grade (greater than 15cm small end diameter) and pulp log.

Sawlog sizes purchased by AKD include:

- SC2: 20.0-24.9cm small end diameter (sed) under bark in lengths 3.7, 4.9, 5.5 and 6.1m.
- SC3: 25.0-29.9cm sed in lengths 4.9, 5.5 and 6.1m.
- SC4: 30.0-34.9cm sed in lengths 4.9, 5.5 and 6.1m.
- SC5: 35.0-39.9cm sed in lengths 4.9, 5.5 and 6.1m.
- SC6: 40.0-44.9cm sed in lengths 4.9, 5.5 and 6.1m.
- SC7: >45.0cm sed in lengths 4.9, 5.5 and 6.1m.

There are price premiums for the larger diameters and for longer log lengths.

Tasmanian blue gum plantations are grown to produce woodchip, which is exported, either through the Port of Portland or the Port of Geelong. Hardwood chip is a global commodity traded in US dollars (USD). Woodchips are sold on the basis of bone-dry metric tonnes (BDT) which limits the impact of variation in wood density and moisture content. BDT is a measure of the quantity of bone-dry wood. The price paid for export woodchips depends on the world price which fluctuates with supply and demand. Prices must be converted from USD / BDT to AUD / GMT (Green Metric Tonne). There was a significant increase in the global price for hardwood chip in 2022, and taking into account current exchange rates, the current Australian FOB price is about $261.51 / BDT. After allowing for the dry weight factor, the current Australian FOB (Free on Board) price is about $138.60 / GMT.

Appendix F Cumulative impact - other projects considered

Table E1: Other infrastructure or construction projects considered for potential cumulative impacts

PROJECT NAME	LOCATION	DESCRIPTION
2022 Melbourne Airport Masterplan	Melbourne Airport	The 2022 Melbourne Airport Master Plan has now been approved by the Federal Minister for Infrastructure, Transport, Regional Development and Local Government. Major Projects include the development of the third runway, the T4 Express Link, and connecting elevated road and forecourt.
Bacchus Marsh Residential Development	Merrimu	Residential development of 15 properties currently used for agriculture, with an additional property used as an off-site site
Delahey Urban Development	Delahey	An urban development and subdivision of 46.1ha for housing and complementary mixed-uses.
Lerderderg River Nature Trail	Lerderderg River	Lerderderg River Nature Trail proposes a new 5km trail that would extend the Aqualink hike and bike network through to MacKenzies Flat picnic area. The proposed reserve is to protect an internationally significant outcrop of Permian glacial rocks.
Lerderderg-Wombat National Park	Lerderderg State Park and Wombat State Forest	Lerderderg – Wombat National Park will be created by linking existing Lerderderg State Park and much of the existing Wombat State Forest to create a new national park covering more than 44,000ha between Daylesford and Bacchus Marsh. The Government is investing in facility upgrades throughout the region, including upgrading campgrounds and new and upgraded walking trails and facilities.
Melbourne Airport Business Park (MABP) – Sky Road West Warehouse Developments	Melbourne Airport	This 25ha project is located at 66 Sky Road, Melbourne Airport, approximately 9km east of the Project Land. The area is not agricultural land.
Melbourne Renewable Energy Hub, Plumpton, Victoria	Plumpton	A battery project that will store wind, hydro and solar energy from regional Victoria and will connect into the adjacent Sydenham Terminal Station. It includes a 12.5MW solar farm to recover battery efficiency losses and ensure low cost and 'net-zero emission' operations of the Battery Energy Storage System.
Merrimu Precinct Structure Plan (PSP)/Bacchus Marsh Urban Growth Framework	Merrimu	Bacchus Marsh Urban Growth Framework identifies new areas for jobs, housing and infrastructure, while protecting valuable cultural and environmental assets. It sets out a vision to support a proposed 7,200 lot residential precinct near Bacchus Marsh, north-west of Melbourne as part of the Merrimu Precinct Structure Plan (PSP).
Powercor Mt Cottrell Zone Substation	Truganina	Construction and operation of the Powercor Mt Cottrell Zone Substation. The area is not agricultural land.
Sand quarry, Lot 8 Seereys Road, Coimadai, Vic	Coimadai	Re-establishment of a quarry and associated infrastructure for the purposes of extracting mineral resources (sand and gravel).
Sunbury Line Level Crossing Removals (Calder Park Drive and Holden Road Level Crossing Removal Project)	Calder Park	The level crossings at Calder Park Drive, Old Calder Highway, Holden Road and Watsons Road will be removed by building a new road bridge over the rail line. The small area involved is not agricultural land.

PROJECT NAME	LOCATION	DESCRIPTION
Sydenham Terminal Station Rebuild	Plumpton	Previously encompassed within the Project this rebuild includes the construction of a new terminal station north of the existing Sydenham Terminal Station. This was removed from the Project in August 2023 and is being completed as a standalone project due to its urgency to ensure network reliability.
West Gate Tunnel (formerly the Western Distributor Project)	Melbourne	A proposed new tunnel and elevated motorway connecting the West Gate Freeway with the Port of Melbourne, CityLink and the western edge of the CBD to provide an alternative river crossing to the existing West Gate Bridge. The Project also involves the widening of the existing West Gate Freeway from the M80 Western Ring Road to the West Gate Bridge to boost capacity, and associated road linkages to the M80 Western Ring Road and Princes Freeway.
Akaysha (Elaine) Battery Energy Storage System Project	Elaine	The Project involves the construction and operation of a proposed 311 MW / 1,244 MWh battery energy storage system (BESS) at 225 Elaine-Bluebridge Road, Elaine VIC. The site is located immediately southwest of Elaine terminal station which forms part of the Project. The BESS will also include a 220v – 33kV high voltage substation on the northern side that would feed into Elaine Terminal Station via a 300m long above ground transmission line or buried cable. As such, it has a spatial relationship. Ministerial permit PA2302247-1 was granted for the project on 13 September 2024 and the project has an indicative construction duration of 18-months.

Appendix G DTP Peer review report

Ground floor 20 Chandos Street
St Leonards NSW 2065
ABN: 28 141 736 558

02 9493 9500

www.emmconsulting.com.au

Memorandum

18 March 2025

To: Victorian Department of Transport and Planning

From: EMM Consulting, Thomas Elder Consulting and Minesoils

Subject: Independent Peer Review - Agriculture and Forestry Impact Assessment of Western Renewable Link

1 Introduction

Ausnet Transmission Group Pty Ltd (AusNet) proposes to develop the Western Renewables Link (WRL), a new major transmission line between Bulgana and Sydenham. The WRL is intended to enhance connectivity for renewable energy generation in western Victoria.

The WRL requires the preparation of an EES under the Victorian *Environment Effects Act 1978* (EES Act). As part of the EES scoping requirements for the WRL, AusNet is required to assess the likely effects of the project on existing and foreseeable land uses, including farming and agriculture. AusNet engaged RM Consulting Group Pty Ltd (RMCG) to prepare an agriculture impact assessment (AIA) for the WRL which will form part of the EES.

The Victorian Department of Transport and Planning (DTP) engaged EMM Consulting Pty Ltd (EMM), in conjunction with Thomas Elder Consulting Pty Ltd (TEC) and Minesoils Pty Ltd (Minesoils), to undertake an independent peer review of the AIA prepared for the WRL EES. This included reviews of two draft versions of the AIA; the results of which were documented in reports to DTP which provided recommendations for additional work to address the scoping requirements for the EES.

DTP has requested EMM, TEC and Minesoils review the final AIA and document any outstanding recommendations and concerns. DTP has requested this be documented in a memorandum that can be appended to the published AIA.

2 Background

DTP engaged EMM, in conjunction with TEC and Minesoils, to undertake an independent peer review of the AIA prepared for the WRL EES. This involved reviews of two versions of the draft AIA, a review of the final version of the AIA, and undertaking a site visit by the peer reviewers.

The objectives of the peer review of the draft AIAs were to provide advice on the suitability and accuracy of proposed assessment methods and the reliability of conclusions regarding impacts and mitigation within the EES scoping requirements. Additionally, they included recommending alternative assessment methods if the current ones were deemed inappropriate or insufficient.

A primary goal of the peer review of the revised draft AIA was to assess how effectively the comments and recommendations provided on the initial draft had been incorporated and addressed in the document.

The reports documenting the results of the peer reviews of the initial and revised drafts of the AIA were issued in August 2022 and September 2024, respectively. A site visit of the proposed alignment of the WRL was undertaken by the peer reviewers in June 2024.

Both the first and second peer review reports provided comments and recommendations for further work on the AIA. While many of the comments and recommendations provided by the peer reviewers have been addressed by the authors in the revised draft and final versions of the AIA, some remain unaddressed.

The final AIA was issued to the peer reviewers on 13 January 2025. Updated maps to be appended to the final AIA were issued on 4 March 2025. DTP has requested the peer reviewers review the final AIA and document any outstanding recommendations and concerns.

3 The project

The WRL is an electricity transmission project which predominantly includes a new ~190 kilometre (km) long 500 kilovolt (kV) overhead transmission line between Bulgana and Sydenham in Victoria. It will facilitate the connection of new renewable energy generated in western Victoria into the national electricity market (NEM) and increase Victorian transmission capacity.

The WRL requires the preparation of an EES under the EES Act. As part of the EES scoping requirements, AusNet is required to assess the environmental effects of the project on a range of values, including farming and agriculture.

As noted in the different versions of the AIA and observed during the site visit, agriculture is the dominant land use within the proposed corridor of the WRL. Therefore, considering the potential impacts of the project on agriculture is a key focus for both the project and DTP.

4 Scope

The peer review process was conducted in stages and included the review of three versions of the AIA; two draft versions (initial draft and revised draft) and the final version. The review of the draft AIAs focused on advising DTP on:

- The suitability of the proposed assessment methods, as well as the adequacy and accuracy of the analysis.
- The reliability of conclusions regarding impacts and mitigation, considering the scoping requirements for the EES.
- Alternative assessment methods where the adopted methods were deemed inappropriate or insufficiently robust.

Additionally, the review of the revised draft AIA assessed how the peer reviewers' comments and recommendations on the initial draft AIA had been addressed (or not).

The purpose of this memorandum is to review the final AIA and document any outstanding comments and recommendations from the first and second peer review reports. These outstanding comments and recommendations are summarised in Section 6 and detailed in a table in Attachment A. The table includes:

- A summary of all comments and recommendations from the second peer review report regarding the revised draft AIA.
- The author's response to each recommendation (where provided).
- The peer reviewer's final comments.

5 Exclusions and limitations

This peer review report is limited to a review of the final AIA comparing it to the comments and recommendations made in the second peer review report on the second draft AIA. It has not included reviews of any other reports associated with the EES.

6 Review of final AIA

6.1 Suitability of proposed methods and adequacy and accuracy of analysis

The initial peer review report highlighted several information gaps and limitations in assessing existing conditions within the draft AIA. Although many of these issues were addressed in the revised draft, some persisted. Notably, these remaining gaps stemmed from referencing other technical reports supporting the EES, without summarising their content within the AIA itself. The peer reviewers recommended that, at a minimum, relevant information from these reports should be summarised in the AIA.

While some recommendations regarding additional information from other reports supporting the WRL EES have been incorporated into the final AIA, not all have been addressed. The outstanding recommendations relate to:

- Providing further justification for the low susceptibility of soil erosion across the study area.
- Including more detailed information on land and soil capability at a project level (rather than a regional level).
- Providing baseline data on agricultural employment, agri-tourism, and agricultural supply chains.

The revised draft AIA had been updated to include a more detailed description of the assessment method used to document land uses along the WRL alignment. This assessment was initially conducted via desktop review, followed by limited ground-truthing. However, while additional details were provided on the methodology for assessing properties affected by the project, the results of this assessment were not included in the revised draft AIA. The peer reviewers believed that, subject to data limitations, details of all attributes identified for each property should be included in the report. Additionally, they recommended that maps and figures showing properties likely to be impacted during both the construction and operational phases be provided at a larger scale to allow for the identification of individual properties.

The recommendations regarding property-level information have not been addressed in the final AIA, including the provision of details on the agricultural use and infrastructure of each property likely to be impacted by the project, including water infrastructure.

Larger scale maps have been provided, and some provide cadastral or property boundaries allowing identification of individual properties.

In addition, the peer reviewers recommended that details of all attributes identified for each property be included in the AIA. This could have been accomplished in tabular form, listing attributes such as dams, irrigation infrastructure, and processing sheds.

6.2 Reliability of conclusions and mitigations

A key recommendation in both the first and second peer review reports was for the AIA to include an assessment of project alternatives — especially the option of undergrounding the transmission lines — rather than merely cross-referencing attachments in the EES. However, the authors did not accept this recommendation, and the final AIA continues to reference a separate report on project alternatives instead of summarising its findings within the document.

The peer reviewers acknowledge that project alternatives are addressed in a separate report. However, considering the predominance of agriculture in the areas within and surrounding the transmission line alignment, they believe the AIA should directly consider alternatives, particularly undergrounding the lines.

Additionally, both peer review reports recommended a commitment to preparing and implementing erosion and sediment control plans (ESCPs) as part of construction and property management plans (CPMPs). These plans would help mitigate erosion impacts, particularly during the construction phase when vegetation is removed. However, this recommendation has not been incorporated into the final AIA.

6.3 Likely effects

The first and second peer review reports found that the initial and revised draft AIAs did not adequately assess the likely effects of certain matters required by the scoping requirements. In the opinion of the peer reviewers, this was primarily because the AIA relied on cross-references to other technical reports instead of summarising the results of these assessments within the document itself.

Many of the peer review recommendations have been adopted by the AIA authors, and the final document has been updated to summarise the likely impacts of the WRL on agricultural employment, agricultural supply chains, and agri-tourism. While these summaries are acknowledged and accepted, they are considered the bare minimum required for an AIA of this scale.

6.4 Alternative assessment methods

Alternative assessment methods recommended in the first peer review report were incorporated into the revised draft AIA, including the inclusion of agricultural production statistics for all regions intersected by the project and the collection of data on land uses and property attributes for potentially impacted areas.

However, it was also recommended that land use and property attribute data be provided for each affected property and that relevant stakeholder engagement findings from other technical studies and the proponent be incorporated into the revised draft AIA. These recommendations have not been adopted in the final AIA.

Additionally, the first and second peer review reports recommended that the AIA authors refer to best-practice guidelines for AIAs to guide the structure and level of detail appropriate for a project of this scale and the magnitude of its agricultural impacts. However, these guidelines have not been considered or applied in any version of the AIA. The authors maintain that such guidelines are not appropriate for linear infrastructure projects.

The peer reviewers disagree with this position. The recommended AIA guidelines provide value by ensuring comprehensive assessment parameters and a logical report structure. Their approach — starting with broad regional data and narrowing down to local and project-level assessments — offers a clear, evidence-based progression of how agricultural impacts have been assessed and from what data conclusions have been drawn. Furthermore, these guidelines facilitate the integration of assessments from other disciplines, with detailed summaries provided within the AIA. Their intent is twofold; to ensure that all agriculture-related parameters are thoroughly considered and clearly presented, and to consolidate findings from multiple disciplines into a single, cohesive report. This includes, as discussed above, a summary of an assessment of project alternatives.

7 Conclusion

The WRL aims to enhance renewable energy connectivity in western Victoria through a ~190 km, 500 kV transmission line between Bulgana and Sydenham. The land primarily impacted by the WRL is agricultural. To assess the potential effects of the project on agriculture, AusNet commissioned RMCG to prepare an AIA, which was subject to independent peer review.

The objectives of the peer review of the draft AIAs were to:

- Assess the suitability and accuracy of the proposed assessment methods.
- Evaluate the reliability of conclusions regarding impacts and mitigation within the EES scoping requirements.
- Recommend alternative assessment methods if the existing ones were found to be inappropriate or insufficient.

The peer review of the AIA has identified improvements in methodology and data accuracy while also highlighting several persistent shortcomings.

The suitability of methods used in the AIA has improved over successive drafts, particularly in data collection and assessment of agricultural land use. However, information gaps remain, particularly in summarising technical findings from supporting reports rather than merely cross-referencing them. The report also lacks sufficient justification for certain conclusions, such as soil erosion susceptibility and land capability at a project-specific level.

Regarding the reliability of conclusions, the peer reviewers found that the assessment remains incomplete in one key area. The final AIA does not directly consider project alternatives, including undergrounding transmission lines, but instead defers to separate documents. While the peer reviewers acknowledge that consideration of project alternatives have been considered in separate reports, this omission weakens the AIA's ability to fully evaluate alternatives and mitigation options and their impact on agriculture. Additionally, while some effort has been made to address agricultural employment, agri-tourism, and supply chain effects, the analysis is considered minimal rather than comprehensive.

Alternative assessment methods recommended in earlier reviews have largely been adopted, however some gaps — such as providing property-level data and referencing best-practice guidelines for AIAs — remain. The reviewers maintain that incorporating these methodologies would enhance the clarity, transparency, and robustness of the AIA.

The outstanding comments and recommendations are detailed in Attachment A.

References

RMCG 2022, draft *Western Victoria Transmission Network Project EES: Agriculture and Forestry Impact Assessment*, RMCG.

DELWP 2020, *Scoping Requirements Western Victoria Transmission Network Project Environment Effects Statement*, Department of Environment, Land, Water and Planning.

EMM 2022, *Western Renewables Link Project, Independent Peer Review - Agricultural Impact Assessment*, EMM Consulting.

RMCG 2024a, draft *Western Renewables Link Project EES: Agriculture and Forestry Impact Assessment*, RMCG.

RMCG 2025, final draft *Western Renewables Link Project EES: Agriculture and Forestry Impact Assessment*, RMCG.

Attachment A

Table of comments and recommendations from second peer review report

EMM
creating opportunities

Table A1 | Review comments and recommendations

Comment/recommendation	Author's response	Reviewer's comment
Project alternatives		
It is recommended that the revised draft AIA be updated to address project alternatives, including the placement of the conductors underground, particularly if these alternatives have the potential to avoid or minimise impacts on agriculture.	No change made. Alternative routes and routes associated with alternative projects have been considered separately in Attachment I: Assessment of Alternatives. RMCG was involved in preliminary technical discussions for these route options.	Peer reviewers stand by previous recommendation.
Existing environment - Land uses along WRL		
It is recommended that the revised draft AIA be updated to provide details of the agricultural use and infrastructure of each property likely to be impacted by the project. Where there are limitations on the availability of data, or there are sensitivities around the publication of the data, these should be noted in the report.	No change made. No change to previous response - the assessment has examined every individual property, including infrastructure. It is not appropriate or necessary to provide this level of information on each specific property in this report. The possible impacts on operations and infrastructure is, in broad terms, consistent across farm similar operations (e.g. cropping).	Peer reviewers stand by previous recommendation. It is recommended the report present findings of the assessment which examined every individual property as an Appendix in tabulated or summary form. The absence of this data may question if all properties were assessed as individual farms. Furthermore, taking an average of the impact may benefit poorer produces and negatively impact above average produces.
It is recommended that the mapping and/or figures in the revised draft AIA showing properties likely to be impacted by the project be provided at a larger scale so that individual properties (project land) can be identified.	No change made. There are 229 properties affected by this project. Including maps at the scale requested is impractical and unnecessary. AusNet has a dynamic mapping tool showing all properties intersected by the Project.	Post provision of the author's response to the peer review of the revised draft, updated maps were provided by the author showing land production potential, primary production land uses, property sizes and enterprise highest value. These maps have been provided at a scale where individual properties can be identified via cadastral (or property) boundaries on the property sizes and enterprise highest value maps. Consideration should be given to including cadastral or property boundaries on the land production potential and primary production land uses maps.
Existing environment - Land classification and suitability		
It is recommended that the revised draft AIA be updated to identify the central and eastern ends of the study area referenced in Section 6.1.1 in a figure.	No change made. The central and eastern areas are not spatially precise but are based on rainfall and production potential. This information is reflected in maps	Peer reviewers stand by previous recommendation. If the project is to be referred eastern, central and western

Comment/recommendation	Author's response	Reviewer's comment
	included in Appendix D. Reference to Appendix D has been added to section 6.1.1.	sections, this should be clearly shown, albeit with a disclaimer that it is approximate only.
It is recommended that further justification on the low susceptibility of soil erosion across the region be provided given it is evident that sodosols are present in some areas.	No change made. We have reviewed this section and believe that the explanation of why soil erosion risk is low is sound. We do not believe that adding further information on soil erosion susceptibility adds value to the report.	Peer reviewers stand by previous recommendation. It is acknowledged that there is reference to the Geology and Soils Impact Assessment in Section 6.1.1, however, the reviewers are still of the view that further justification on the low susceptibility of soil erosion across the region be provided. It is noted that the scope of the review did not include a review of the Geology and Soils Impact Assessment to confirm the statements about erosion risk.
Existing environment - Topography		
It is recommended topographic figures be provided in the revised draft AIA and a discussion be provided on topography, topographic changes and how that relates to agricultural land uses along the study area.	No change made. We have reviewed section 6.1.1 and we do not think adding specific information on topography adds value to the report. The agricultural potential and land uses in the area are a product of many factors combined, which is reflected in the land systems mapping that is discussed. Topography is one of several factors included in land systems, so presenting it separately is unnecessary.	Peer reviewers note the author's response and acknowledge that post provision of this response, updated land production potential maps were provided at a more localised scale. Notwithstanding this, these maps are based on 1:250,000 scale land system maps which represent regional level survey accuracy, not local level accuracy. Appropriate disclaimers should be provided within the text of the AIA around the accuracy of the mapping when viewed at the zoomed in local scale.
Existing environment – Land and soil capability		
It is recommended that the revised draft AIA be updated to provide a detailed summary of the: • correlation between soil landscapes, SMUs and land production potential and capability class mapping • correlation between soil types and capability classes with the specific agricultural land use types • known or potential hazards and limitations of the soils in the study area, particularly those soils prone to erosion and degradation when disturbed.	No change made. No change to previous response. The study includes Land Systems maps because they reflect the factors listed - topography, soil and climate (and thereby capability). This information addresses the study scope as described. It is our view that including the suggested additional detail does not provide any additional clarity or value to the impact assessment.	Peer reviewers note the author's response and acknowledge that post provision of this response, updated land production potential maps were provided at a more localised scale. Notwithstanding this, these maps are based on 1:250,000 scale land system maps which represent regional level survey accuracy, not local level accuracy. Appropriate disclaimers should be provided within the text of the AIA around the accuracy of the mapping when viewed at the zoomed in local scale.
It is recommended that a series of figures be provided in the revised draft AIA at 1:25,000 scale along the length of	No change made.	Peer reviewers stand by previous recommendation.

Comment/recommendation	Author's response	Reviewer's comment
the study area which includes, topography, soil management units and land capability classes as it relates directly to agriculture activities and safe land use.	There is very little 1:25,000 scale soil or land capability mapping in this area (the only exception is small areas where detailed studies were completed, but even then, most of this mapping is not in a digital form). The study uses the best available and most appropriate data to address the scope of the assessment, namely Land Systems because they integrate the factors listed - topography, soil and climate. The description of land systems has been reviewed and we believe it provides an adequate explanation.	It is understood that the regional mapping is variable and should be presented according to its survey scale, however there is an opportunity to zoom into this mapping to assist with property level assessment, whilst disclaiming the survey intensity should be considered less accurate when viewed at the zoomed in scale.
Existing environment – Zoning and overlays		
It is recommended that the revised draft AIA be updated to include a summary of land use zoning and overlays within the study area specifically relevant to agriculture and how they support agricultural land uses and activities. This should be supported by figures additional to that already provided the revised draft AIA which focus on discrete sections of the proposed WRL route and provide better resolution/readability. This could be done at a scale of 1:25,000 or broken into the eastern, central and western sections as referenced in the draft report.	Accepted – Change made Detailed information on planning zones etc is included in the Land Use and Planning Impact Assessment. An additional note describing the zoning of the land included in the project has been added to section 6.2.2 (including a referencing the planning zones map in Appendix D). This text reads: '....These land uses are reflected in the local planning schemes. The Planning zones map, included in Appendix D, shows that the vast majority of the route falls within the Farming Zone or the Rural Conservation Zone. '	Peer reviewers stand by previous recommendation. The additional paragraph and reference to the broad scale maps in Appendix D are acknowledged, however this level of information is still presented at a regional level instead of a project level suitable for an impact assessment.
Existing environment - Agricultural productivity and production value – project area		
It is recommended that the revised draft AIA be updated to provide details of the use of each property likely to be impacted by the project. This property level information should be used to derive agricultural productivity and production value for these properties. Where there are limitations on the availability of data, or there are sensitivities around the publication of the data, these should be noted in the report.	No change made. Property level information has been used to identify both the production and impacts of the project on each property. This is described in section 5.3.3. Limitations are described in section 5.8.	Peer reviewers stand by previous recommendation. Section 5.3.3 outlines what information was collected and subsequently grouped into categories, however the data from this work both desktop and field inspections should be presented in either tabular form or as a 1-page summary of each property as an appendix in the report. This would clarify the information confirmed at each property, the information gaps, and assumptions based on desktop or site inspections. Without presenting the data obtained there is no way to understand or verify how individual properties fit the assumed groupings. It is also noted that the production values are based on 2020 data which is now 5 years old.

Comment/recommendation	Author's response	Reviewer's comment
It is recommended that the mapping and/or figures in the revised draft AIA showing properties likely to be impacted by the project be provided at a larger scale so that individual properties (project land) can be identified.	No change made. There are 229 properties affected by this project. Including maps at the scale requested is impractical and unnecessary. AusNet has a dynamic mapping tool showing all properties intersected by the Project.	Post provision of the author's response to the peer review of the revised draft, updated maps were provided by the author showing land production potential, primary production land uses, property sizes and enterprise highest value. These maps have been provided at a scale where individual properties can be identified via cadastral (or property) boundaries on the property sizes and enterprise highest value maps. Consideration should be given to including cadastral or property boundaries on the land production potential and primary production land uses maps. There is an expectation that report figures are usable and readable at an appropriate scale.
Existing environment – Agricultural employment		
It is recommended that the revised draft AIA be updated to include: • agricultural employment data for all regions intersected by the Project, in comparison with employment in other sectors (as context on the relative importance or otherwise of the agricultural sector in terms of overall employment) • any relevant trends in agricultural employment over time (eg reducing, declining, static, etc).	No change made. No change to previous response.	Peer reviewers stand by previous recommendation.
Existing environment – Agri-tourism		
It is recommended that the revised draft AIA be updated to describe the type and location of agri-tourism enterprises likely to be impacted by the project.	No change made. No change to previous response.	Peer reviewers stand by previous recommendation.
Existing environment – Supply chains		
It is recommended that the revised draft AIA be updated to describe the type and location of agricultural supply chains likely to be impacted by the project.	Accepted – Change made. Possible impacts on agricultural supply chains is included in the Economic Impact Assessment. This report does not highlight any specific impacts on agricultural supply chains. Reference to the up-dated Economic Impact Assessment report has been added to section 6.2.4 an[d] 7.2.2.	Peer reviewers stand by previous recommendation. It is noted that reference is made to the Economic Impact Assessment, a summary of this information should be presented in the AIA.

Comment/recommendation	Author's response	Reviewer's comment
		It is noted that the scope of the review did not include a review of the Economic Impact Assessment to confirm the statements about agricultural supply chains.
Existing environment – Water		
It is recommended that the revised draft AIA be updated to provide a description of the infrastructure on properties reliant on water that could be impacted by the project.	No change made. No change to previous response - every property has water infrastructure that could be affected by the project (irrigation, stock and domestic water supply). This impact has been identified. Impacts on water infrastructure need to be assessed at the time of construction, so have been noted in the PAMP requirements.	Peer reviewers stand by previous recommendation. The impact assessment process is designed to quantify the impacts on various resources including water related infrastructure, in order to assess the project prior to any approval. It is not acceptable to only assess the impact on water related infrastructure after the approval process.
Mitigation measures – Soil management		
It is recommended that Section 7.5.3 of the revised draft AIA be updated to include the commitment to the preparation of ESCPs.	No change made. No change to previous response.	Peer reviewers stand by previous recommendation.
Mitigation measures – Measures to enhance benefits		
It is recommended that the revised draft AIA be updated to include an assessment of potential benefits of the project to local communities and businesses (in the context of agriculture).	No change made. No change to previous response.	Peer reviewers stand by previous recommendation.
Likely effects – Agricultural employment		
It is recommended that the revised draft AIA be updated to include a summary of the potential direct and indirect impacts of the project on agricultural employment.	Accepted – Change made. The following text has been added to section 7.1.6: 'Assessing the impacts of the Project on these businesses is outside the scope of this assessment but is considered in the Economic Impact Assessment. This assessment describes the potential economic impacts of the Project on businesses operating in the study area, at an industry-level (based on ANSZIC industry categories). These categories include Agriculture, forestry and fishing, Accommodation and food services, and Professional, scientific and technical services, which would cover the agriculture service sector, agricultural supply chain businesses, food processing and agri-tourism. Appendix D in the Economic Impact Assessment lists the specific businesses considered in this analysis. This list	Peer reviewers accept the reference to the Economic Impact Assessment and the additional text provided as a brief summary in the AIA.

Comment/recommendation	Author's response	Reviewer's comment
	includes agri-tourism (e.g. farm stays), farm services (e.g. fencing contractor), food processing (e.g. Smeaton Mill). The conclusions from the business impact analysis were that the project will have a neutral effect for most industries though there are some potential negative impacts for Accommodation and Food Services during construction and operation (and potentially during decommissioning). The study recommends that a Business Mitigation and Support Strategy (EPR AF1) be prepared to reduce these potential impacts.'	
Likely effects – Supply chains		
It is recommended that the revised draft AIA be updated to include a summary of the potential impacts of the project on agricultural supply chains.	Accepted – Change made. As above – Additional text in Section 7.1.6.	Peer reviewers accept the reference to the Economic Impact Assessment and the additional text provided as a brief summary in the AIA.
Likely effects – Agri-tourism		
It is recommended that the revised draft AIA be updated to include a summary of the potential impacts of the project on agri-tourism.	Accepted – Change made As above – Additional text in Section 7.1.6.	Peer reviewers accept the reference to the Economic Impact Assessment and the additional text provided as a brief summary in the AIA.
Likely effects – Other effects		
It is recommended that the revised draft AIA be updated to consider climate-driven impacts on, or changes to, agriculture and whether the project may compound these effects.	No change made. We have considered whether the Project could compound changes to agriculture driven by climate. The climate change factors that will drive change in agriculture are changes in rainfall and temperature, and increased occurrence of extremes of each. We have not identified any situations where the presence the Project would have any additional influence or impact so no additional text has been added to the report. If the reviewers have specific examples that we should consider then we could re-visit this.	Peer reviewers accept the response provided.
Use of NSW best-practice AIA guidelines		
In addition, it was recommended in the first peer review report that the authors of the draft AIA consider best-practice guidelines for AIA, such as the NSW guidelines for the preparation of AIAs for the mining sector, for guidance on the structure and detail recommended for a	No response provided.	Peer reviewers stand by previous recommendation.

Comment/recommendation	Author's response	Reviewer's comment
project of this scale and the magnitude of associated agricultural impacts. These guidelines have not been considered in the revised draft AIA with the authors stating that they do not believe they are appropriate for linear infrastructure projects. Since the draft AIA was prepared, NSW released the *Large-Scale Solar Energy Guidelines* (DPE 2022), which in addition to the guidelines referenced in the first peer review report, provide best-practice guidelines for the preparation of AIA. The peer reviewers disagree with the response made by RMCG. The value in the recommended guidelines for AIA lies in the detailed coverage of assessment parameters and logical structure of the report. The logical flow of presenting broad regional data and then drilling down from regional to local and project level assessment provides a clear picture and detailed evidence of how agricultural impacts have been assessed and from what data the conclusions have been drawn. The typical agriculture assessment for a mining, solar, wind farm (which is typically a series of linear projects) or transmission line in NSW follows these guidelines. The detailed assessments from all other relevant disciplines including economics, groundwater, surface water, social, and soils, is brought together within the AIA with detailed summaries of each discipline in the relevant section. So, the intent of the recommended guidelines is to firstly make sure all agriculture-related parameters are considered and presented, and secondly, to bring all those discipline areas into one report. It is the peer reviewer's opinion that the recommended guidelines are certainly applicable to a ~ 190 km long linear energy project.		

This report has been prepared by:

RM Consulting Group Pty Ltd trading as RMCG

Level 1 East, 1100-1102 Toorak Road, Camberwell Victoria 3124

(03) 9882 2670 — rmcg.com.au — ABN 73 613 135 247

Offices in Victoria, Tasmania and NSW

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