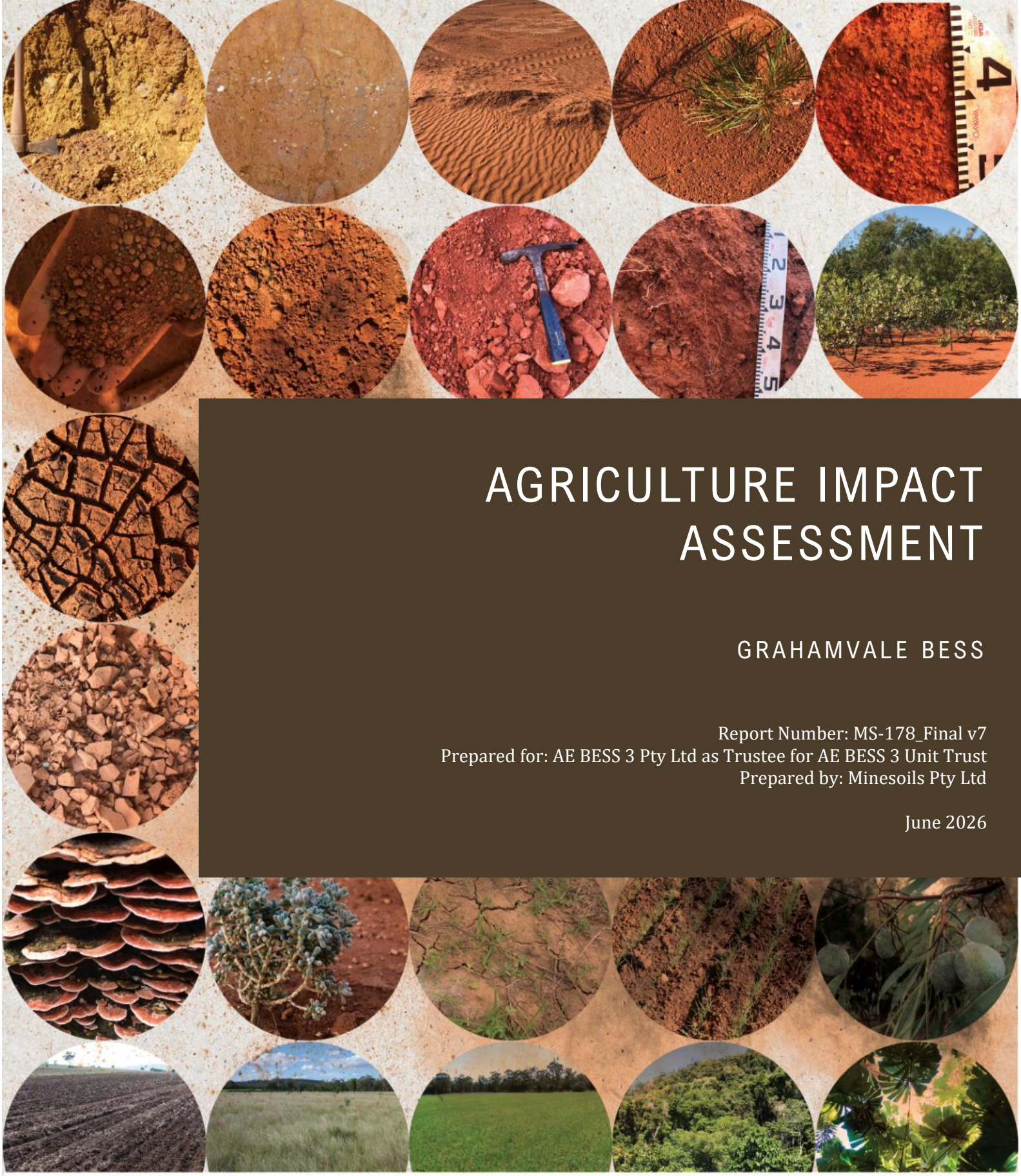

AGRICULTURE IMPACT ASSESSMENT

GRAHAMVALE BESS

Report Number: MS-178_Final v7
Prepared for: AE BESS 3 Pty Ltd as Trustee for AE BESS 3 Unit Trust
Prepared by: Minesoils Pty Ltd

June 2026

MINESOILS
LAND & REHABILITATION SPECIALISTS

PREPARED BY

Minesoils Pty Ltd
ABN 84 627 497 509

0408 474 248
clayton@minesoils.com.au
www.minesoils.com.au
PO Box 11034 Tamworth NSW 2340

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DOCUMENT CONTROL

Reference	Date	Prepared by	Approved
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MS-179_ Final v4	19 March 2026	Matt Hemingway	Matt Hemingway
MS-179_ Final v5	1 April 2026	Matt Hemingway	Matt Hemingway
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MS-179_ Final v7	01 June 2026	Matt Hemingway	Matt Hemingway

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1 INTRODUCTION

1.1 OVERVIEW

Minesoils Pty Ltd (Minesoils) was engaged by Avenis Energy Pty Ltd (Avenis Energy) on behalf of AE BESS 3 Pty Ltd as Trustee for AE BESS 3 Unit Trust to conduct an Agricultural Impact Assessment of the Grahamvale Battery Energy Storage System (BESS) (the Project), located in the Goulburn region of northern Victoria.

This report will contribute to the planning application documentation for the proposed development of the site as a BESS, which will be submitted to the Department of Transport and Planning for Development Approval.

The purpose of this agricultural assessment is to determine the agricultural uses and value of the site, and the potential impacts of the Project on agriculture.

The DELWP guidelines reference the importance of a site's land and economic attributes in determining strategically important agricultural land in Victoria.

1.2 THE PROJECT

The BESS will have a capacity of 480 MW with 4-hours (1,920 MWh) of lithium-ion battery storage, which will provide energy storage capacity for current and future renewable energy generators within the AusNet electricity network. The project will also provide greater grid stability to the broader national electricity market (NEM).

The BESS will connect directly into the 220kV Shepparton Terminal Substation located west of the project site on an adjacent property.

- Construction and operation of the project would involve the following key components:
- Battery containers using lithium-ion technology
- Inverters
- Transformers
- Switchgear
- Maintenance workshop
- New access roads off Grahamvale Road and Verney Road
- On site water storage
- Parking, site office and amenities
- Earthworks and Stormwater management
- Lay down areas and internal access tracks
- Security fencing

At the end of the Projects operational life, the decommissioning phase would involve removal of all above ground infrastructure, and return of the site to its existing agricultural land use and capability.

1.3 PROJECT SITE AND DISTURBANCE FOOTPRINT

The Project will be constructed on private land, approximately 5 km northeast of Shepparton City Centre (refer **Figure 1**). The approximate Disturbance Footprint, as shown on **Figure 2**, covers an area of 10.5 ha is the subject of this assessment.

1.4 SCOPE AND APPROACH

The Minesoils scope of works is to prepare an agricultural assessment addressing the potential impacts on agriculture as a result of the BESS. There are no specific agricultural assessment guidelines for a BESS utility. As such, this assessment has been undertaken in accordance with the *Solar Energy Facilities Design and Development Guidelines* (DELWP, 2022), which outlines agriculture requirements to be completed for all large-scale solar energy

projects or associated infrastructure, as a conservative approach to assessment and planning strategy. While these guidelines were not developed for BESS projects, they represent a robust and stringent policy benchmark and contain relevant material to guide this assessment.

The guidelines provide specific planning strategies for the protection of agricultural land. The key measures noted in the guidelines are:

- Protecting strategically important agricultural and primary production land from incompatible land use
- Protecting productive agricultural land that is of strategic significance to a local area or in a regional context
- Avoiding the loss of productive agricultural land without considering the impact of the loss on the agricultural sector and its consequential effect on other sectors.

This assessment has also considered Clauses 14.01-1S (Protection of Agricultural Land State Policy) and 14.01-1L (Protection of Agricultural Land Local Policy), critical components of the Victorian Planning Provisions (VPPs) and local planning schemes, specifically designed to protect agricultural land and manage rural development. In addition, this assessment has considered clause 14.02-3S (Protection of declared irrigation districts).

Minesoils scope of work will be to consider the Project against the above listed items, and prepare an assessment that includes analysis of the following:

- Site features relevant to agriculture, such as existing land use, infrastructure, soil types, climate and water availability.
- Surrounding agricultural land uses.
- Agricultural productivity.
- Relative agricultural value to the region and state.
- Impacts to agriculture at the level of the Project site, locality and wider region.

Minesoils has conducted a site investigation and desktop analysis of available data to inform this Agriculture Impact Assessment report.

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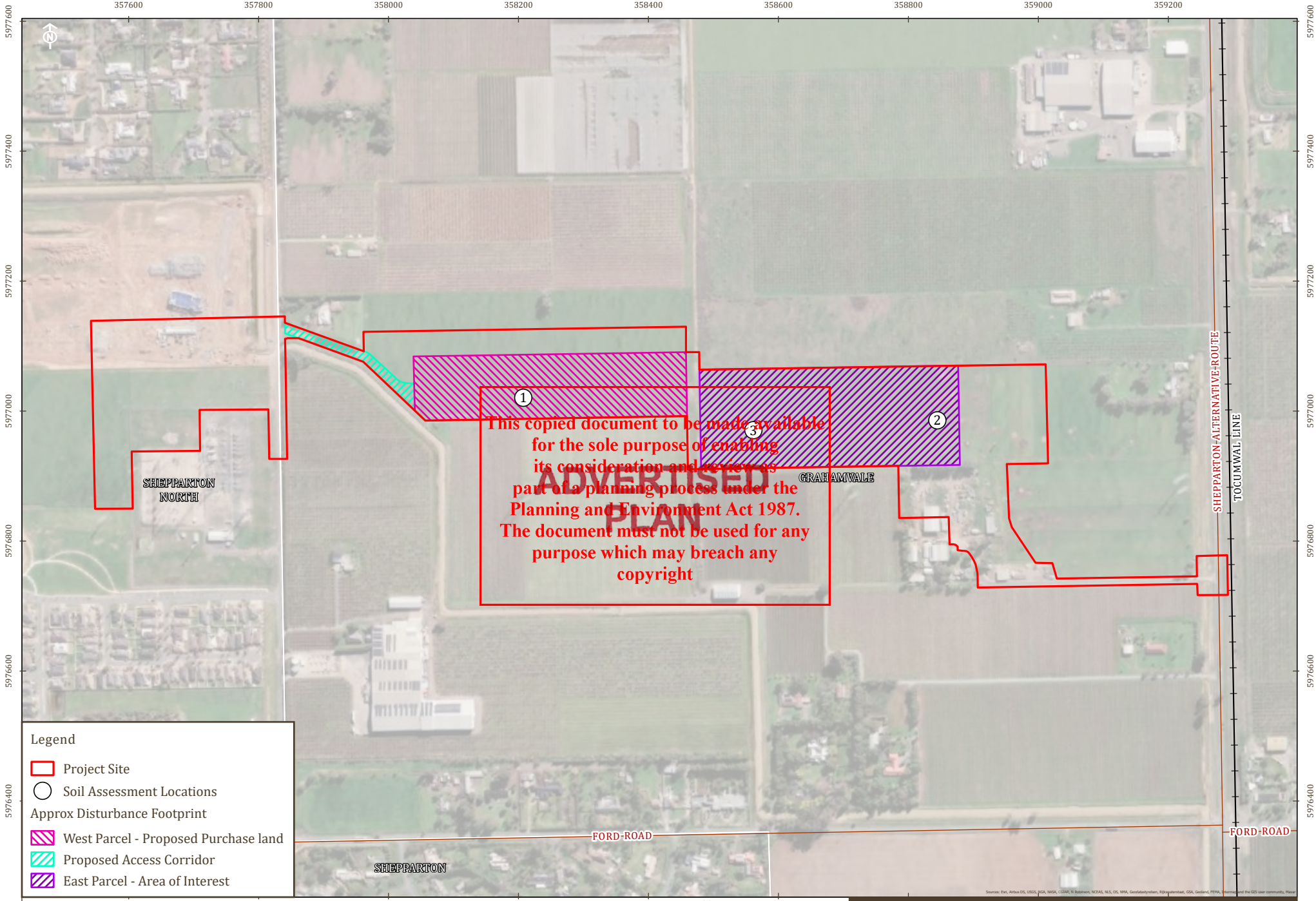
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TOCUMWAL LINE
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ADVERTISED PLAN
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Legend
Project Site
Soil Assessment Locations
Approx Disturbance Footprint
West Parcel - Proposed Purchase land
Proposed Access Corridor
East Parcel - Area of Interest
GDA2020 MGA Zone 55
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Project Site
FIGURE 2
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2 REGIONAL AND LOCAL CONTEXT

2.1 CLIMATE AND RAINFALL

The Greater Shepparton region experiences a temperate climate, with hot and dry summers, warm spring and autumn, and cold and frosty winters. The closest Bureau of Meteorology (BOM) weather station to the Project Site is at Shepparton Airport (Site No. 081125), approximately 4km southwest (BOM, 2025). Climate data from this location is considered representative of the Project site.

The annual average rainfall is 451.2mm, falling throughout the year over approximately 61 rain days, with the average highest rainfall in the month of November and the lowest in the month of February. The annual average maximum temperature recorded at the site is 22.4°C and the annual average minimum temperature is 8.8°C. The highest average maximum temperature of 32.0°C is recorded in January, while the lowest average maximum temperature of 13.4°C is recorded in July.

2.2 REGIONAL AGRICULTURE

The Project site lies within the wider Goulburn region of Victoria, which includes Mitchell, Moira, Murrindindi, Strathbogie and Greater Shepparton Local Government Areas (LGA's). The region is currently home to approximately 170,000 people with the highest population bases in Greater Shepparton and Mitchell Shires with agriculture, forestry and fishing being the second highest employment industry after health care and social assistance (Department of Agriculture, Fisheries and Forestry (DAFF), 2024).

The region falls predominantly within the catchment areas of the Goulburn and Broken rivers and is renowned for fertile soils, mild climate, good water resources and, growth opportunities for population and business. It extends from Melbourne's northern growth corridor to the Murray River and is diverse in culture, landscape and economic enterprises. Like many rural regions of Victoria and Australia, it has a large agriculture sector underpinning the economy and is often described as the 'food bowl of Australia'. Manufacturing, health care and social assistance also contribute largely to jobs and the economy (DAFF, 2024).

The region has a history of livestock grazing and horticulture. Following in the steps of explorer Thomas Mitchell, settlements were established on the Goulburn River in the 1830s near what would become the towns of Seymour and Nagambie. The settlements catered for overland travellers from Melbourne to Adelaide (via the river system) and to Sydney (via land). Settlers and squatters took up land from the 1840s for sheep grazing and wool production. Wine production began in the 1860s (Murray-Darling Basin Authority, 2024).

The construction of the Goulburn Weir in the late 1880s enabled irrigation for grain, fodder, pasture, orchards and vines. A regional food processing industry was established in the Goulburn Valley with the construction of a large fruit processing plant at Shepparton in 1917. The population and economy of the region expanded with soldier-settlement schemes after World War I and European immigration after World War II (Murray-Darling Basin Authority, 2024).

Today, the area is of national significance for dairying, horticultural production and secondary processing, with a strong rural economy based on irrigated and dryland agriculture. Local investment of $2 billion is occurring through the Northern Victoria Foodbowl Irrigation Modernisation Project to secure water savings and drive industry efficiency into a new era of competitiveness (DAFF, 2024).

The wider Goulburn-Broken catchment supports a range of industries, with the predominant being agriculture and food processing. Of the 2.4 million hectares in the catchment, 1.4 million hectares is dryland agriculture and almost 300,000 hectares is irrigated (refer Section 2.3). Agricultural and other land use across the region is extremely diverse, as is the landscape. Forested and hilly upland areas in the southeast give way to flatter areas and flood plains in the north that includes a large irrigation area within the Goulburn Murray Irrigation District. The

agricultural enterprises across the region include dairy, livestock (sheep, cattle and pigs), horticulture (fruit, nuts, olives and grapes), cereals and other broadacre cropping (Murray-Darling Basin Authority, 2024).

The latest Commonwealth Scientific and Industrial Research Organisation (CSIRO) report found that 50% of available surface water was extracted for use, which is extremely high compared with other catchments in the Basin. Groundwater extraction is 10% of available resources, and mainly occurs west of Shepparton for salinity control purposes (Murray-Darling Basin Authority, 2024).

2.3 IRRIGATED LANDS

The Goulburn region features many areas of the Goulburn Murray Irrigation District (GMID). Surface water is sourced primarily from the Murray, Goulburn and Broken rivers with the key water storages being Lake Eildon, and Hume and Dartmouth which are upstream on the Murray (Murray-Darling Basin Authority, 2024).

GMID is the country's largest irrigation district and produces more fruit and dairy produce than any other region, as well as supporting significant general horticulture and mixed farming. The region has extensive and well established value chain businesses including food processors and manufacturers as well as industries providing support services (Goulburn-Murray Water, 2014).

Within the GMID, the Shepparton Irrigation Area covers 81,750ha, of which 51,000ha is irrigated. There are 1470 irrigated properties within the region. The area has 754km of irrigation channel and 441km of drainage channels (Goulburn-Murray Water, 2014). The Shepparton Irrigation Area is diverse in that it has a range of irrigated agriculture, from intense horticulture and dairying areas to annual pasture and permanent pasture areas.

The Shepparton Irrigation Area has experienced significant changes over the past 35 years, both in terms of climate, land use and irrigation infrastructure. Above average rainfall during the 1970s and 1980s supported significant growth in agricultural development and production, however this was tempered by the emergence of a widespread rise in shallow water tables in the 1990s leading to land salinization and water logging, which posed a serious risk to agricultural productivity and the environment. Significant investment, both in terms of management arrangements and supporting infrastructure were developed to mitigate the risks posed by shallow groundwater (Goulburn-Murray Water, 2014).

2.4 REGIONAL WATER SUPPLY LIMITATIONS

The GMID is one of the irrigation areas within the Southern Catchment of the Murray Darling Basin (sMDB). Irrigation water supplied and distributed throughout the sMDB is able to be transferred within and outside irrigation districts. Water is increasingly traded between farms, districts and states enabling irrigators from Shepparton, Griffith (NSW), Deniliquin (NSW), Mildura and Berri (SA) to trade water entitlements and allocations with each other to meet the long term, annual and immediate needs of their irrigated farms (Goulburn Broken Catchment Management Authority, 2022). The viability and success of an irrigation farm at Shepparton is no longer linked to the allocation to an individual property, or even the whole irrigation district- but rather to a competitive market from all water-users throughout the Connected Southern Murray Darling basin (Rendell, 2018).

Water availability has been on the decline as outlined by the Goulburn Broken Catchment Management Authority report GMID Drainage Management Strategy (2022). Over the last twenty years, the Goulburn Murray Irrigation District (GMID) water deliveries have declined by almost 50% to around 1,000 GL/year. Approximately half of this decline is due to water recoveries for the environment, and the other half is due to water trading out of the regions and climate change.

The 2006/07 Goulburn-Murray Water Plan confirms that more than 500,000 Ha within the GMID was irrigated in an average irrigation season. Based on the water sold out of the region, the April 2013 GMW Blueprint confirmed this area irrigated on an average season, had reduced to 300,000 ha being irrigated, leaving more than 200,000ha

typically able to irrigate without irrigation water, leading to a large increase in the area of dry-land (rainfall-only) or non-irrigated agriculture throughout the region (Rendell, 2018).

Further, as noted by Thompson (2016) in *The Challenges and Opportunities of Changes to Water Availability on the Food and Fibre Sector in the GMID*, "the GMID potentially serves an irrigation area of around 600,000 ha, of which 390,000 ha is currently irrigated. A key determinant of the area of irrigated land is the volume of irrigation water available to irrigators. Through water trade, buy backs, climate and water reform the volume available has declined substantially since 1989. A key issue is whether the region can continue to afford to fund infrastructure operation, maintenance and replacement for a 600,000 ha footprint, when only 390,000 ha is actively irrigated (and may be much lower in drought). Water use in the GMID is likely to continue to decline through a combination of further water recovery to meet Basin Plan sustainable diversion limits (SDLs), water trade to horticulture and climate change."

In addition, there have been recent announcements that there may be future water taken from the area due to the Federal Government buyback scheme relating to water purchasing in the Murray–Darling Basin (DCCEEW, 2026), with Greater Shepparton City Council concerned that water purchases may threaten the viability of agriculture, horticulture and food processing in the Greater Shepparton region (Greater Shepparton City Council, 2025)

The Goulburn Broken Catchment Management Authority (2022) also notes that potential impacts of climate change relevant to irrigation include reduced water availability and security, and an overall decline in irrigated area due to reduced water availability.

These factors suggest

a) the area serviced by irrigation infrastructure exceeds what can actually be irrigated

b) there will be markedly less irrigation in the GMID in the future

The changing status of water availability constraint is therefore a consideration for horticultural developments of the region which don't currently have water that is High Reliability Water Share (Goulburn Broken Catchment Management Authority, 2022). Perennial horticulture requires water every year and thus will develop based on the most secure supply. The total size of horticulture will be capped at the total water available in a drought year (Thompson, 2016). It is noted to be possible that horticultural land use experience growth, but the next severe drought would force a costly and painful contraction as some areas of horticulture dry off (RM Consulting Group Pty, 2016).

An expert witness report relating to four solar farm projects in the Greater Shepparton City Council (Rendell, 2018) found that: "Water not land is limiting production in the region and will continue to do so into the future. The removal of land for solar farms is not the determinant of how much land or water is used for irrigation in the region."

Although the agricultural production of the GMID since its initial development more than 100 years ago has been based on irrigated agriculture, the factor limiting production has not been availability of farmland, but irrigation water availability. Even in the 1980s and 1990s when water use in the GMID was at its maximum, there was still insufficient water to fully irrigate all of the land available.

As Rendell (2018) notes, the area of land able to utilise irrigation-water is now far greater than the water availability in almost every season-type throughout the GMID, including within the Shepparton Irrigation area.

Therefore, it can be concluded that available water, rather than available land, is the current limit to agricultural production including irrigated horticultural land uses within the region.

2.5 REGIONAL AGRICULTURAL INFRASTRUCTURE

The key infrastructure item assisting agricultural market access and cost of production is the transport network servicing the Goulburn region. Underlining the importance of this issue, total freight costs from farm to port can be

as much as 30% of the value of the crop being marketed depending on Australian and world commodity prices in a given season. The region is a key transport hub for the distribution of goods across southeastern Australia with rail freight, roads and airport links within reach of major markets. The region has extensive commercial links to the ACT and NSW, as well as Melbourne, Sydney and Adelaide.

The region is ideally located for distribution of produce to any markets in South-Eastern Australia. Domestic markets served include Sydney, Melbourne and Adelaide, as well as Brisbane and Newcastle via an excellent road and transport system with local transport companies operating this national network on a daily basis.

In close proximity to the Project site, the agricultural service centre of Shepparton allows access to businesses providing agricultural equipment and supplies, including horticulture machinery, animal fencing, animal vaccinations, livestock ID, stock supplements, seed, fertiliser and crop protection.

Shepperton has extensive cool chain and storage infrastructure designed to meet the needs of the main horticultural crops in the region. In addition, any of Australia's best-known food processors including Unilever, Freedom Foods, Campbells, Snow Brand and SPC, have established operations in the region.

Other infrastructure critical to agricultural production includes energy needs (gas and electricity), telecommunications services, urban water and wastewater services. Irrigation infrastructure within the region has typically supported dairy and horticulture. These industries are integrated in local supply chains that include processing, manufacturing and distribution, all contributing to the regional economy and employment opportunities.

2.6 AGRICULTURE IN GREATER SHEPPARTON LGA

The Shepparton region is renowned for irrigated fruit production, particularly peaches, pears, apples and tomatoes, but a wide range of horticultural crops are produced. Dairying is a significant broadacre industry and to a lesser degree, irrigated. Dryland crops produce cereal, legume and oilseed grains, and fodder for livestock (Murray-Darling Basin Authority, 2024).

The Greater Shepparton LGA covers 2,422 square kilometres. As of the last agricultural census of 2020 - 2021 (ABS, 2022a), 148,014 ha of land within the LGA is subject to agricultural activity. The area of land used by agricultural type is presented in **Table 1**, which shows livestock grazing as the dominant land use narrowly ahead of cropping for the LGA, accounting for 51% of total area subject to agricultural land use.

The ABS (2022a) data shows that within the greater Shepparton LGA there were 436 cropping businesses and 470 grazing businesses.

Table 1: Greater Shepparton LGA Agricultural Land Use 2020 – 2021

Agricultural Land Use	Area	
	ha	%
Livestock Grazing	76,145	51
Cropping	69,087	47
Forestry	1,852	1
Other	931	1
Total	148,014	100

Gross value is a measure of size or net wealth generated by the local economy and can be measured by industry and enterprise. The gross value of agriculture for the Greater Shepparton LGA for the last agricultural census year of 2020 – 2021 is estimated at over 700 million (ABS, 2022b). **Table 2** highlights the dominance of cropping as 66% of the total gross value for agriculture. Within this category, fruit and nuts represents 72% of the total value of cropping, as shown in **Table 3**, or 47% of the overall total gross value of agriculture.

Fruit and nut production occurs over large areas subject to irrigated horticulture, covering 6,092 ha, with 4,305,441 total fruit and nut tree's in the LGA. Of this, there are 2,789,197 apple trees, and 962,547 pear trees. Other prevalent perennial horticulture includes citrus and stone fruit (2022a). Broadacre cropping is dominated by wheat for grain and canola (2022b).

Within the category of livestock slaughtered, cattle and calves dominate in the LGA followed by sheep and lambs, as shown in **Table 4** (ABS, 2022b), while milk dominates the gross value of livestock products with 96% (**Table 5**).

Table 2: Greater Shepparton LGA Agricultural Gross Value 2021 – 2022 by Enterprise (2022b)

Agricultural Enterprise	Gross Value	
	$	%
Cropping	481,879,749	66
Livestock Slaughtered	146,861,579	20
Livestock Products	100,534,939	14
Total	729,276,268	**100**

Table 3: Greater Shepparton LGA Crop Gross Value by Type 2020 – 2021 (2022b)

Crop	Value	
	$	%
Fruit and nuts	345,820,743	72
Broadacre crops	74,234,418	15
Hay	32,798,277	7
Vegetables	23,528,527	5
Nurseries, cut flowers, or turf	5,497,785	1
Total	**481,879,749**	**100**

Table 4: Greater Shepparton LGA Agricultural Gross Value 2021 – 2022 by Livestock Slaughter (ABS, 2022b)

Agricultural Enterprise	Gross Value	
	$	%
Cattle and calves	67,855,741	67
Sheep and lambs	15,010,848	15
Poultry	9,563,063	10
Pigs	5,849,140	6
Other	2,256,147	2
Total	**100,534,939**	**100**

Table 5: Greater Shepparton LGA Livestock Products Gross Value by Type 2020 – 2021 (2022b)

Livestock	Value	
	$	%
Milk	140,698,521	96
Wool	6,150,585	4
Eggs	12,474	<1
Total	**146,861,579**	**100**

2.7 LAND USE IN THE LOCALITY

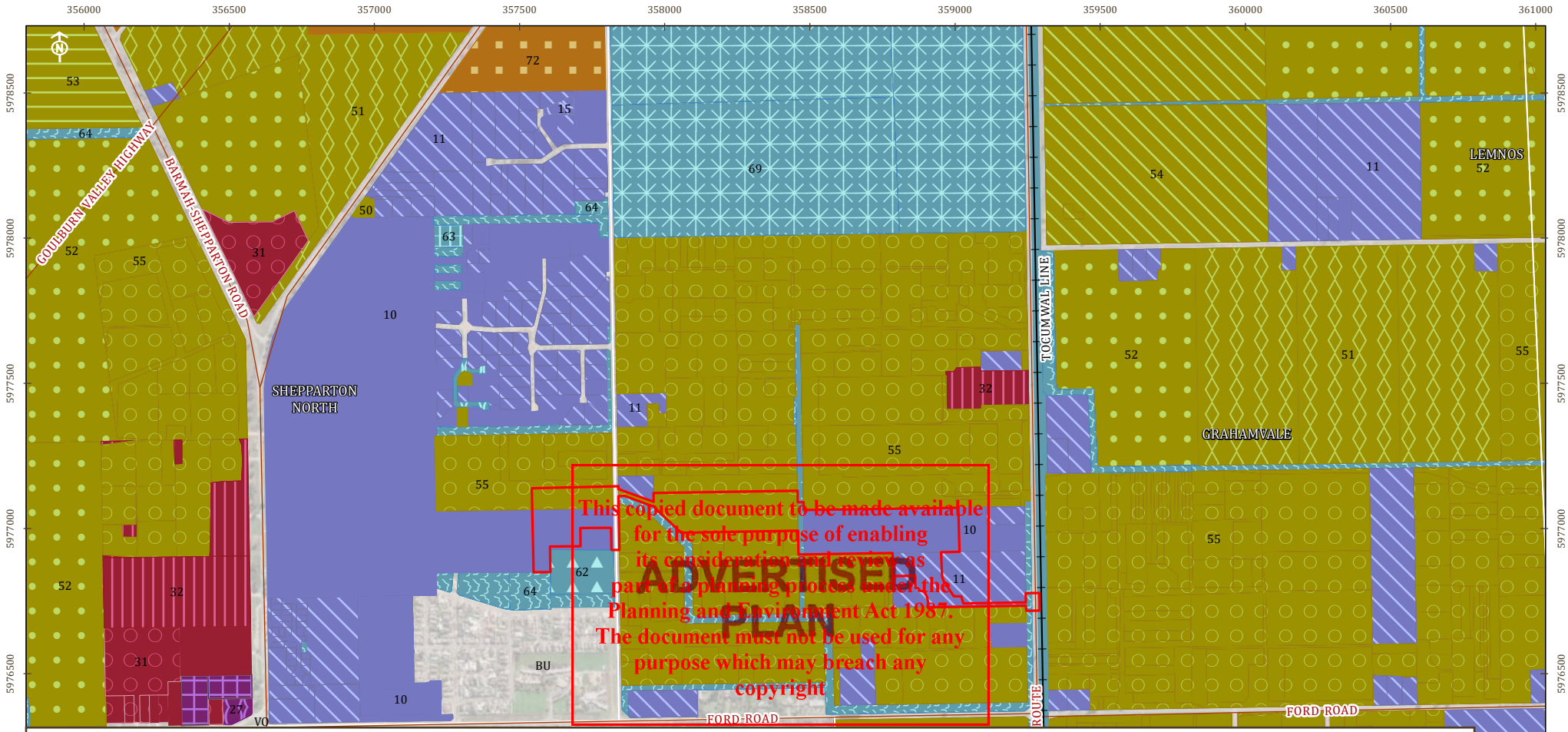
At a scale of the locality, agricultural enterprises and land use surrounding the Disturbance Footprint largely consist of irrigated horticulture (refer **Figure 3**), with horticultural operations occurring to the north, east and south of the Disturbance Footprint. Crops were observed to be predominantly apples and pears (**Plate 1**).

On neighbouring properties, soil based horticulture is likely to continue for the foreseeable future, being the most suited to the conditions of the Project locality and given the area's access to services and labour supply. An assessment of alternative types of agriculture (RMCG, 2020) for the locality found that perennial horticulture continues to be the most suitable option for this area given its:

- Ability to 'outcompete' other industries (such as dairy) for water due to the income generated per ML used
- Suitability to the soil types, geography and climate
- Ability to generate a relatively high income per effective hectare resulting in an ability to be viable on smaller farms
- Aesthetic value.

To the west of the Disturbance Footprint the land has historically been used for cropping and livestock grazing, and now houses the Shepparton Terminal Station (electrical infrastructure), and the All Saints Anglican School. The wider locality contains horticultural, residential, recreational and light industrial land uses (refer **Figure 3**).

Plate 1: Irrigated horticulture immediately adjacent the Project Site.



Legend

- Project Site

Land Use Secondary (2017)

- 10. Residential Use Development Land
- 11. Single Residential Accommodation
- 15. Ancillary structures (not capable of occupation)
- 20. Commercial Use Development Land
- 21. Retail
- 22. Office
- 23. Short Term Business and Tourist Accommodation
- 24. Hospitality
- 27. Personal Services
- 28. Vehicle Car Parking, Washing and Sales
- 30. Industrial Use Development Land
- 31. Manufacturing
- 32. Warehouse/Distribution/Storage
- 50. Native Vegetation
- 51. Agriculture Cropping
- 52. Livestock Grazing
- 53. Mixed Farming and Grazing
- 54. Livestock - special purpose fencing, pens, cages, yards or sheeding, stables
- 55. Horticulture Fruit and Vegetable Crops
- 60. Vacant and unspecified
- 62. Electricity
- 63. Waste Disposal, Treatment and Recycling
- 64. Water Supply
- 65. Transport - Road Systems
- 66. Transport - Rail and Tramway Systems
- 69. Communications, including Print, Post, Telecommunications and Airwave Facilities
- 72. Education and Research
- 74. Religious
- 78. Community service facilities or other
- 82. Local Sporting Facilities
- 90. Reserve Land

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Secondary Landuse

FIGURE 3

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3 SITE AGRICULTURE STATUS

3.1 SITE LANDSCAPE AND LANDUSE

A site inspection was undertaken by Minesoils in January 2025. The Disturbance Footprint was determined to be a stable, generally treeless, open plain landform with a range between 80 - 90% surface cover in the form of pasture (**Plates 2** and **3**). The Disturbance Footprint is generally level, being located on a floodplain, although it contains very subtle rises and depressions.

The Disturbance Footprint is currently used for livestock grazing and cereal cropping, although no livestock were observed during the inspection. Anecdotal evidence and a review of aerial photography from 2004 to present indicates cattle and sheep are routinely grazed within the Disturbance Footprint, with occasional cropping (no horticulture has been undertaken within the Disturbance Footprint within the last 20 years). Hay supplements pasture and livestock are watered through a series of troughs, which are filled with pumped water.

General agricultural improvements are present, including stock fences and gates, and unsealed access tracks. Stockyards are presents within the wider host properties. Irrigation and drainage channels are present immediately adjacent to the Project Site which highlights the historical use of the land for irrigated agriculture.

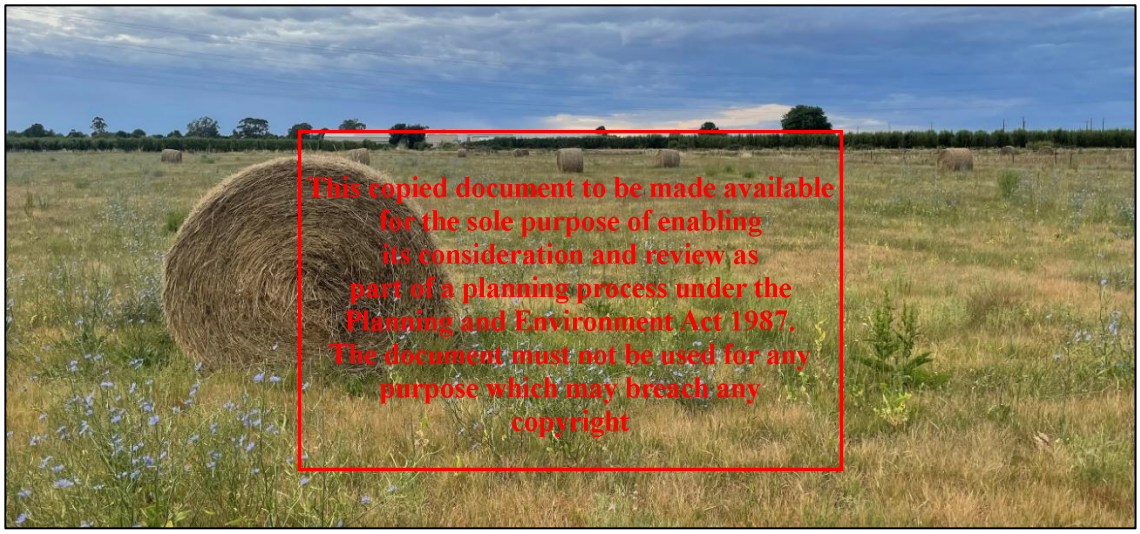


Plate 2: Lot 2\LP219260.

Plate 3: Lot 2\PS314077

3.2 AGRICULTURAL PRODUCTIVITY

Agricultural productivity is subject to long term climate and rainfall variables, as well as changes in economic, social and policy frameworks, often at a scale well beyond the Disturbance Footprint. There is no set agricultural productivity value for land under agricultural use.

Nonetheless, there is a way to broadly estimate the productivity of the Disturbance Footprint accounting for grazing and cropping activity consistent with the locality by analysing the information presented from the last agricultural census of 2021-2022 in Section 2.3 (ABS 2022a and 2022b).

Agricultural productivity modelling presented below presents one scenario: a livestock grazing enterprise consistent with its current land use. An irrigated horticulture enterprise consistent with the land and soil capability and the surrounding land use, is not considered appropriate for the purpose of the productivity assessment. This is based on:

- the subject land not currently being irrigated and would require significant investment costs to support horticulture;
- the limited scale of the Disturbance Footprint;
- the absence of Group 1 and 2 soils (as further described in Section 3.4) which would typically host most types of horticulture production; and
- the land holder does not have water rights to sustain horticulture, which is notable in the context of the area of land able to utilise irrigation-water is now far greater than the water availability in almost every season-type within the Shepparton Irrigation area (as noted in Section 2.4).

As such it is appropriate to consider the agricultural productivity of the Disturbance Footprint not in terms of its potential as an irrigated horticultural land enterprise, but rather in terms of its current agricultural land use

The ABS data shows that within the Greater Shepparton LGA 76,145 ha of land was used for grazing, of which the gross commodity value of cattle and calves, and sheep and lambs, (part of the livestock for slaughter category, as well as milk and wool from the livestock products category (a combined value of $229,715,695), can be attributed to that area. This results in a $/ha ratio of $3,017/ha for a livestock grazing enterprise. (Note, by using all grazing enterprises, which would include dairy, this is considered a conservative overestimation.)

By applying these rates to the Disturbance Footprint, the current productivity is estimated to be approximately $31,679 as shown in **Table 6**.

Table 6: Estimated Potential Productivity based on Greater Shepparton LGA Data

Commodity	Estimated Gross Value in LGA ($/ha/year)	Disturbance Footprint (ha)	Estimated Productivity ($/year)
Livestock Grazing	3,017	10.5	31,679

The related economic activity arising from the primary productivity is referred to as the secondary productivity.

The value of secondary productivity can be calculated using an economic multiplier. Agricultural economic multipliers provide annual estimates of employment and output effects of trade in agricultural products on the economy. When expressed as multipliers, these effects reflect the amount of economic activity and jobs generated by agricultural exports.

There are a range of upstream and downstream employment roles associated with agricultural production in the Project locality and wider region. These include:

- Horticulture services.
- Machinery sales and mechanical support.
- Input providers (chemical, fertilisers, etc).
- Grain and livestock transport.
- Production marketing.
- Fencing, harvest and other contractors.

Upstream activities for the current GAA enterprises include contractors, farm input and service providers. Downstream activities for the current landowners' enterprises include distribution and processing (value adding). The related economic activity from the proposed area can be calculated using the economy multiplier of 2.1788, as previously used by ABS (DPI, 2016).

By applying the economic multiplier of 2.1788 to the estimated productivity of the agricultural land within the Project Site based on the ABS data, the current value to the broader economy is estimated at $69,022 per year.

3.3 LANDOWNER HISTORICAL LAND USE AND WATER ASSETS

The Disturbance Footprint for the Project consists of two private properties owned by two unassociated parties. To assist with this assessment the landowners have provided background on the historical use of the land and details of their properties:

- existing water infrastructure;
- water delivery shares; and
- water use.

This information is summarised in **Table 7** below with further details found in **Appendix 2**.

Table 7: Landowner Historical Use and Assets

Matter	East Parcel	West Parcel
Historical Use	Has been used for grazing for the past 25 years and is not irrigated.	Has been used for grazing operations for at least the past 10 years and is not irrigated.
Water Delivery Shares	Water Delivery Shares exist and these will be retained by the landowner throughout the operation of the project.	Water Delivery Shares exist and these will be retained by the landowner throughout the operation of the project.
Water use	The Area of Interest is not currently irrigated. Water use occurs on the eastern portion of the broader lot, outside the Area of Interest.	The property has not been irrigated during the landowner's 10-year period of ownership and was not irrigated prior to acquisition. Permanent water entitlements were not included in the sale of the property and were retained by the previous owner, before being sold separately following settlement.
GMW irrigation infrastructure	No GMW irrigation infrastructure is located on the property and access to such existing infrastructure will not be impeded by the project.	No GMW irrigation infrastructure is located within the Disturbance Footprint and access to existing infrastructure will not be impeded by the project.
Private irrigation infrastructure	No private irrigation infrastructure is located on the property.	Limited private irrigation infrastructure on the property, comprising of some drainage infrastructure.

3.4 SOIL TYPE

The Victorian regional soil mapping (Soil Health Knowledgebase, 2024) indicates the dominant soil type within the Disturbance Footprint and immediate surrounds are Sodosols as per Australian Soil Classification (ASC) (Isbell, R. F.,2021).

Sodosols are soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2t horizon (or the major part of the entire B2t horizon if it is less than 0.2 m thick) is not sodic and not strongly acid. Soils with strongly subplastic upper B2t horizons are also included even if they are sodic.

Soil profile assessment was undertaken at three locations within the Disturbance Footprint during the site investigations (as shown on **Figure 2**). Soil assessment was undertaken in accordance with the *Guidelines for Surveying Soil and Land Resources* (2008).

All three soil profiles assessed were determined to be Sodosols, consistent with the regional mapping. Soil profile descriptions are included in **Appendix 1**.

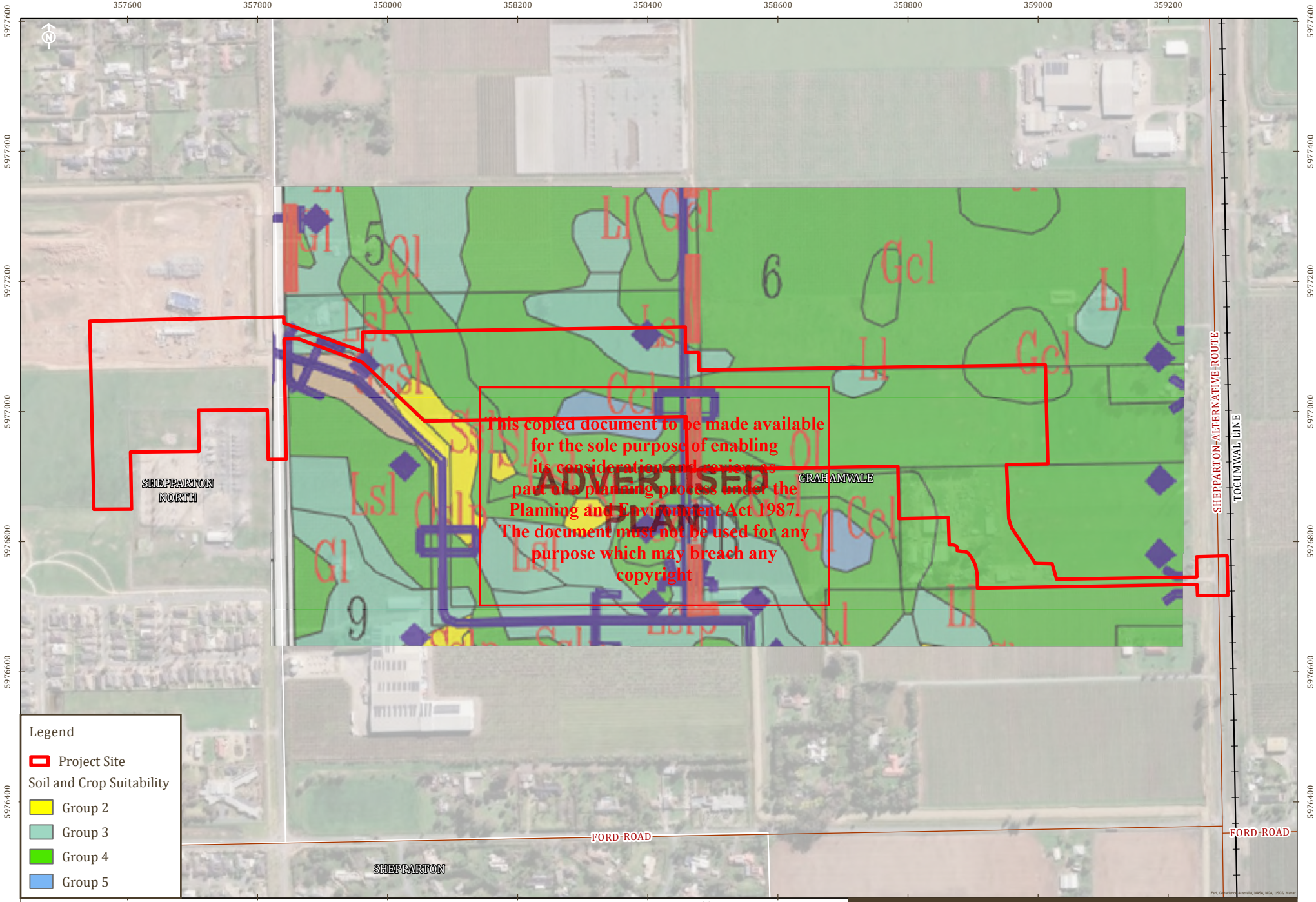
3.5 SOIL AND CROP SUITABILITY

Soils within the Project Site have been extensively mapped and classified according to their suitability for irrigation and horticulture (J.K.M. Skene and T.J. Poutsma, 1962). As presented in **Figure 4**, there are six groups within the scheme: Group 1 and 2 soils (shown below in yellow) are the highest quality agricultural lands generally well suited to irrigation and most types of horticulture production including perennial horticulture (apples, pears and stone fruit) and annual horticulture such as vegetable production. Group 3 and 4 soils shown as light and dark green can also be irrigated and are suitable for the production of apples, pears and some stone fruit. Group 5 and 6 soils shown in blue are better suited to production of fodder crops.

The mapping shows the Disturbance Footprint to be generally classified as Group 4, with a limited extent of Group 2 and 5, indicating a land capability greater than its current use. There are no Group 1 lands.

Site investigations including soil profile assessment supports this classification.

Minesoils notes that within the Shepparton District approximately 50% of the Group 1 and 2 soils are either not being used for irrigation or low intensity water use properties suggesting there is a significant area of Class 1 and 2 soils that could be used for horticulture but are not.



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LAND & REHABILITATION SPECIALISTS

Soil and Crop Suitability

FIGURE 4

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4 IMPACTS ASSESSMENT

The impacts BESS facility activities can have on agricultural resources, productivity and enterprises range from short term temporary impacts to long term and permanent impacts. Temporary impacts can include the removal agriculture from service over a period of the life of the Project. Permanent impacts may include changes to land and soil capability and agricultural resources of a site. Permanent impacts are irreversible and compromise the reinstatement of agricultural lands and land productivity.

This section identifies and describes the nature, duration and consequence of the potential impacts on agricultural land as a result of the Project, for the Disturbance Footprint and in the wider region, across five key risk areas:

- Changes in the amount of land used for agriculture.
- Changes to current agricultural productivity and agricultural enterprises.
- Changes to agricultural potential.
- Changes to agricultural resources.
- Other potential impacts to agriculture considered for the Project.

4.1 LAND USED FOR AGRICULTURE

The Project will disturb an area of approximately 10.5 ha of land that is currently subject to agriculture land use. For the purpose of this assessment it is assumed agriculture will be removed from this area for the duration of the Project.

If available soils and land rehabilitation mitigation measures are implemented (as detailed in Section 5), it is anticipated that agricultural land use will be re-established over the entire 10.5 ha of disturbed agricultural land at the time of decommissioning.

Agricultural land immediately surrounding the Disturbance Footprint, including unaffected areas within the host properties (i.e. outside the Disturbance Footprint) and agricultural land in the broader Project locality, will not be impacted or restricted in its current agricultural use as a result of the Project.

There will be no fragmentation or displacement of existing agricultural industries.

The temporary reduction of 10.5 ha is considered a negligible impact in the context of the land area subject to agriculture use in the Greater Shepparton LGA, representing 0.007% of land used for agriculture (as outlined in Section 2.5.

4.2 PRODUCTIVITY AND ENTERPRISES

4.2.1 PRIMARY PRODUCTIVITY

The productivity of the Project Site is described in Section 3.2. For the purpose of this assessment, the estimated temporary impact of the Project on productivity of agricultural land based on the change in current land use for the duration of the Project is up to $31,679 per year.

Due to the minimal disturbance to the landform, following the life of the Project land removed from agriculture will be returned to agricultural use, with no reductions in land and soil capability. Agricultural enterprises can then re-commence at an equivalent agricultural productivity.

The temporary reduction of agricultural productivity per year is considered a negligible impact in the context of the agricultural industry gross value of the Greater Shepparton LGA as outlined in Section 2.5 (representing 0.004% (estimated current agricultural productivity as a percentage of the gross value of agriculture for the LGA).

4.2.2 SECONDARY PRODUCTIVITY

The secondary productivity of the Project Footprint is described in Section 3.2. For the purpose of this assessment, the temporary impact of the Project on productivity of agricultural land based on the change in land use for the duration of the Project is up to $69,022 per year.

4.2.3 PRODUCTIVITY OF LAND WITHIN LOCALITY

Agricultural productivity of land outside of the Project Site, including neighbouring properties, are not anticipated to be affected by the Project as the associated agricultural resources (soils, water access, climate, etc) and agricultural infrastructure will not be affected.

A consideration of potential impacts to neighbouring properties and agriculture in the locality relating to soil resources, agricultural infrastructure, traffic, noise, dust and biosecurity are included in Section 4.4 and 4.5

There would be negligible shading effects from the development that would impact surrounding crops. In addition, project related infrastructure is generally bunded, and retention ponds have been proposed, therefore any water run-off in the very unlikely event of a spillage / fire water, would be captured and not affect the surround agricultural land.

Finally, as further detailed in Section 5.4, once the Project reaches the end of its investment and operational life, the project infrastructure will be decommissioned and the site returned to its pre-existing land use (livestock grazing) or other land use (i.e., horticulture), with the reinstated land generally unaffected by its previous use as a BESS.

Therefore, the Project will not negatively impact any existing agricultural enterprise outside of the Project Site.

4.2.4 AGRICULTURE SUPPORT SERVICES

The Project will have a negligible impact on the viability of local and regional agricultural services and employment. There will be a negligible impacts experienced by employees or contracting services currently engaged (i.e., feed providers, stock mustering services). Changes to the supply and viability of agricultural support services in Shepparton are driven by social and market trends far exceeding the scale of the negligible reduction in agricultural land use and productivity as a result of the Project.

4.2.5 CRITICAL MASS THRESHOLDS

Due to the limited reduction in agricultural livestock grazing activity as a result of the Project, and given the nature and scale of the established agricultural industries within Shepparton and the wider region, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in agricultural industries and infrastructure.

4.3 LOST AGRICULTURAL POTENTIAL

As detailed in Sections 2 and 3, due to the presence of irrigation infrastructure, industry support advantages and suitable soils, the Project Site, like its immediate neighbours and wider locality, is well suited to perennial horticulture land use. In addition, existing horticulture enterprises are of strategic significance to the local area and important in a regional context.

However, as detailed in Section 2.4, the area of land able to utilise irrigation-water is now far greater than the water availability in almost every season-type within the Shepparton Irrigation area. The volume of water available for irrigation, not the available land, is the limiting factor to irrigated horticultural land use in the region. This issue is likely to be compounded by the federal buy backs of water from the Murray darling basin, as described in Section 2.4. Further, the landowners do not have the water entitlements to grow horticulture on the land, which is notable in the context of the above water supply limitations for the region.

For properties within irrigation areas that are subject to a change in land use and not available for irrigation purposes, (i.e. used as a BESS), the total irrigated production in the Shepparton district or wider region would not change as any available water would readily find alternative land.

In addition, as noted in Section 3.4 within the Shepparton District approximately 50% of the Class 1 and 2 soils are either not being used for irrigation or low intensity water use properties suggesting there is a significant area of Class 1 and 2 soils that could be used for horticulture but are not.

As such it is appropriate to consider the loss of the agricultural land as a result of the Project not as a loss of potential irrigated horticultural land, but rather a loss of land in terms of its current agricultural land use.

Therefore, the irrigated horticultural potential of the land subject to land use change is discounted in light of available regional water supply limitations information and for the purpose of this assessment there is no meaningful lost agricultural potential as a result of the Project.

Despite this, following the life of the Project, it is anticipated that the irrigation infrastructure, industry support advantages, and soil quality would be retained for post-Project grazing, cropping or horticultural endeavours.

4.4 AGRICULTURAL RESOURCES

4.4.1 SOILS

Soils within the Project Site will be subject to impacts as part of the construction or maintenance of site infrastructure and access tracks. In areas where earthworks and excavations are necessary for construction, soils will be subject to higher impact disturbance.

All soil that is proposed to be disturbed during the Project will be stripped and re-used during construction and/or rehabilitation in order to mitigate long term effects on soil resources during operation. All soil stripping and re-use will be localised; that is, soil will be stripped and stored adjacent to disturbance and respread from where it was stripped. This localised approach will promote the reinstatement of the soil profile to an approximate original condition. Where soil is unable to be stored for the duration of the Project, suitable growth medium would be imported during decommissioning to satisfy rehabilitation commitments.

Due to the flat nature of the landform and the limited disturbance anticipated, the risk of erosion and sedimentation impacts on agriculture as a result of the Project is low.

Overall, the impacts to the soils of the Project Site are expected to be minimal and for the duration of the Project only. There will be no direct or indirect impacts to the soil resources of the Project locality outside of the Project Site.

Soil impact mitigation measures are outlined in Section 6.2.

4.4.2 AGRICULTURAL INFRASTRUCTURE

Irrigation infrastructure including channels and drainage immediately adjacent to the Project Site, will not be impacted by the Project.

The presence of the BESS will not prevent GMW from making any future changes to the irrigation network, as long as there is sufficient buffer between the BESS infrastructure and the GMW irrigation structures to allow for any works on the channel to be implemented (whether that be channel rationalisation to reduce the irrigation footprint or future investment in irrigation infrastructure to improve efficiencies).

The host properties will continue to pay for the Delivery Share (DS) attached to the irrigation service points associated with the property, noting that GMW use the annual charges on DS as the mechanism to pay for the upkeep of the infrastructure.

There will be no change to existing Water Delivery Share arrangements for either property and no reduction in revenue to GMW to maintain their adjoining infrastructure, and no change to existing water use arrangements on either property.

Further, there will be no impact GMW irrigation infrastructure and access to such infrastructure will not impeded by the Project, nor will there be impact to existing private irrigation infrastructure.

The Project will have a negligible impact on local and regional agricultural infrastructure. There will be negligible impacts on the road and rail network that connects the agricultural industry to markets, services and suppliers (refer Section 5.4.4).

4.5 OTHER POTENTIAL IMPACTS ON AGRICULTURE

4.5.1 WEEDS AND PEST SPECIES

Weeds and pest species could be inadvertently brought into the Project Project with imported materials, machinery, or allowed to invade naturally through cessation of grazing activities, or removal or damage of current vegetation. The proliferation of weed species has the potential to be a long term hindrance to agricultural endeavours within the locality, as well as rehabilitation efforts within the Project Site.

The impacts of weeds and pest species on agriculture as a result of the Project are anticipated to be minor due to mitigation measures available, which are described in Section 6.3.

4.5.2 BIOSECURITY

Biosecurity is defined in the NSW Biosecurity and Food Safety Strategy 2022 - 2030 (DPI, 2022) as 'the protection of the economy, environment and community from pests, diseases and weeds. It includes measures to prevent new pests, diseases and weeds from entering our country and becoming established.

The introduction and spread of plant disease has the potential to be a significant, long term hindrance to agricultural endeavours within the locality, as well as rehabilitation efforts within the Project Site.

Given the available mitigation measures as described in Section 6.4, it is considered that biosecurity risks as a result the Project are low and impacts to agricultural resources and enterprises within the region are unlikely to be experienced.

4.5.3 AIR QUALITY AND DUST

Construction and decommissioning activities have the potential to increase dust through movement of traffic on unsealed roads on dry days, vegetation removal, and localised dust emissions generated by land disturbance (such as excavation activities required for infrastructure). Dust control measures will be detailed in a Construction environmental management plan (CEMP). With the implementation of the CEMP, it is expected that the construction and decommissioning activities would have a negligible impact on local air quality.

During operations, ongoing maintenance of infrastructures and land will result in very minor, localised vehicle emissions and generation of dust from vehicles travelling along unsealed internal access tracks. These impacts are unlikely to affect agriculture and standard dust suppression measures can be readily implemented where required.

4.5.4 TRAFFIC

Agricultural enterprises can be impacted by increased traffic movements through an increase in noise and dust, and also through the cumulative impact of road transport being utilised by energy and industrial operations, leaving fewer transport options for agricultural enterprises.

The roads in proximity to the Project Site are anticipated to experience a minor increase in traffic volumes during the peak construction period. However, the Traffic Impact Assessment for the Project determined that the road

network is able to accommodate the traffic generated by the development during the construction, operation and decommissioning stages.

Further, no increases in levels of noise and dust that would impact agriculture are anticipated to result from increased traffic.

Therefore, the traffic impacts of the Project are not likely to have consequences on agricultural enterprises within the Project locality.

4.5.5 NOISE

Noise levels as a result of the Project are expected to reflect the site's location in a rural/industrial setting. Noise levels during construction and operation are predicted to comply with noise criteria. It is expected that noise will be effectively managed and minimised through the adoption of standard management practices. The proponent will implement practicable measures to reduce noise impacts including for example, the careful location of noise generating components within the site to increase the distance to sensitive receivers.

Adjacent horticulture enterprises will not be affected by Project related noise.

5 MITIGATION MEASURES

The Project will include a number of measures to prevent, minimise and manage adverse impacts on agricultural resources. This incorporates procedural mitigation measures along with a land management process that ensures the Project has negligible impact on agricultural resources and enterprises.

In addition to the specific measures described in this assessment, all activities associated with the Project will be conducted in consideration of approval obligations and environmental management measures in development consent stipulated environmental management plans.

5.1 SOIL EROSION MANAGEMENT

Based on site observations and the flat nature of the landform, there is a low potential risk for dispersion where soils are disturbed by Project construction efforts. Higher impact activities such as where earthworks are necessary for construction of sub-station pads and site facilities may result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. However, due to the nature of the landform, and the anticipated impacts, the risk of erosion and sedimentation impacts as a result of the Project remains a low.

Nonetheless, erosion and sedimentation risks may result in agricultural impacts if suitable controls are not implemented. As such, the Project will prepare an erosion and sediment control plan (ESCP) that addressed specific soil dispersion risks based on disturbance activity and phase of the Project. The ESCP should include the following:

Construction Phase

- The Project should utilise the existing landform and not endeavour to undertake broad-scale re-contouring of the existing ground levels.
- At locations where earthworks are necessary, localised erosion and sediment controls will be placed in accordance with the Landcom (2004) guidelines.
- Minimisation of the extent and duration of any surface disturbance / exposure will be prioritised during construction.
- All areas disturbed during construction that are complete and have no further use during construction should be sown with grass to provide long term protection against erosion.

Operation Phase

- Soil disturbance during operation of the Project should be minimal and limited to maintenance activities, involving very small, localised impacts on an infrequent basis.
- Standard erosion and sediment control measures should be implemented to minimise the potential for sediment export within areas to be disturbed during operations. These measures would be developed on a case-by-case basis referring to this soil assessment and are likely to include measures such as sediment fencing, localised sediment traps, and progressive stabilisation with vegetation.
- Groundcover should be maintained at a minimum of 70% where practical (subject to long terms seasonal variations, such as drought).

Decommissioning and Rehabilitation Phase

- A detailed Decommissioning and Rehabilitation Plan should be prepared within 18 months of the planned closure of the Project. This plan will detail all aspects of decommissioning and removal of all infrastructure unwanted for post Project land use (some infrastructure may remain for post Project land use purposes i.e., constructed internal roads may be kept as part of the agricultural infrastructure), which may require temporary erosion and sediment control measures.

5.2 SOIL STRIPPING FOR REHABILITATION

Soil that is proposed to be disturbed during the Project will be stripped and re-used in construction and/or rehabilitation efforts in order to mitigate long term effects on the land and soil capability of the Project Site. All soil stripping and re-use will be localised; that is, soil will be respread from where it is stripped during construction, reinstating the soil profile to its original condition. Additionally, soils will be stripped only in areas where soil disturbance occurs. This localised, fluid approach is an integral process for successful rehabilitation of the Project.

A site Soil Management Plan that includes soil management measures relating to stripping, management of sodic and dispersive soils, stockpiling, respread/reuse, and land rehabilitation should be prepared for the Project to inform the CEMP and OEMP.

It is not anticipated the Project will involve major amounts of soil excavation requiring long-term stockpile solutions and eventual respread, however small scale potential soil stockpiling from hardstand locations should abide by the following measures where practicable:

- Strip soil material to maximum excavation depths only.
- Soil should ideally be stripped in a slightly moist condition, where practicable. Material should not be stripped in either an excessively dry or wet condition.
- The surface of soil stockpiles should be left in as coarsely structured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming.
- Where necessary, a flow diversion bank or catch drain should be placed up-slope of a stockpile to direct surface water flows away. All stockpiles shall remain in a free-draining location to avoid long term soil saturation.
- Where necessary, silt fences or clean vegetation should be installed around topsoil stockpiles or stripped areas as a form of erosion and sediment control. Mulch or wood chip from cleared vegetation can also be applied as a veneer over topsoil stockpiles to slow erosion, weed establishment and to maintain moisture content.
- As a general rule, maintain a maximum stockpile height of 3 m. Clayey soils should be stored in lower stockpiles for shorter periods of time compared to coarser textured sandy soils.
- Seed and fertilise stockpiles as soon as possible. An annual cover crop species that produce sterile florets or seeds may be sown. A rapid growing and healthy annual pasture sward will provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species will not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil. Final rehabilitation target species should be established on stockpiles to build up a desirable species seed bank in the topsoil.
- An inventory of available soil should be maintained to ensure adequate materials are available for planned rehabilitation activities when the time comes.
- Prior to re-spreading stockpiled soil, an assessment of weed infestation on stockpiles should be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading.
- Where soil material is unable to be stored for the duration of the Project due to spatial constraints, suitable growth medium would be imported during decommissioning to satisfy rehabilitation commitments.

The following re-spreading and seedbank preparation techniques are recommended to prevent excessive soil deterioration and dispersion for any minor areas of soil respread.

- Soil should be spread to a depth that best reflects pre-disturbance soil horizons.

- Soil should be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for soil loss to wind and water erosion. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation.
- The respread soil surface should be scarified prior to, or during seeding, to reduce run-off and increase infiltration. This can be undertaken by contour tilling with a fine-tyned plough or disc harrow.

5.3 PEST SPECIES

Weeds in general will be managed across the site through a Pest and Weed Management Plan. This will include an ongoing effort to identify and eliminate existing weed populations on-site over the life of the Project. The spread of declared noxious weeds will be prevented by using site specific measures such as direct spraying.

Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Any use of herbicides will be carried out in accordance with the regulatory requirements. Records will be maintained of weed infestations and control programs will be implemented according to best management practice for the weed species concerned.

Feral animals will be controlled in accordance with Livestock Health and Pest Authority procedures. Feral animal control may be undertaken in consultation with host and neighbouring landholders, as required. Programs to control feral animals will include the determination of appropriate control practices, consultation with appropriate authorities, obtaining appropriate approvals, implementing control practices, and undertaking follow-up monitoring and control as required.

5.4 BIOSECURITY

At the local level, the mitigation measures outlined for pest species will reduce biosecurity risks. On a regional level, any import of equipment or machinery from overseas will follow the standard procurement safeguards and quarantine procedures as per Australian requirements.

Further, a Biosecurity Management Plan will be prepared that details construction and operational risks and controls in relation to pests, weeds, and diseases being introduced to the Project Site via workers vehicles and machinery.

5.5 SITE MONITORING PROGRAMS

Monitoring programs are instituted to assess predicted versus actual impacts as the Project progresses in order to implement controls where required. All operations associated with the Project undertaken in accordance with approved environmental management plans and strategies. The management plans will include environmental monitoring programs, where required. Key management plans, or chapters housed within a larger CEMP, that will assist in managing impacts on agricultural land will be stipulated in conditions of development consent.

These management plans, which will include mitigation measures to control impacts to soils and agriculture, will be reviewed and revised where necessary to incorporate the requirements associated with the Project prior to commencement.

5.6 DECOMMISSIONING AND REHABILITATION

Once the Project reaches the end of its investment and operational life, the project infrastructure will be decommissioned and the site returned to its pre-existing land use (livestock grazing) or other land use (i.e., horticulture) in consultation with the landholder. Land capability will restored, as far as practicable, to its pre-existing use.

A Decommissioning and Rehabilitation Plan will be prepared and outline the:

- rehabilitation objectives
- proposed method for removal of infrastructure

- disposal options for infrastructure once it has been removed
- performance criteria for rehabilitation, including soil quality (including a commitment to return the site to the pre-development condition or better to enable agricultural operations to be undertaken)
- timelines and responsibilities for implementation of this plan.

The Decommissioning and Rehabilitation Plan will be prepared three years prior to cessation of operations and will be finalised in consultation with relevant authorities.

5.7 MITIGATION SUMMARY

The mitigation measures pertaining to soils and agriculture that have been referenced in this assessment will form part of the Project approval commitments. A summary of these is presented in **Table 8**.

Table 8: Summary of Mitigation Measures

Risk Category	Mitigation Measure
Agricultural Land Use	Agriculture land use will be re-established over all agricultural land removed from agriculture at the time of decommissioning (unless otherwise agreed with the landowner and/or regulatory authorities).
Agricultural Productivity	The Project Site will be returned to an approximately equivalent potential agricultural productivity following the Project.
Soil Resources	All soil that is proposed to be disturbed during the Project will be handled in accordance with the strategy outlines in Section 5.1 and Section 5.2 and a site Soil Management Plan prepared for the Project.
Agricultural Infrastructure	Irrigation infrastructure including channels and drainage lines to be protected from Project impacts.
Pest Species	Pest species will be managed in accordance with measures outlined in Section 5.3, and a Weed Management Plan prepared for the Project.
Biosecurity	Biosecurity will be managed in accordance with measures outlined in Section 5.4 and a Biosecurity Management Plan prepared for the Project.

6 SUMMARY

There is a high level of certainty about the status of agricultural resources and enterprises in the Disturbance Footprint, locality and broader region, based on the site inspection and soil assessment undertaken and desktop studies carried out. Further, there is a high level of confidence regarding the Project activities, surface disturbance requirements and commitments to returning land to pre-disturbance agricultural status following the life of the Project.

Based on these factors, the impacts on agriculture as a result of the Project are determined to be minor, temporary, and limited to the Disturbance Footprint. These impacts can be summarised as the following:

- Temporary removal of 10.5 ha of land from agricultural land use for the duration of the Project.
- Temporary removal of potential agricultural primary productivity to the estimated value of up to $31,679 per year for the duration of the Project.
- Temporary removal of potential agricultural secondary productivity to the estimated value of up to $69,022 per year for the duration of the Project.
- Temporary impacts on soil resources within the Project Area where surface disturbance occurs.

In addition, it is noted that horticulture is strategically significant to the local area and is a possible land use for the Disturbance Footprint due to the presence of nearby irrigation infrastructure, industry support advantages and suitable soils. However, the irrigated horticultural potential of the land subject to land use change is discounted in this assessment, in light of available regional water supply limitations information (as presented in Section 2.4) and b) the limited scale of the of the Disturbance Footprint. For the purpose of this assessment there is no meaningful lost agricultural potential as a result of the Project.

The temporary impacts on agriculture listed above are considered a negligible impact in the context of the gross commodity values and land use coverage of the agricultural enterprises and industries operating within the Shepparton LGA. Given the nature and scale of the established agricultural industries within the region and wider state, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in agricultural industries and infrastructure. At the scale of the enterprises operating within the Project Site (currently livestock grazing), the anticipated impacts are considered offset as the involved landowners would be financially compensated.

Agricultural productivity of land outside of the Project Site, including neighbouring properties, are not anticipated to be affected by the Project as the associated agricultural resources (soil, water access, climate, etc) and agricultural infrastructure will not be affected.

A summary of mitigation measures and management recommendations have been provided at Section 5.7 as key controls to the risks of the Project on agriculture. It is anticipated that by adopting these measures, the Project will have negligible long term impact on the Project Site's agricultural productivity or potential, and negligible impact on agriculture enterprises and industries within the locality and region.

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Appendix 1

Soil Profile Descriptions

Site Description – Site 1				
Site Reference	1	**Soil Type**	Brown Sodosol	
Average Slope	0%	**Land Use**	Livestock Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 358207
Surface Condition	Firm	**Permeability**	High	Y: 5977021

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.10**	Brown (Munsell 7.5YR 5/2) Silty Clay Loam with weak pedality, earthy fabric and moderate consistence. No course fragments. Many roots and well drained. Clear boundary.
A2	**0.10 – 0.30**	Light brown (Munsell 7.5YR 6/4) Silty Loam with weak pedality, earthy fabric and weak consistence. No coarse fragments. Common roots and moderately well drained. Abrupt boundary.
B2	**0.30 +**	Strong brown (Munsell 7.5YR 4/6) Medium Clay with moderate pedality, rough fabric and strong consistence. No course fragments. No roots and moderately well drained. 10% faint dark grey mottling. High dispersion characteristics.

Site Description – Site 2				
Site Reference	2	**Soil Type**	Red Sodosol	
Average Slope	0%	**Land Use**	Livestock Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 358845
Surface Condition	Firm	**Permeability**	High	Y: 5976986

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	0.00 – 0.210	Very dark greyish brown (Munsell 10YR 3/2) Clay Loam with moderate pedality, earthy fabric and moderate consistence. No course fragments. Many roots and well drained. Clear boundary.
A2	0.10 – 0.30	Brown (Munsell 7.5YR 5/2) Silty Loam with weak pedality, earthy fabric and weak consistence. No coarse fragments. Common roots and moderately well drained. Abrupt boundary.
B2	0.30 +	Dark red (Munsell 2.5YR 3/6) Medium Clay with strong pedality, rough fabric and strong consistence. No course fragments. No roots and moderately well drained. High dispersion characteristics.

Site Description – Site 3				
Site Reference	3	**Soil Type**	Red Sodosol	
Average Slope	0%	**Land Use**	Livestock Grazing	**Coordinates**
Landform Pattern	Plain	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 358561
Surface Condition	Firm	**Permeability**	High	Y: 5976971

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark greyish brown (Munsell 10YR 4/2) Silty Clay Loam with moderate pedality, earthy fabric and moderate consistence. No course fragments. Many roots and well drained. Clear boundary.
A2	**0.15 – 0.25**	Brown (Munsell 7.5YR 5/2) Loam with weak pedality, earthy fabric and weak consistence. No coarse fragments. Common roots and moderately well drained. Clear boundary.
B2	**0.25 +**	Reddish brown (Munsell 2.5YR 4/4) Medium Clay with moderate pedality, rough fabric and strong consistence. No course fragments. No roots and moderately well drained. 10% faint dark grey mottling. High dispersion characteristics.

Appendix 2

Historical Water Use