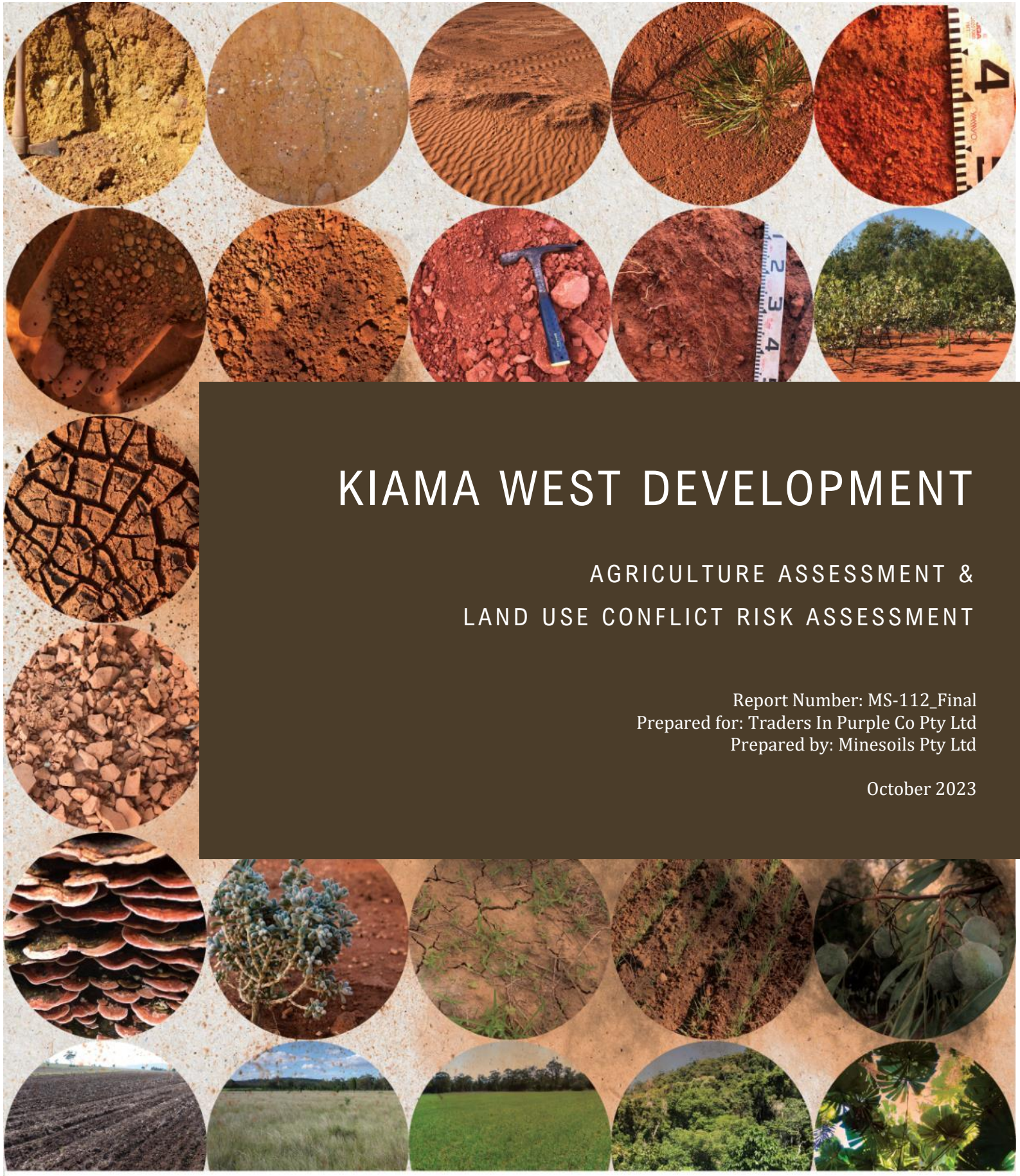

KIAMA WEST DEVELOPMENT

AGRICULTURE ASSESSMENT &
LAND USE CONFLICT RISK ASSESSMENT

Report Number: MS-112_Final
Prepared for: Traders In Purple Co Pty Ltd
Prepared by: Minesoils Pty Ltd

October 2023

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DISCLAIMER

This report has been prepared by Minesoils Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared by	Approved
MS-112_ Draft 1	29 September 2023	Matt Hemingway	Clayton Richards
MS-112_ Final	30 October 2023	Matt Hemingway	Matt Hemingway

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1. INTRODUCTION

1.1 OVERVIEW

Minesoils Pty Ltd (Minesoils) was engaged by Traders in Purple Co Pty Ltd (TIP) to conduct an agricultural impact assessment and a land use conflict risk assessment (LUCRA) to inform a Planning Proposal for the Kiama West proposal (herein referred to as 'the Project'), located immediately west of Kiama, New South Wales.

1.2 PROJECT DESCRIPTION AND STUDY AREA

The objective of the Planning Proposal is to rezone the area subject to the Project, covering 122.1 ha and referred to as the Study Area (**Figure 1**), from RU2 Rural Landscape to a variety of new land use zones including residential (R2, R3 and R5), recreational (RE1), special purpose (SP4) and conservation (C2). The study area consist of the following properties: 103 Jamberoo Road Kiama, 33 Greyleigh Drive Kiama and 177 Long Brush Road Jerrawa (**Figure 2**).

The study area currently has a range of land uses including rural industry, rural living and a small hospitality business. The current land use zoning within the study area is RU2 Rural Landscape within the cleared paddocks and C2 Environmental Conservation and C3 Environmental management along Spring Creek consistent with the *Kiama Local Environment Plan* (LEP) (**Figure 3**). The land surrounding the study area to the north, west and south is a mix of rural industry and rural living. Kiama residential land is present along the eastern boundary. Jamberoo Road traverses the northern boundary of the study area.

The Project incorporates open space, conservation areas and buffers and perimeter roads that provides a separation between the proposal and adjoining rural land. In addition, the Project includes large lot residential as a transition from more urban uses to rural uses.

The study area has historically been utilised for agricultural practices with evidence of broad native vegetation modification resulting from extensive clearing and agricultural land use. Current land use generally comprises grazing of beef and dairy cattle, which is consistent with agricultural lands in the broader locality. The site is immediately bordered by the suburban development of Kiama to the east.

1.3 SCOPE OF WORK

The Minesoils scope of work has been designed to address the following Ministerial Directions:

1. **Direction 9.1 Rural zones** - say that Planning Proposals must not rezone rural land. But can be inconsistent with this if there is a study that has considered the agricultural production value of the land.
2. **Direction 9.2 Rural land** – any potential land use conflicts between proposed urban zones (i.e. residential, business) and adjoining rural zoned land

The Minesoils scope of works consists of the following items:

1. An agricultural assessment that considers the agricultural productive value of the land, as well as anticipated impacts to agriculture as a result of the project.
2. A LUCRA in accordance with the NSW Department of Primary Industries (2011) *Land and Use Conflict Risk Assessment Guide* that considers any potential land use conflicts between proposed urban zones (i.e. residential, business) and adjoining rural zoned land.

1.4 ASSESSMENT APPROACH

An agricultural assessment and LUCRA must be to a level of assessment which is proportionate to the agricultural capability and activities of the land and the anticipated impacts of the Project. Minesoils approach includes the level

of detail as described in **Table 1**, which Minesoils considers appropriate and justified based on the scale of the Project and the impacts anticipated. This approach informs the report structure.

Direct consultation to inform this assessment was undertaken with land managers regarding current and historical management of land and agricultural practices on the Study Area and its surrounds, and the potential effects on current enterprises, neighbouring properties, local industries and support services as a result to changes to agricultural land use in the Study Area.

Table 1: Assessment Approach

Assessment	Content and form	Section Addressed
Project description	Description of the project and purpose of report, and includes a map of the Project locality and study area.	**1**
Regional context	Description of the regional context, including climate and rainfall, regional landform, regional land use including significant agricultural industries and/or infrastructure	**2**
Site characteristics and land use description	Description of the nature and location of agricultural land with the potential to be impacted by the development. Description of the current agricultural status and productivity of the proposed development area and surrounding locality including regional mapping of soil data.	**3**
LUCRA assessment	Conduct an assessment of potential land use conflicts, including completion of an assessment in accordance with the Department of Industries' *Land Use Conflict Risk Assessment Guide*	**4 (Appendix 1)**
Impacts on agricultural land	Identify and description of the nature, duration and consequence of potential impacts on agricultural land subject to Project at the level of the Project site and in the wider region	**5**


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ROCKLOW ROAD
MINNAMURRA
FIG HILL LANE
MINNAMURRA LANE
DUNMORE
PRINCES HIGHWAY
RIVERSIDE DRIVE
KIAMA DOWNS
MINNAMURRA RIVER
FACTORY LANE
BROWNS LANE
SWAMP ROAD
JERRARA CREEK
COLVERS CREEK
JAMBEROO ROAD
JAMBEROO
FOUNTAINDALE ROAD
MEHAN DRIVE
BARTON DRIVE
CLIFFE DRIVE
PANAMA STREET
BOMBO
RIVERSDALE ROAD
SPRING CREEK
MERRICK CIRCUIT
CARWA CREEK
JERRARA ROAD
WILLOW GALLERY
BLAND STREET
SHOALHAVEN STREET
MANNING STREET
LONG BRUSH ROAD
JERRARA
KIAMA
OLD SADDLEBACK ROAD
MOUNT BRANDON ROAD
MCILWRATH CREEK
PRINCES HIGHWAY
SADDLEBACK MOUNTAIN ROAD
MUNNAMUNNORA CREEK
ATTUNGA AVENUE
SADDLEBACK MOUNTAIN
WILLIAMS ROAD
KIAMA HEIGHTS
GOAREE CREEK
ROSE VALLEY
OMEGA ROAD
GERRINGONG
ROSE VALLEY ROAD
MERRI GULLY
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Wollongong
Site Location
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Water Features
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Regional Context
FIGURE 1
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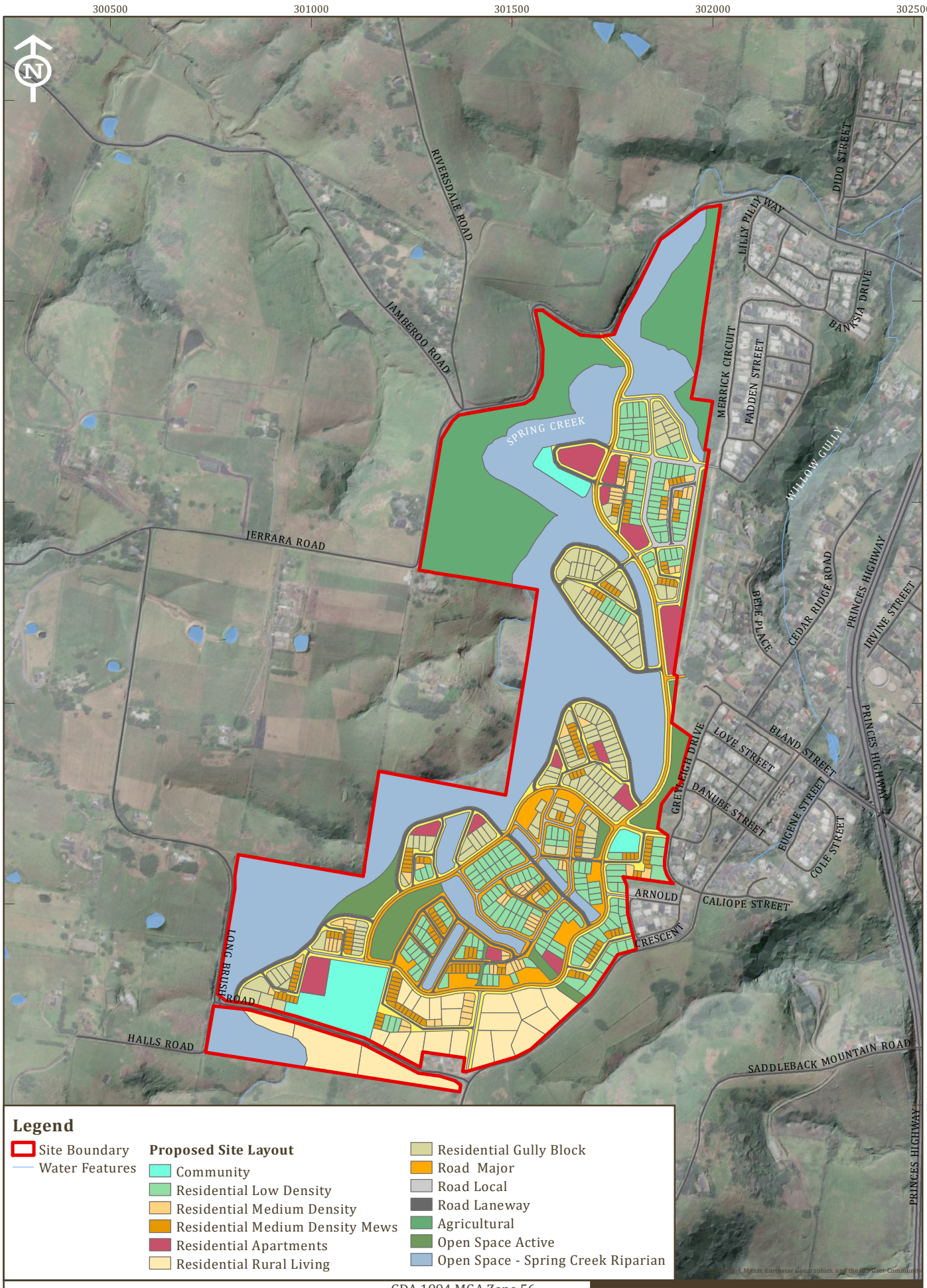

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Study Area

FIGURE 2

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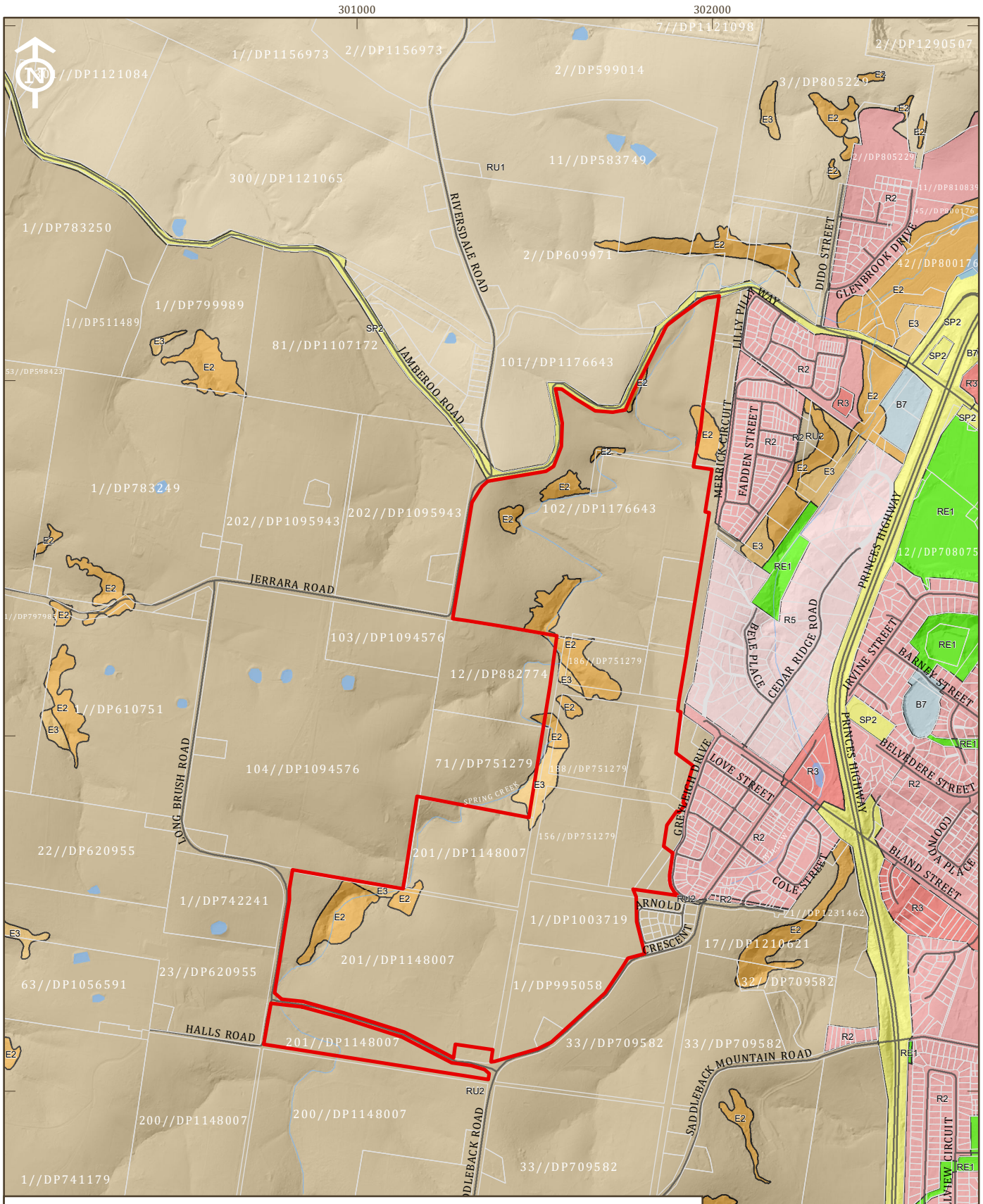

Legend

- Site Boundary
- Lot Boundaries
- Water Features

Kiama Local Environmental Plan 2011

- B7 Business Park
- E2 Environmental Conservation
- E3 Environmental Management
- R2 Low Density Residential
- R3 Medium Density Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- SP2 Infrastructure

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Land Zoning

FIGURE 4

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2 REGIONAL CONTEXT

2.1 CLIMATE AND RAINFALL

The Study Area lies within the Illawarra region of NSW. The proximity of the region to the coast and its topography results in a considerable variation in climate conditions. The region has a mostly cool temperate climate, with an average annual rainfall or around 1100 mm. Rainfall is nearly uniformly distributed throughout the year with slightly more rain in summer and autumn. The highest rainfall occurs to the east of the escarpment inland from Kiama, with an average annual rainfall of around 1600 mm. Summers are mild throughout most of the region, with winters cool closer to the Southern Highlands (OEH, 2014).

The climate of the Illawarra region is generally suitable for a range of agricultural enterprises including permanent and annual horticulture, cropping enterprises, and improved perennial and native pastures.

The closest Bureau of Meteorology (BOM) weather station to the Study Area is Kiama (Bombo Headland) (068242). This station is located approximately 2 km north east of the site and has a data range from 2001 to present (BOM, 2023). The average maximum temperature ranges from 25.1°C in January, down to 17.4°C in July, while average minimum temperatures range from 19.1°C in January, down to 10.2°C in July.

The annual average rainfall is 1,134.9 mm, with the highest average rainfall of 191.1 mm falling in March, and the lowest average rainfall of 56.6 mm falling in September. Rain generally falls over approximately 93 days.

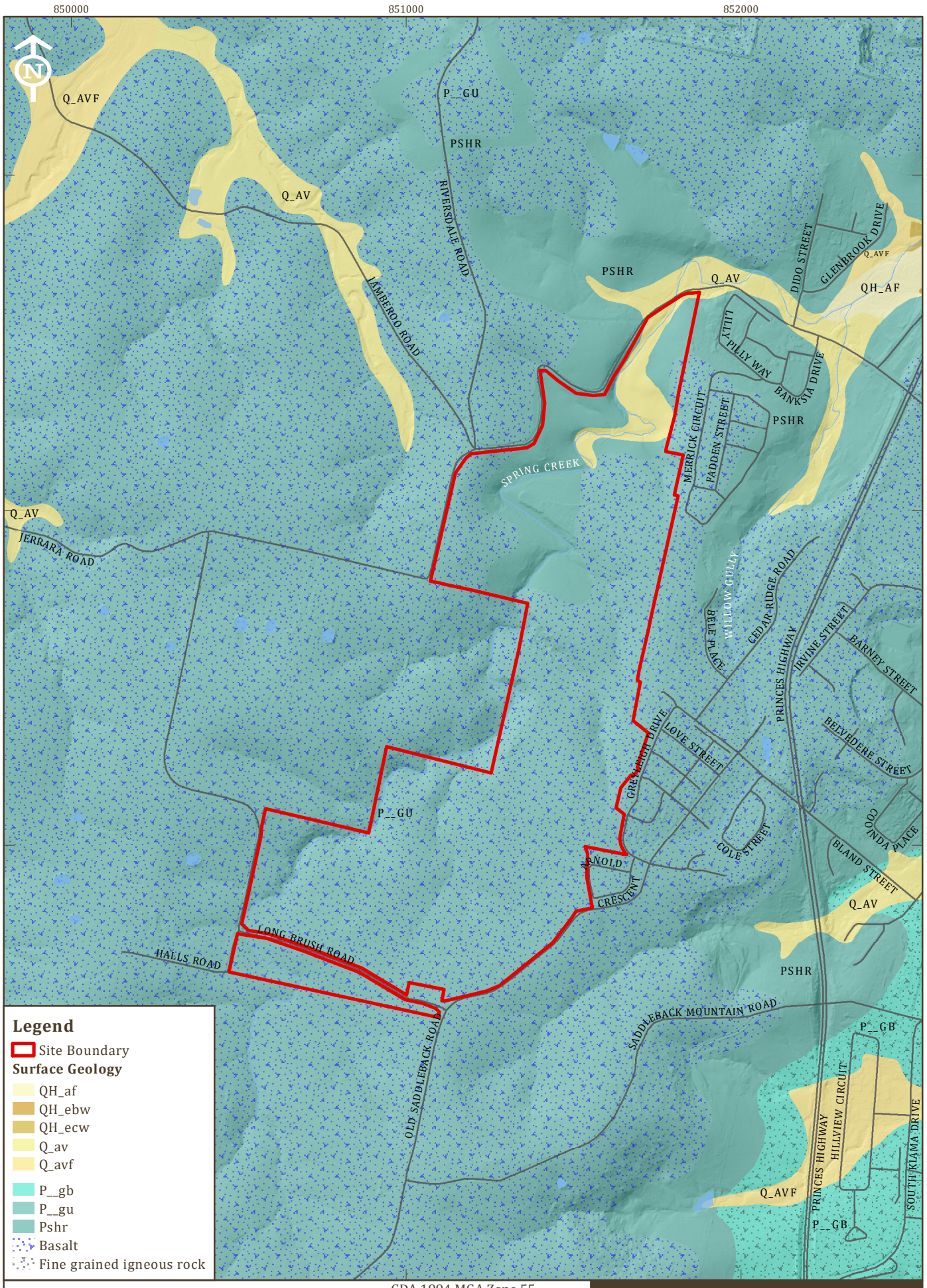
2.2 REGIONAL LANDFORM

The Illawarra region on the NSW coast south of Sydney covers over 7000 km^2 and has about 200 km of coastline. It is home to regional cities, commercial hubs and settlements, including Wollongong, Nowra, Kiama, Jamberoo, Hyams Beach and Calderwood. It stretches from Garie Beach in the Royal National Park in the north to Durras Lake in the south. The coastline is characterised by long sandy beaches, rivers, large, protected estuaries and small coastal embayment's protected by large sandstone headlands – much of which is Hawkesbury sandstone. The coastal plain is clearly delineated from the rolling hills of the Southern Tablelands in the west, by the sharp rise of the Illawarra Escarpment, which stretches 120 km from the sea cliffs of the Royal National Park in the north to the junction of the Shoalhaven and Kangaroo rivers in the south. The escarpment rises from 300 m above sea level in the north to 700 m in the south around Albion Park

The environment which makes up the Municipality of Kiama, within which the Study Area lies, is defined by three key landform features: the coastlines bold, rocky headlands and flat shore landform in the east, the undulating pasture lands and rolling hills, and the steep slopes of the Illawarra escarpment in the west. The Saddleback range is an extension of the escarpment following in a south-easterly direction.

The Minnamurra River is the largest in the region, connected to the associated floodplain and Tarragon Swamps. The Minnamurra River catchment area is approximately 100km^2, from the Illawarra escarpment in the west to the Tasman Sea in the east. The majority of this catchment is contained within the Municipality of Kiama, with some small areas of rural land within the Shellharbour Local Government Area.

With regard for the broader geological context, the Project is located within the Permo-Triassic Sydney Basin which formed in the Late Carboniferous – Early Permian due to igneous rifting and crustal thinning, which resulted in the deposition of Permian and Triassic aged sedimentary sequences (refer **Figure 5**). The basin overlies the Lachlan Fold Belt and Late Carboniferous volcanoclastic sediments. Volcanic rocks appear in the rock layers below the shale, quartz-lithic sandstone, conglomerate, sporadically carbonaceous mudstone, coal and torbanite seams formed in the late Permian 253-263mya coal beds along the coastline of Kiama, giving testimony to the volcanic violence that accompanied the rapid deposition of the sediment layers across this area



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Surface Geology

FIGURE 5

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2.3 REGIONAL LAND USE

2.3.1 AGRICULTURAL LAND USE

The Municipality of Kiama is located approximately 120 km south of Sydney. Residential land use dominates the coastal eastern landscape, with the western portion of the LGA primarily agricultural. Budderoo National Park is located to the south-west, supporting remnant vegetation.

Approximately 10,000ha of the Kiama Municipality is zoned for rural purposes – this represents 35.5% of the local government area. Beef and dairy cattle defines the rural character of the region. In recent years, the redevelopment of agriculture is linked to enhanced accommodation and food service rural land uses.

Of this, the area of land mainly used for agricultural purposes in the Municipality of Kiama LGA is 4,505 ha as of the last agricultural census (ABS, 2022a). The agricultural land use types within this area is presented in **Table 2**, which shows grazing activities represent 90 per cent of the agricultural land use, followed by cropping at eight per cent, and forestry and other land uses totalling two per cent.

Table 2: Municipality of Kiama LGA Agricultural Land Use 2020 – 2021 (ABS, 2022a)

Agricultural Land Use	Area	
	ha	%
Livestock Grazing	4,057	90
Cropping	367	8
Forestry	46	1
Other	35	1
Total	4,505	100

2.3.2 AGRICULTURAL ENTERPRISES

While the countryside around Kiama today is synonymous with dairy farming, the first European settlers came to cut and ship out timber. The early 1800's saw farmers experiment with various farming endeavours. Two local landowners, John Colley and James Robb (Riversdale) planted and harvested sugar cane but it never gained popularity with local farmers. The rainfall experienced in the region meant that rust (plant disease) was a continual problem. Wheat was also seen as an agricultural staple by the mid 1800's, and the municipality had several flour mills to process the crop.

Dairy took the lead in the 1880s with visits and subsequent innovations from two prominent men in the field, leading to Kiama opening the first cooperative butter and cheese factory in Australia (1884), the Kiama Pioneer Butter Factory. The Kiama Pioneer Butter Factory was the first factory in Australia to make a shipment of butter to Great Britain. Only one month after the Kiama factory opened came the Jamberoo Dairy factory. Omega launched a butter factory in 1886 and Gerringong in 1888.

Dairy farmers in Kiama were years ahead of the times with the invention of a butter box for transportation, use of refrigeration and pasteurisation and opening up the export market for Australian butter. By forming cooperatives, these farming visionaries also revolutionised their industry with Australia's first successful attempts at co-operative marketing.

In the past two decades a large number of dairy farms have been converted to beef production. Beef cattle are now an established agricultural industry in Municipality of Kiama. Beef and dairy cattle defines the rural character of the region, contributes significantly to the economy and facilitates the ongoing management of rural resource lands.

Nonetheless, for the census year of 2020 – 2021 (2022a), out of 9,677 total head of cattle, 8,642 were dairy cattle, representing 90%.

Across much of the Municipality of Kiama the typically shallow soil depths, erodible sub soils, low soil phosphorous levels and naturally moderate to high acidity. Those soils are best suited for permanent pastures and hence grazing enterprises. Factors in favour of cattle grazing and the region's beef and dairy industries include the:

- Suitability of the climate, pasture types and landscape.
- Available service suppliers (eg, produce merchants, contractors).
- Proximity to infrastructure (dairy production, abattoirs, saleyards, transport etc) and a range of markets.
- Potential for higher returns from group marketing activities.
- Increasing adoption of Industry standards, such as Meat Standards Australia (MSA) grading, which provide a tool for producers to identify and differentiate their products.
- Good international and domestic market prospects and the opportunity for professional beef and dairy producers to increase productivity and become more competitive.

The ABS (2022b) data shows that livestock consist primarily of dairy and meat cattle. sheep and lambs. Pigs and poultry (chicken) represent a more limited agricultural land use by area. Lands used for cropping are dominated by cereals, including wheat, oats, and barley for grain.

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 Kiama Municipality LGA for the last agricultural census year of 2020 – 2021 is estimated as $27.5 million (ABS, 2022b). **Table 3** highlights the dominance of livestock products as 75% of the total gross value for agriculture. Within this category, milk generally represents the entirety of the total value of livestock products, as shown in **Table 4**. Livestock products represent 25% of the total gross value for agriculture, within which cattle and calves for slaughter generally represents the entirety of the total value (**Table 5**).

This data highlights the dominance of dairy and meat cattle grazing as the leading agricultural enterprises for the LGA, not just in terms of area of land used but also in terms of estimated gross value generated.

Table 3: Municipality of Kiama LGA Agricultural Gross Value 2021 – 2022 by Enterprise (ABS, 2022b)

Agricultural Enterprise	Gross Value	
	$	%
Livestock products	20,669,726	75
Livestock slaughter	5,981,078	22
Cropping	862,198	3
Total	27,513,003	100

Table 4: Municipality of Kiama LGA Agricultural Gross Value 2021 – 2022 by Livestock Products (ABS, 2022b)

Agricultural Enterprise	Gross Value	
	$	%
Milk	20,668,583	100
Wool	1,143	<1
Total	20,669,726	100

Table 5: Municipality of Kiama LGA Agricultural Gross Value 2021 – 2022 by Livestock Slaughter (ABS, 2022b)

Agricultural Enterprise	Gross Value	
	$	%
Cattle and Calves	5,972,914	100
Poultry	4,088	<1
Other	2,587	<1
Sheep and Lambs	1,474	<1
Pigs	16	<1
Total	5,981,078	100

2.3.3 REGIONAL AGRICULTURAL INFRASTRUCTURE

The key infrastructure item assisting agricultural market access and cost of production is the transport network servicing the central west region. Underlining the importance of this issue, total freight costs from farm to port can be as much as 30% of the value of a commodity being marketed depending on Australian and world commodity prices in a given season. The Study Area is located immediate to Kiama, which was developed as a dairy centre supplying the Sydney market with fresh milk via the rail system.

Kiama has a well-developed road network that connects the agricultural industry to markets, services and suppliers. The Princess Highway connect the region to Sydney, Port Kembla and Wollongong and other regional centres. The railway at Kiama serves NSW TrainLink diesel multiple unit trains traveling south to Bomaderry and electric multiple unit trains north to Wollongong and Sydney. The region is well serviced with rail access into the main NSW bulk shipping ports at Port Kembla and Newcastle.

The main agricultural service centres in proximity to the Study Area is Kiama, Shellharbour, Nowra and Wollongong, with local businesses providing agricultural equipment and supplies, including animal fencing, animal vaccinations, livestock ID, stock supplements, seed, fertiliser and crop protection.

The Southern Regional Livestock Exchange, located at Moss Vale approximately 50km from the Study Area, is an important economic and historic facility for the local community providing the regions producers with a competitive market to sell livestock. For the latest survey year of 2022, the Southern Regional Livestock Exchange sold 25,318 head of cattle, representing 2.2% of the states cattle sales.

Other infrastructure critical to agricultural production include energy needs (gas and electricity), telecommunications services, some small scale, private irrigation system infrastructure and urban water and wastewater services. General agricultural improvements such as stock fences, shedding, dams and access tracks as well as infrastructure for milking, feeding and housing dairy cows, are widespread throughout the locality which reflects the historical and current development of the local lands for livestock grazing.

3 SITE CHARACTERISTICS AND LAND USE

3.1 SITE CHARACTERISTICS

3.1.1 LANDSCAPE

A site inspection was undertaken by Minesoils in July 2023. The Study Area was determined to be a stable, free draining landform with 90 - 100% surface cover in pasture that has been highly disturbed in the past by land clearing for agriculture, with areas of native trees on some hill crests, lower slopes and more extensively, along drainage lines.

The Study Area landscape is characterised by undulating rolling hills transected by a series of unnamed drainage lines and gullies which drain into the Spring Creek, which transects the site and flows in a north east direction towards Storm Bay. Site topography slopes slightly to the north east with elevation approximately 135 m Australian Height Datum (AHD) on crests to 60 m AHD along drainage lines (refer **Figure 5**).

A review of the NSW Office of Water groundwater database undertaken indicate there are no registered groundwater features located within a 500m radius of the site.

Prominent built features within the Study Area include residences, accommodation, venues and farm shedding.

3.1.2 AGRICULTURAL LAND USE

The Study Area is subject to livestock grazing on native and introduced pastures as the primary land-use, supporting approximately 125 dairy and 75 black angus beef cattle and calves (**Plates 1** and **2**), as well as approximately 100 sheep. Livestock are grazed on rotation. Six alpacas, two ponies, numerous chickens and a goat are retained within select paddocks as hobby stock for accommodation attraction purposes. Four horses were also observed within the Study Area at the time of inspection. Livestock are watered through pumped in water, Spring Creek, and a series of farm dams. The Study Area is not fertilised, and there is sporadic ongoing use of herbicides.

General agricultural improvements are present, including yards and housing for hobby stock (**Plate 3**) dams, cattle yards (**Plate 4**), stock fences and gates (**Plate 5**), water pumps, tanks and troughs, and unsealed access tracks.

Based on satellite imagery, site observation, soil and land capability, and anecdotal evidence, it is determined that cleared areas of land within the Study Area have historically been used for livestock grazing on native and improved pastures, with very limited previous opportunistic cultivation.

At the time of inspection, neighbouring properties in the immediate vicinity were observed to be used primarily for livestock grazing. Similar agricultural improvements (e.g. cattle yards, stock fences, dams and existing access tracks) are widespread throughout the locality which reflects the historical and current development of the local lands for these land uses.

No sensitive agricultural activities such as intensive plant or livestock agriculture are being undertaken within the Study Area or immediately adjacent lands.

Plate 1: Southern extent of Study Area facing north with dairy cows present and Spring Creek in foreground

Plate 2: Northern extent of Study Area facing south with beef cattle present

Plate 3: Agricultural improvements include yards and housing for hobby stock.

Plate 4: Agricultural improvements include dams.

Plate 5: Agricultural improvements include a cattle yard.

Plate 6: Agricultural improvements include fencing and gates.

3.2 SOILS AND AGRICULTURAL STATUS

The following section presents the NSW state government regional mapping data for soil landscapes, soil types, inherent soil fertility and LSC as applied to the Study Area (NSW and Department of Planning, Industry and Environment, 2022).

3.2.1 SOIL LANDSCAPES

Soil landscape units provides an inventory of soil and landscape properties of an area and identifies major soil and landscape qualities and constraints. It integrates soil and topographic features into single units with relatively uniform land management requirements. Soils are described in terms of soil materials in addition to the Great Soil Group and Northcote classification systems.

The soil landscapes within the Study Area and locality are presented in the *Soil Landscapes of the Kiama 1:100,000 Sheet* (Hazelton 1992), as shown on **Figure 6** and described below. The Bombo Soil Landscape unit, which covers the entire Study Area, is described as follows:

Landscape—rolling low hills with benched slopes and sea cliffs with extensive rock platforms on Bombo Latite. Relief 40–100m. Slope gradients 15–25%. Extensively cleared with stands of closed-forest and tall open forest.

Soils—shallow (<50 cm) Structured Loams (Um6) occur on crests, moderately deep (50–100 cm) Krasnozems (Gn4.11) on upper slopes and benches. Brown Podzolic Soils (Db1.11, Db1.21) and Red Podzolic Soils (Dr2.21) occur on mid and lower slopes.

Limitations—rock fall hazard, wave erosion hazard, rock outcrop, hard setting, low wet bearing strength, sodicity

3.2.2 SOIL TYPES

The NSW regional soil mapping indicates the dominant soil type within the Study Area is Ferrosols, as per Australian Soil Classification (ASC) (Isbell, R. F.,2021) (refer **Figure 7**).

Ferrosols are soils that:

- Have B2 horizons in which the major part has a free iron oxide content greater than 5% Fe in the fine earth fraction (<2 mm), and
- Do not have a clear or abrupt textural B horizon or a B2 horizon in which at least 0.3 m has vertic properties.

3.2.3 INHERENT SOIL FERTILITY

NSW regional mapping provides an estimation of the inherent fertility of soils in NSW. It uses the best available soils and natural resource mapping developed for LSC dataset. The mapping describes soil fertility in NSW according to a five-class system: Low (1), Moderately low (2), Moderate (3), Moderately high (4), High (5).

Soils with 'Low' fertility, due to their poor physical and/or chemical status, only support limited plant growth. Soils with 'Moderately Low' fertility can generally only support plants suited to grazing; large inputs of fertiliser are required to make the soil suitable for arable purposes. Soils with 'Moderate' fertility usually require fertilisers and/or have some physical restrictions for arable use. Soils with 'Moderately High' fertility have a high level of fertility in their virgin state which is significantly reduced after a few years of cultivation (Murphy *et al*., 2007).

The Study Area is dominated by soils with Moderately high (4) fertility (refer **Figure 8**).

Land and Soil Capability

Land capability, as detailed in LSC Scheme, is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. Failure to manage land in accordance with its capability risks degradation of resources both on- and off-site, leading to a decline in natural ecosystem values, agricultural productivity, and infrastructure functionality.

The scheme uses the biophysical features of the land and soil to derive detailed rating tables for a range of land and soil hazards. The scheme consists of eight classes, which classify the land based on the severity of long-term limitations. The LSC classes are described in **Table 6** and their definition has been based on two considerations:

- The biophysical features of the land to derive the LSC classes associated with various hazards.
- The management of the hazards including the level of inputs, expertise and investment required to manage the land sustainably.

The biophysical features of the land that are associated with various hazards are broadly soil, climate and landform, specifically noted as slope, landform position, acidity, salinity, drainage, rockiness; and climate. The eight hazards associated with these biophysical features that are assessed by the LSC scheme are:

1. Water erosion
2. Wind erosion
3. Soil structure decline
4. Soil acidification
5. Salinity
6. Water logging
7. Shallow soils and rockiness
8. Mass movement

Each hazard is assessed against set criteria tables, as described in the LSC Guideline, with each hazard ranked from 1 through to 8 with the overall ranking of the land determined by its most significant limitation.

Table 6: Land and Soil Capability Classification

Class	Land and Soil Capability
Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)	
1	**Extremely high capability land**: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	**Very high capability land**: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	**High capability land**: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)	
4	**Moderate capability land**: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	**Moderate–low capability land**: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)	

Class	Land and Soil Capability
6	**Low capability land**: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.
Land generally incapable of agricultural land use (selective forestry and nature conservation)	
7	**Very low capability land**: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	**Extremely low capability land**: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

The NSW regional based maps of LSC indicate the Study Area consists of land capable of a variety of land uses and characterised by LSC class 4: moderate capability land (refer **Figure 9**)

Strategic Regional Land Use Policy Mapping

The 'NSW Government's Strategic Regional Land Use Policy' (the Policy) defines and identifies strategic agricultural land across NSW. Strategic agricultural land includes land with unique natural resource characteristics, known as biophysical strategic agricultural land (BSAL), and clusters of significant agricultural industries known as critical industry clusters (CICs). The Policy has been developed to achieve balanced land use outcomes, particularly between mining, coal seam gas and agriculture.

There is no BSAL or CICs mapped within the Study Area. The nearest BSAL is located approximately 1.5 km west of the Study Area in association with Jerra Creek (refer **Figure 1**).

State Significant Agricultural Land

The NSW Department of Primary Industries is undertaking a mapping program to identify State Significant Agricultural Land (SSAL). A map of SSAL is an essential component of agricultural land use planning, enabling clearer local planning with informed prioritisation of future land uses.

SSAL is mapped extensively within the Study Area. However, no assessment criteria or decision-making framework has been developed to accompany the SSAL mapping.

3.3 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 Study Area. There is no set agricultural productivity value for land under agricultural use.

Agricultural productivity in the context of an impact assessment must also consider the potential productivity of a property, as opposed to the actual productivity, which may be influenced by land management that does not fulfill the potential or capabilities of the land being assessed.

An estimate of the potential agricultural productivity has been informed by the agricultural resources within the study area as well as existing agricultural enterprises in the study area and its locality. Based on these considerations, and by analysing the information presented from the last agricultural census of 20220 – 2021 in Section 2.3 (ABS 2022a and 2022b), a conservative estimation of the gross annual value of a dairy enterprise on the Study Area has been modelled.

Based on 90% of cattle in the LGA being dairy (ABS 2022a), a conservative assumption can be made that 3,651 ha of the 4,057 ha of land used for livestock grazing in the LGA is used for dairy cattle.

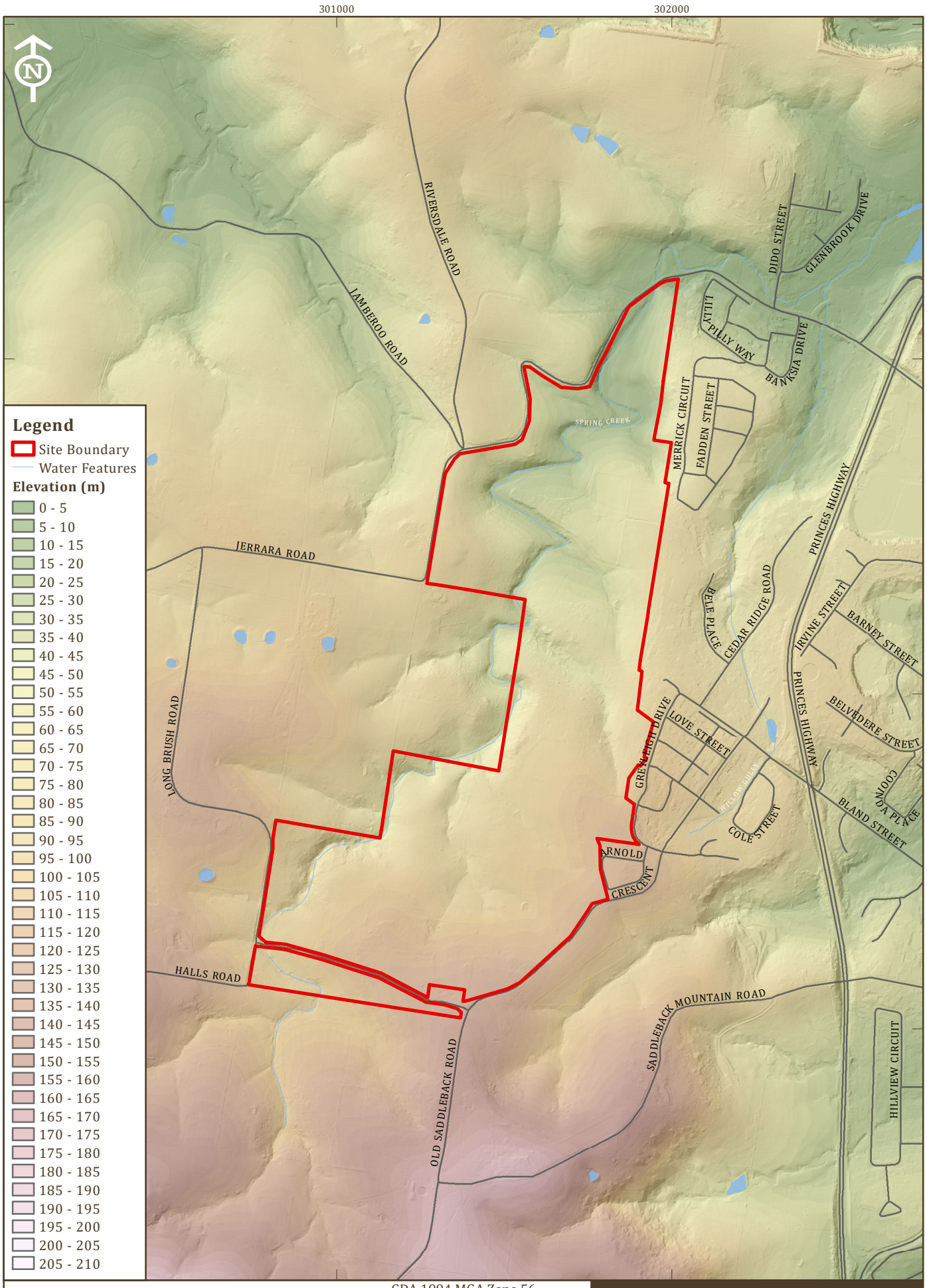
The total value of milk as an agricultural commodity in the LGA ($20,668,583 – refer **Table 4**) can then be measured against the assumed area of dairy cattle (3,651 ha), resulting in a $ per ha per year gross value productivity rate of $5,661 per ha per year.

By multiplying this productivity rate against the Study Area of 122.1 ha, a conservative estimate of potential productivity in terms of gross value is $691,208 per year, as presented in **Table 7.**

Note, this is gross value (as opposed to gross margin) and does not account for input costs including feed, milking, contracted services, etc.

Table 7: Estimated Productivity of Study Area Under Dairy Operation

Enterprise	Estimated Gross Value in LGA ($/ha/year)	Study Area (ha)	Study Area Potential Productivity ($/year)
Dairy cattle	5,661	122.1	691,208



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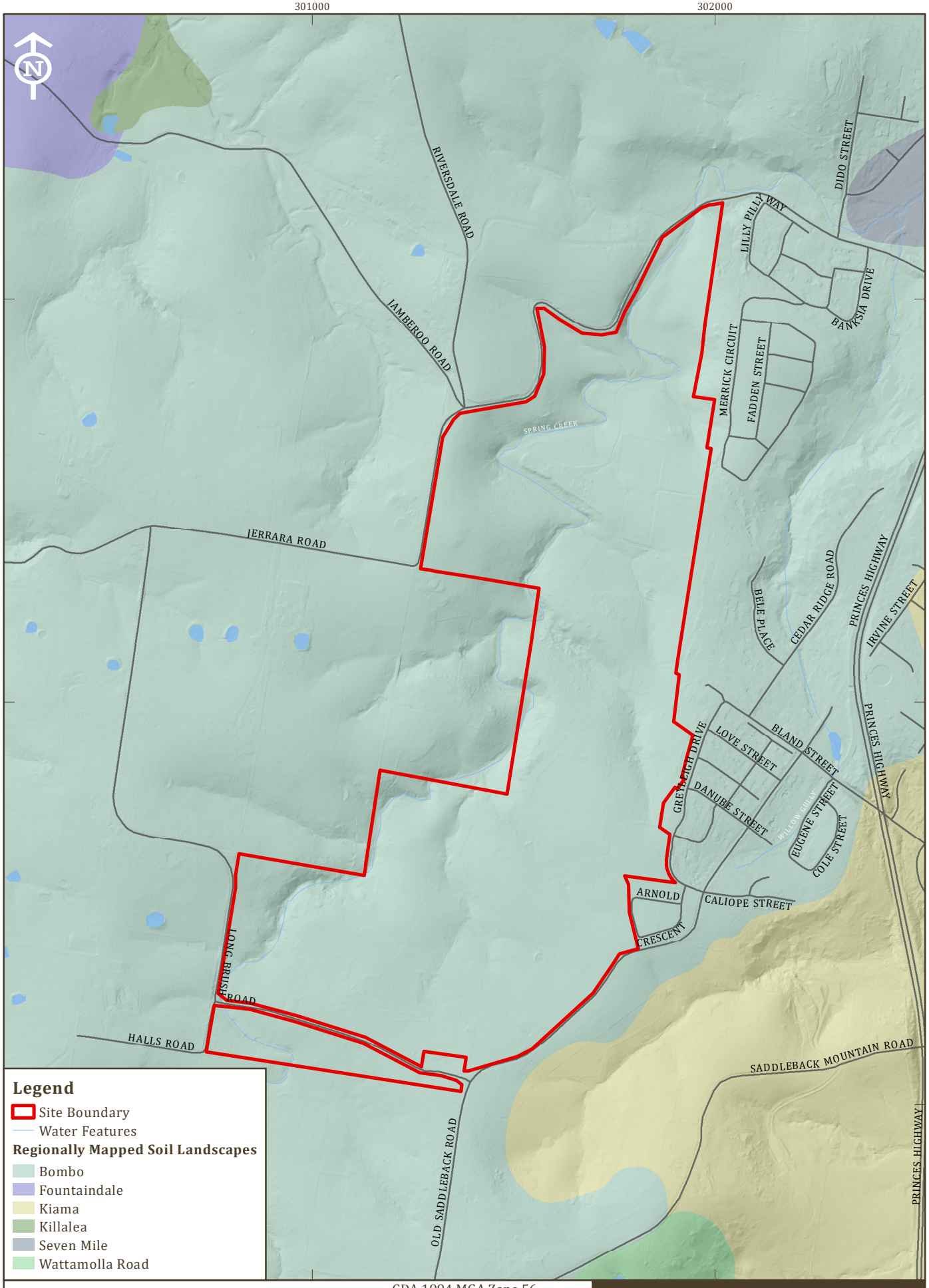

GDA 1994 MGA Zone 56

MINESOILS
LAND & REHABILITATION SPECIALISTS

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Scale 1:12500 at A4

Regionally Mapped Soil Landscapes

FIGURE 7

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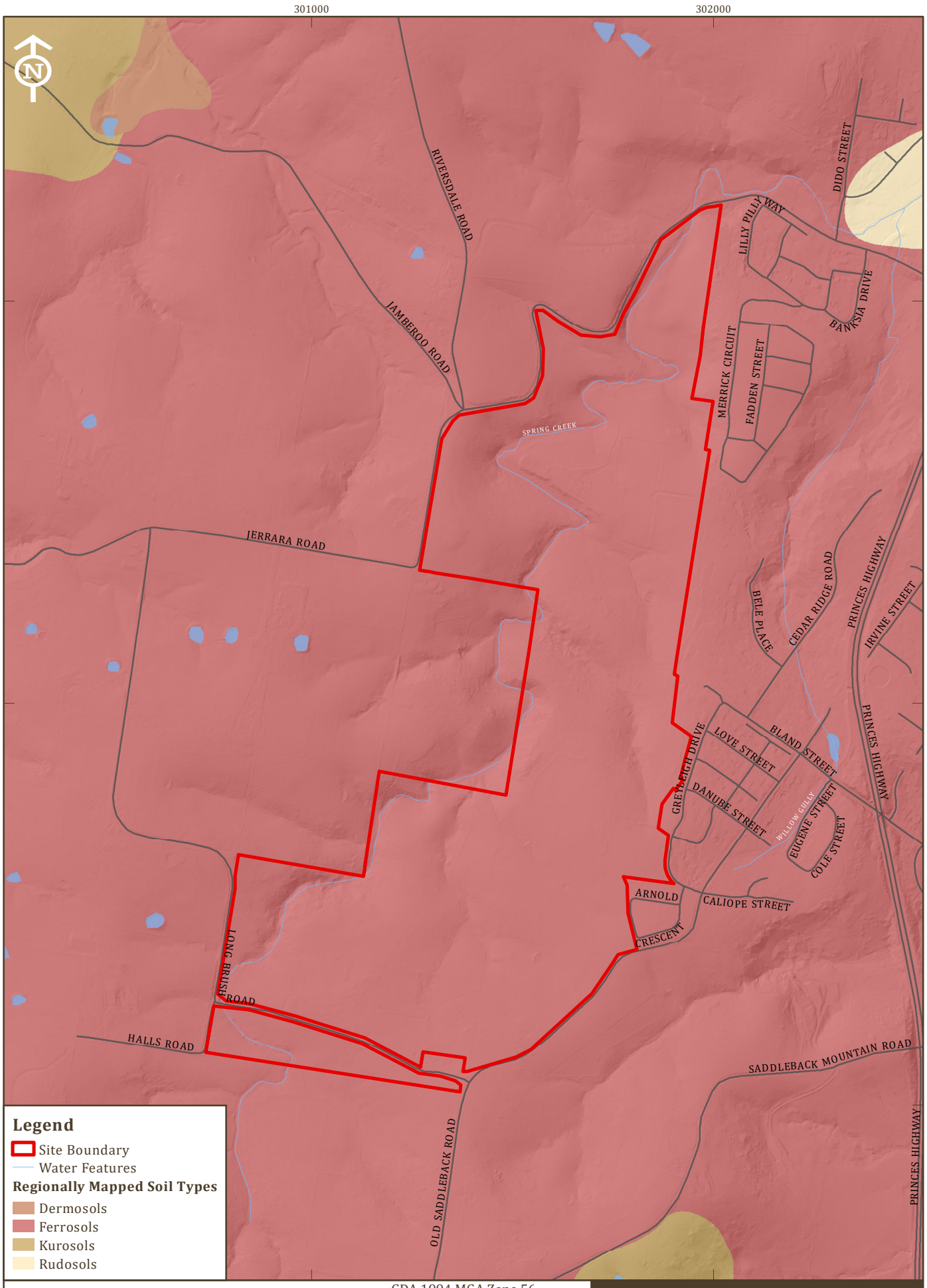

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Regionally Mapped Soil Types

FIGURE 8

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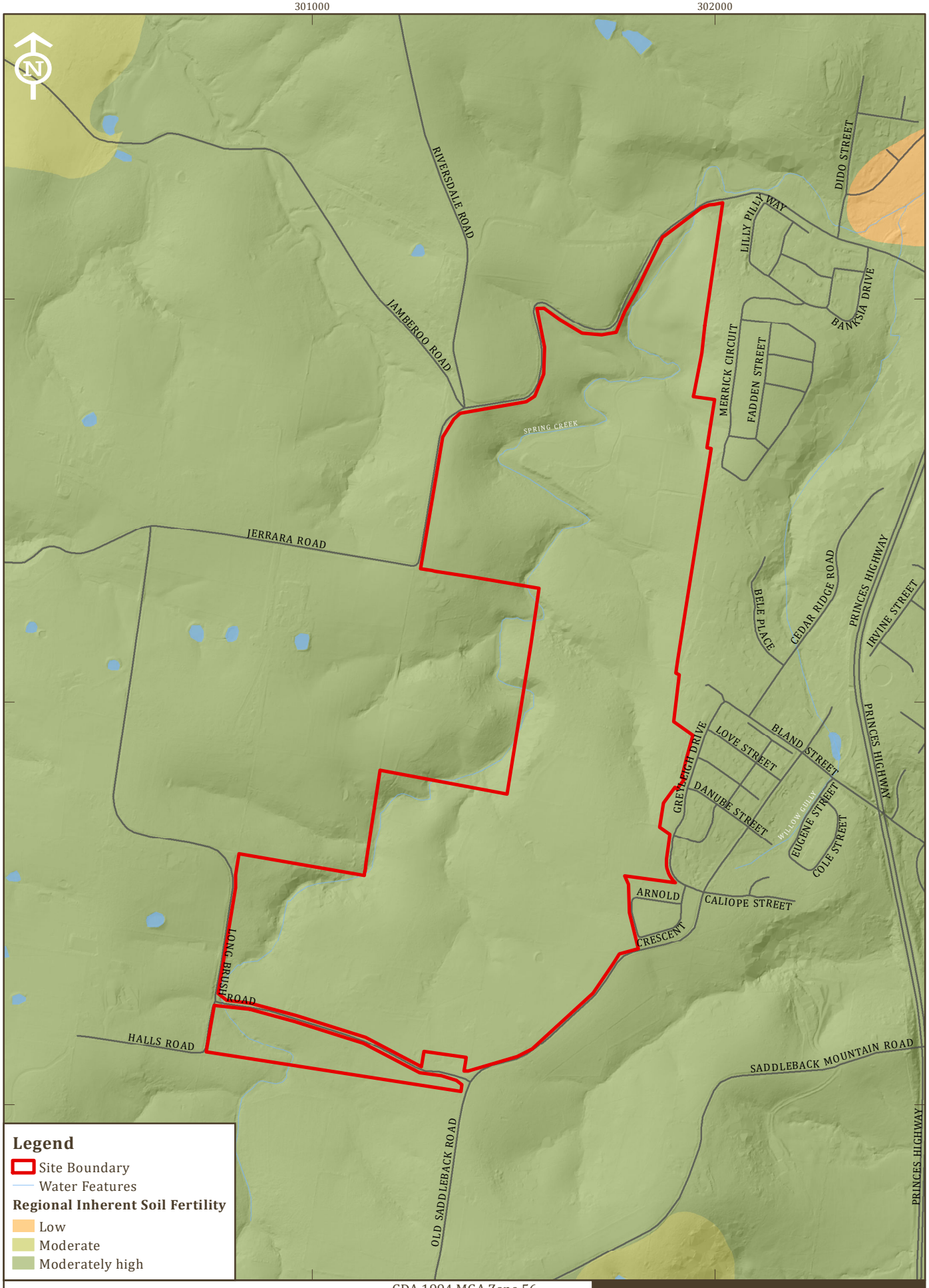

GDA 1994 MGA Zone 56

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LAND & REHABILITATION SPECIALISTS

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Regionally Mapped Inherent Fertility

FIGURE 9

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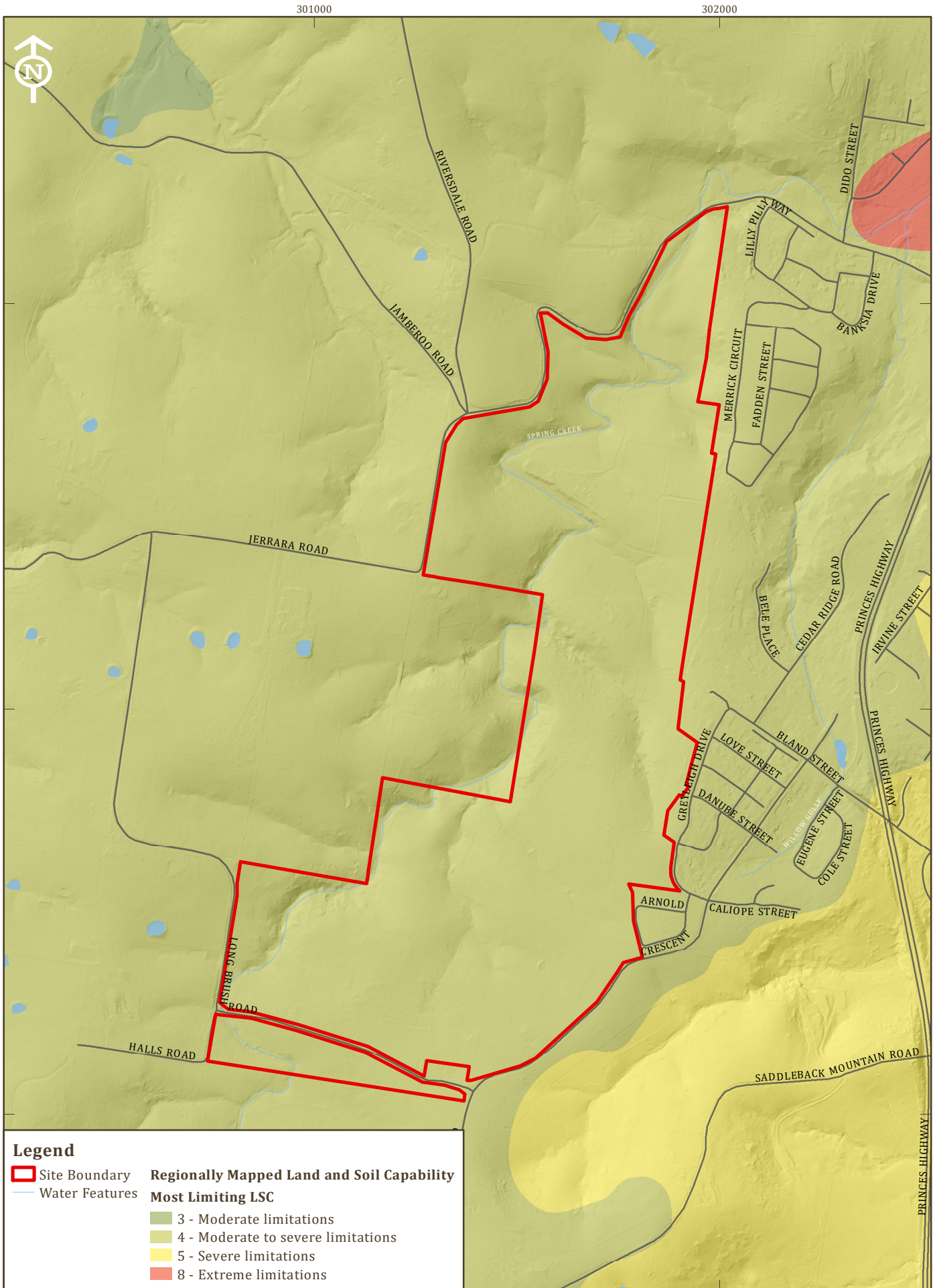

GDA 1994 MGA Zone 56

MINESOILS
LAND & REHABILITATION SPECIALISTS

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Scale 1:12500 at A4

Regionally Mapped Land and Soil Capability

FIGURE 10

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4 LAND USE CONFLICT RISK ASSESSMENT

4.1 OVERVIEW

The Land Use Conflict Risk Assessment (LUCRA) (NSW Department of Primary Industries, 2011) is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict. LUCRA aims to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses.
- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements.
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

Land use conflicts occur when one land user is perceived to infringe upon the rights or impact the values or amenity of another. In rural areas land use conflicts commonly occur between agricultural and residential uses. However, land use conflicts can also occur between different agricultural enterprises and other primary industries.

Rural amenity issues are the most common land use conflict issues, followed by environmental protection issues. Rural amenity issues include impacts to air quality due to agricultural and rural industry (odour, pesticides, dust, smoke and particulates); use and enjoyment of neighbouring land e.g., noise from machinery; and visual amenity associated with rural industry e.g., the use of netting, planting of monocultures and impacts on views.

Environmental protection issues include soil erosion leading to land and water pollution, clearing of native vegetation, and stock access to waterways.

Direct impacts from neighbouring land uses on farming operations can also cause conflict, such as: harassment of livestock from straying domestic animals; trespass; changes to storm water flows or water availability; and poor management of pest animals and weeds.

4.2 APPROACH

The LUCRA as presented in **Appendix 1** compares and contrasts the Project against adjoining/surrounding land uses and activities for perceived or actual incompatibility and conflict issues based on the agricultural status of the locality, and the risks and impacts identified in Section 5. Each potential perceived or actual conflict between the proposed development and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in **Appendix 1**.

4.3 FINDINGS

There are 32 risk items of potential perceived or actual impact that were considered as part of the LUCRA. The mitigation and measures and controls, where available, reduce the level of risk for the majority of considered potential risks. However, there are several high and medium risk potential conflicts, which may require further consultation and management or will remain as a likely conflict as a result of the proposed development. These are summarised in **Table 8**. The LUCRA methodology including risk ranking matrix and full LUCRA assessment are included as **Appendix 1**.

Table 8: LUCRA Moderate Risk Items and Risk Controls Summary

Conflict Category	Description
Construction and Agriculture	Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction during increased volume of vehicles and workers from out of area during construction and spread to agricultural land.
Construction and Agriculture	Stakeholders may have concerns that the construction of the Project will alter and disturb existing soil properties, undermining the capability of the land for future agricultural production.
Construction and Environment	Land users in the locality may be concerned about changes to water quality, quantity and surface water flows that may affect the Study Area and locality, including Spring Creek, from surface disturbances during construction activities.
Construction and Environment	Stakeholders may be concern about potential impacts to biodiversity within the Project area and locality.
Development and Agriculture	There will be a permanent removal of 102.2 ha from agricultural land use. The scale of this impact in the context of land used for agriculture within the region is presented in the agricultural assessment for stakeholder consideration. No mitigation measures or agricultural offsets are proposed.
Development and Agriculture	Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the Project.
Development and Agriculture	Stakeholders in the locality, such as accommodation operators, may be concerned about impacts on agriculture-based tourism.
Development and Residential	Landowners in the locality may be concerned about potential devaluation of properties due to development.

5 IMPACTS ON AGRICULTURAL LAND

The impacts development activities can have on land resources and agricultural productivity 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 a project. Permanent impacts may include changes to land and soil capability and agricultural resources of the Study Area. 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 Study Area and in the wider region, across five key risk areas:

- Changes in the amount of land used for agriculture.
- Changes to agricultural productivity and agricultural enterprises.
- Changes to agricultural resources.
- Other potential impacts to agriculture considered for the Project.
- Cumulative impacts of the potential for multiple developments within the region.

5.1 LAND USED FOR AGRICULTURE

The Project will be undertaken over an area of approximately 122.1 ha of land that is currently subject to agriculture land use or capable of agricultural land use. An area of this will be retained as agricultural land, as per the current Project layout (refer **Figure 2**). These areas total 19.9 ha.

Therefore, it is anticipated that the Project will permanently remove 102.2 ha of land used for agriculture or capable for use in agriculture.

This represents 2.2% of land used for agriculture in the Municipality of Kiama LGA (refer Section 2.4.1).

Current agricultural land use immediate to the Study Area and in the broader Project locality will not change as a result of the Project, and there will be no fragmentation or displacement of existing agricultural industries.

5.2 PRODUCTIVITY AND ENTERPRISES

5.2.1 PRIMARY PRODUCTIVITY

The Project will permanently remove 102.2 ha, resulting in the permanent removal of $578,554 per year, as outlined in **Table 10.**

This represents 2.1% of the gross value of agriculture in the Municipality of Kiama LGA (refer Section 2.4.2).

Table 10: Estimated Lost Potential Productivity of the Study Area

Enterprise	Estimated Gross Value in LGA ($/ha/year)	Study Area (ha)	Lost Potential Productivity ($/year)
Dairy cattle	5,661	102.2	578,554

5.2.2 PRODUCTIVITY OF LAND WITHIN LOCALITY

Agricultural productivity of land outside of the Study Area will not be affected by the Project as the associated agricultural resources and infrastructure will not be affected. Therefore, the Project will not negatively impact any existing agricultural enterprise outside of the Study Area.

5.2.3 AGRICULTURE SUPPORT SERVICES

The Project will have a negligible impact on local, regional and state agricultural services. Changes to the supply and viability of agricultural support services in the main service centres of Kiama, Shellharbour, Nowra and Wollongong are driven by social and market trends far exceeding the scale of the minor reduction in agricultural land use and productivity as a result of the Project.

The reduction in livestock being sold during Project will be a negligible impact on the Southern Regional Livestock Exchange which sells approximately 2.2% of NSW's beef cattle (MLA 2022). Assuming a conservative estimate of 150 head of cattle being removed from sales at the Southern Regional Livestock Exchange, this reduction is estimated to represent 0.6% of all cattle sold per year.

5.2.4 CRITICAL MASS THRESHOLDS

Due to the limited reduction in agricultural activity as a result of the Project, and the scale of the livestock industries operating in the Municipality of Kiama LGA and broader region, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in agricultural service industries and infrastructure.

5.3 AGRICULTURAL RESOURCES

5.3.1 SOILS

Over the area of the Study Area being permanently impacted, soils will be subject to significant, permanent impacts where earthworks and surface disturbance are necessary for construction.

There will be no direct or indirect impacts to the soil resources of the Project locality outside the Study Area.

5.3.2 AGRICULTURAL CAPABILITY

Land will be permanently removed from agricultural capability over the area of the Study Area being permanently impacted.

There will be no direct or indirect impacts to the agricultural capability of the Project locality outside the Study Area.

5.3.3 WATER

There are no impacts on groundwater anticipated and risks to water quality are expected to be readily manageable by and Project design and erosion and sediment controls during construction. No impacts are anticipated on the availability of current surface or groundwater resources used by neighbouring landholders.

5.3.4 EROSION AND SEDIMENTATION

Erosion risks are primarily associated with the anticipated impacts to soils during construction. The Project must prepare an erosion and sediment control plan (ESCP) that addressed specific soil dispersion risks based on disturbance activity and phase of the Project.

5.3.5 AGRICULTURAL INFRASTRUCTURE

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

5.4 OTHER POTENTIAL IMPACTS ON AGRICULTURE

5.4.1 PEST SPECIES

Pest species could be inadvertently brought into the Study Area with imported materials, machinery, or allowed to invade naturally through removal or damage of current vegetation. The presence of weed species has the potential to be a major hinderance to agricultural endeavours on neighbouring properties.

Weeds in general must be managed across the site through specific control measures. In the event that weeds are not effectively managed, minor impacts to agriculture may be experienced in the locality.

5.4.2 BIOSECURITY

Biosecurity is defined in the 'Draft NSW Biosecurity Strategy' (DPI, 2021) 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. At the local level, as per Section 5.4.1 above, appropriate weed management 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. Given the processes above, it is considered that the Project will not have any potential impact on the biosecurity of agricultural resources and enterprises within the region.

5.4.3 AIR QUALITY AND DUST

Construction has 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). These impacts are unlikely to affect agriculture and standard dust suppression measures can be readily implemented where required.

5.4.4 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 Project activities, leaving fewer transport options for agricultural enterprises.

The roads in proximity to the Study Area are anticipated to experience an increase in traffic volumes as a result of the Project. However, the current road network has adequate capacity for additional traffic and free flow conditions would continue. Further, no increases in levels of noise and dust that could impact agriculture will result from increased traffic.

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

5.4.5 NOISE AND VIBRATION

Noise levels as a result of the Project 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.

Generally, agriculture is only impacted by noise when constantly high noise levels or sudden loud noise leads to a decrease in animal production through increased livestock stress. Cattle may tolerate moderate levels of noise and may easily adapt to an intensity level of 60-90dB. Continuous exposure to noise above 90dB has been known to severely affect animals (Dairy Global, 2017).

Appropriate mitigation measures are recommended to minimise noise impacts. As a result, there must be no exceedances of noise greater than 90dBA where cattle will be located on a non-associated property adjacent to the Study Area. As such, livestock and other agricultural resources are unlikely to be impacted by traffic noise due to the Project.

5.5 CUMULATIVE IMPACTS

The Project has the potential to generate cumulative impacts with other existing, approved or proposed developments in the region.

Increased cumulative impacts including changes to land used for agricultural, localised productivity, secondary productivity and some agricultural support services are likely to be experienced where projects in the region conflict with agricultural land. However, given the nature and scale of the established agricultural industries within the region, significant impacts to critical mass thresholds and regional agricultural infrastructure are unlikely to occur in the foreseeable future.

6 SUMMARY

This agricultural impact assessment and a land use conflict risk assessment (LUCRA) has established the potential productivity of the Study Area, identified the key land use conflicts risks associated with the project, and determined the key impacts to agriculture as a result of the Project. The following key findings are noted:

- The conservative potential agricultural productivity gross value of the Study Area under a dairy farming enterprise has been estimated up to $691,208 year.
- The LUCRA undertaken identified the following key high and medium risk potential perceived or actual conflicts:
  - Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction during increased volume of vehicles and workers from out of area during construction and spread to agricultural land.
  - Stakeholders may have concerns that the construction of the Project will alter and disturb existing soil properties, undermining the capability of the land for future agricultural production.
  - Land users in the locality may be concerned about changes to water quality, quantity and surface water flows that may affect the Study Area and locality, including Spring Creek, from surface disturbances during construction activities.
  - Stakeholders may be concern about potential impacts to biodiversity within the Project area and locality.
  - There will be a permanent removal of 102.2 ha from agricultural land use. The scale of this impact in the context of land used for agriculture within the region is presented in the agricultural assessment for stakeholder consideration. No mitigation measures or agricultural offsets are proposed.
  - Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the Project.
  - Stakeholders in the locality, such as accommodation operators, may be concerned about impacts on agriculture-based tourism.
  - Landowners in the locality may be concerned about potential devaluation of properties due to development.

The impacts on agriculture as a result of the Project are determined to be permanent but limited to the Study Area only. These impacts can be summarised as the following:

- Permanent removal of 102.2 ha of land used for agriculture, or land capable for use for agriculture, within the Study Area. This represents 2.2% land used for agriculture within the Municipality of Kiama LGA.
- Permanent removal of potential agricultural primary productivity to the estimated value of up to $578,554 per year. This represents 2.1% of gross commodities value of agriculture within the Municipality of Kiama LGA.
- Permanent impacts to soil resources and agricultural capability within the Study Area where surface disturbance occurs.

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Appendix 1

Land Use Conflict Risk Assessment

Overview

LUCRA is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict.

The LUCRA compares and contrasts the Project against adjoining/surrounding land uses and activities for incompatibility and conflict issues based on the risks and impacts identified in Section 5, and the mitigation measures and controls of the Project design. Each potential conflict between the Project and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in the following section.

Methodology

A risk ranking matrix (**Table A1**) provided by the DPI (2011) is used to rank the identified potential land use conflicts. The risk ranking matrix assesses the economic, social and environmental impacts according to the probability of occurrence and consequence of the impact.

Table A1: Risk Ranking Matrix

	Probability				
Consequence	**A**	**B**	**C**	**D**	**E**
Level 1	25	24	22	19	15
Level 2	23	21	18	14	10
Level 3	20	17	13	9	6
Level 4	16	12	8	5	3
Level 5	11	7	4	2	1

(Source: DPI, 2011)

The risk ranking matrix yields a risk ranking from 25 to 1. It covers each combination of five levels of 'probability' (a letter A to E as defined in **Table A2**) and 5 levels of 'consequence', (a number 1 to 5 as defined in **Table A3**) to identify the risk ranking of each impact. For example, an activity with a 'probability 'of D and a 'consequence' of 3 yields a risk rank of 9. A rank of 25 is the highest magnitude of risk; a highly likely, very serious event. A rank of 1 represents the lowest magnitude of risk; an almost impossible, very low consequence event. Low risk is a ranking score of 10 or below.

Table A2: Probability Definitions

Level	Descriptor	Description
A	Almost Certain	Common or repeating occurrence.
B	Likely	Known to occur or it has happened.
C	Possible	Could occur or 'I've heard of it happening.'
D	Unlikely	Could occur in some circumstances but not likely to occur.
E	Rare	Practically impossible or 'I've never heard of it happening.'

(Source: DPI, 2011)

Table A3: Consequence Definitions

	Description	Example of Implications
Level 1		
Severe	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level 2		
Major	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level 3		
Moderate	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur	• Water or soil known to be affected, probably in the short to medium-term (e.g. 1-5 years) • Management could include significant change of management needed for agricultural enterprises to continue
Level 4		
Minor	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level 5		
Negligible	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

(Source: DPI, 2011)

Conflict	Potential Conflict Description	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction and Agriculture	Land users in the locality may be concerned construction activity disturbances may affect livestock behaviour and/or breeding.	D	3	9	Compliance with standard construction mitigation measures and criteria is anticipated to reduce the risk of conflict related to noise impacts on agricultural land users. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours regarding effects to livestock can be managed within normal construction procedures.
Construction and Agriculture	Land users in the locality may be concerned that the increased vehicles during construction or operation may result in an accident with livestock or farm machinery on roads.	D	1	19	Project design and mitigation measures are anticipated to reduce the risk of conflict related to construction traffic for surrounding land users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans and/or consent conditions (if approved).	E	3	6	Effectiveness of mitigation measures will be measured as part of a construction management plan.
Construction and Agriculture	Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction during increased volume of vehicles and workers from out of area during construction and spread to agricultural land.	B	2	21	Compliance with standard construction mitigation measures is anticipated to reduce the risk of conflict related to pest spread to agricultural land. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	3	10	Any complaints from neighbours regarding weed spread can be addressed within normal construction procedures.
Construction and Agriculture	Stakeholders may have concerns that the construction of the Project will alter and disturb existing soil properties, undermining the capability of the land for future agricultural production.	B	2	21	There will be a permanent impact on soil resources where significant disturbance occurs (such as earthworks), resulting in a sterilisation of agriculture land. The scale of this impact in the context of land used for agriculture within the region is presented in the agricultural assessment for stakeholder consideration.	C	2	18	Nil.
Construction and Residential	Land users in the locality may be concerned that dust generated by construction activities may have adverse health implications for residential land users within the locality.	D	3	9	Compliance with standard construction mitigation measures and criteria is anticipated to reduce the risk of conflict related to dust impacts on neighbouring residents. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	Any complaints from neighbours regarding effects of construction dust can be managed within normal construction procedures.
Construction and Residential	Increased noise generated by construction activities and heavy vehicle movements may be perceived as nuisance to residential land users within the locality.	C	4	8	Compliance with standard construction mitigation measures and criteria is anticipated to reduce the risk of conflict related to dust impacts on neighbouring residents. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours regarding effects of construction dust can be managed within normal construction procedures.

Conflict	Potential Conflict Description	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction and Environment	Land users in the locality may be concerned about changes to water quality, quantity and surface water flows that may affect the Study Area and locality, including Spring Creek, from surface disturbances during construction activities.	C	3	13	Appropriate mitigation measures, including soil erosion and sedimentation controls, must be implemented to minimise impacts to watercourse health and quality. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to watercourse health and quality. Implement all measures specified in an erosion and sediment control plan developed for the construction phase of the Project. This will include groundcover being maintained where possible and practical, and identifying and repairing active erosion.	D	3	9	Effectiveness of mitigation measures will be measured as part of a construction management plan.
Construction and Environment	Stakeholders may be concerned about impacts to heritage items or values at the Study Area and locality.	B	4	12	An assessment of impacts to heritage will be undertaken. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to environmental features, culturally sensitive land and heritage. Implement all measures specified in management plans and/or consent conditions (if approved).	D	4	5	Effectiveness of engagement will be measured as part of the construction management plan.
Construction and Environment	Stakeholders may be concern about potential impacts to biodiversity within the Project area and locality.	B	3	17	The assessment of impacts to biodiversity has been undertaken. Appropriate mitigation measures are specified to minimise the risk for impacts on biodiversity within the Project area and locality. Implement all measures specified in management plans and/or consent conditions (if approved). Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	3	9	Effectiveness of engagement will be measured as part of the construction management plan.
Construction and Roads	Use of surrounding roadways during construction may cause conflict by interacting with agricultural and/or local transport activities, and/or resulting in additional travel time for road users or potentially impacting / degrading the physical condition of local roads.	C	4	8	Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for surrounding land users. Liaison with relevant road authorities (ie. Kiama Council and Transport for NSW) regarding ongoing maintenance of road surface during construction. Damaged or degraded roads as a result of construction activities will be repaired. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Effectiveness of mitigation measures will be measured as part of a construction management plan.
Development and Agriculture	Stakeholders in the locality may be concerned about the reduction of land used for agricultural purposes.	A	3	20	There will be a permanent removal of 102.2 ha from agricultural land use. The scale of this impact in the context of land used for agriculture within the region is presented in the agricultural assessment for stakeholder consideration. No mitigation measures or agricultural offsets are proposed.	A	4	16	Nil.
Development and Agriculture	Stakeholders in the locality may be concerned about the removal of agriculture over an area that is mapped as State Significant Agricultural Land (SSAL).	D	4	5	The identification of SSAL mapping within the Study Area has been undertaken within this agricultural assessment. SSAL mapping is currently draft only. Given that there is currently no assessment method to verify SSAL, or decision-making framework to prioritise SSAL in the context of developments such as the Project, no further consideration of SSAL is required.	D	5	2	Nil.

Conflict	Potential Conflict Description	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Development and Agriculture	Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the Project.	A	3	20	There will be a permanent impact to the existing visual amenity of agricultural land. Project design has included measures to mitigate the impacts.	C	3	13	Nil.
Development and Agriculture	Stakeholders in the locality, such as accommodation operators, may be concerned about impacts on agriculture-based tourism.	C	3	13	Impacts to agriculture-based tourism may be experienced for accommodation in proximity to development. Project design has included measures to mitigate the impacts. Ongoing consultation with stakeholders will identify concerns if they arise.	D	3	9	Nil.
Development and Agriculture	Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction that may spread to agricultural land as a result of proposed land uses.	C	4	10	The potential weed and pest spread impacts are determined to be appropriate in the context of existing residential development. No mitigation measures are proposed. Project design has included measures to mitigate the impacts (buffer area).	D	4	5	No complaints from agricultural land users regarding pest or weed spread as a result of the development.
Development and Agriculture	Neighbouring property owners may be concerned about sprays from weed control adversely affecting adjacent land.	D	4	5	Impacts to agricultural operations as a result of residential and small scall pesticide use spray drift is anticipated to be minor. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	No complaints from agricultural land users regarding impacts from residential weed control activities.
Development and Agriculture	Land users in the locality may be concerned that waste generated by the development may increase the presence of pest animals and/or vermin which could impact agricultural productivity	D	4	5	The potential impacts as a result of increased waste generation are determined to be appropriate in the context of existing residential development and surrounding agricultural activities. No mitigation measures are proposed.	E	4	3	No complaints from land users in locality regarding increased waste or pest animals.
Development and Agriculture	Land users in the locality may be concerned about the risk of fires occurring at the Project area and their potential to spread to surrounding land, infrastructure or livestock.	E	3	6	The risks related to fire spread are determined to be appropriate in the context of existing residential development and surrounding agricultural activities. Standard design in accordance with relevant guidelines will mitigation risk.	E	3	6	No instances of fire starting on the Project are as a result of the Project, which impact surrounding land, infrastructure or livestock.
Development and Agriculture	Land users in the locality may be concerned about impacts to agricultural support infrastructure in the Project locality and wider region.	D	4	5	The assessment of the impacts to agricultural support infrastructure in the Project locality and wider region has been undertaken within this agricultural assessment. Anticipated impacts are determined to be negligible and presented in this report for stakeholder consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No complaints from agriculture enterprises regarding impact to agricultural support infrastructure due to Project activities.

Conflict	Potential Conflict Description	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Development and Agriculture	Stakeholders may be concerned about impacts to agricultural industries and critical mass thresholds that determine viability.	D	4	5	The assessment of the impacts to agricultural industries has been undertaken within this agricultural assessment. Given the nature of agriculture being removed (i.e., dairy and beef cattle grazing) and in the context of the scale of the established agricultural industries within the region and wider state, impacts to critical mass thresholds and regional and state agricultural industries are unlikely to occur. Impacts are determined to be minor and presented in this report for stakeholder consideration.	D	5	2	No complaints from wider agriculture industries due to Project activities.
Development and Agriculture	Neighbouring landowners may be concerned about their livestock entering the Project area and becoming injured or causing damage.	D	4	5	Fencing will be fit for purpose and maintained. The potential impacts are determined to be appropriate in the context of existing residential development and surrounding agricultural activities. Standard design in accordance with relevant guidelines will mitigation risk (fencing). Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No instances of livestock entering Project area and becoming injured or causing damage.
Development and Residential	Residents in the locality may be concerned that dust generated by increased vehicle movements, as well as increased pollution from increased vehicle movements, has the potential to impact air quality and may have adverse health implications for residential land users within the locality.	D	3	9	The potential dust and pollution impacts are determined to be negligible in the context of existing urban development and mitigated by development design. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans and/or consent conditions (if approved).	E	5	1	No complaints from residents regarding air quality or dust.
Development and Residential	Land users in the locality may be concerned about an increase in nuisance noise generated from proposed residential and recreational land use.	D	3	9	The potential nuisance noise impacts are determined to be appropriate in the context of existing residential development and mitigated by development design. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans and/or consent conditions (if approved).	D	4	5	No complaints from land users in locality regarding nuisance noise.
Development and Residential	Landowners in the locality may be concerned about potential devaluation of properties due to development.	B	3	17	Impacts to property values in the locality may be experienced for properties in proximity to development. Project design has included measures to mitigate the impacts. Ongoing consultation with stakeholders will identify concerns if they arise.	C	3	13	Nil.
Development and Residential	Land users in the locality may be concerned that the change in land use may attract people to the area who may not otherwise visit the area, including workers. This may be perceived to adversely affect a resident's security.	D	3	9	The potential impacts are determined to be appropriate in the context of existing residential development. Workforce behaviour will be managed through the implementation of the construction management plan, which will encourage positive workforce behaviour. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	Effectiveness of mitigation measures will be measured as part of a construction management plan.

Conflict	Potential Conflict Description	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Development and Roads	Land users in the locality may be concerned about an increase in traffic volume on local roads as a result of the proposed development, which may cause conflict by interacting with agriculture transport activities or increasing travel times.	D	4	5	Anticipated impacts are determined to be minor and presented in a traffic assessment for land user consideration. Liaison with relevant road authorities (ie. Council and Transport for NSW) regarding final design and road capacity will be undertaken. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	5	1	No complaints from land users in locality regarding impacts to agricultural transport activities or increased travel times.
Agriculture and Residential	Residents may have concerns about nuisance noise from cattle and farm machinery.	D	3	9	The potential impacts are determined to be appropriate in the context of existing residential development adjacent to agricultural land use. Project design has included measures to mitigate the impacts. Ongoing consultation with stakeholders will identify concerns if they arise.	E	3	6	No complaints from residents regarding nuisance noise.
Agriculture and Residential	Residents may have concerns about odour from fertiliser and cattle manure.	D	3	9	The potential impacts are determined to be appropriate in the context of existing residential development adjacent to agricultural land use. Project design has included measures to mitigate the impacts. Ongoing consultation with stakeholders will identify concerns if they arise.	E	3	6	No complaints from residents regarding nuisance odour.
Agriculture and Residential	Residents may have concerns about increased presence of flies and vermin attracted by agricultural activities.	D	3	9	The potential impacts are determined to be appropriate in the context of existing residential development adjacent to agricultural land use. Project design has included measures to mitigate the impacts. Ongoing consultation with stakeholders will identify concerns if they arise.	E	3	6	No complaints from residents regarding flies and vermin.
Agriculture and Residential	Residents may have concerns about spray drift of pesticides from pasture weed control.	D	2	14	Project design has included measures to mitigate the impacts (buffer area). Ongoing consultation with stakeholders will identify concerns if they arise.	E	3	6	No complaints from residents regarding pesticide spray drift.
Agriculture and Residential	Landowners in the locality may be concerned about domestic dogs entering agricultural properties and harassing cattle and calves	C	4	8	Project design will include measures to mitigate the impacts (dog-proof fencing and buffer area). Ongoing consultation with stakeholders will identify concerns if they arise.	D	4	5	No complaints from agricultural land users regarding domestic dogs' presence.