DESIGN BUILD INSTRUCT

PLANNING PROPOSAL

Rural Residential (R5)

Mountain Ash Road, Gundary, Goulburn NSW 2580

Views of Precinct 1 of the site, looking South-east along Mountain Ash Road (R).

Thursday 25 November 2021

Rural Residential (R5) 1
Introduction / Executive Summary 4
Site Details 5
Planning Proposal 11
Intent & Objective 11
Explanation of Provisions 14
Justification 16
The South East and Tablelands Regional Plan 2036 16
Operational Plan 2021/22 21
Our Environment 21
Our Economy 22
Our Community 23
Our Infrastructure 24
Local Strategic Planning Statement 24
1. Infrastructure 25
Infrastructure meets the needs of a growing community 25
2. City, Town and Village Centres 25
Vibrant, accessible town centres which provide a range of services to meet the community's needs. 25
3. Community Facilities, Open Space and Recreation 26
Physical, social and cultural activity is supported by a range of facilities and shared spaces. 26
4. Housing 26
A range and diversity in housing type, which is contextual and affordable and is primarily centred around Goulburn and Marulan. 26
5. Primary Industry 26
Primary resource land is a valued asset; and primary industry is a significant economic sector within the LGA which contributes to positive environmental and social outcomes. 26
6. Industry and Economy 27
Local industry provides for the employment needs of the region within a thriving and diversified economy which is resilient to change. 27
7. Sustainability 27
A sustainable environment which utilises best practice to minimise waste and maximise renewables. 27
8. Natural Hazards 27

Natural hazards are identified, planned for and mitigated where possible throughout the planning process. 27
9. Heritage 28

Goulburn Mulwaree's cultural heritage is conserved, actively adapted for use (where appropriate) and celebrated. 28
10 Natural Environment 28

Protection and enhancement of the quality of natural environments and systems. 28
Goulburn Mulwaree Urban and Fringe Housing Strategy 29

Local Strategic Planning Statement 30

Goulburn Mulwaree Urban and Fringe Housing Strategy 30

Local Housing Strategy Objectives 32

SEPP55 Remediation of Land 33

SEPP Rural Lands 35

SEPP Sydney Drinking Water Catchment 2011 36

Goulburn Mulwaree Local Environmental Plan 2009 38

Direction 1.2 Rural zones 39

Direction 1.5 Rural lands 39

Direction 5.2 Sydney Drinking Water Catchments 39

Direction 5.10 Implementation of Regional Plans 39

Biodiversity Conservation Act (2016) 44

Goulburn Mulwaree Local Environmental Plan 2009 45
Conclusion 52

Attachment 1

Ecological Constraints Analysis 53

Attachment 2

Engineering Services Report 96

Attachment 3

Proposal Plans 214

Introduction / Executive Summary

This Planning Proposal has been prepared by Design Build Instruct Pty Ltd on behalf of Windellama Road Pty Ltd & GTSMF Pty Ltd seeking council support for land identified along Mountain Ash Road as included within Precinct 10 of the Urban and Fringe Housing Strategy to be rezoned to R5 Large Lot Residential. The proposal has scope to provide much needed rural residential lifestyle living within less than 2 kilometres of Goulburn. Australia's first inland City.

Providing much needed housing for the community brings with it new people the region. Enticing intra-regional migration often brings fresh and exciting ideas which can support increases in tourism and economic development. This proposal has been lodged in support of council initiatives to bolster and grow the regional economy of Goulburn.

Council has invested in infrastructure and facilities development that help to make Goulburn a good place to live, invest and visit. For example, a new Performing Arts Centre, refurbished Regional Art Gallery, Adventure Playground, Wollondilly River Walkway, Aquatic Centre Redevelopment, and War Memorial Museum. This Planning Proposal provides the housing for new residents to enjoy these facilities and in turn continue to grow the economy.

The proposal is reflected within numerous economic development drivers at the State, Regional and Local level. Positioned on the fringe of the city, with readable access to Canberra or Sydney via Hume Highway and less than two kilometres to the city centre, the proposal provides scope for new residents to enjoy the region and contribute positively to regional growth. The Planning Proposal is aligned with the South East and Tablelands Regional Plan 2036, Council's Operational Plan 2021-22 and Community Strategic Plan. The subject site is highlighted as Precinct 10 within council's Urban and Fringe Housing Strategy, and the Local Strategic Planning Statement.

Lodged pursuant to the relevant sections of Part III of the Environmental Planning & Assessment Act, 1979 and in accordance with the support of the aforementioned extrinsic material, Local Environmental Plan, adopted strategies and documentation. The proposal is the next logical progression for housing within the Goulburn - Mulwaree Shire, supporting job creation, and broadening economic growth in alignment with Canberra Region, Goulburn Australia and Goulburn Mulwaree Destination Action Plan 2020 to 2025.

We look forward to working with council to progress the assessment of this planning proposal in a proactive, timely manner.

Site Details

The subject site along Mountain Ash Road is positioned north and south of the carriageway and geographically presents as three distinct precinct areas (Figure 1) on State government mapping. North of Mountain Ash Road the site comprises allotments known legally as Lots1 in DP779194, 103 in DP70346, 1 in DP853498 104, 105, 106 in DP126140 and 1, 2 in DP835278 South of Mountain Ash Road the allotments consist of Lots 3 in DP835278, 1 in DP731427 and 22, 23, 24 in DP811954.

The subject site comprises a total of 13 parcels fronting Mountain Ash Road Gundary in the parish's of Goulburn and Towrang.

The site is currently zoned RU1 Primary Production and totals 277ha in area. Access to the site can be made via 5 constructed and unconstructed gazetted road reserves which appropriately provide various access points, in, through, and surrounding the subject site from Windellama, Mountain Ash, Rosemont Roads and Barretts Lane.

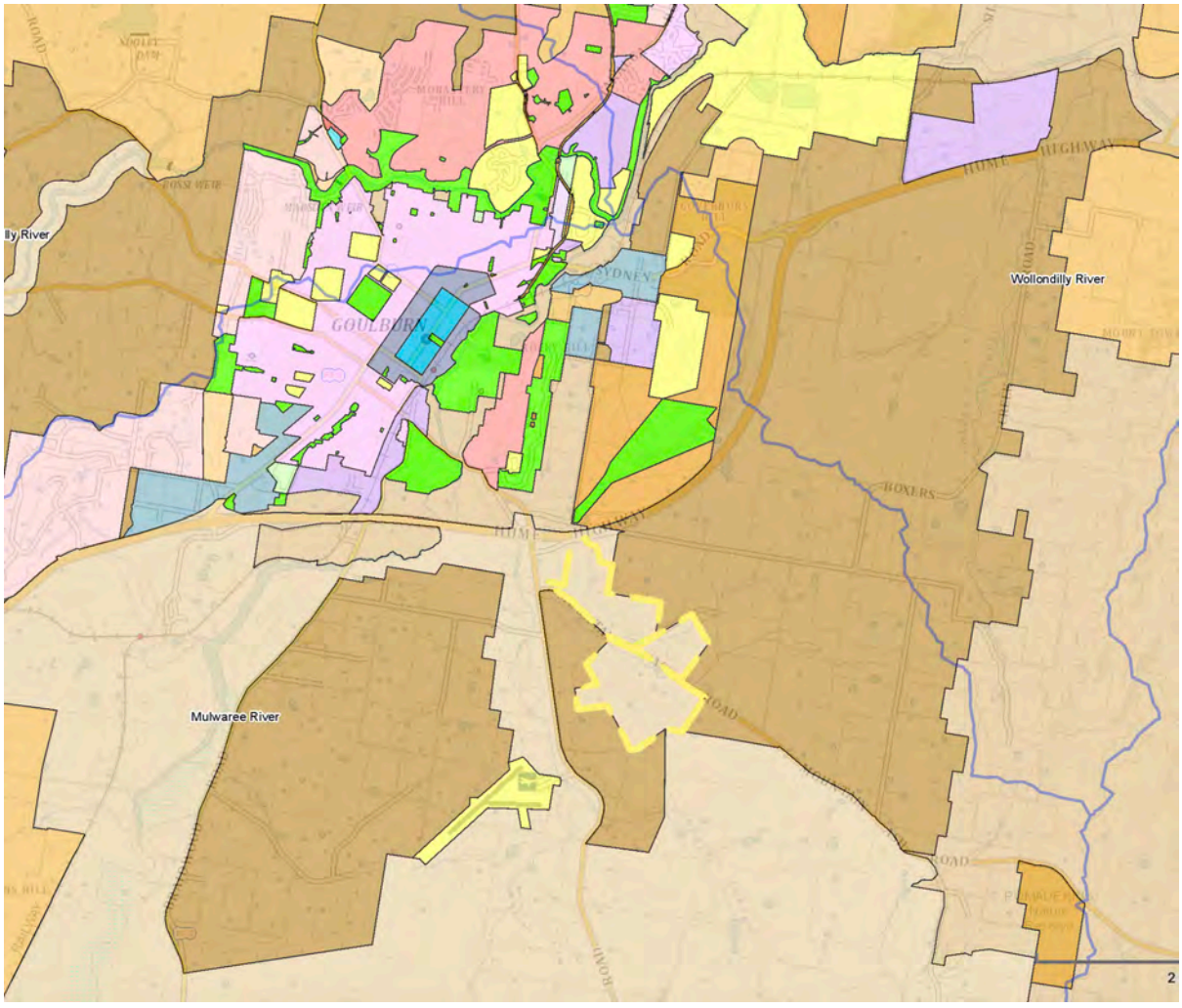

Figure 1. Regional Context of the site. Goulburn township North of Hume Highway

The regional context of the site positions it within very close proximity to Goulburn providing readable access to local employment centres, as well as easy access to Hume Highway for access to Canberra or Sydney. The site is situated within two (2) kilometres of the city centre positioning itself in a suitable location for rural residential sized allotments.

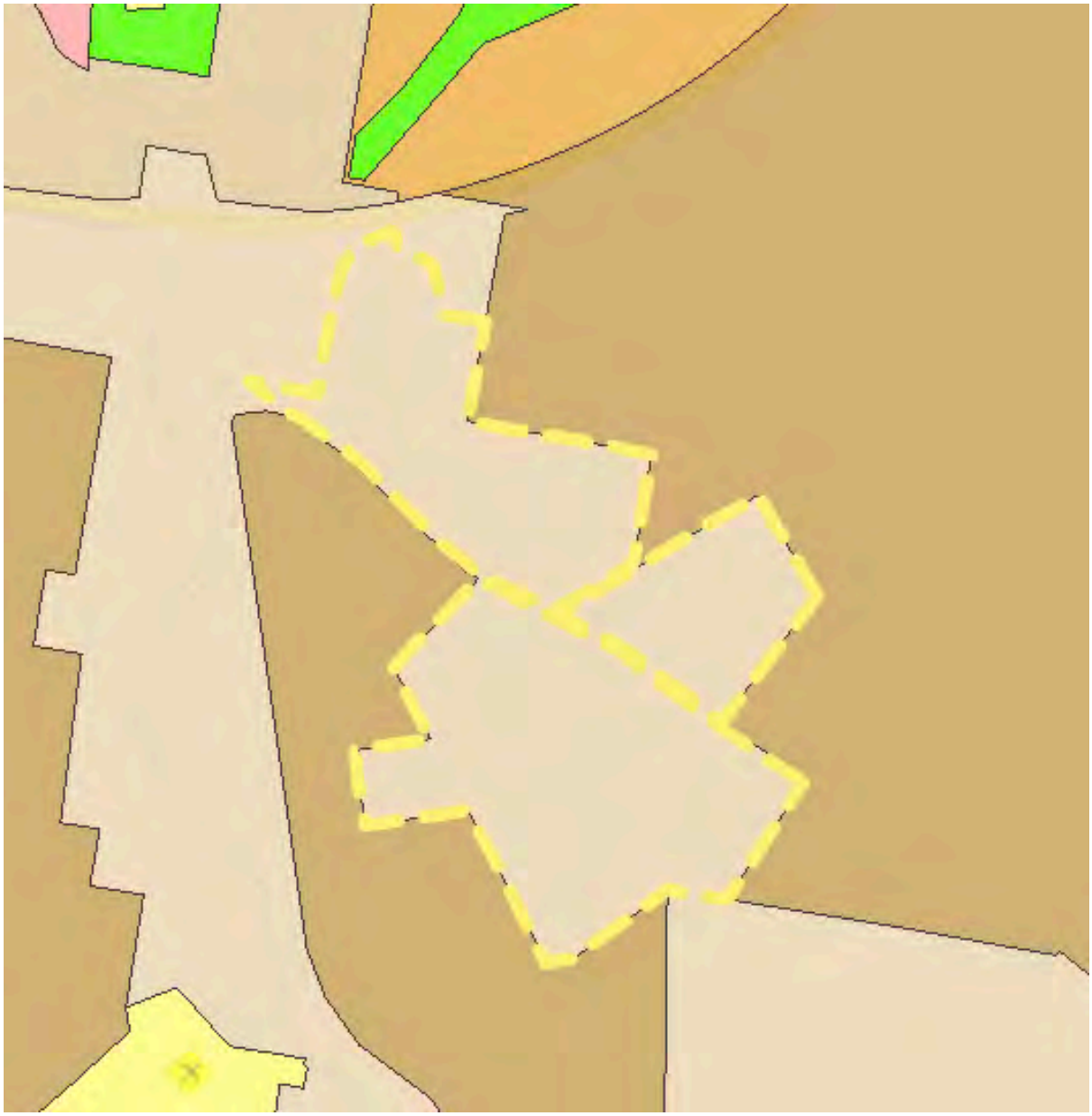

Figure 2. Site and surrounds Zoning layer (Goulburn township North of site)

The subject site contains no dominant vegetation and is generally described as farmed paddock lands and is currently utilised for low scale cropping (no spray). The subject site contains bushfire prone open plain grasslands and is situated within a blanket Vegetation Category 3 overlay.

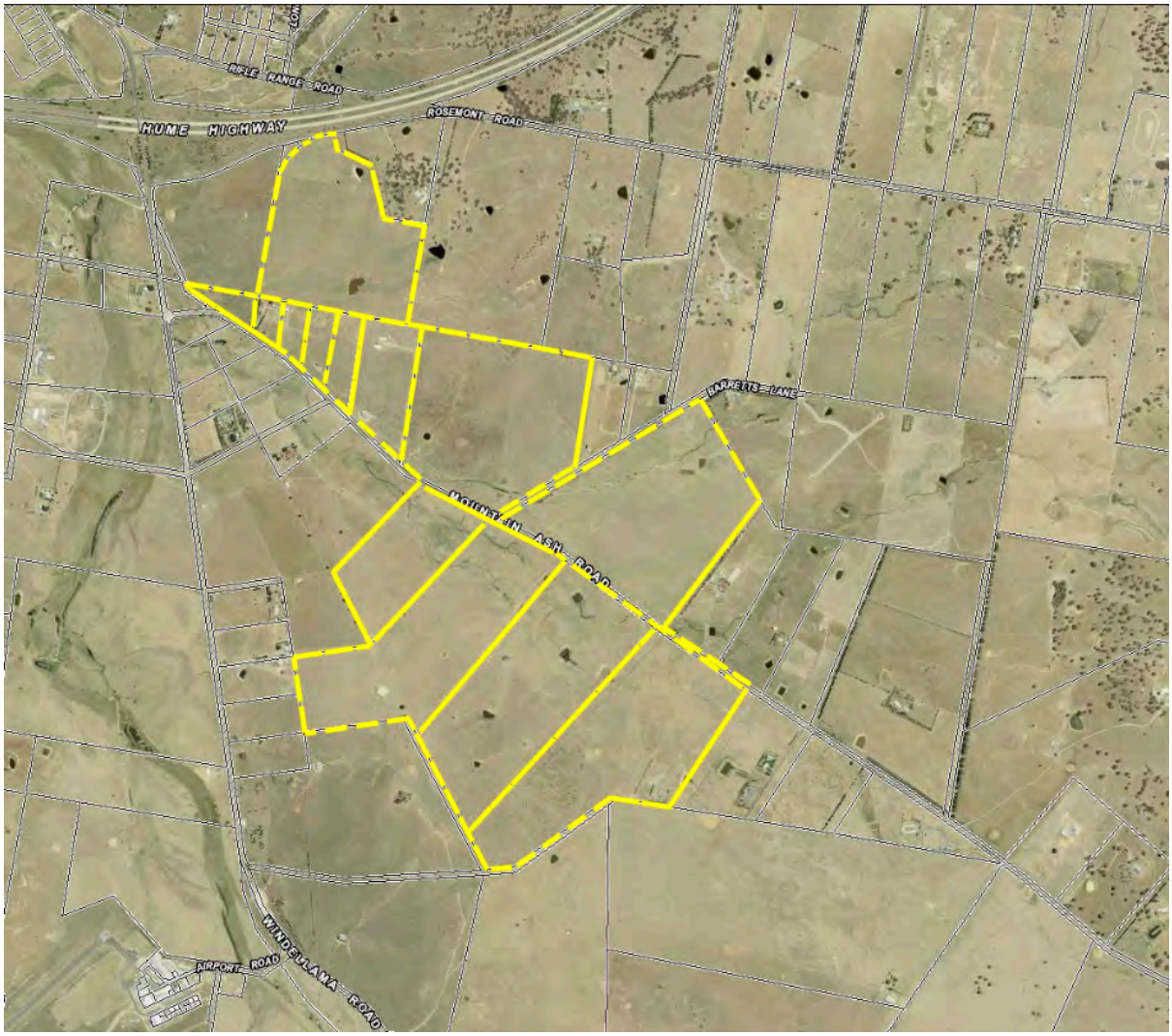

Figure 3. Subject site consisting of thirteen (13) allotments.

The site (Figure 3), comprised of several allotments is improved by dwelling house upon some of these allotments.

The site contains some minor drainage channels which could be classified as 1st, 2nd and 3rd order channels which present physically as heavily scoured drainage paths

containing no permanent water within the drainage channels. The drainage paths have been historically modified for numerous man-made dams.

The site and LGA is included within the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 (ref. Figure 4) as the site's drainage channels are included as part of the SEPPs "Mulwaree River" Sub-Catchment (Map ID Number SEPP SDWC002 20101215). The drainage channels on site meander to the west eventually leading off site to Gundary Creek, which then continues into Mulwaree River. The entire region south of the Hume Highway has been heavily modified and impacted by early European settlement and the locality contains a number of constructed dams in the area (Ref. Figure 3 for aerial).

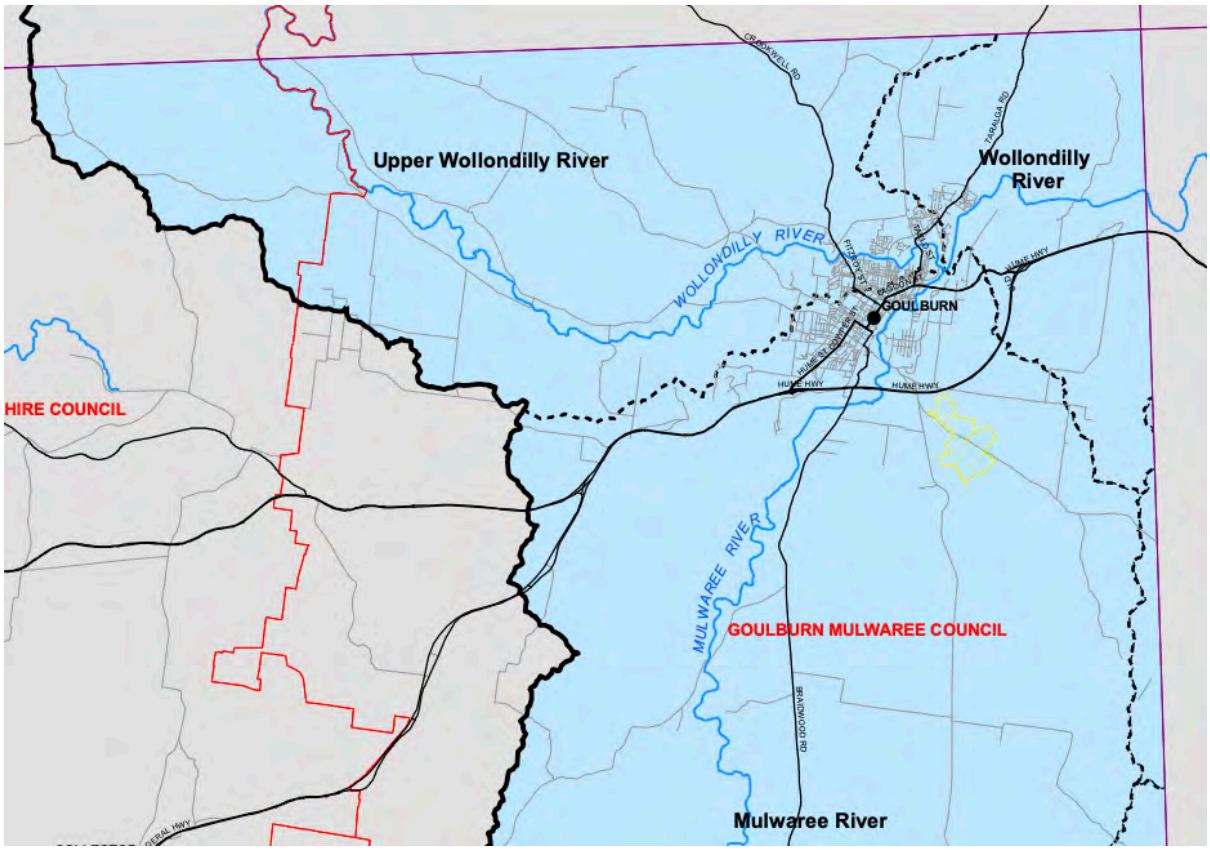

Figure 4. SEPP Sydney Drinking Water Catchment map extract with site location (map ID: SDWC_002)

The planning proposal acknowledges the cultural heritage of the Shire, both Early European and Aboriginal settlement and use of the lands in the Shire. The subject site is not identified as a heritage item nor is located in a heritage conservation area however individual heritage items can be found in close proximity. The most significant site of cultural interest is the 1924 Motor Cycle Grand Prix Memorial. The memorial erected at the start of the 1914 Tourist Trophy Race and 1924 Motor Cycle Grand Prix on Windellama Road is located adjacent to the subject land. A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that the site contains no places or sites of interest upon it, nor within the surrounding locality.

Figure 5. View of the N-W portion (Precinct 1) of the site, looking South along Mountain Ash Road (R).

Figure 6. View N-E being part of Precinct 2 of the site, looking from road reserve on Mountain Ash Road.

Intent & Objective

Part 1

Design Build Instruct Pty Ltd has been commissioned by Windellama Road Pty Ltd & GTSMF Pty Ltd to prepare a Planning Proposal for the subject site. We are seeking to better utilise the unconstrained land of the site for rural residential purposes, supporting

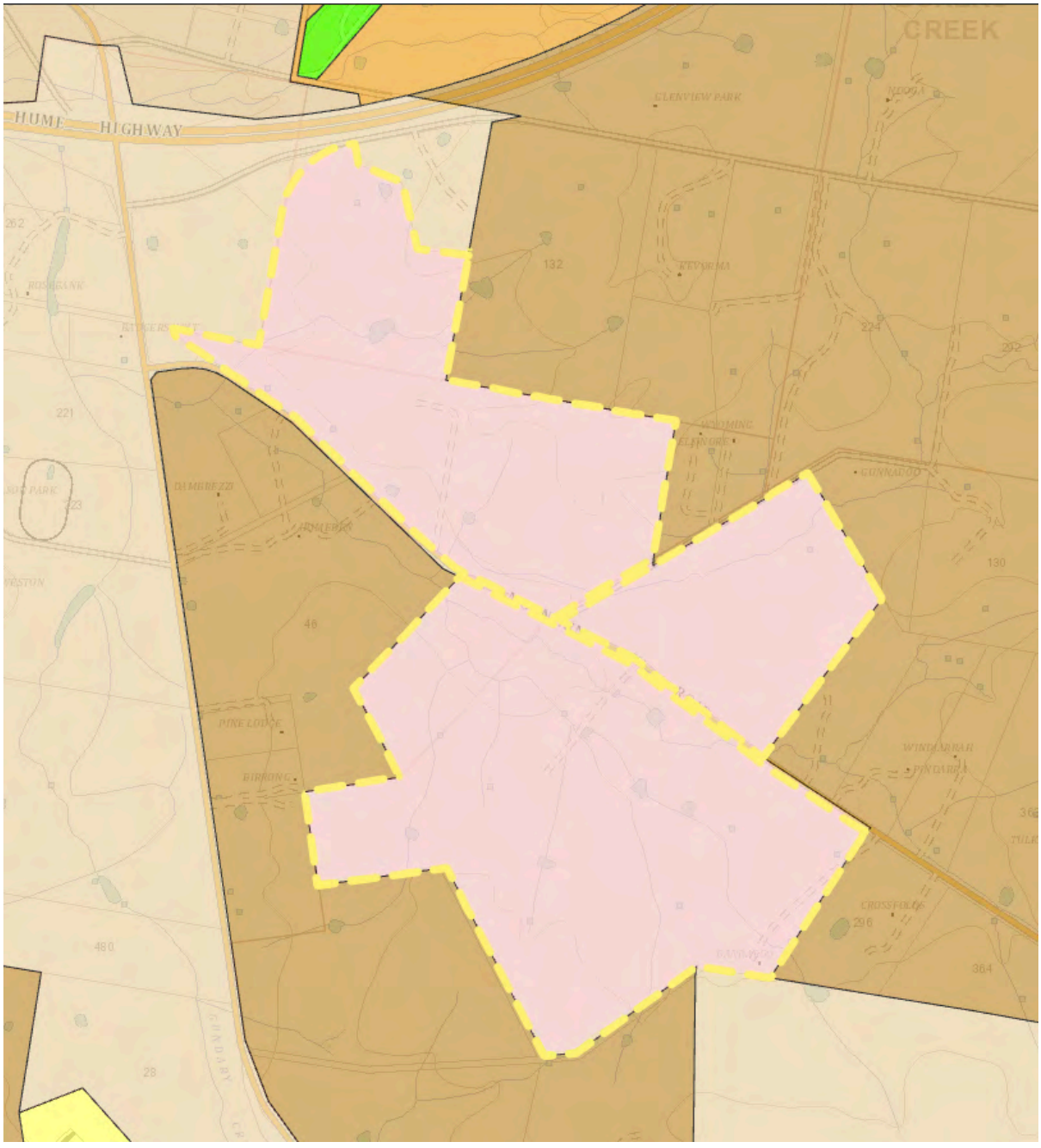

Figure 9. Subject Site Proposed zone to R5 - Large Lot Residential

urban growth of the Goulburn-Mulwaree Shire. In order for this to be achieved, we

Figure 8. Mountain Ash Road Looking S-E.

Figure 7. Mountain Ash Road Looking N-W.

submit this information seeking the council support for a Planning Proposal to amend the *Goulburn-Mulwaree Local Environmental Plan 2009* (LEP).

We are seeking to amend the LEP per s3.33(2) of the *Environmental Planning and Assessment Act 1979* in order to rezone the subject site from RU1 to an appropriate combination of suitably sized R5 Large Lot Residential Precincts, consistent with the State Government's South East and Tablelands Regional Plan 2036, Council's Local Strategic Planning Statement, and Goulburn Mulwaree Urban and Fringe Housing Strategy.

It is our belief that Goulburn and the wider region's population is increasing at a significantly quicker rate than was projected.

- Mayor Bob Kirk
Goulburn Post Article 6 July 2021

The proposal has been developed as three (3) Precincts characterised by road boundaries and whole contained within Precinct 10 of the Urban and Fringe Housing Strategy. The precincts are:

- Precinct 1 - Adjacent Mountain Ash Road and North of Barretts Lane.
- Precinct 2 - South of Barretts Lane and East on Mountain Ash Road
- Precinct 3 - South- west of Mountain Ash Road.

Proposal Plans aiding in the assessment of this report are identified as Attachment 3.

Explanation of Provisions

Part 2

In order to carry out the intent of this proposal, it is considered the following matters would require attention to suit the desired outcome of this proposal. We consider amendment to the clause 1.7 Maps of the *Goulburn Mulwaree Local Environmental Plan 2009* as the only clause requiring change to the LEP and these map-specifics are as follows:

- Land Zoning Map with reference for the allotments identified as the subject site change to R5 Large Lot Residential Zone upon:
  - Land Zoning Map - Sheet LZN 001
  - Land Zoning Map - Sheet LZN 001E
- Subsequent map changes as a result of the zoning change to R5 will also need to occur. This includes but is not limited to the following:
  - Lot Size Map - Sheet LSZ_001
  - Lot Size Map - Sheet LSZ_001E
  - Terrestrial Biodiversity Map - Sheet BIO_001

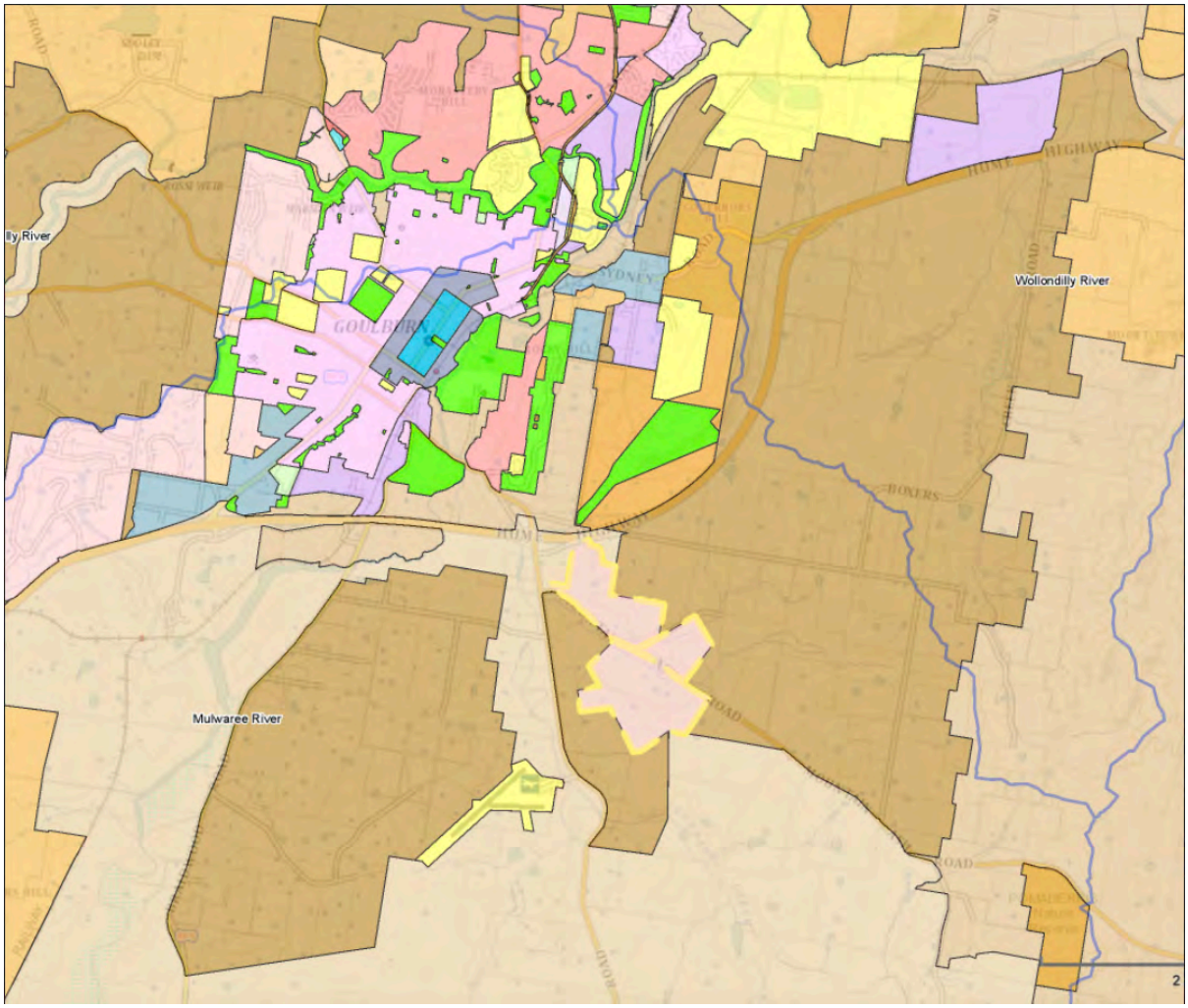

Figure 10. Locality Snapshot - Subject Site Proposed zone to R5 - Large Lot Residential

Justification

Part 3

In order to proceed with the proposal and the support of council and toward Gateway endorsement, necessary justification is required to be provided for the Planning Proposal. There are a number of supporting reports including the Regional Plan, Local Strategic Planning Statement and Goulburn Mulwaree Urban and Fringe Housing Strategy which procedurally outline the subject site as necessary for rezoning to R5 lands to support the growth of the community particularly with the regional growth experienced due to COVID19 inter-state and regional internal migration changes.

Goulburn is a thriving regional city incredibly rich in heritage, contemporary services and natural beauty ... All this, just two hours from Sydney, an hour from Canberra and just under two hours to the coast.

- Goulburn Australia

Q1. Is the planning proposal a result of an endorsed local strategic planning statement, strategic study or report?

The subject site is included within the Goulburn Mulwaree Urban and Fringe Housing Strategy and also the council's local strategic planning statement. These documents also reflect the South East and Tablelands Regional Plan 2036. Compliance with these strategies and extrinsic material is provided as follows.

The South East and Tablelands Regional Plan 2036

The NSW Government has established a regional plan for the area being the ***South East and Tablelands Plan 2036***. The regional plan includes a number of directions for the region including local government narratives. The population of the region is projected to increase by a minimum of 45,450 people between 2016 and 2036. With these figures likely to dramatically increase with the COVID-19 related exodus and intra-regional migration of Sydney based families into the regions. Providing for better lifestyles whilst maintaining employment opportunities locally is key to the success of Goulburn's growth.

The Key Priorities outlined in the Local Government Narrative for Goulburn Mulwaree identified in the Plan (Pg. 61) related to the delivery of housing and supporting growth are to:

- diversify the housing market to respond to demographic change and pre-empt housing affordability pressures
- promote successful adaptive heritage re-use opportunities and conserve the area's unique built heritage
- encourage design innovation and quality outcomes to complement the natural and built heritage with modern architecture.

- Strengthen relationships and opportunities with Western Sydney and Canberra to grow the local economy.

There are four goals in the Plan aimed at achieving the vision of building resilient and sustainable communities by balancing growth opportunities with protecting the region's diverse environment and lifestyles. The goals are supported by a number of directions and actions. The goals are:

Goal 1: A connected and prosperous economy
Goal 2: A diverse environment interconnected by biodiversity corridors
Goal 3: Healthy and connected communities
Goal 4: Environmentally sustainable housing choices

The following Goals and directions applicable to the Planing Proposal are provided as follows.

Goal 1: A connected and prosperous economy

Direction 1: Leverage access to the global gateway of Canberra Airport

Canberra's Airport provides direct access to New Zealand and Asia. Providing additional rural residential housing opportunities within Goulburn with such readable access to International cultures presents a much greater opportunity for residents to grow their base within the Goulburn locality, whilst expanding in to Asian markets both economically and culturally.

Relative easy of access to an international airport also offers visitors from these locations to visit local tourist areas. An opportunity to visit regional areas opens availability for families who may wish to relocate for a better lifestyle than the large city environments.

It is therefore considered that this planning proposal bolsters opportunity to relocate from higher density areas from both intra-regionally and international areas which therefore helps to leverage multiple opportunities for residents and future residents within the planning proposal able to provide opportunity to future residents to take advantage of this global gateway.

This planning proposal is consistent with Direction 1.

Direction 4: Leverage growth opportunities from Western Sydney

This direction discusses the Western Sydney area as Australia's third largest economy with greater jobs that Perth and Adelaide. It seeks to capitalise on this by promoting business opportunities in the Tablelands and hence a greater provision of living opportunities and typologies needs to be in place to support such growth.

It is considered this proposal presents great opportunity for people relocating form Western Sydney to work locally or travel to Sydney to work and maintain an enviable lifestyle. The Rural Residential allotments provide greater space than what they would normally be used to living in the Sydney Shires, and hence quality of life and mental health both improve in relocating to the Goulburn Shire.

This planning proposal is consistent with Direction 4.

Goal 2: A diverse environment interconnected by biodiversity corridors

Direction 18: Secure water resources

The proposal, and entire shire of Goulburn-Mulwaree is included within an overlay for the Sydney Water Catchment. And hence is within the SEPP requirements. The subject site is currently presented as open plains with one-hundred plus year old heavily scoured drainage paths traveling the site toward the eventual discharge of Mulwaree River.

The ability to improve the land for rural residential lifestyle allotments, improves the drainage standards which ultimately improves the ability to capture and transport water resources from the tablelands and provide to an improved standard, which ultimately improves the surrounding environment as well as water quality objectives.

This planning proposal is consistent with Direction 18.

Goal 3: Healthy and connected communities

Direction 22: Build socially inclusive, safe and healthy communities

The planning proposal has been presented in three precincts which provides opportunity for improved infrastructure in the provision of suitable roads, bicycle paths, stormwater drainage and electrical and communication standards. Being situated on the fringe of the city of Goulburn, the proposal offers a number of transport methods to access the city centre (less than 2km). Improving lifestyles in the rural residential setting and promoting social inclusion given proximity to the city centre, the proposal provides support for healthy communities to grow.

This planning proposal is consistent with Direction 22.

Goal 4: Environmentally sustainable housing choices

Direction 24: Deliver greater housing supply and choice

The city of Goulburn, established during the 1830s has a long and defined structure for housing a low density residential setting, with more recent medium density living opportunities in the city centre. The spread for housing in the city is well catered for smaller dwelling typologies.

This planning proposal provides large lot residential sized blocks within 2km of this city centre, which at a minimum of 4000m^2 provides greater housing choice and supply for Goulburn.

This planning proposal is consistent with Direction 24.

Direction 25: Focus housing growth in locations that maximise infrastructure and services

The planning proposal is proposed within an area allocated within council's growth urban and fringe housing strategy, as Precinct 10, identified and studied to be suitable of rural residential development. The proximity to the city centre, relative ease of open plain terrain, provides positive cost effective improvements to infrastructure for the shire both in the immediate vicinity to the subject site for servicing, as well as shire wide improvements under a contribution policy.

This planning proposal is consistent with Direction 25.

Direction 28: Manage rural lifestyles

Having a ready supply of well located land for residential development will create downward pressure on house prices, maximise the use of existing infrastructure and protect environmentally sensitive areas. The proposal also provides necessary upgrades to infrastructure for the community through the contribution policies and capital works program of council.

It's all about balance and in Goulburn, you'll get a great work/life balance ... That means more time for family, friends and recreation. More time to live.

- Canberra Region

Latest ABS Statistics demonstrate that in 2020 the local population was 31,554 an increase almost 1.5 times the rest of regional NSW with the previous 10 year horizon including an additional 3900 people moving to the shire (Source: Australian Bureau of Statistics, Regional Population Growth, Australia (3218.0)).

The local government Narratives for the Goulburn-Mulwaree Shire states:

> *As Australia's first inland city, Goulburn is a strategic centre rich in heritage, contemporary services and natural beauty. Goulburn and its surrounding towns and villages combine an easygoing lifestyle and city accessibility.*

The plan continues that Goulburn provides:

> *a better cost of living and proximity to Canberra and Sydney, with easy access to the South Coast and the Snowy Mountains, attract new residents. Goulburn-Mulwaree's population is projected to increase by at least 4,700 people by 2036, requiring more than 3,000 new dwellings.*

The list of priorities for the locality all aim to further strengthen our first inland city as an enviable place to live and build businesses.

This Planning proposal is situated upon the edge of the Goulburn township with readable access to the Hume Highway connecting Canberra and Sydney. Given new movements in remote working as a requirement of COVID-19 restrictions, the planning

proposal provides opportunity to assist with economic and employment opportunities aligning with the following priority under the Local Government Narratives.

- *diversify the housing market to respond to demographic change and pre-empt housing affordability pressures*
- *promote successful adaptive heritage re-use opportunities and conserve the area's unique built heritage*
- *encourage design innovation and quality outcomes to complement the natural and built heritage with modern architecture.*
- *Strengthen relationships and opportunities with Western Sydney and Canberra to grow the local economy.*

These Local Government Narratives reflect the previously listed Goals and Directions of the Regional Plan for the Shire. It has been demonstrated the planning proposal is consistent with these goals and hence carrying with it the implicit requirement to support the priorities in housing, economy and employment for the shire.

The planning proposal promotes, supports and actions the local government narratives of the South East and Tablelands Regional plan.

This planning proposal is consistent with Direction 28.

Council have with the support of DPIE endorsed the Goulburn-Mulwaree Urban and Fringe Housing Strategy for the shire. Of which the subject site is situated within Precinct 10 of the Strategy.

Combined with the council's Operational Plan, Local Strategic Planning Statement, and the South East and Tablelands Regional Plan 2036, these primary documents provide support for the subject site to provide part of the much needed housing for continued growth of the area. An enviable location between Canberra and Sydney.

At the time of drafting this proposal the council has the following documents of interest for this planning proposal with a response to relevant items following.

1. Operational Plan 2021/22 and Delivery Program 2017/22
2. Local Strategic Planning Statement
3. Goulburn Mulwaree Urban and Fringe Housing Strategy

Operational Plan 2021/22

The Goulburn-Mulwaree Shire's Operational Plan 2021-2022 adopted 15 June 2021 is used to steer the council's operations, budget and delivery program over an extended (covid) five (5) year period. The plan includes a number of areas for the shire including of relevance to this Planning Proposal. The plan includes five strategic pillars. These are:

- Our Environment
- Our Economy
- Our Community
- Our Infrastructure
- Our Civic Leadership

Each pillar contains a number of strategies with delivery program actions, activities and scales for success. The strategies relevant for the planning proposal are provided herein with respect to the planning proposal's ability to reflect the actions sought within the Operational Plan which reflect the objectives of the Community Strategic Plan (CSP).

Our Environment

CSP Strategy EN1

Protect and enhance the existing natural environment including flora and fauna native to the region

Delivery Program Action	Activity	Measure	Compliance
EN1.2 Review and monitor Local Environmental Plan and Development Control Plan	EN1.2.1 Undertake reviews as set out in the Strategic Planning Program	Ongoing – currently implementing recommendations from Local Strategic Planning Statement (LSPS, Urban and Fringe Housing Strategy (UFHS), Employment Lands Strategy (ELS) and Social Sustainability Strategy & Action Plan (SSS AP)	✅ This Planning Proposal seeks to implement the LSPS and UFHS strategies with the provision of additional suitably identified R5 Large Lot Residential lands within Precinct 10 of the Strategy.

CSP Strategy EN4

Maintain a balance between growth, development and environmental protection through sensible planning

Delivery Program Action	Activity	Measure	Compliance
EN4.2 Review and monitor the Local Environmental Plan and Development Control Plan	EN4.2.2 Undertake Urban and Fringe Housing Strategy (UFHS)	Implementation of Strategy Recommendations commenced.	✅ Commencement of UFHS Strategy Recommendations is via this Planning Proposal which is consistent with Precinct 10 recommendations.

Our Economy

CSP Strategy EC1

Capitalise on the region's close proximity to Canberra and its position as a convenient hub to South East Australia to attract industry and investment

Delivery Program Action	Activity	Measure	Compliance
EC1.1 Implementation of the Goulburn Australia Marketing Campaign and associated activities to attract new residents, new industry and investment	EC1.1.1 Implement Goulburn Australia campaign activities	Ongoing campaign implementation activities; Data collection	✅ This Planning Proposal provides within Precinct 10 of the UFHS the lands necessary to attract new residents which in turn supports the goals of the Goulburn Australia Marketing Campaign. The location of the subject site provides easy access to Hume Highway (Canberra/Sydney) and located less than 1.2km from the city centre.

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Our Community

CSP Strategy CO5

Maintain our rural lifestyle

Delivery Program Action	Activity	Measure	Compliance
CO5.1 Review and monitor Local Environmental Plan (LEP) and Development Control Plan (DCP)	CO5.1.1 Update planning controls reflecting community expectations as required	Ongoing	✅ The inclusion of the UFHS, LSPS and Regional Plan identifying the lands within this Planning Proposal solidify these lands and the surrounding Goulburn fringe lands for rural residential use, and beyond that, for the continued agricultural pursuits. This clear delineation provides strength for both typologies and activities to exist without any negative implications.

CSP Strategy IN2

Improve public transport links to connect towns within the region and increase access to major centres

Delivery Program Action	Activity	Measure	Compliance
IN2.1 Maintain and upgrade GMC regional road network	IN2.1.1 Complete rehabilitation and upgrade works on Regional Roads.	Completion of annual Capital and Maintenance works attributed to Block Grant and RRRP funding	✅ Proceeding with this planning proposal will result with the improvement of Mountain Ash Road and Windellama Road (refer Figure 7 and Figure 8) for the establishment of a new rural residential estate. Additional funding is also raised with the development assessment process. With these works, comes improvements for amenity and for all council assets under a contribution policy and capital works program with various improvements for infrastructure and other vegetation improvements presenting an aesthetically pleasing and low scale relaxing rural residential environment for residents to enjoy.
	IN2.1.2 Complete roadside vegetation management program on Regional Roads	Completion of annual Maintenance programs attributed to Block Grant funding.	

This Planning Proposal provides actions and goals in alignment with councils Operational Plan 2021/22.

Local Strategic Planning Statement

The Goulburn-Mulwaree Shire's Local Strategic Planning Statement (LSPS) was adopted by Council 29 September 2020. The document sets out planning priorities consistent with our strategic planning documents such as the Tablelands Regional Community Strategic Plan, Regional Economic Development Strategy, and South East and Tablelands Regional Plan along with Council's own strategic framework.

The LSPS includes ten (10) planning priorities for the Shire which are considered critical to achieve the vision for the shire. These priorities are cited herein with information as to how this planning proposal supports, actions, or implements each priority. The planning principles are broad and range from various matters which may or may not relate to the

planning proposal. The priorities that are applicable have been cited and a response provided under each priority.

1. Infrastructure

The vision for this priority is:

Infrastructure meets the needs of a growing community

With all development in any shire of NSW, costs for infrastructure not already covered under a capital works program or by other funding mechanisms are born by the developer. This planning proposal will provide improvements to Mountain Ash Road and Windellama Road for the establishment of a logically sequenced new rural residential estate.

Planning Principle: New development and planning decisions provide for adequate infrastructure (water, sewerage, stormwater management) to accommodate new development.

With the works associated with subsequent development of Precinct 10 (the subject site), comes improvements for all associated civil services and inherently improvements to amenity provisions. With various improvements for infrastructure and other vegetation improvements present an aesthetically pleasing and low scale relaxing rural residential environment for the community to enjoy.

2. City, Town and Village Centres

The vision for this priority is:

Vibrant, accessible town centres which provide a range of services to meet the community's needs.

Challenge: Maintaining Goulburn's CBD as the main retail precinct in Goulburn, whilst also ensuring that new essential retail services are also provided within walking or riding distance of new residential areas on the outskirts of Goulburn.

The site of the planning proposal is positioned within 2km from the city centre. This affords alternative transport modes to access the CBD for example via bicycle. With renewed interest in the Precinct 10 locality brings with it renewed opportunities to strengthen the CBD retail centre with new employment and business opportunities through new ideas by existing and new residents moving to the locality.

3. Community Facilities, Open Space and Recreation

The vision for this priority is:

Physical, social and cultural activity is supported by a range of facilities and shared spaces.

Planning Principle: Ensure new subdivisions and development includes open space using both natural systems such as riparian corridors and areas for active recreation use and provides pedestrian cycle connectivity to existing footpath and cycleway networks.

Within the areas of proposed precinct 2 and 3 there are larger allotments which cater for defined flood events. These areas during the DA stage could be modified and utilised for open space and civil stormwater purposes. This would provide additional open space areas within the locality for active recreational use.

4. Housing

The vision for this priority is:

A range and diversity in housing type, which is contextual and affordable and is primarily centred around Goulburn and Marulan.

Planning Principles:

Goulburn continues to be the focus of housing growth for the region.
Ensure that residential development is supported by relevant infrastructure.

The subject site is included within the Urban and Fringe Housing Strategy as Precinct 10 and is situated within 2km of Goulburn. Due to its close proximity the site is capable of providing infrastructure improvements for the area and future land holders.

5. Primary Industry

The vision for this priority is:

Primary resource land is a valued asset; and primary industry is a significant economic sector within the LGA which contributes to positive environmental and social outcomes.

Planning Principle: Ensure local planning provisions provide adequate protection for primary industry activities while also balancing the interests of the community.

The subject site has been identified within council's Urban and Fringe Housing Strategy as being suitable for Rural Residential development. This demonstrates the site has been researched and hence identified to support the continued growth of the city of Goulburn without impacting on Primary Industry activities which occur in the outer localities of the shire.

6. Industry and Economy

The vision for this priority is:

Local industry provides for the employment needs of the region within a thriving and diversified economy which is resilient to change.

Actions - Council General: Promote our competitive advantages to businesses considering relocating or struggling with high operating costs and overheads in Sydney, particularly industries leaving Sydney due to second airport and growth western Sydney/Sydney generally.

This planning proposal directly supports this action in providing the much needed housing for the Shire to cater for individuals and families looking to relocate and operate businesses locally and remotely.

7. Sustainability

The vision for this priority is:

A sustainable environment which utilises best practice to minimise waste and maximise renewables.

Planning Principle:

Incorporate best practice energy, water and waste management in new development.
Building design is to be resilient to extremes of climate.

Rural Residential sized allotments provide opportunity for best practice waste management systems, as well as water collection and storage initiatives. In today's climate the majority of new housing always results with the provision of solar energy, hence my virtue of the planning proposal, future housing will enable best use of renewable resources to suit the locality and greater shire.

8. Natural Hazards

The vision for this priority is:

Natural hazards are identified, planned for and mitigated where possible throughout the planning process.

Planning Principle: Identification and mitigation of vulnerabilities to natural hazards is incorporated into planning provisions

The Planning Proposal has provided a development layout that has considered the natural environment including such risks due to flood, drought, and bushfire. The size, orientation and location of the allotments and carriageways has been designed to cater for defined flood events, to reduce risk to property and life, and also identified separation distances for APZs to be provided for bushfire risks as well as provision with infrastructure upgrades to secure reticulated water supply to avoid potential drought scenarios and in lieu on site storage of water and firefighting tanks. Not only will these hazards be further assessed at gateway, however in more detail during the development assessment process.

9. Heritage

The vision for this priority is:

Goulburn Mulwaree's cultural heritage is conserved, actively adapted for use (where appropriate) and celebrated.

Challenge: Ensuring the promotion of heritage as an opportunity rather than constraint to development.

The planning proposal acknowledges the cultural heritage of the Shire, both Early European and Aboriginal settlement and use of the lands in the Shire. The subject site is not identified as a heritage item nor is located in a heritage conservation area however individual heritage items can be found in close proximity. The most significant site of cultural interest is the 1924 Motor Cycle Grand Prix Memorial. The memorial erected at the start of the 1914 Tourist Trophy Race and 1924 Motor Cycle Grand Prix on Windellama Road is located adjacent to the subject land. An AHIMS search was also carried out for the planning proposal and there were no known results returned.

10 Natural Environment

The vision for this priority is:

Protection and enhancement of the quality of natural environments and systems.

Action: Locate, design, construct and manage new developments to minimise impacts on water catchments, including downstream impacts and groundwater sources.

This planning proposal has identified a Neutral or Beneficial Effect (NorBE)on the water quality attributed to and via the drainage channels of the land. It is considered these values will be further upheld during the detailed design phase for civil engineering providing a clear improvement in water quality above the no worsening standards adopted elsewhere. Particularly with reduction in siltation from the heavily scarred and scoured drainage paths which traverse the site with improvements to stormwater drainage through these areas.

Goulburn Mulwaree Urban and Fringe Housing Strategy

The subject site is situated within the strategy as Precinct 10 Mountain Ash and provides the following recommendations for the Precinct:

The strategy included that "The majority of vegetation in the precinct has been removed for agricultural purposes and is therefore significantly disturbed and represents low ecological value."

Further details in relation to this strategy are discussed further under Q4.

Recommendations

- Rezone the land that is least constrained by topography and environmental constraints to a Large Lot Residential zone.
- Amend GMLEP to address anomalies in split zone created by Highway.
- Priority – High

Excerpt: Precinct 10 Recommendations

Q2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

The planning proposal is reflected within the Goulburn Mulwaree Urban and Fringe Housing Strategy. With the intended design layout the proposal also adoptions the council's operational plan objectives and ultimately supports the state governments regional plan.

The proposal is demonstrated via various extrinsic material and council strategies which implies the land as proposed is the best possible use to support the ongoing needs of the community providing housing diversity with readable access to the city centre or further afield on the Hume Highway.

It is considered this planning proposal provides the best means of achieving the outcomes desired of the State and council.

Q3. Will the planning proposal give effect to the objectives and actions of the applicable regional, or district plan or strategy (including any exhibited draft plans or strategies)?

As identified within response to Question 2, the planning proposal reflects the objectives and actions of the South East and Tablelands Regional Plan as well as the council's Local Strategic Planning Statement and Urban and Fringe Housing Strategy. These are further under the following section.

Q4. Will the planning proposal give effect to a council's endorsed local strategic planning statement, or another endorsed local strategy or strategic plan?

Snapshot: The proposal is consistent with and supports council's Local Strategic Planning Statement and Urban and Fringe Housing Strategy objectives and goals. Reflected as Precinct 10, the objectives of the LSPS and Strategy are fulfilled with logical extension to the city centre for rural residential lifestyle lots.

Local Strategic Planning Statement

The Goulburn-Mulwaree Shire's Local Strategic Planning Statement (LSPS) was adopted by Council 18 August 2020. The Statement sets out the 20 year visions, objectives and planning priorities for land-use in the local area. A detailed response of the LSPS was provided in response to Question 1.

Goulburn Mulwaree Urban and Fringe Housing Strategy

The subject site is included within the strategy as a site suitable for rezoning for rural residential use. The strategy provides within the **Housing Demand** section that *"It is estimated that an additional 3,359 dwellings will be required to meet demand to 2036."* The Regional Plan also reflects this requirement providing that the "*population is projected to increase by at least 4,700 people by 2036, requiring more than 3,000 new dwellings.*" Noting that this was written pre COVID19, and the reality of intra-regional migration which is already occurring to the shire, we consider this estimate to realistically be conservative.

This is evident with the improved remote working conditions from NSW Government organisations and other industry corporations affording greater flexibility in employment location opportunities as an outcome of the pandemic. What this means is that there has been, from both Melbourne and Sydney, a large exodus of residents moving away from these heavily affected areas, and into regional locations such as Goulburn to improve lifestyle and continue to progress with their careers. The remote working conditions have been highly supported and will likely continue well into the future providing the key for the much sought after work/life balance, which thanks to remote employment technology is now better achievable.

The prime location of Goulburn situated between Sydney and Canberra, with recent and ongoing improvements to the Hume Highway and improvements to infrastructure and and facilities has provided the development that has helped to make Goulburn a good place to live, invest and visit. For example, a new Performing Arts Centre, refurbished Regional Art Gallery, Adventure Playground, Wollondilly River Walkway, Aquatic Centre Redevelopment, and War Memorial Museum. This Planning Proposal provides the housing for new residents to enjoy these facilities and in turn continue to grow the economy.

The proposal is reflected within numerous economic development drivers at the State, Regional and Local level. Positioned on the fringe of the city, with readable access to Canberra or Sydney via Hume Highway and less than two kilometres to the city centre, the proposal provides scope for new residents to enjoy the region and contribute positively to regional growth. The Planning Proposal is aligned with the South East and Tablelands Regional Plan 2036, Council's Operational Plan 2021-22 and Community Strategic Plan. The subject site is highlighted as Precinct 10 within council's Urban and Fringe Housing Strategy, and the Local Strategic Planning Statement and will continue to bolster Goulburn as an enviable place to position families and maintain links to city locations within easy reach, where necessary.

10/11 - Brisbane Grove & Mountain Ash constraints and opportunities

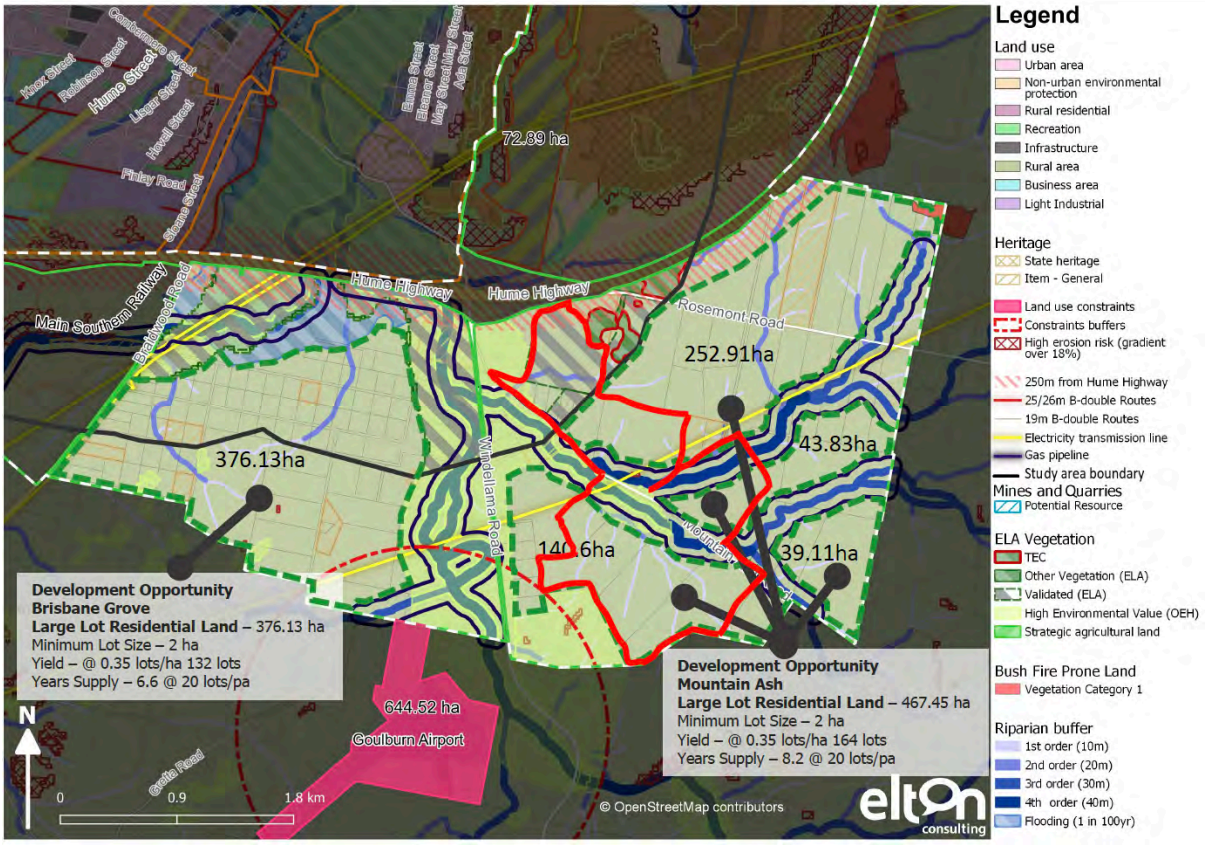

Figure 11. Precinct 10 and 11 constraints and opportunities (site highlighted in red)

Local Housing Strategy Objectives

> *» ensure the timely delivery of suitable residential zoned land to meet the current and future needs of the Goulburn Mulwaree LGA to 2036*

The conservative pre-covid housing speculation within the strategy sighted a need for 195 new dwellings per year for R5 zoned Large Lot Residential Housing within the Goulburn area. However when spreading the load for the 15 year period to 2036 the dwelling number amounts to 313 dwellings per year.

This planning proposal provides scope for a total of 321 allotments with minimum lots sizes at 4000m^2 which spans over Three Precincts and supported by Water NSW's NorBE requirements. This provides clarity that the proponent is able to provide flexibility with the release of land which supports the desires of council and the community in the timely delivery for rural residential lifestyle lots.

The proposal is consistent with this Objective.

> *» ensure growth occurs in a contiguous and logical manner concentrating on the central areas of settlements for medium density and on the fringe of settlements (within the investigation areas) for rural lifestyle lots*

The subject site is situated within the strategy as being suitable for R5 large lot residential housing and is positioned logically adjacent the Hume Highway south-east of the township and 2km from the CBD. Labelled as Precinct 10 Mountain Ash within the Strategy the site provides a contiguous extension of the city for rural residential lifestyle lots, occurring in a logical manner extending away from the city centre.

The proposal is consistent with this Objective.

> *» provide for development that will complement and reinforce existing and future settlement structure, character and uses and allow for the creation of legible and integrated growth*

As with the previous objective, the site is connected to the city and within 2km from the city centre provides a logical settlement structure for rural residential lifestyle lots on the fringe of existing city zones. The location in such close proximity provides an ability for future residents to access locations with varying transport modes such as cycling to employment centres and provides larger lifestyle lots differentiating from low density residential established closer to town, whilst still maintaining close proximity to the city centre.

The proposal is consistent with this Objective.

> *» encourage large lot residential development where opportunity areas are identified in the Goulburn and Marulan Precinct Maps*

This Planning Proposal is for large lot rural residential development within the city of Goulburn, and is supported by the council's Urban and Fringe housing Strategy as Precinct 10.

The proposal is consistent with this Objective.

> » *residential development should avoid areas of environmental significance, significant natural and/or economic resources, potential hazards, high landscape or cultural heritage value, or potential increased risk associated with impacts of climate change*

The design of the planning proposal's precinct layout, has taken into account the surrounding topography, the soil types, and flora and fauna surrounding the locality. It is considered the proposal is consistent with this objective providing a well thought out allotment layout which responds to the needs of the community as well as the natural environment.

The proposal is consistent with this Objective.

Q5. Is the planning proposal consistent with applicable State Environmental Planning Policies?

Snapshot: The proposal is consistent with all applicable SEPPs and LEP. LEP consistency only impact is an amendment to zoning map, minimum lot size map and terrestrial map. Subject Site is in proximity to the township in an enviable location situated adjacent Major arterial road networks for the town connecting Canberra and Sydney (Hume Highway).

SEPP55 Remediation of Land

The site contains some minor drainage channels which could be classified as 1st, 2nd and 3rd order channels which present physically as heavily scoured drainage paths containing no permanent water within the drainage channels. The drainage paths have been historically modified for manmade dams. The site is included within the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 as the site's drainage channels are included as part of the SEPPs "Mulwaree River" Sub-Catchment.

The drainage channels on site meander to the west eventually leading off site to Gundary Creek, which then continues into Mulwaree River. The entire region south of the Hume Highway has been heavily modified and impacted by early European settlement and the locality contains a number of constructed dams in the area. The Goulburn Mulwaree Urban and Fringe Housing Strategy provided in relation to the subject site being precinct 10 that "The majority of vegetation in the precinct has been removed for agricultural purposes and is therefore significantly disturbed and represents low ecological value."

Currently a large area of the site is being used for agriculture which may require the use of fertilisers and possibly pesticides. The planning proposal has the potential to reduce the amount of contaminates that would currently be washed into the existing

depressions and watercourses. The Site & Soil Evaluation undertaken by ACT Geotechnical Engineers P/L (Attachment 2) also included test results for the presence of organochlorine pesticides (OCP) and organophosphorus pesticides (OPP) in three locations. The results of these tests were assessed against the National Environmental Protection Measure (NEPM and were significantly below the required health-based investigation levels for residential development.

Given the results of soils testing, the proposal is considered to be in accordance with the requirements of SEPP55 – Remediation of Land and as the results presented are significantly below health requirements, remediation is unlikely to be required.

The site is therefore considered to be low in risk with regard to contamination and is unlikely to present any concerns for future residents.

SEPP Rural Lands

The Rural Planning Principles outlined in the State Environmental Planning Policy (Rural Lands) 2008 relates to:

a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,
b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,
c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,
d) in planning for rural lands, to balance the social, economic and environmental interests of the community,
e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,
f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,
g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,
h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The SEPP also contains provisions relating to Rural Subdivision Principles and matters for consideration when determining a development application for a rural subdivision.

The planning proposal is consistent with the Rural Lands SEPP in the following terms:

- The proposal facilities rural lifestyle, settlement and housing in close proximity to a major regional centre (approximately 2 km).
- The proximity of the subject land to Goulburn and adjoining land with appropriate minimum lot size provisions will ensure that the proposal will not result in fragmentation of farm land.
- The proximity of the site to Goulburn ensures the proposal will increase compatibility and minimise any potential for land use conflicts caused by intensive agricultural uses.
- The proximity of the subject land to the Hume Highway and network of local roads will minimise the potential for land use conflicts. The ridgeline to the south of the subject land will also assist to reduce any land use conflicts if there was to be any significant intensification of use in the surrounding rural land.
- The planning proposal will have minimal environmental impact on the local biodiversity and water resources.
- The subject site is adequately serviced in terms of electricity, telecommunications, road network and associated services (e.g. school bus and postal services). The proximity to Goulburn will ensure readable access to all the services provided by the City of Goulburn (e.g. health, education, employment, recreational and social etc).

- No significant development of an intensive agricultural or rural industry nature has been approved in close proximity to the subject land. The surrounding rural area is used predominately for rural residential purposes with agricultural activities restricted to grazing or low scale cropping (no sprays).

SEPP Sydney Drinking Water Catchment 2011

This SEPP has three primary aims being:

- To provide for healthy water catchments that will deliver high quality water and permit development that is compatible with that goal
- To ensure that consent authorities only allow proposed developments that have a neutral or beneficial effect on water quality (NorBE)
- To support water quality objectives in the Sydney drinking water catchment.

The SEPP gives effect to Water NSW's current recommended practices and standards, including the practice of referring development applications and planning proposals to Water NSW for concurrence where so required. The SEPP represents a key environmental constraint to the expansion of land for residential development where the site would be reliant on on-site waste treatment. This SEPP also relates to Ministerial Direction 5.2 Sydney Drinking Water Catchment.

The subject site is located within the Sydney Drinking Water Catchment Area. Therefore, concurrence will be required from Water NSW for any proposed development of the site relating to achieving a Neutral or Beneficial Effect (NorBE) in regards to stormwater runoff quality and effluent management.

Discussions were held with the local Water NSW officer regarding the site. The site assessment to achieve NorBE incorporated the application of the department's guidelines particularly the Water Sensitive Design Guide for Rural Residential Subdivisions 2021. The assessment included site inspections to classify the existing watercourses. Furthermore, there were no indications from the inspections of any areas of salinity and/or possible contamination and there was only the one localized area of rock outcrops.

The result of the assessment is that the development site would be able to support onsite effluent management areas within unencumbered lots of 4,000m².

Treatment of Stormwater Runoff

The proposed roads will incorporate table drains which will assist in treating the runoff from the roads. To offset any increase in pollutants in the runoff from the site, it is proposed that tree planting is undertaken along the main watercourses. The widths of planting would be in the order of 10-15m wide and will be fenced. This could also be applied in conjunction with modifying the two 3rd order watercourses within Precinct 3 to create one channel if desired.

Effluent Management

For each lot, an area of up to approximately 2,000m² for an Effluent Management Area (EMA) has been considered in the determination of the proposed lot sizes & layout. A process in accordance with the Water NSW's guidelines 'Water Sensitive Design Guide for Rural Residential Subdivisions' was applied to support this area for an EMA to each lot.

A Site & Soil Evaluation was undertaken by ACT Geotechnical Engineers which included 31 test holes across the proposed development site. The report is included in Attachment 2.

The data from the report was then entered into the WaterNSW's NorBE assessment tool for a number of test locations applying:

- Four bedrooms excluding a spa bath
- Rainwater water supply
- Standard Aerated Wastewater Treatment System (AWTS)
- Sub-surface irrigation for disposal
- Ground water generally >1m deep as none test holes encountered any ground water
- The calculated permeability applied where suitable
- Slope gradients were obtained from the terrain model

The AWTS system was trialed as this would be the most likely cost-effective methodology of wastewater treatment but other treatment systems would also be suitable. A spa bath was included for one of the locations and the required area of treatment was less than 2,000m². The results of the test holes entered into the assessment tool would be indicative of the whole of the site and supported the area of 2,000m² for the EMA's. The proposed lot layout will require some additional refinement during the preparation of a Development Application including identifying the location of table drains to the proposed roads.

The detailed NorBE assessment summaries with the test hole reference number shown on the top left corner is included within attachment 2 of the engineering report.

Given that the result of the assessment is that the development site would be able to support onsite effluent management areas within unencumbered lots of 4,000m² it is considered that the planning proposal provides no risk to the catchment.

The proposal provides per clause 11A of the SEPP that the development will provide a neutral or beneficial effect on the catchment.

Goulburn Mulwaree Local Environmental Plan 2009

Amendment to the clause 1.7 Maps of the *Goulburn Mulwaree Local Environmental Plan 2009* is the only clause requiring change to the LEP and these map-specifics are as follows:

- Land Zoning Map with reference for the allotments identified as the subject site change to R5 Large Lot Residential Zone upon:
  - Land Zoning Map - Sheet LZN 001
  - Land Zoning Map - Sheet LZN 001E
- Subsequent map changes as a result of the zoning change to R5 will also need to occur. This includes but is not limited to the following:
  - Lot Size Map - Sheet LSZ_001
  - Lot Size Map - Sheet LSZ_001E
  - Terrestrial Biodiversity Map - Sheet BIO_001

These maps are required to be updated to reflect the intended zone change from RU1 to R5. Consistency of this planning proposal is evidenced with the intent of the Regional Plan, Local Strategic Planning Statement and the subject site identified as Precinct 10 within the Goulburn Mulwaree Urban and Fringe Housing Strategy.

Q6. Is the planning proposal consistent with applicable Ministerial Directions (s.9.1 directions)?

All of the direction applicable to the Planning Proposal have appropriately been identified within the extrinsic material, being the South East and Tablelands Regional Plan and subsequent documentation adopted by council being the Local Strategic Planning Statement and the Urban and Fringe Housing Strategy. Compliance with these documents has been provided earlier within this proposal, and hence by virtue with the appropriate reflection, the planning proposal achieves the requirements of the ministerial directions. For thoroughness, the directions are cited below with a general response provided.

Direction 1.2 Rural zones

The proposal will not significantly affect the agricultural production value of rural land in the Goulburn Mulwaree area given its close proximity on the fringe of Goulburn City. This has been considered previously during the establishment of the council LSPS and Urban and Fringe Housing Strategy of which the proposal is consistent and the site is proposed for R5 Large Lot Residential land use.

Direction 1.5 Rural lands

The proposal will facilitate the orderly and economic development of rural lands for rural and related purposes by the provisions of rural lifestyle living in close proximity to an existing Regional centre thereby reducing fragmentation of rural lands.

Direction 5.2 Sydney Drinking Water Catchments

The proposal has minimal environmental impact. Compliance with the Neutral or Beneficial Effects (NorBE) test for impact on water quality has been clearly demonstrated with further detailed assessment provided in Attachment 2.

Direction 5.10 Implementation of Regional Plans

The proposal is consistent with the outcomes and actions nominated in the Regional Strategy. The site is located in close proximity to an existing Regional centre.

Q7. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

An Ecological Constraints Analysis (ECA) of the site was undertaken by James Warren and Associates (JWA) Ecological Consultants Pty Ltd. the ECA is included in full as **Attachment 1**. The ECA involved a desktop review, was undertaken to identify any Commonwealth, State and Local environmental constraints that may apply to the subject site. These include, but may not be limited to the following:

- the presence of any Commonwealth, State and/or Locally threatened vegetation / ecological communities;
- the presence of, or likelihood of occurrence of any Commonwealth, State and/ or Locally threatened flora and fauna species; and
- habitat and corridor values at a local and regional scale.

Based on the outcomes of the ECA, any ecological constraints occurring on the subject site were identified to assist in planning for a proposed re-zoning for a rural residential lot development. Ecological constraints were allocated to a category ranging from high to low depending upon the following assessment criteria:

- Presence of significant flora species;
- Presence of significant vegetation communities/ecosystems;
- Presence of significant fauna species and/or their habitat; and
- Recognition of environmental values in planning and policy documents.

Threatened ecological communities (TECs)

Database searches using the Commonwealth PMST revealed that two TECs may occur within 10 km of the subject site:

- Natural temperate grassland of the south eastern highlands – critically endangered; and
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland – critically endangered.

The subject site is characterised by “grassland with lightly scattered timber including remnant stands of Blakely’s Red Gum (Eucalyptus blakelyi)” (Mecone 2019) which has the potential to align with the critically endangered TEC white box-yellow box-Blakely’s red gum grassy woodland and derived native grassland. However, as identified in Mecone (2019), “preliminary ecological assessment was undertaken by Pat Guinane, a Senior Ecologist with Macrozamia Environmental (BAM Assessor Accreditation Number BAAS19018) in July 2019. As part of this assessment, it was concluded that due to the highly modified nature, the subject site did not contain any TECs.

Threatened flora species

Database searches identified 16 threatened species that may occur within 10 km of the subject site. These included 16 species identified using the Commonwealth PMST based on the availability of suitable habitats, of which three species were identified using the

BioNet database. A compiled species list from both database searches is provided in the following Table 8.

Scientific name	Common Name	EPBC Act	BC Act
Acacia bynoeana	Bynoe's wattle	V	
Caladenia tessellata	Thick-lipped spider-orchid	V	
Calotis glandulosa	Mauve burr-daisy	V	
Commersonia prostrata	Dwarf kerrawang	E	
Diuris aequalis	Buttercup doubletail	E	E
Dodonaea procumbens	Trailing hop-bush	V	
Eucalyptus aggregata	Black gum	V	
Lepidium hyssopifolium	Basalt pepper-cress	E	
Leucochrysum albicans subsp. Tricolor	Hoary sunray	E	
Pomaderris delicata	Delicate pomaderris	CE	CE
Pomaderris pallida	Pale pomaderris	V	
Prasophyllum petilum	Tarengo leek orchid	E	
Rhizanthella slateri	Eastern underground orchid	E	
Rutidosis leptorhynchoides	Button wrinklewort	E	E
Swainsona recta	Small purple-pea	E	
Thesium australe	Austral toadflax	V	

EPBC Act - Commonwealth Environment Protection Biodiversity and Conservation Act 1999
BC Act – New South Wales Biodiversity Conservation Act 2016
Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened
Note: conservation status is only listed for those species identified during the database search. As a result, some species not identified using one database may still be listed as threatened.

TABLE 8. RECORDS OF LISTED THREATENED FLORA SPECIES WITHIN 10 KM OF THE SITE

Threatened Fauna Species

Database searches identified 28 threatened species that may occur within 10 km of the subject site. These included 20 species identified using the Commonwealth PMST based on the availability of suitable habitats, and 11 species recorded using the BioNet database.

A compiled species list from both database searches is provided in TABLE 9. Species that rely heavily on large permanent waterbodies and will clearly not occur on the subject site have been omitted e.g. Macquarie perch (Macquarie australasica).

Scientific name	Common Name	EPBC Act	BC Act
Amphibians			
Litoria aurea	Green and gold bell frog	V	E
Birds			
Anthochaera phrygia	Regent honeyeater	CE	CE
Botaurus poiciloptilus	Australasian bittern	E	
Calidris ferruginea	Curlew sandpiper	CE	
Daphoenositta chrysoptera	Varied sittella		V
Falco hypoleucos	Grey falcon	V	
Falco subniger	Black falcon		V
Grantiella picta	Painted honeyeater	V	
Haliaeetus leucogaster	White-bellied sea-eagle		V
Hieraaetus morphnoides	Little eagle		V
Hirundapus caudacutus	White-throated needletail	V	
Lathamus discolor	Swift parrot	CE	
Polytelis swainsonii	Superb parrot	V	
Rostratula australis	Australian painted snipe	E	
Insects			
Synemon plana	Golden sun moth	CE	
Mammals			
Chalinobolus dwyeri	Large-eared pied bat	V	
Dasyurus maculatus (SE mainland population)	Spotted-tail quoll	E	
Falsistrellus tasmaniensis	Eastern false pipistrelle		V
Micronomus norfolkensis	Eastern coastal free-tailed bat		V
Miniopterus australis	Little bent-winged bat		V
Miniopterus orianae oceanensis	Large bent-winged bat		V
Petauroides volans	Greater glider	V	

Petrogale penicillata	Brush-tailed rock wallaby	V	
Phascolarctos cinereus	Koala	V	
Pseudomys novaehollandiae	New Holland mouse	V	
Pteropus poliocephalus	Grey-headed flying-fox	V	V
Reptiles			
Aprasia parapulchella	Pink-tailed worm-lizard	V	
Delma impar	Striped legless lizard	V	
EPBC Act - Commonwealth Environment Protection Biodiversity and Conservation Act 1999 BC Act – New South Wales Biodiversity Conservation Act 2016 Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened **Note:** conservation status is only listed for those species identified during the database search. As a result, some species not identified using one database may still be listed as threatened.			

TABLE 8. RECORDS OF LISTED THREATENED FLORA SPECIES WITHIN 10 KM OF THE SITE

Migratory species

Database searches using the Commonwealth PMST identified 12 migratory species that may occur within 10 km of the subject site based on the availability of suitable habitat.

Migratory species identified in database searches are listed in Table 9. Species that are heavily reliant on marine / large wetland environments and will clearly not occur on the subject site have been omitted.

Scientific name	Common Name	Status
Apus pacificus	Fork-tailed swift	-
Adrea alba	Great egret	-
Ardea ibis	Cattle egret	-
Haliaeetus leucogaster	White-bellied sea-eagle	-
Hirundapus caudacutus	White-throated needletail	V
Lathamus discolor	Swift parrot	CE
Merops ornatus	Rainbow bee-eater	-
Monarcha melanopsis	Black-faced monarch	-
Motacilla flava	Yellow wagtail	-
Myiagra cyanoleuca	Satin flycatcher	-
Pandion haliaetus	Osprey	-

Rhipidura rufifrons	Rufous fantail	-
Conservation status (EPBC Act): CE - Critically endangered, E - Endangered, V - Vulnerable		

TABLE 9. RECORDS OF COMMONWEALTH LISTED MIGRATORY SPECIES WITHIN 10 KM OF THE SITE

Biodiversity Conservation Act (2016)

In accordance with Section 7.3 of the *Biodiversity Conservation Act* (2016), a 'test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitat' has been undertaken for all listed species/EECs recorded on the site, including threatened fauna predicted to occur over time.

In determining the nature and magnitude of an impact, it is important to consider matters
such as:

- Pre-construction, construction and occupation/maintenance phases;
- All on-site and offsite impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- All direct and indirect impacts;
- The frequency and duration of each known or likely impact/action;
- The total impact which can be attributed to that action over the entire geographic
area affected, and over time;
- The sensitivity of the receiving environment; and
- The degree of confidence with which the impacts of the action are known and understood.

Recovery and threat abatement plans, priorities action statements and threatened species profiles may provide further guidance on whether an action/activity is likely to be significant.

Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species, population or ecological community, or its habitat, then it should be assumed that a significant impact is likely.

Threatened Flora

Based on a lack of suitable habitat and the highly disturbed nature of the subject site, no threatened flora species listed within schedules of the BC Act are considered possible occurrences.

Endangered Ecological Communities (EECs)

No EECs have been recorded from the subject site or are considered a possible occurrence.

Fauna

No threatened fauna species listed within schedules of the BC Act are considered possible occurrences due to an absence of suitable habitat types and/or structural diversity.

The BOS threshold test has determined that the proposed development may trigger entry into the BOS based on the area clearing threshold.

To determine if a test of significance (5-part test) test is required for ecological communities, a targeted field assessment should be undertaken to confirm the presence and extent of the EEC 'White Box–Yellow Box–Red Gum Grassy Woodland' on the subject site during detailed planning stages.

Targeted field surveys should be conducted to determine that no threatened flora or fauna species listed under the BC Act occur on the subject site. A 5-part test is not considered necessary at this stage; nevertheless, this can be addressed at a later planning stage.

Goulburn Mulwaree Local Environmental Plan 2009

No regulated vegetation is mapped on the subject site; however, parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under the LEP. As per Clause 7.2 Terrestrial biodiversity of the LEP, the following constraints may apply:

> Terrestrial biodiversity
>
> (1) The objectives of this clause are to protect, maintain or improve the diversity of the native vegetation, including—
>
> (a) protecting biological diversity of native flora and fauna, and
>
> (b) protecting the ecological processes necessary for their continued existence, and
>
> (c) encouraging the recovery of threatened species, communities or populations and their habitats.
>
> (2) This clause applies to development on land that is identified as "Biodiversity" on the Terrestrial Biodiversity Map.
>
> (3) Development consent must not be granted to development on land to which this clause applies unless the consent authority has considered a report that addresses the following matters—
>
> (a) identification of any potential adverse impact of the proposed development on any of the following—

(i) a native vegetation community,
(ii) the habitat of any threatened species, population or ecological community,
(iii) a regionally significant species of plant, animal or habitat,
(iv) a habitat corridor,
(v) a wetland,
(vi) the biodiversity values within a reserve, including a road reserve or a stock route, and

(b) a description of any proposed measures to be undertaken to ameliorate any such potential adverse impact.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development is consistent with the objectives of this clause and—

(a) the development is designed, sited and managed to avoid the potential adverse environmental impact, or

(b) if a potential adverse impact cannot be avoided, the development—

(i) is designed and sited so as to have minimum adverse impact, and
(ii) incorporates effective measures so as to have minimal adverse impact, and
(iii) mitigates any residual adverse impact through the restoration of any existing disturbed or modified area on the site.

Site Constraints Analysis

Each of the habitats or communities occurring on the subject site has been allocated to a constraint category ranging from high to low depending upon the satisfaction of the above criteria as summarised in Table 10.

Constraints category	Environmental attributes
High	• World heritage areas • National heritage places • RAMSAR wetlands • Endangered species or endangered species habitat • Endangered populations • Endangered Ecological Communities (EEC)
Moderate-High	• Areas containing habitat for a threatened species (other than endangered) • Areas of high biodiversity value (Biodiversity Values Map)
Moderate	• Wildlife corridors of regional importance • Wetland buffer areas • Major waterways or waterbodies
Low-Moderate	• Wildlife corridors of local significance • Minor waterways or waterbodies
Low	• Exotic vegetation • Cleared areas

TABLE 10. KEY TO CONSTRAINTS ANALYSIS

Highly constrained areas

Areas mapped as high ecological constraint are generally not considered to be suitable for development. These areas should be retained, rehabilitated, and buffered as much as practicable. Where impacts cannot be avoided, biodiversity offsets are likely.

Based on the results of this assessment, there are currently no areas of the site considered to be highly constrained. However, the following should be noted:

- If confirmed, the presence of the EEC 'White Box–Yellow Box–Red Gum Grassy Woodland' would represent highly constrained areas on the subject site. Additionally, an assessment of condition can confirm the extent of this constraint.
- There are three endangered species that are considered possible on the subject site (i.e. green and gold bell frog, button wrinklewort and small purple pea). The importance and suitability of habitat on the subject site, and its relevance as highly constrained areas, will be guided by targeted surveys and confirmation of species presence/absence.

Moderately-highly constrained areas

Based on the results of this assessment, there are currently no areas of the site considered to be moderately-highly constrained. However, the following should be noted:

- There are six vulnerable species that are considered possible on the subject site (i.e. black gum, Austral toadflax, white-throated needletail, superb parrot, pinktailed worm lizard, and striped legless lizard). The importance and suitability of habitat on the subject site, and its relevance as moderately-highly constrained areas, will be guided by targeted surveys and confirmation of species presence/absence.

Moderately constrained areas

The constraints analysis has indicated that no moderately constrained areas are present on the subject site.

Low-moderately constrained areas

Stock dams and associated 1st and 2nd order watercourses / drainage lines on the subject site represent areas that may be considered low-moderately constrained areas. The importance of these can be guided by threatened species surveys (i.e. green and gold bell frog). Regardless, from a development planning perspective, consideration for relevant setbacks/buffers from watercourses/drainage lines (i.e. 10m buffers to 1st order watercourses; 20m buffers to 2nd order watercourses and 40m buffers to 4th order watercourses) are likely to be required.

Areas of low constraint

Apart from the 'possible' EEC, stock dams, and associated watercourses / drainage lines, most of the subject site is comprised of cleared areas dominated by exotic grasses. These areas are consistent with a category of low environmental constraint.

Based on interrogation of geographic ranges and specific habitat requirements, habitat suitability assessments combining this ECA and information provided in Mecone (2019) determined that, four (4) EPBC Act / BC Act listed flora species could possibly occur within the subject site. None of these species were previously recorded during site assessments; however, a targeted field assessment is warranted to confirm the presence or absence of these species, and the relevance of areas that may or may not be ecologically constrained.

Six (6) threatened fauna species listed within schedules of the EPBC Act and/or BC Act were considered a possibility to utilise habitat on the subject site. With this said, utilisation by five (5) is most likely by wide-ranging bird species that may aerially traverse the subject site on occasion. No other threatened fauna species are considered a possible occurrence due to an absence of suitable habitat types and/or structural diversity.

A targeted field assessment is warranted to confirm the presence or absence of the green and gold bell frog due to the presence of suitable stock dams and nearby grassy habitat. It is considered however that a change to the lower intensity of use being R5 large lot Residential would only improve any likelihood of survival if evidenced, when compared to potential current agricultural affects to the land which would likely occur if not proceeding with the rezoning process.

With consideration of commonwealth, state, and local legislation and mapping, no other environmental constraints are applicable to the subject site. No state or regional corridors are mapped on or in the vicinity the subject site. As part of a wider context, the subject site provides no corridor value for fauna species in the locality.

Beyond the areas mentioned above, the remainder of the subject site is comprised of cleared areas dominated by exotic grasses, all of which are consistent with a category of low environmental constraint.

Q8. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

The subject site is located within the gentle undulating and open slopes of the Gundary Plains. The bulk of the site is located in a shallow valley about 2km wide and 3km long. The topography ranges from relatively flat land to sloping landform with gradients of 10 to 1.

A geotechnical report **(Attachment 2)** undertaking 31 bored samples has identified soil texture types including sand, sandy loam, loam, light clay, clay loams, medium and heavy clays and gravel of varying depth and moderate fertility. There are also a few outcrops of silty sandstone and quartz. The land is located in a hydrologic catchment which contains numerous overland flow paths and intermittent creeks which drain to the north-west via a drainage line that runs parallel to the southern side of Mountain Ash Road. The drainage line discharges to Gundary Creek which flows to the Mulwaree Chain-O-Ponds and ultimately into the Wollondilly River.

The data from the Geotechnical report was then entered into the WaterNSW's NorBE assessment tool for a number of test locations applying:

- Four bedrooms excluding a spa bath
- Rainwater water supply
- Standard Aerated Wastewater Treatment System (AWTS)
- Sub-surface irrigation for disposal
- Ground water generally >1m deep as none test holes encountered any ground water
- The calculated permeability applied where suitable
- Slope gradients were obtained from the terrain model

The AWTS system was trialed as this would be the most likely cost-effective methodology of wastewater treatment but other treatment systems would also be suitable. The results of the NorBE assessment are included within Attachment 2.

The proposal is unlikely to impact upon existing flood events as most of the flooding is associated with water aflux from the confluence of the Wollondilly River well beyond the subject site. In flood events Windellama Road and Mountain Ash Road tend to be inundated near their intersection. The subject land is only prone to minor flooding, however with these infrastructure improvements at DA stage these matters will be less of an issue than what they currently present.

There is no indication of site contamination that would cause environmental or health impacts. Given the proximity to Goulburn it is unlikely that the storage of large volumes of fuel and chemicals occurred on site. Likewise access to waste disposal facilities at Goulburn would suggest that illegal disposal of waste on the site is highly unlikely. Nor evidenced in the soils study undertaken as part of this planning proposal.

Therefore the proposed change to R5 Large Lot Residential is a suitable amendment to the Local Environmental Plan warranting support of council and the State.

Q9. Has the planning proposal adequately addressed any social and economic effects?

The planning proposal acknowledges the cultural heritage of the Shire, both Early European and Aboriginal settlement and use of the lands in the Shire. The subject site is not identified as a heritage item nor is located in a heritage conservation area however individual European heritage items can be found in close proximity.

The most significant site of cultural interest is the 1924 Motor Cycle Grand Prix Memorial. The memorial erected at the start of the 1914 Tourist Trophy Race and 1924 Motor Cycle Grand Prix on Windellama Road is located in proximity to the subject site. An AHIMS search was also carried out for the planning proposal and there were no known results returned.

Q10. Is there adequate public infrastructure for the planning proposal?

Earthworks

The proposal does not include any regrading of the site and hence the required earthworks will be restricted to that required for the roads. As the topography is characterised by gently to moderately sloped hillsides, then there will not be any significant cut and fill required. There may be some works relating to stabilising the existing 3rd order watercourses but this will largely be limited to battering back of embankments which again will only require minimal earthworks and would not require any removal of spoil from the site nor require any additional material to be brought onsite.

Road Network

The existing roads that the development site has frontages are, Mountain Ash Road, Rosemont Road and Barretts Lane. All these roads are 20.115m wide sealed roads with 80kph speed zones.

The proposed road reserve widths are 20m in accordance with Council's Standards for Engineering Works Design Specification 2013. The new roads will incorporate table drains in accordance with Council's standard drawing SD-R 01 A. The table drains can incorporate mitre drains at regular intervals. It is expected that the any intersections with an existing road will incorporate BAR/BAL treatment.

Precinct 1 has two proposed intersections with Mountain Ash Road and one intersection with Barretts Lane. Precinct 2 has the single access with Mountain Ash Road whilst Precinct 3 has just the two intersections with Mountain Ash Road. This reflects the current number of driveway accesses to the existing lots. All of the proposed intersections have suitable separation from any other intersection whether it be existing or proposed.

The locations of the intersections enable suitable sight distance requirements in accordance with the Austroads guidelines.

Some of the roads follow depressions to avoid common boundaries crossing the flow paths. The roads incorporating a cul-de-sac are all less than 200m in length and suitable in terms of any bushfire risk and council's design specifications.

Water Supply

The nearest Council water main is located on the other side of the Hume Highway approximately 1km away from the intersection of Rosemont Road and Windellama Road. It is understood that the pipe size is 100mm which is expected to have insufficient capacity to service the site.

There is potential for upgrading this reticulated service with provision o pump station and rising main extension, alternatively on site supply of water can be collected via rain water tanks. It is expected that in such circumstances future dwellings will be required to

have not less than 46,000 litres of roof water storage for domestic purposes in accordance with the DCP.

Sewer

Connection of the site to an existing sewerage system is unavailable and therefore wastewater will be required to treated and disposed of onsite.

Electrical

There is an overhead electrical service along Mountain Ash Drive from which it is expected that electrical power can be expanded through the proposed road layout to service the new lots.

Communications

There are existing telecommunication services within Mountain Ash Road, Rosemont Road and Barretts Lane. Telecommunication services to the lots can be reticulated from these existing services.

Q11. What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway determination?

Contact was made with officers at WaterNSW as well as Dept of Environment in relation to the soils of the site during the conception of the planning proposals development plan layout. Further consultation will be made with State representatives during the Gateway determination process.

Conclusion

This Planning Proposal has been prepared with considerable investigation of constraints, the assessment and measure of the proposal in relation to compliance with Ministerial Directions, the South East and Tablelands Regional Plan 2036, the Council's Local Strategic Planning Statement and the Urban and Fringe Housing Strategy. The proposal has been developed in accordance with NSW Government's Guideline for the Preparation of Planning Proposals.

The proposal as submitted provides consistency with these extrinsic materials and adopted policies of the Goulburn Mulwaree Shire Council. Given the consistent nature of the proposal and the impending support for the local economy and much needed housing, We look forward to progressing this Planning proposal with council and the state government. We therefore consider that the support is warranted by council staff and Councillors for progression to gateway determination where we will be pleased to provide any additional reporting requirements or meeting requests in the instance they arise.

Should you have any queries in relation to this report please do not hesitate to contact the undersigned at our office on 0423 002 257 or via return email simon@dbilink.com.

Kind regards

Simon Halcrow, BUrbRegPlan
Property Development Consultant

Attachments:

Attachment 1 - Ecological Constraints Analysis
Attachment 2 - Engineering Servicing Report (and attachments)
Attachment 3 - Proposal Plans

Attachment 1

Ecological Constraints Analysis

JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

ECOLOGICAL CONSTRAINTS ANALYSIS

Mountain Ash Road, Gundary

A report prepared for
Windellama Road Pty Ltd & GTSMF Pty Ltd

OCTOBER 2021

JWA Pty Ltd

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TABLE OF CONTENTS

1 Introduction 6
1.1 Background 6
1.2 The subject site 6
1.3 Planning context 7
1.4 The proposed development 7
2 Desktop Assessment 8
2.1 Introduction 8
2.2 Methods 8
2.2.1 Commonwealth Database Searches 8
2.2.2 State Database Searches 8
2.2.3 State government mapping 9
2.2.4 Local government plans and mapping 9
2.3 Results 10
2.3.1 Database searches 10
2.3.2 State government mapping 13
2.3.3 Local government mapping 13
2.3.4 Habitat suitability assessments 13
3 Corridors and connectivity 18
3.1 Background 18
3.2 Site assessment 18
4 Consideration of Statutory Requirements 19
4.1 Introduction 19
4.2 EPBC Act (Commonwealth) 19
4.2.1 Background 19
4.2.2 Declared world heritage areas 20
4.2.3 Declared Ramsar wetlands 20
4.2.4 Commonwealth listed threatened flora and fauna species 20
4.2.5 Listed ecological communities 21
4.2.6 Listed migratory species 22
4.3 BC Act (NSW) 23
4.3.1 Background 23
4.3.2 Biodiversity Offsets Scheme (BOS) 24
4.3.3 Section 7.3 of the Biodiversity Conservation Act (2016) 26
4.3.4 Summary 27
4.4 Goulburn Mulwaree Local Environmental Plan 2009 (*current version 19th February 2021*) 27
4.4.1 Background 27
4.4.2 Summary 27
5 Constraints analysis 29
5.1 Introduction 29
5.2 Constraints analysis key 29
5.3 Site constraints analysis 30

5.3.1 Highly constrained areas 30
5.3.2 Moderately-highly constrained areas 30
5.3.3 Moderately constrained areas 30
5.3.4 Low-moderately constrained areas 31
5.3.5 Areas of low constraint 31
6 Summary and Recommendations 32
References 34

ABBREVIATIONS

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	NSW Biodiversity Conservation Act 2016
BCR	Biodiversity Conservation Regulation 2017
BOS	Biodiversity Offset Scheme
BVM	Biodiversity Values Map
DAWE	Australian Government Department of Agriculture, Water and the Environment
DoPIE	Department of Planning, Industry and Environment
DotE	Department of the Environment
ECA	Ecological Constraints Analysis
EEC	Endangered Ecological Community
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
GWC	Goulburn Mulwaree Council
GWLEP	Goulburn Mulwaree Local Environmental Plan 2009
GWLGA	Goulburn Mulwaree Local Government Area
Ha	Hectare
JWA Pty Ltd	JWA Ecological Consultants Pty Ltd
Km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
LLS Act	Local Land Services Act 2013
m	Metres
mm	Millimetres
MNES	Matters of National Environmental Significance
NSW	New South Wales
PKFT	Preferred Koala Food Tree
PMST	Protected Matters Search Tool
RU	Primary Production zoning
SEPP	State Environmental Protection Policy
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee

1 INTRODUCTION

1.1 Background

JWA Pty Ltd was engaged by Windellama Road Pty Ltd & GTSMF Pty Ltd to complete an Ecological Constraints Analysis (ECA) of a parcel of land on Mountain Ash Road, Gundary, New South Wales (NSW) (hereafter referred to as the 'subject site').

The ECA involved a desktop review was undertaken to identify any Commonwealth, State and Local environmental constraints that may apply to the subject site. These include, but may not be limited to the following:

- the presence of any Commonwealth, State and/or Locally threatened vegetation / ecological communities;
- the presence of, or likelihood of occurrence of any Commonwealth, State and/or Locally threatened flora and fauna species; and
- habitat and corridor values at a local and regional scale.

Based on the outcomes of the ECA, any ecological constraints occurring on the subject site were identified to assist in planning for a proposed re-zoning for a rural residential development. Ecological constraints were allocated to a category ranging from high to low depending upon the following assessment criteria:

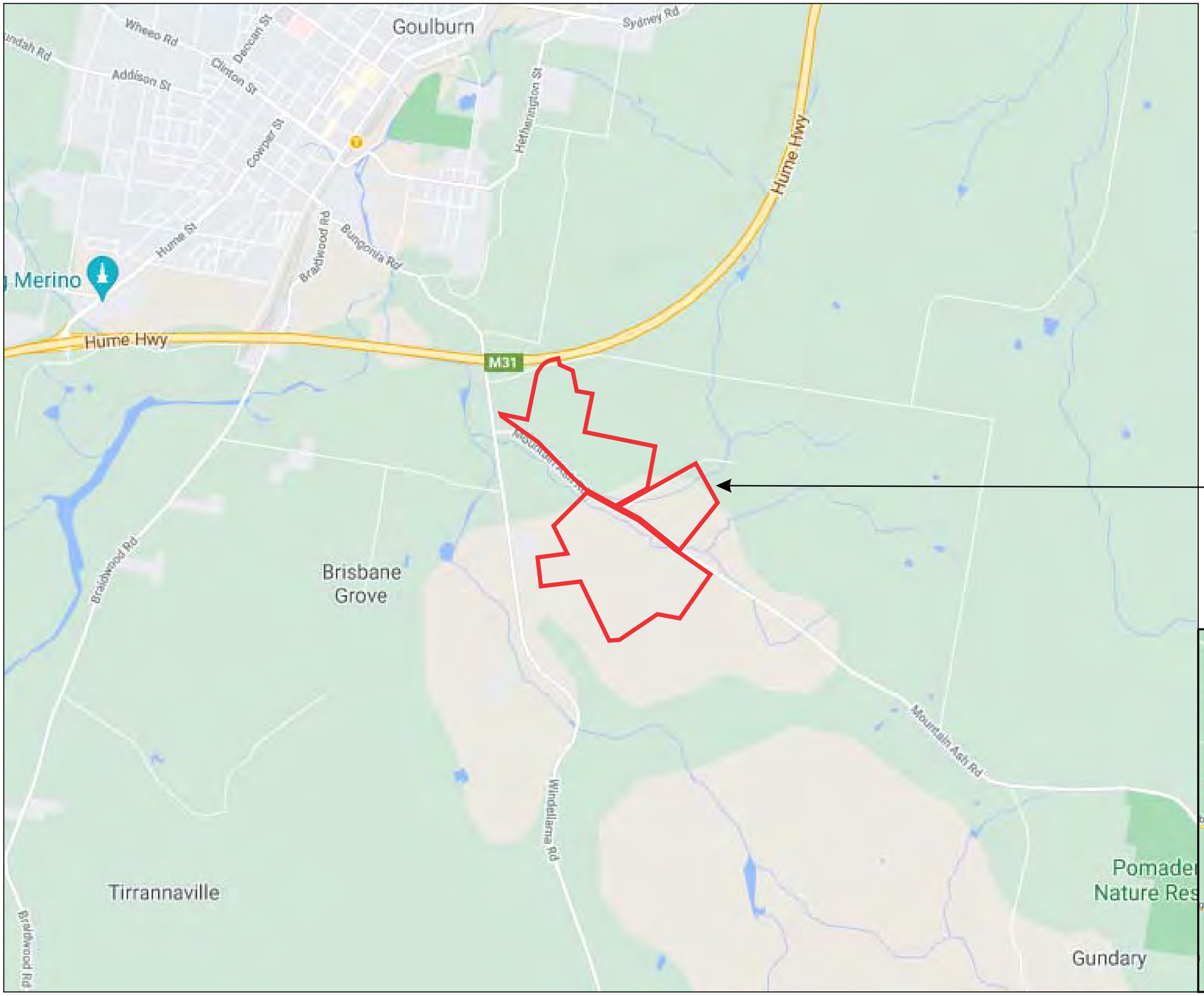
- Presence of significant flora species;
- Presence of significant vegetation communities/ecosystems;
- Presence of significant fauna species and/or their habitat; and
- Recognition of environmental values in planning and policy documents.

1.2 The subject site

The subject site is ~265 ha in size and is formally identified as the following (**FIGURE 1**):

- Lot 1 on DP779194
- Lot 1 on DP731427
- Lot 1 on DP853498
- Lot 103 on DP70346
- Lots 1, 2, 3, on DP835278
- Lots 22, 23, 24 on DP811954
- Lot 104, 105, 106 on DP126140

The subject site is located ~2-5 km to the south, southeast of regional city of Goulburn, NSW. The subject site is bounded entirely by a cleared and managed landscape utilised for rural residential, agricultural and/or grazing purposes. The Goulburn airport is ~1 km to the southwest of the subject site. An aerial photograph of the site is shown in **FIGURE 2**.



N

LEGEND
Subject Site

SUBJECT SITE

INSET NOT TO SCALE

0 1km
1 : 40 000

SOURCE: Google Maps

SCALE: 1 : 40 000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Design Build Instruct Pty Ltd

PROJECT
Ecological Constraints Analysis
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 1

PREPARED: BW
DATE: 21 April 2021
FILE: N21007_Locality.cdr

TITLE

LOCALITY PLAN

LEGEND
Subject Site

0 500m
1 : 12 500

SOURCE: Google Earth Aerial dated Feb 2021

SCALE: 1 : 12 500 @ A3

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Mountain Ash Road, Gundary NSW
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FIGURE 2

PREPARED: BW
DATE: 21 April 2021
FILE: N21007_Aerial.cdr

TITLE

AERIAL PHOTOGRAPH

The subject site is characterised by flat to slightly undulating terrain dominated by cleared and historical managed grassland, with minimal native forest cover. There are numerous stock dams present, along with watercourses / drainage lines traversing the subject site from Gundary Creek to the west.

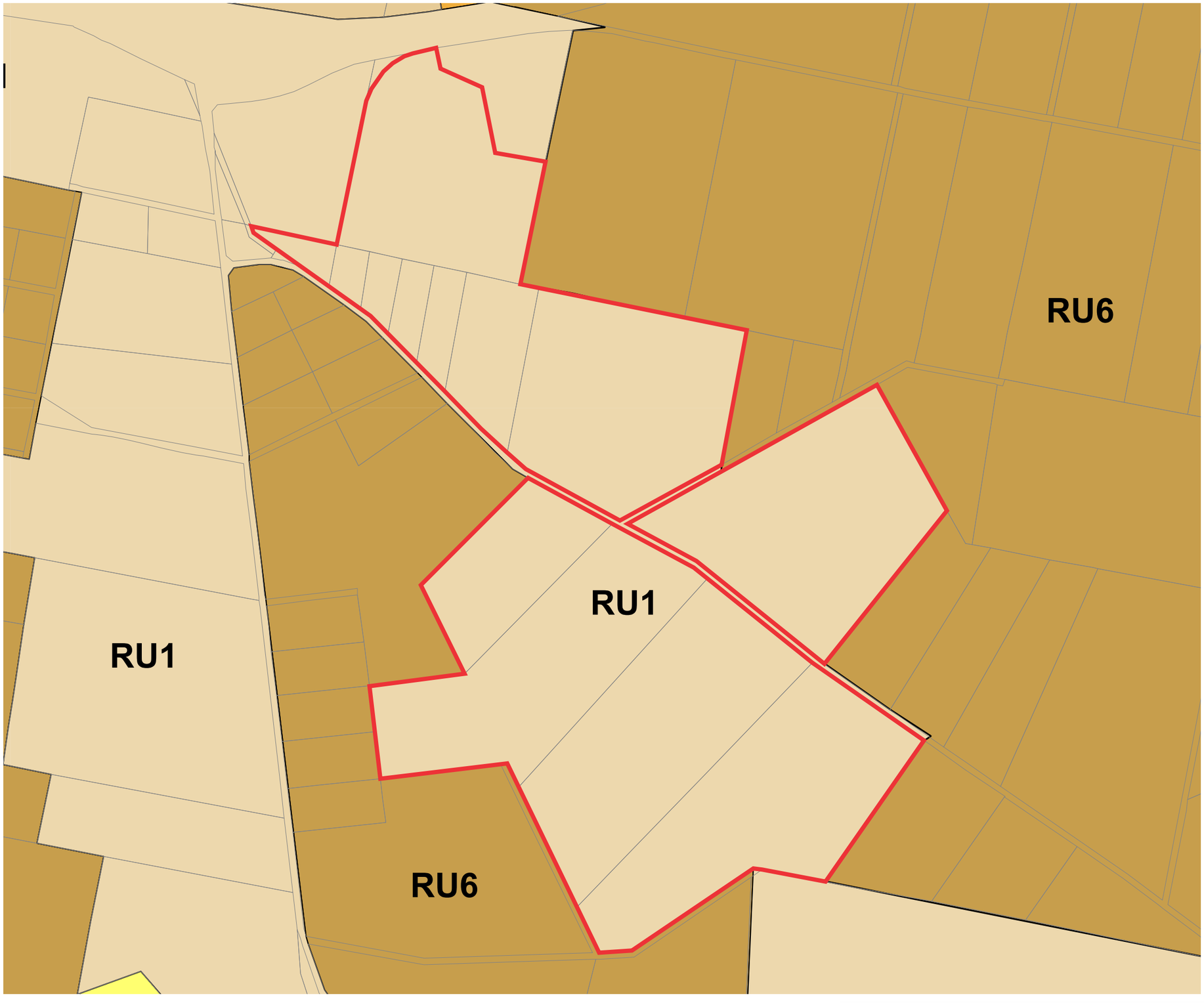
1.3 Planning context

The subject site is located within the Goulburn Mulwaree Local Government Area (GWLGA) and is zoned as Primary Production (RU1)[1] under the *Goulburn Mulwaree Local Environmental Plan 2012* (GWLEP) (GMC 2009) (**FIGURE 3**).

1.4 The proposed development

It is understood that the landowner is proposing to lodge a rezoning proposal for a rural residential subdivision of the subject site.

[1] Land zoning map – sheet LZN_004C



LEGEND

Subject Site

Goulburn Mulwaree LEP 2009

- E2 - Environmental Conservation
- RE1 - Public Recreation
- RU1 - Primary Production
- RU2 - Rural Landscape
- RU6 - Transition
- SP2 - Infrastructure (Airport)

0 500m

1 : 12 500

SOURCE: Goulburn Mulwaree LEP 2009
Land Zoning Map LZN_001

SCALE: 1 : 12 500 @ A3

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Ecological Constraints Analysis
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 3

PREPARED: BW
DATE: 21 April 2021
FILE: N21007_Zoning.cdr

TITLE

ZONING MAP

2 DESKTOP ASSESSMENT

2.1 Introduction

A desktop assessment was completed to highlight any potential conservation significant vegetation communities, any potential habitat for threatened flora and fauna, and any ecologically sensitive areas on the subject site. The desktop assessment included a review of:

- State and Commonwealth databases;
- Commonwealth legislation;
- NSW plans, policies and legislation;
- Goulburn Mulwaree Council (GWC) plans and policies; and
- Scientific journal articles and botanical literature to assist with habitat suitability assessments.

2.2 Methods

2.2.1 Commonwealth Database Searches

The Protected Matters Search Tool (PMST) was used to generate a list of the following Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act) that may occur within 10 km of the subject site:

- world heritage and national heritage areas;
- wetlands of international significance (Ramsar Wetlands);
- Commonwealth marine areas;
- threatened ecological communities;
- threatened species; and
- migratory species.

The PMST database incorporates information from a range of sources, including government agencies, research, and community organisations. It should be noted that there are limitations on the accuracy of some matters reported by the PMST. Database records of threatened and migratory species are based on their current known distribution and do not necessarily correlate to an actual observation. As a result, these records are an indicator of potential presence only and do not consider if suitable vegetation, geology, soil, climate, or habitat types are present to support the occurrence of a species or community.

2.2.2 State Database Searches

The NSW Department of Planning, Industry and Environment (DoPIE) BioNet online database is based on collated biodiversity data acquired by the NSW Government through a range of sources including specimen collections, research and monitoring programs, and community

wildlife groups. A BioNet database search was used to generate a list of threatened flora and fauna species listed under the NSW *Biodiversity Conservation Act* 2016 (BC Act) that may occur within 10 km of the subject site.

2.2.3 State government mapping

2.2.3.1 Background

The following relevant environmental mapping was reviewed as part of the desktop assessment:

- Biodiversity Values Map; and
- Native Vegetation Regulatory Map.

2.2.3.2 Biodiversity Values Map

The Biodiversity Values Map identifies land with high biodiversity value, as defined by clause 7.3(3) of the *Biodiversity Conservation Regulation 2017* (BCR). The Biodiversity Offsets Scheme applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BCR (i.e. all local developments, major projects or the clearing of native vegetation where the Vegetation SEPP applies) on land identified on the map.

2.2.3.3 Native Vegetation Regulatory Map

The Native Vegetation Regulatory (NVR) Map was prepared by OEH under Part 5A of the amended *Local Land Services Act 2013* (LLS Act) and supporting regulation. The NVR Map is a tool to give landholders certainty when planning future management of their land.

The NVR Map generally covers rural land in NSW. It categorises land where management of native vegetation can occur without approval or where management of native vegetation may be carried out in accordance with Part 5A of the LLS Act.

2.2.4 Local government plans and mapping

The GMLEP was made under the *Environmental Planning and Assessment Act 1979*, and among other things, aims to achieve the following:

- *to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts;*
- *to promote and co-ordinate the orderly and economic use and development of land in the area;*
- *to provide a framework for the Council to carry out its responsibility for environmental planning provisions and facilitate the achievement of the objectives of this Plan;*
- *to encourage the sustainable management, development and conservation of natural resources;*

- *to promote the use of rural resources for agriculture and primary production and related processing service and value adding industries;*
- *to protect and conserve the environmental and cultural heritage of Goulburn Mulwaree,*
- *to enhance and provide a range of housing opportunities in, and the residential and service functions of, the main towns and villages in Goulburn Mulwaree;*
- *to establish a framework for the timing and staging of development on certain land in Goulburn and Marulan;*
- *to provide a range of housing opportunities, including large lot residential development in the vicinity of the villages;*
- *to allow development only if it occurs in a manner that minimises risks due to environmental hazards, and minimises risks to important elements of the physical environment, including water quality;*
- *to provide direction and guidance as to the manner in which growth and change are to be managed in Goulburn Mulwaree; and*
- *to protect and enhance watercourses, riparian habitats, wetlands and water quality within the Goulburn Mulwaree and Sydney drinking water catchments so as to enable the achievement of the water quality objectives.*

Relevant environment constraints are mapped for the GMLEP under the NSW planning portal and native vegetation regulatory map.

2.3 Results

2.3.1 Database searches

2.3.1.1 Threatened ecological communities (TECs)

Database searches using the Commonwealth PMST revealed that two TECs may occur within 10 km of the subject site:

- Natural temperate grassland of the south eastern highlands – critically endangered; and
- White box-yellow box-Blakely's red gum grassy woodland and derived native grassland – critically endangered.

The subject site is characterised by *"grassland with lightly scattered timber including remnant stands of Blakely's Red Gum (Eucalyptus blakelyi)"* (Mecone 2019) which has the potential to align with the critically endangered TEC white box-yellow box-Blakely's red gum grassy woodland and derived native grassland. However, as identified in Mecone (2019), "*preliminary ecological assessment was undertaken by Pat Guinane, a Senior Ecologist with Macrozamia Environmental (BAM Assessor Accreditation Number BAAS19018) in July 2019.* As part of this assessment, it was concluded that due to the highly modified nature the subject site did not contain any TECs.

2.3.1.2 Threatened flora species

Database searches identified 16 threatened species that may occur within 10 km of the subject site. These included 16 species identified using the Commonwealth PMST based on the availability of suitable habitats, of which three species were identified using the BioNet database. A compiled species list from both database searches is provided in **TABLE 1.**

TABLE 1
RECORDS OF LISTED THREATENED FLORA SPECIES WITHIN 10 KM OF THE SITE

Scientific Name	Common Name	EPBC Act	BC Act
Acacia bynoeana	Bynoe's wattle	V	
Caladenia tessellata	Thick-lipped spider-orchid	V	
Calotis glandulosa	Mauve burr-daisy	V	
Commersonia prostrata	Dwarf kerrawang	E	
Diuris aequalis	Buttercup doubletail	E	E
Dodonaea procumbens	Trailing hop-bush	V	
Eucalyptus aggregata	Black gum	V	
Lepidium hyssopifolium	Basalt pepper-cress	E	
Leucochrysum albicans subsp. tricolor	Hoary sunray	E	
Pomaderris delicata	Delicate pomaderris	CE	CE
Pomaderris pallida	Pale pomaderris	V	
Prasophyllum petilum	Tarengo leek orchid	E	
Rhizanthella slateri	Eastern underground orchid	E	
Rutidosis leptorhynchoides	Button wrinklewort	E	E
Swainsona recta	Small purple-pea	E	
Thesium australe	Austral toadflax	V	

EPBC Act - Commonwealth *Environment Protection Biodiversity and Conservation Act 1999*

BC Act – New South Wales *Biodiversity Conservation Act 2016*

Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened

Note: conservation status is only listed for those species identified during the database search. As a result, some species not identified using one database may still be listed as threatened.

2.3.1.3 Threatened fauna species

Database searches identified 28 threatened species that may occur within 10 km of the subject site. These included 20 species identified using the Commonwealth PMST based on the availability of suitable habitats, and 11 species recorded using the BioNet database.

A compiled species list from both database searches is provided in **TABLE 2.** Species that rely heavily on large permanent waterbodies and will clearly not occur on the subject site have been omitted e.g. Macquarie perch (*Macquarie australasica*).

TABLE 2
RECORDS OF LISTED THREATENED FAUNA SPECIES WITHIN 10 KM OF THE SITE

Scientific Name	Common Name	EPBC Act	BC Act
Amphibians			
Litoria aurea	Green and gold bell frog	**V**	E
Birds			
Anthochaera phrygia	Regent honeyeater	CE	CE
Botaurus poiciloptilus	Australasian bittern	E	
Calidris ferruginea	Curlew sandpiper	CE	
Daphoenositta chrysoptera	Varied sittella		V
Falco hypoleucos	Grey falcon	V	
Falco subniger	Black falcon		V
Grantiella picta	Painted honeyeater	V	
Haliaeetus leucogaster	White-bellied sea-eagle		V
Hieraaetus morphnoides	Little eagle		V
Hirundapus caudacutus	White-throated needletail	V	
Lathamus discolor	Swift parrot	CE	
Polytelis swainsonii	Superb parrot	V	
Rostratula australis	Australian painted snipe	E	
Insects			
Synemon plana	Golden sun moth	CE	
Mammals			
Chalinobolus dwyeri	Large-eared pied bat	V	
Dasyurus maculatus (SE mainland population)	Spotted-tail quoll	E	
Falsistrellus tasmaniensis	Eastern false pipistrelle		V
Micronomus norfolkensis	Eastern coastal free-tailed bat		V
Miniopterus australis	Little bent-winged bat		V
Miniopterus orianae oceanensis	Large bent-winged bat		V
Petauroides volans	Greater glider	V	
Petrogale penicillata	Brush-tailed rock wallaby	V	
Phascolarctos cinereus	Koala	V	
Pseudomys novaehollandiae	New Holland mouse	V	
Pteropus poliocephalus	Grey-headed flying-fox	V	V
Reptiles			
Aprasia parapulchella	Pink-tailed worm-lizard	V	
Delma impar	Striped legless lizard	V	

EPBC Act - Commonwealth *Environment Protection Biodiversity and Conservation Act 1999*
BC Act – New South Wales *Biodiversity Conservation Act 2016*
Conservation status: CE - Critically endangered; E – Endangered; V – Vulnerable; NT – Near threatened
Note: conservation status is only listed for those species identified during the database search. As a result, some species not identified using one database may still be listed as threatened.

2.3.1.4 Migratory species

Database searches using the Commonwealth PMST identified 12 migratory species that may occur within 10 km of the subject site based on the availability of suitable habitat. Migratory species identified in database searches are listed in **TABLE 3**. Species that are heavily reliant on marine / large wetland environments and will clearly not occur on the subject site have been omitted.

TABLE 3
RECORDS OF COMMONWEALTH LISTED MIGRATORY SPECIES WITHIN 10 KM OF THE SITE

Scientific Name	Common Name	Status
Apus pacificus	Fork-tailed swift	-
Adrea alba	Great egret	-
Ardea ibis	Cattle egret	-
Haliaeetus leucogaster	White-bellied sea-eagle	-
Hirundapus caudacutus	White-throated needletail	V
Lathamus discolor	Swift parrot	CE
Merops ornatus	Rainbow bee-eater	-
Monarcha melanopsis	Black-faced monarch	-
Motacilla flava	Yellow wagtail	-
Myiagra cyanoleuca	Satin flycatcher	-
Pandion haliaetus	Osprey	-
Rhipidura rufifrons	Rufous fantail	-
Conservation status (EPBC Act): CE - Critically endangered, E - Endangered, V - Vulnerable		

2.3.2 State government mapping

2.3.2.1 Biodiversity Values Map

The site is not mapped on the Biodiversity Values Map.

2.3.2.2 Native Vegetation Regulatory Map

Th site is not mapped as containing regulated land on the NVR Map.

2.3.3 Local government mapping

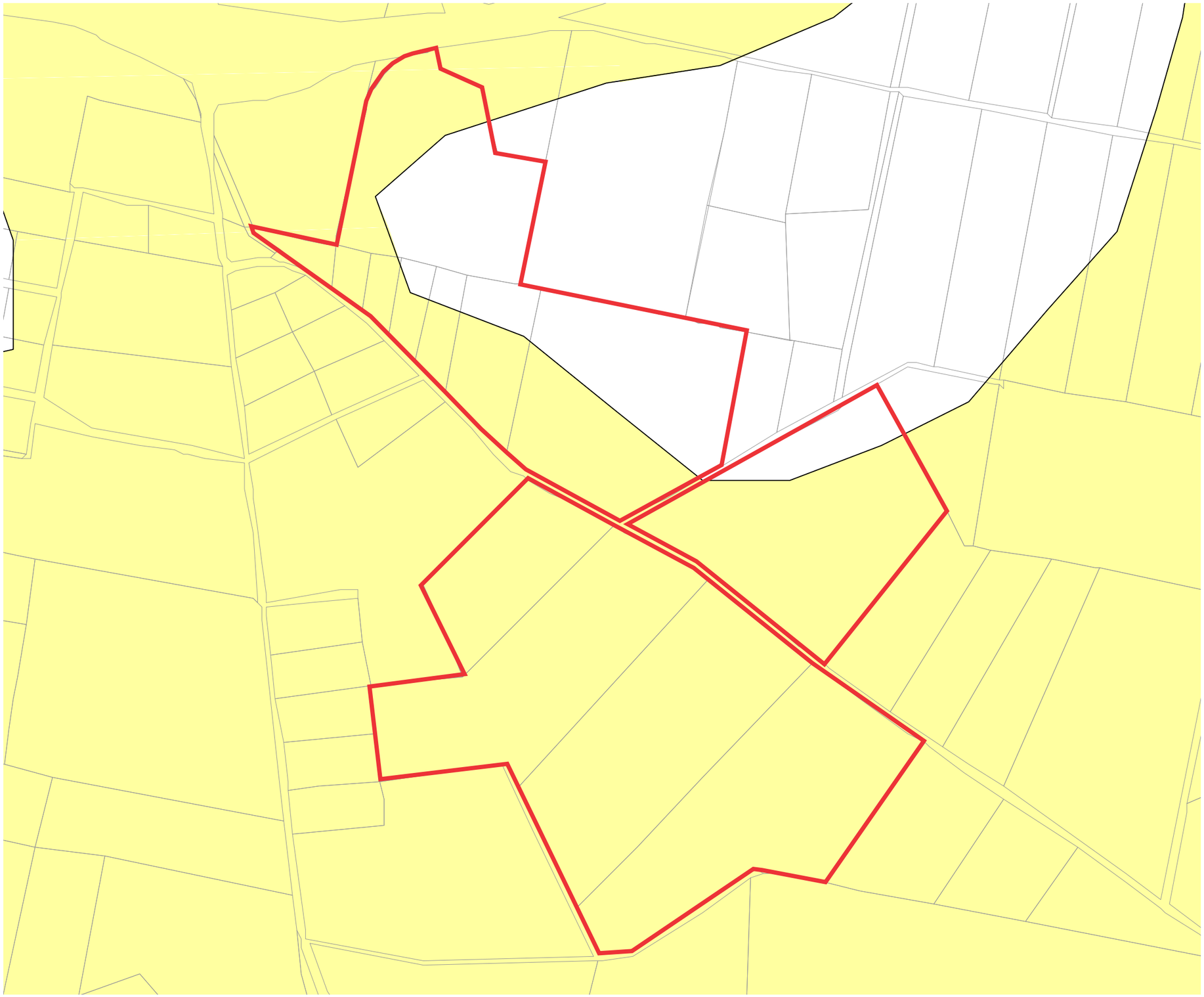
The subject site is zoned as Primary Production (RU1) under the GMLEP (**FIGURE 3**). Parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under the GMLEP (**FIGURE 4**).

2.3.4 Habitat suitability assessments

2.3.4.1 Threatened flora

Sixteen (16) threatened flora species were identified in the database searches that are known to occur or considered possible occurrences within 10 km of the subject site. Based on further interrogation of geographic ranges and specific habitat requirements, five (5) species are considered to warrant further examination.

Habitat suitability assessments were completed and determined that four (4) of these species could possibly to occur within the subject site (**TABLE 4**). None of these species were previously recorded during site assessments (Mecone 2019).



LEGEND
Subject Site
Goulburn Mulwaree LEP 2009
Biodiversity

0 500m
1 : 12 500

SOURCE: Goulburn Mulwaree LEP 2009
Terrestrial Biodiversity Map BIO_001

SCALE: 1 : 12 500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Design Build Instruct Pty Ltd

PROJECT
Ecological Constraints Analysis
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 4

PREPARED: BW
DATE: 21 April 2021
FILE: N21007_Bio Areas.cdr

TITLE
TERRESTRIAL BIODIVERSITY MAP

TABLE 4
HABITAT SUITABILITY ASSESSMENT FOR THREATENED FLORA SPECIES THAT HAVE THE POTENTIAL TO OCCUR ON THE SUBJECT SITE

Scientific name	Common name	Likelihood of occurring
Eucalyptus aggregata	Black gum	**Possible** Often grows in open woodland with a grassy ground layer, and on occasion is found as isolated paddock trees in modified native or exotic pastures (DoPIE 2020b). The subject site has the potential to support this species; however, there are no recorded from prior assessments (Mecone 2019).
Prasophyllum petilum	Tarengo leek orchid	**Unlikely** Has been recorded in open grassland sites, as well as grassy box-gum woodland (DoPIE 2020c). Despite this, the species is likely to be highly susceptible to grazing pressures. The latter makes the subject site very unlikely to be suitable to support this species.
Rutidosis leptorhynchoides	Button wrinklewort	**Possible** Has not previously been identified on the subject site (Mecone 2019); however, the species has been recorded in the Goulburn area growing in box-gum woodland, secondary grassland derived from box-gum woodland or in natural temperate grasslands (OEH 2012). The species also exhibits an ability to colonise disturbed areas (OEH 2012).
Swainsona recta	Small purple-pea	**Possible** Known to exist in the area and has a historical relationship with the grassy understorey of box-gum woodland, namely Blakely's red gum and yellow box (DoPIE 2018b). The species was not recorded on the subject site during prior assessments (Mecone 2019); however, the timing of surveys can be essential for this species (i.e. spring, with a peak in October).
Thesium australe	Austral toadflax	**Possible** Can occur in grassland and grassy woodland away from the coast, and often in association with kangaroo grass (*Themeda australis*) (DoPIE 2018c). Potentially suitable habitat is present on the subject site; however, the species was not recorded during previous assessments and is susceptible to grazing pressures.

2.3.4.2 Threatened fauna

Amphibians

The habitat requirements of most species are strongly influenced by factors such as climate, distance to water bodies, riparian vegetation, hydrological and morphological characteristics of water bodies and the availability of suitable micro-habitat for aestivation

and shelter. Stock dams and drainage lines present on the subject site are likely to provide suitable habitat for common and disturbance adapted amphibian species.

It is considered possible that the green and gold bell frog (*Litoria aurea*) would occur on the subject site due to the presence of stock dams that are unshaded and nearby grassy habitat (DoPIE 2017b).

Reptiles

Reptile distributions are strongly influenced by structural characteristics of the vegetation, climate and other factors affecting thermoregulation such as shade and availability of shelter and basking sites. Such habitat components characterise eucalypt forests and woodlands, where species diversity may be much higher, depending on disturbance factors. Open and disturbed grassland, like those consistent across the subject site, have the potential to support some common reptile species; however, a lack of suitable habitat features would mean that reptiles are largely absent.

Two (2) threatened reptile species were identified within 10 km of the subject site using database searches (**TABLE 5**), with one species considered a possible occurrence due to the presence of potential suitable habitat.

TABLE 5
HABITAT SUITABILITY ASSESSMENT FOR THREATENED REPTILE SPECIES THAT HAVE THE POTENTIAL TO OCCUR ON THE SUBJECT SITE

Scientific name	Common name	Likelihood of occurring
Aprasia parapulchella	Pink-tailed worm-lizard	**Unlikely** This species prefers sloping, open woodland areas that are well drained and contain rock outcrops (DoPIE 2017c). Some of the main identified threats to this species includes habitat loss and fragmentation, habitat degradation (including rock removal and stock grazing), and predation by cats and foxes (DoPIE 2017c). Key threats persist on the subject site, and no preferred habitat is available.
Delma impar	Striped legless lizard	**Possible** Is known to occur in the area and is a grassland specialist. All occupied sites have or had a grassy groundcover, often mixed with native and exotic perennial and annual species (DAWE 2000). The species has been recorded sheltering in grass tussocks, think ground cover, soil cracks, under rocks or timber, or in spider burrows (DAWE 2000). The subject site contains potentially suitable habitat for this species.

Birds

Thirteen (13) threatened bird species were identified that are known to occur or considered possible occurrences within 10 km of the subject site. Considering geographic ranges and given the disturbed and predominately cleared nature of the subject site, habitat suitability assessments determined that eight (8) of these species, including migratory species, could possibly occur. The presence of each species is likely to be related to traversing or forage purposes (**TABLE 6**).

TABLE 6
HABITAT SUITABILITY ASSESSMENT FOR THREATENED BIRDS SPECIES THAT HAVE THE POTENTIAL TO OCCUR ON THE SUBJECT SITE

Scientific name	Common name	Likelihood of occurring
Apus pacificus	Fork-tailed swift	**Possible** Widespread and may forage above the subject site.
Adrea alba	Great egret	**Possible** Stock dams and grasslands on the subject site provide potentially suitable forage habitat.
Ardea ibis	Cattle egret	**Possible** Stock dams and grasslands on the subject site provide potentially suitable forage habitat.
Falco subniger	Black falcon	**Possible** The black falcon is widely distributed and can travel hundreds of kilometres (Marchant and Higgins 1993). The species may traverse over the subject site; however, the loss of large old trees is a primary threat due to a loss of nesting and hunting platforms (DoPIE 2017d).
Haliaeetus leucogaster	White-bellied sea-eagle	**Possible** The subject site contains potentially suitable terrestrial foraging habitat (i.e. grassland, woodland); however no suitable mature tall forests or trees would provide breeding or nesting sites (DoPIE 2019a).
Hieraaetus morphnoides	Little eagle	**Possible** Found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occupies open eucalypt forest, woodland, open woodland, She oak or Acacia woodlands, and riparian woodlands of interior NSW (DoPIE 2017e). The subject site does not provide suitable nesting habitat but may be traversed by this species will foraging.
Hirundapus caudacutus	White-throated needletail	**Possible** Widespread across the eastern Australia from October to April; however, more common in coastal areas (DoPIE 2021). The species may forage above the subject site.

Scientific name	Common name	Likelihood of occurring
Polytelis swainsonii	Superb parrot	**Possible** The subject site is unlikely to provide suitable nesting trees (e.g. large hollow-bearing trees). However, the species forages up to 10 km from nesting sites in box-gum woodlands in the understorey and on the ground (DoPIE 2017f)

Mammals

The cleared nature of the subject site, and lack of structural complexity and habitat diversity (including hollow-bearing trees, intact and preferred vegetation, rocky outcrops, caves) is likely to result in very limited nesting and foraging opportunities for threatened terrestrial or arboreal mammals. It is unlikely the subject site forms a critical home range component for the following threatened species:

- Koala (*Phascolarctos cinereus*)
    - e.g. Eucalypt woodland and forests containing preferred koala food trees (PKFTs)[2].
- Greater glider (*Petauroides volans*)
    - e.g. Old growth forest with large hollow-bearing trees (DAWE 2015)
- Brush-tailed rock wallaby (*Petrogale penicillata*)
    - e.g. Rocky escarpments, outcrops and cliffs (DoPIE 2019b)
- New Holland mouse (*Pseudomys novaehollandiae*)
    - e.g. heathland, woodlands and forests with a heathland understorey (DoPIE 2017g)
- Spotted-tailed quoll (*Dasyurus maculatus*)
    - e.g. forested areas with hollow-bearing trees, fallen logs, caves and rocky outcrops (DoPIE 2020d).

Insectivorous bats overlap considerably in diet and broad vegetation preferences (Hall 1981) but specialise in foraging in specific layers or substrates within the forest (Crome and Richards 1988). The subject site lacks suitable roosting (*i.e.* caves, tree hollows/crevices etc.) or forage habitat to be of value to threatened Microchiroptera species in the locality.

The grey-headed flying-fox (*Pteropus poliocephalus*) may traverse the subject site; however, a paucity in flowering native trees would provide a very limited forage resource when compared to the wide locality.

[2] PKFTs are a discrete suite of species in the Genus *Eucalyptus* which, as the term implies, are the subject of preferential utilisation (i.e. statistically significant levels of use by koalas when compared to the relative abundance of that tree species in the landscape being assessed) (Phillips 1999; Phillips et al. 2000; Phillips and Callaghan 2000; Phillips and Callaghan 2011).

3 CORRIDORS AND CONNECTIVITY

3.1 Background

The term 'connectivity' is used to describe the degree to which the landscape facilitates or impedes the movement of species among habitat areas (Bélisle 2005). The level of connectivity between habitat areas in the landscape can be described along a (high – medium – low – isolated) continuum.

Landscapes with high levels of connectivity form an unbroken expanse of habitat through which a wide range of the fauna species can easily move to or between high quality areas. Landscapes with low levels of connectivity are characterised by habitat areas that are bisected by wide gaps, and where the quality and quantity of remaining habitat is reduced (habitat fragmentation). Habitat fragmentation impedes the movement of species among remaining suitable habitat areas (Andrén 1994; Fahrig 2003) and generally restricts movement and increases threats to all but the most mobile of species.

At a broad landscape scale, maintaining habitat connectivity is necessary to maintain the long-term viability of species populations (Beier and Noss 1998). In fragmented landscapes, corridors of native vegetation (ecological corridors) can enhance landscape connectivity by (i) providing habitat for a range of species; and (ii) facilitating safe movement between larger, more suitable habitat areas.

Three broad types of corridors can be distinguished. These are:

- linear corridors - long, uninterrupted strips of vegetation, such as hedges, strips of forest, and the vegetation growing on banks of rivers and streams;
- steppingstone corridors - a series of small, non-connected habitats that are used to find shelter, food, or to rest; and
- landscape corridors - diverse, uninterrupted landscape elements that provide sufficient cover for safe movement from one core area to another.

3.2 Site assessment

No state or regional corridors are mapped on or in the vicinity the subject site. As part of a wider context, the subject site provides very little corridor value for fauna species in the locality beyond potential stepping stone habitat for highly-mobile and wide ranging species.

4 CONSIDERATION OF STATUTORY REQUIREMENTS

4.1 Introduction

This section includes an assessment of the likely impacts of the proposed development with regard relevant Commonwealth, State and local legislation as listed in **Section 2**.

Amelioration measures recommended to minimise and mitigate these impacts on the biodiversity and habitat values of the subject site have also been detailed where applicable. Detailed assessment of compliance with relevant legislative requirements is provided in the following sections.

4.2 EPBC Act (Commonwealth)

4.2.1 Background

The EPBC Act provides a mechanism for assessing the environmental impact of activities and development on MNES. A person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on any of the following MNES:

- world heritage properties or national heritage places.
- declared Ramsar wetlands.
- listed threatened species or ecological community.
- listed migratory species.
- Commonwealth marine area or Commonwealth land.

The Act also prohibits the taking, without an approval under the Act, of:

- a nuclear action; and
- an action in a Commonwealth marine area or on Commonwealth land that has or will have, or is likely to have, a significant impact on the environment.

MNES include:

- declared World Heritage areas.
- declared Ramsar wetlands.
- listed threatened species (Schedule 1 and 2 of the *Commonwealth Endangered Species Protection Act 1992*).
- listed ecological communities.
- listed migratory species (JAMBA and CAMBA).

An action includes a project, development, undertaking or an activity or series of activities. An action does not require approval if it is a lawful continuation of a use of land, sea or seabed that was occurring before the commencement of the Act. An enlargement, expansion or intensification of a use is not a continuation of a use.

The EPBC Act does not require Commonwealth approval for the rezoning of land; however, it does suggest that when rezoning land, planning authorities should consider whether to allow actions that could significantly affect MNES or environment of Commonwealth land.

A Commonwealth assessment will be required for proposed activities on the subject site if they affect a MNES. The Commonwealth Department of the Environment has prepared EPBC Act Policy Statements, including the *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DotE 2013), which provides a self-assessment process to assist in determining whether an action should be referred to the Commonwealth for a decision on whether assessment and approval is required.

Where a project or action is believed to potentially cause a significant impact on a MNES, it is to be referred to the Australian Government Department of Agriculture, Water and the Environment (DAWE) for assessment as to whether the action is a 'controlled action' requiring Commonwealth approval for the proposed action. The proposed development has been considered against the Principal Significant Impact Guidelines for each of the MNES identified on the subject site. This assessment is provided in the following sections.

4.2.2 Declared world heritage areas

There are no declared World Heritage areas located on or near the subject site.

4.2.3 Declared Ramsar wetlands

There are no Ramsar wetlands near the subject site.

4.2.4 Commonwealth listed threatened flora and fauna species

4.2.4.1 Significant impact criteria

An action is likely to have a significant impact on a critically endangered, endangered, or vulnerable species if it results in the following:

- a long-term decrease in the size of a population;
- reduction in the area of occupancy of the species;
- fragments an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupts the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduces disease that may cause the species to decline; or
- interferes with the recovery of the species.

A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to a geographically distinct regional population, or collection of local populations, or a population, or collection of local populations that occur within a particular bioregion.

An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.

4.2.4.2 Relevance to the subject site

Habitat suitability assessments combining this ECA and information provided in Mecone (2019) determined that, albeit very conservative, four EPBC Act listed flora species could possibly to occur within the subject site (**TABLE 4**). None of these species were previously recorded during site assessments (Mecone 2019 infers); however, a targeted field assessment is warranted to confirm the presence or absence of this species during detailed planning stage.

Six threatened fauna species listed within schedules of the EPBC Act were considered a possibility to utilise habitat on the subject site. With this said, utilisation by five is most likely by wide-ranging species that may aerially traverse the subject site on occasion (e.g. white-throated needletail, black falcon, little eagle and grey-headed flying fox). No other threatened fauna species are considered a possible occurrence due to an absence of suitable habitat types and/or structural diversity.

A targeted field assessment is warranted to confirm the presence or absence of the green and gold bell frog due to the presence of suitable stock dams and nearby grassy habitat (DoPIE 2017b).

4.2.5 Listed ecological communities

4.2.5.1 Significant impact criteria

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community;
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines;
- adversely affect habitat critical to the survival of an ecological community;
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns;

- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting;
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
    - assisting invasive species, that are harmful to the listed ecological community, to become established, or
    - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

4.2.5.2 Relevance to the subject site

The subject site is characterised by "*grassland with lightly scattered timber including remnant stands of Blakely's Red Gum (Eucalyptus blakelyi)*" (Mecone 2019) which has the potential to align with the critically endangered TEC white box-yellow box-Blakely's red gum grassy woodland and derived native grassland. However, as identified in Mecone (2019), "*preliminary ecological assessment was undertaken by Pat Guinane, a Senior Ecologist with Macrozamia Environmental (BAM Assessor Accreditation Number BAAS19018) in July 2019*". As part of this assessment, it was concluded that due to the highly modified nature the subject site did not contain any TECs.

4.2.6 Listed migratory species

4.2.6.1 Significant impact criteria

An action will require approval if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species. The significant impact criteria below are relevant to migratory species that are not threatened.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles); or
- alter hydrological cycles, destroy, or isolate an area of important habitat for a migratory species; or
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

An area of 'important habitat' for a migratory species is:

- habitat used by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- habitat that is of critical importance to the species at life-cycle stages; and/or
- habitat utilized by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, the definition of what an 'ecologically significant proportion' of the population is varies with the species (each circumstance needs to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness, and species-specific behavioural patterns (for example, site fidelity and dispersal rates).

The term 'population' in relation to migratory species, means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries including Australia.

4.2.6.2 Relevance to the subject site

following four species may, on rare occasions, traverse over the subject site and/or forage in stock dams:

- Great egret;
- Cattle egret;
- Fork-tailed swift; and
- White-throated needletail.

Despite this, it is considered unlikely that breeding habitat occurs on site for any of these species, and therefore these species would not be significantly impacted by any future development.

4.3 BC Act (NSW)

4.3.1 Background

The BC Act commenced on the 25th August 2017. The BC Act, together with the *Biodiversity Conservation Regulation 2017* (BCR), outlines the framework for addressing impacts on biodiversity from development and clearing. It establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS).

The BOS creates a transparent, consistent, and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant

impact on biodiversity. It also establishes biodiversity stewardship agreements, which are voluntary in-perpetuity agreements entered into by landholders, to secure offset sites.

There are five key steps to participating in the BOS for developers or landholders ('proponents') who want to undertake development or clearing.

- Step 1 – The proponent determines whether the BOS applies.
- Step 2 – An accredited assessor applies the Biodiversity Assessment Method and offsetting rules to the activity.
- Step 3 – The consent authority assesses the application and determines whether to approve or refuse the application.
- Step 4 – The consent authority determines the application and sets the offset obligation.
- Step 5 – The proponent satisfies its credit obligation and can begin the approved activity.

Step 1 of this process has been completed (in the following sections) as part of this ECA to determine if the BOS applies to the proposed development. Additional steps (if required) will be completed separately, and in addition, to this ECA report.

4.3.2 Biodiversity Offsets Scheme (BOS)

4.3.2.1 Background

The BOS applies to:

1. local development assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP & A Act) that triggers the BOS threshold or is likely to significantly affect threatened species based on the test of significance in section 7.3 of the BC Act;
2. state significant development and state significant infrastructure projects, unless the Secretary of the Department of Planning and Environment and the Chief Executive of OEH determine that the project is not likely to have a significant impact;
3. biodiversity certification proposals;
4. clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent;
5. clearing of native vegetation that requires approval by the Native Vegetation Panel under the *Local Land Services Act 2013* (LLS Act); and
6. activities assessed and determined under Part 5 of the EP & A Act (generally, proposals by government entities), if proponents choose to 'opt in' to the BOS.

Point 1 above applies to the proposed development.

4.3.2.2 The BOS threshold

The BOS Threshold is a test used to determine when is necessary to engage an accredited assessor to apply the Biodiversity Assessment Method (BAM) to assess the impacts of a proposal.

It is used for local developments (development applications submitted to councils) and clearing that does not require development consent in urban areas and areas zoned for environmental conservation *i.e.* under the SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP).

The BCR sets out threshold levels for when the BOS will be triggered. The threshold has two elements:

1. whether the amount of native vegetation being cleared exceeds a threshold area set out below; and
2. whether the impacts occur on an area mapped on the Biodiversity Values Map (BVM) published by the Minister for the Environment.

If clearing and other impacts exceeds either trigger, the BOS applies to the proposed development including biodiversity impacts prescribed by clause 6.1 of the BCR.

Area clearing threshold

The area threshold varies depending on the minimum lot size (shown in the lot size maps made under the relevant LEP), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP) as shown in **TABLE 7** below.

The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots. In the case of a subdivision, the proposed clearing must include all future clearing likely to be required for the intended use of the land after it is subdivided.

TABLE 7
BOS AREA CLEARING THRESHOLD

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	0.25 ha or more
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

The minimum lot size associated with the subject property is 10 ha. An area clearing threshold of 0.5 ha or more therefore applies for entry into the BOS.

If the proposed development will result in the removal of more than 0.5 ha (5,000 m^2) of native vegetation from the subject site, entry into the BOS may triggered by the area clearing threshold.

Biodiversity Values Map (BVM) threshold

The BVM identifies land with high biodiversity value, as defined by clause 7.3(3) of the BCR. The BOS applies to all clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BCR on land identified on the map.

The subject site does not occur within an area of high biodiversity value on the BVM. Entry into the BOS is therefore not triggered by the BVM threshold.

Test of Significance

In addition to the Biodiversity Offsets Scheme Threshold, proponents are also required to carry out a 'test of significance' for all local development proposals. The test of significance is set out in section 7.3 of the BC Act 2016 and is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

4.3.3 Section 7.3 of the Biodiversity Conservation Act (2016)

4.3.3.1 Background

In accordance with Section 7.3 of the *Biodiversity Conservation Act (2016)*, a 'test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitat' has been undertaken for all listed species/EECs recorded on the site, including threatened fauna predicted to occur over time **(SECTION 3.3)**.

In determining the nature and magnitude of an impact, it is important to consider matters such as:

- Pre-construction, construction and occupation/maintenance phases;
- All on-site and offsite impacts, including location, installation, operation and maintenance of auxiliary infrastructure and fire management zones;
- All direct and indirect impacts;
- The frequency and duration of each known or likely impact/action;
- The total impact which can be attributed to that action over the entire geographic area affected, and over time;
- The sensitivity of the receiving environment; and
- The degree of confidence with which the impacts of the action are known and understood.

Recovery and threat abatement plans, priorities action statements and threatened species profiles may provide further guidance on whether an action/activity is likely to be significant.

Application of the precautionary principle requires that a lack of scientific certainty about the potential impacts of an action does not itself justify a decision that the action is not

likely to have a significant impact. If information is not available to conclusively determine that there will not be a significant impact on a threatened species, population or ecological community, or its habitat, then it should be assumed that a significant impact is likely.

4.3.3.2 Threatened Flora

Based on a lack of suitable habitat and the highly disturbed nature of the subject site, no threatened flora species listed within schedules of the BC Act are considered possible occurrences.

4.3.3.3 Endangered Ecological Communities (EECs)

No EECs have been recorded from the subject site or are considered a possible occurrence.

4.3.3.4 Fauna

No threatened fauna species listed within schedules of the BC Act are considered possible occurrences due to an absence of suitable habitat types and/or structural diversity.

4.3.4 Summary

The BOS threshold test has determined that the proposed development may trigger entry into the BOS based on the area clearing threshold.

To determine if a test of significance (5-part test) test is required for ecological communities, a targeted field assessment should be undertaken to confirm the presence and extent of the EEC '*White Box-Yellow Box-Red Gum Grassy Woodland*' on the subject site during detailed planning stages.

Targeted field surveys should be conducted to determine that no threatened flora or fauna species listed under the BC Act occur on the subject site. A 5-part test is not considered necessary at this stage; nevertheless, this can be addressed at a later planning stage.

4.4 Goulburn Mulwaree Local Environmental Plan 2009 (*current version 19th February 2021*)

4.4.1 Background

The GMLEP was made under the *Environmental Planning and Assessment Act 1979*, and among other things, relevant environment constraints are mapped for the GMLEP under the NSW planning portal and native vegetation regulatory map.

4.4.2 Summary

No regulated vegetation is mapped on the subject site; however, parts of the subject site are mapped as Terrestrial Biodiversity – Biodiversity under the GMLEP (**FIGURE 4**). As per Part 7, Section 7.2 Terrestrial biodiversity of the GMLEP, the following constraints may apply:

Terrestrial biodiversity

(1) The objectives of this clause are to protect, maintain or improve the diversity of the native vegetation, including—

(a) protecting biological diversity of native flora and fauna, and

(b) protecting the ecological processes necessary for their continued existence, and

(c) encouraging the recovery of threatened species, communities or populations and their habitats.

(2) This clause applies to development on land that is identified as "Biodiversity" on the Terrestrial Biodiversity Map.

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority has considered a report that addresses the following matters—

(a) identification of any potential adverse impact of the proposed development on any of the following—

(i) a native vegetation community,

(ii) the habitat of any threatened species, population or ecological community,

(iii) a regionally significant species of plant, animal or habitat,

(iv) a habitat corridor,

(v) a wetland,

(vi) the biodiversity values within a reserve, including a road reserve or a stock route, and

(b) a description of any proposed measures to be undertaken to ameliorate any such potential adverse impact.

(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development is consistent with the objectives of this clause and—

(a) the development is designed, sited and managed to avoid the potential adverse environmental impact, or

(b) if a potential adverse impact cannot be avoided, the development—

(i) is designed and sited so as to have minimum adverse impact, and

(ii) incorporates effective measures so as to have minimal adverse impact, and

(iii) mitigates any residual adverse impact through the restoration of any existing disturbed or modified area on the site.

5 CONSTRAINTS ANALYSIS

5.1 Introduction

A constraints analysis plan (**FIGURE 5**) has been prepared for the subject site with consideration of the information contained in **Sections 2 - 4**. This plan has identified areas of the subject site of conservation and/or habitat significance based on:

- Presence of significant plant species;
- Presence of significant vegetation communities/remnant ecosystems;
- Presence of significant fauna species and/or their habitat; and
- Recognition of environmental values in planning and policy documents.

5.2 Constraints analysis key

A number of criteria were considered for the constraints analysis, including:

- Commonwealth, State and Local government plans and policies;
- Occurrence of threatened flora and fauna;
- Habitat for threatened or significant fauna and flora;
- Vegetation and ecosystem value including diversity, species composition and structure;
- Protected areas; and
- Corridors and connectivity.

Each of the habitats or communities occurring on the subject site has been allocated to a constraint category ranging from high to low depending upon the satisfaction of the above criteria as summarised in **TABLE 8** below.

TABLE 8
KEY TO CONSTRAINTS ANALYSIS

Constraints category	Environmental attributes
High	• World heritage areas • National heritage places • RAMSAR wetlands • Endangered species or endangered species habitat • Endangered populations • Endangered Ecological Communities (EEC)
Moderate-High	• Areas containing habitat for a threatened species (other than endangered) • Areas of high biodiversity value (Biodiversity Values Map)
Moderate	• Wildlife corridors of regional importance • Wetland buffer areas

Constraints category	Environmental attributes
	• Major waterways or waterbodies
Low-Moderate	• Wildlife corridors of local significance • Minor waterways or waterbodies
Low	• Exotic vegetation • Cleared areas

5.3 Site constraints analysis

5.3.1 Highly constrained areas

Areas mapped as high ecological constraint are generally not considered to be suitable for development. These areas should be retained, rehabilitated, and buffered as much as practicable. Where impacts cannot be avoided, biodiversity offsets are likely.

Based on the results of this assessment, there are currently no areas of the site considered to be highly constrained. However, the following should be noted:

- If confirmed, the presence of the EEC '*White Box-Yellow Box-Red Gum Grassy Woodland*' would represent highly constrained areas on the subject site. Additionally, an assessment of condition can confirm the extent of this constraint.
- There are three endangered species that are considered possible on the subject site (i.e. green and gold bell frog, button wrinklewort and small purple pea). The importance and suitability of habitat on the subject site, and its relevance as highly constrained areas, will be guided by targeted surveys and confirmation of species presence/absence.

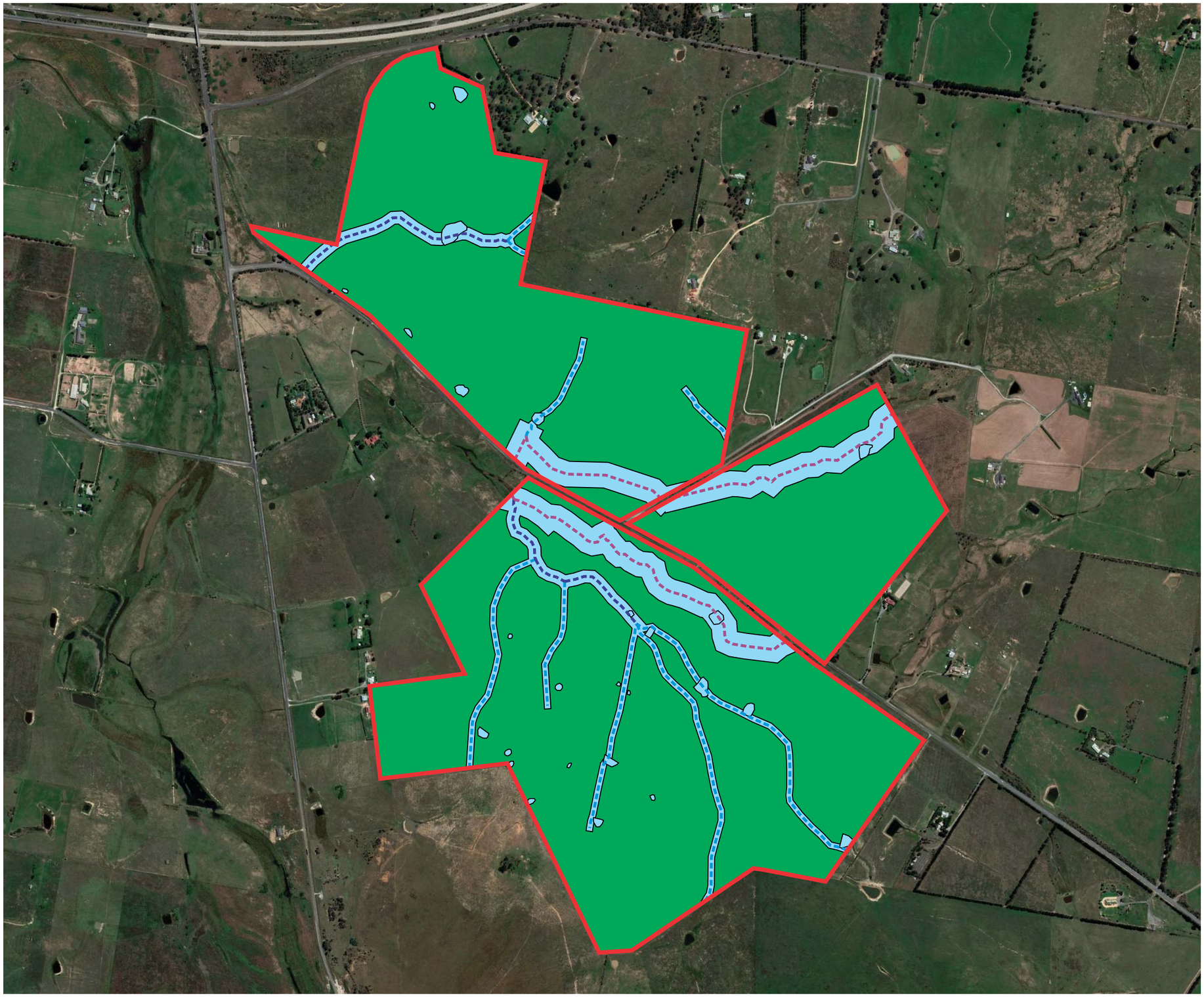
5.3.2 Moderately-highly constrained areas

Based on the results of this assessment, there are currently no areas of the site considered to be moderately-highly constrained. However, the following should be noted:

- There are six vulnerable species that are considered possible on the subject site (i.e. black gum, Austral toadflax, white-throated needletail, superb parrot, pink-tailed worm-lizard, and striped legless lizard). The importance and suitability of habitat on the subject site, and its relevance as moderately-highly constrained areas, will be guided by targeted surveys and confirmation of species presence/absence.

5.3.3 Moderately constrained areas

The constraints analysis has indicated that no moderately constrained areas are present on the subject site.



LEGEND

Subject Site

Waterways

1st Order Waterway

2nd Order Waterway

4th Order Waterway

Ecological Constraints

Low - Moderately Constrained Areas

Areas of Low Constraint

N

0 500m

1 : 12 500

SOURCE: NSW Govt. Water Management (General) Regulations 2018 Hydroline Spatial Data 1.0 (accessed 21/05/21); Google Earth Aerial dated Feb 2021

SCALE: 1 : 12 500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Design Build Instruct Pty Ltd

PROJECT
Ecological Constraints Analysis
Mountain Ash Road, Gundary NSW
Goulburn Mulwaree Council LGA

FIGURE 5

PREPARED: BW
DATE: 21 May 2021
FILE: N21007_Constraints.cdr

TITLE

CONSTRAINTS ANALYSIS

5.3.4 Low-moderately constrained areas

Stock dams and associated 1st and 2nd order watercourses / drainage lines on the subject site represent areas that may be considered low-moderately constrained areas. The importance of these can be guided by threatened species surveys (i.e. green and gold bell frog). Regardless, from a development planning perspective, consideration for relevant setbacks/buffers from watercourses/drainage lines (i.e. 10m buffers to 1st order watercourses; 20m buffers to 2nd order watercourses and 40m buffers to 4th order watercourses) are likely to be required.

5.3.5 Areas of low constraint

Apart from the 'possible' EEC, stock dams, and associated watercourses / drainage lines, most of the subject site is comprised of cleared areas dominated by exotic grasses. These areas are consistent with a category of low environmental constraint.

6 SUMMARY AND RECOMMENDATIONS

JWA Pty Ltd was engaged by Windellama Road Pty Ltd & GTSMF Pty Ltd to complete an ECA of a parcel of land on Mountain Ash Road, Gundary, NSW. The subject site is located ~5 km to the south, southeast of regional city of Goulburn, NSW, and is bounded entirely by a cleared and managed landscape utilised for rural residential, agricultural and/or grazing purposes.

It is understood that the client is proposing to lodge a rezoning proposal for ~320 rural residential allotments on the subject site. This ECA uses current database and site information to review and update (where applicable) ecological constraints identified by Mecone in 2019.

The subject site has been characterised as containing "*grassland with lightly scattered timber*" that has the potential to align with the EEC 'White Box–Yellow Box–Red Gum Grassy Woodland'. As identified in Mecone (2019), due to the highly modified nature the subject site this community is unlikely to meet the criteria for the EEC under the EPBC Act.

Based on interrogation of geographic ranges and specific habitat requirements, habitat suitability assessments combining this ECA and information provided in Mecone (2019) determined that, four (4) EPBC Act / BC Act listed flora species could possibly occur within the subject site. None of these species were previously recorded during site assessments; however, a targeted field assessment is warranted to confirm the presence or absence of these species, and the relevance of areas that may therefore be ecologically constrained.

Six (6) threatened fauna species listed within schedules of the EPBC Act and/or BC Act were considered a possibility to utilise habitat on the subject site. With this said, utilisation by five (5) is most likely by wide-ranging bird species that may aerially traverse the subject site on occasion. No other threatened fauna species are considered a possible occurrence due to an absence of suitable habitat types and/or structural diversity. A targeted field assessment is warranted to confirm the presence or absence of the green and gold bell frog due to the presence of suitable stock dams and nearby grassy habitat.

With consideration of commonwealth, state, and local legislation and mapping, no other environmental constraints are applicable to the subject site. No state or regional corridors are mapped on or in the vicinity the subject site. As part of a wider context, the subject site provides no corridor value for fauna species in the locality.

At this stage, and subject to further confirmation, the primary constraint to the proposed development is stock dams and narrow 1st and 2nd order watercourses/drainage lines that represent potential habitat for endangered and/or vulnerable flora and fauna species. In the event that threatened species are not recorded, these areas are likely to require consideration for setbacks/buffers from a development planning perspective (i.e. 10m buffers to 1st order watercourses; 20m buffers to 2nd order watercourses and 40m buffers to 4th order watercourses).

Outside of the areas mentioned above, the remainder of the subject site is comprised of cleared areas dominated by exotic grasses, all of which are consistent with a category of low environmental constraint.

REFERENCES

Andrén, H. (1994) Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat – a review. *OIKOS* **71**:355-366.

Beier, P. and R.F. Noss (1998) Do habitat corridors provide connectivity? *Conservation Biology* **12:** 1241-1252.

Bélisle, M. (2005) Measuring landscape connectivity: The challenge of behavioral landscape ecology. *Ecology* **86:** 1988-1995.

Chrome, F.H.J. and Richards, G.C. (1988). Bats and gaps: Microchiropteran community structure in a Queensland rain forest. *Ecology* **69(6):** 1960-1969.

DAWE (2000). *Delma impar – Striped legless lizard*. Species profile and threats database. Department of Agriculture, Water and the Environment (DAWE). Australian Government. Available at http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1649.

DAWE (2015). Consultation document on listing eligibility and conservation actions, *Petauridoes volans (greater glider)*. Department of Agriculture, Water and the Environment (DAWE). Australian Government. Available at https://www.environment.gov.au/biodiversity/threatened/nominations/comment/greater-glider.

DotE (2013). *Matters of National Environmental Significance - Significant impact guidelines 1.1, Environmental Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Australian Government, Canberra, ACT.

DotE (2014) *EPBC Act Referral Guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*, Department of the Environment (DotE), Australian Government, Canberra.

DoPIE (1979). *Environmental Planning and Assessment Act 1979* no 203. Current version 30 October 2020, Prepared by the New South Wales (NSW) Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2013). *Local Land Services Act 2013*. Prepared by the New South Wales (NSW) Environment, Energy and Science Group within the Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2016). *Coastal Management Act 2016*. Prepared by the New South Wales (NSW) Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2017a). *Environmental Planning and Assessment Amendment Act 2017* No 60. Prepared by the New South Wales (NSW) Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2017b). Green and gold bell frog profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10483

DoPIE (2017c). Pink-tailed legless lizard profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10061.

DoPIE (2017d). Black falcon profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20269

DoPIE (2017e). Little eagle profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20131

DoPIE (2017f). Superb parrot profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10645.

DoPIE (2017g). New Holland mouse profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20253.

DoPIE (2018a). *Land Management (Native Vegetation) Code 2018*. Prepared by the New South Wales (NSW) Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2018b). Small purple-pea profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10782

DoPIE (2018c). Austral toadflax profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10802

DoPIE (2019a). White-bellies sea-eagle profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20322

DoPIE (2019b). Brush-tailed rock wallaby profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10605.

DOPIE (2020a). *State Environmental Planning Policy (Koala Habitat Protection) 2020*. Under the Environmental Planning and Assessment Act 1979. Prepared by the New South Wales (NSW) Department of Planning, Industry and Environment (DOPIE), NSW Government.

DoPIE (2020b). Black gum – profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20128

DoPIE (2020c). Tarengo Leek Orchid – profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10666

DoPIE (2020d). Spotted-tailed quoll profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10207.

DoPIE (2021). White-throated needletail - profile. NSW Department of Planning, Industry and Environment (DoPIE). NSW Government. *A*vailable at https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20354.

Fahrig, L. (2003) Effects of habitat fragmentation on biodiversity. *Annual Review of Ecology Evolution and Systematics* **34:** 487-515.

GMC (2009). Goulburn Mulwaree Local Environmental Plan. Current from 19th February 2021, Goulburn Mulwaree Council (GMC). Goulburn, New South Wales.

Hall, I.S. (1981) 'The biogeography of Australian bats', in Keast, A. (ed) *The Ecological Biogeography of Australia*, W. Junk Publishers, The Hague, Boston.

Marchant S, and Higgins PJ (Eds) (1993). 'Handbook of Australian, New Zealand and Antarctic birds', vol. 2. Oxford University Press: Melbourne.

Mecone (2019). Ecological Constraints Assessment – Mountain Ash Road, Brisbane Grove. Mecone, Sydney NSW.

OEH (2012). National Recovery Plan for Button Wrinklewort *Rutidosis leptorrhynchoides*. NSW Office of Environment and Heritage (OEH), Hurstville.

Phillips, S. (1999). Habitat Use by Koalas (*Phascolarctos cinereus*: Goldfuss), Unpub. PhD Thesis, Southern Cross University, Lismore NSW.

Phillips, S., and Callaghan, J. (2000). Tree species preferences of koalas (*Phascolarctos cinereus*) in the Campbelltown area south-west of Sydney, New South Wales Wildlife Research, 27, 509 – 516.

Phillips, S. and Callaghan, J. (2011). The spot assessment technique: a tool for determining localized levels of habitat use by koalas *Phascolarctos cinereus*. Australian Zoologist 35: 774-780.

Phillips, S., Callaghan, J., and Thompson, V. (2000). The tree species preferences of koalas (*Phascolarctos cinereus*) inhabiting forest and woodland communities on Quaternary deposits in the Port Stephens area, New South Wales. Wildlife Research 27, 1 – 10.

TSSC (2011). Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on Amendment to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Threatened Species Scientific Committee (TSSC), Department of the Environment, Water, Heritage and the Arts. Available at https://www.environment.gov.au/biodiversity/threatened/species/pubs/197-listing-advice.pdf

Attachment 2

Engineering Services Report

PLANNING PROPOSAL

THE HUB
MOUNTAIN ASH ROAD, GOULBURN
ENGINEERING SERVICES REPORT

Contents

1. Roads and Lot layout 2
1.1. Site Features 2
1.2. Considerations 3
1.3. Road Layout 3
1.4. Earthworks 3
1.5. Lot Layout 3
2. Flooding 4
3. State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 5
3.1. Treatment of Stormwater Runoff 5
3.2. Effluent Management 5
4. Contamination 6
5. Utility Services 6
5.1. Water Supply 6
5.2. Electrical 6
5.3. Telecommunications 6
5.4. Sewer 6

Attachment A – Layout Plans

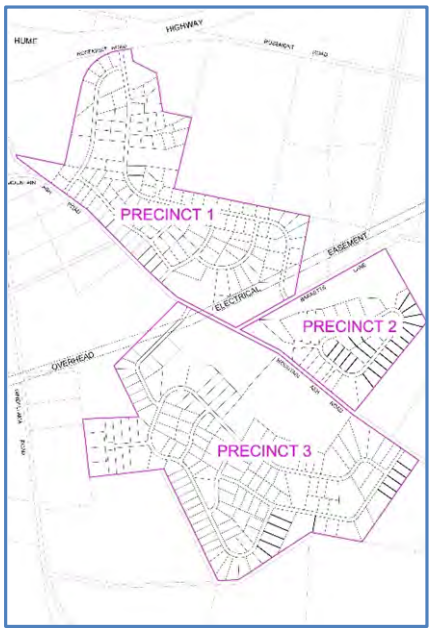
Attachment B - Report on Effluent Disposal - Site and Soil Evaluation

Attachment C - NorBE Assessment Wastewater Effluent Model Summaries

1. Roads and Lot layout

1.1. Site Features

The site is characterized by gently to moderately sloped hillsides generally falling towards Mountain Ash Road with gradients between 2% to 12%. These hillsides contain predominantly 1st and 2nd order drainage depressions and these contain a number of farm dams. Topographical data was obtained from the ELVIS – Elevation & Depth – foundation spatial data. The aerial photo was obtained from Nearmap's Mapbrowser and is dated April 2021.



PRECINCT PLAN

On the western side of Mountain Ash Road two watercourses run parallel through Precinct 3 before converging just prior to the northern boundary of this precinct with an average slope of less than 1%. The watercourse to the east originates on the eastern side of Mountain Ash Road which it crosses by a series of culverts and would be classified as a 3rd order watercourse. The other enters the southern boundary of Precinct 3 as a 1st order depression where it joins with a number of other 1st order depressions.

There is another 3rd order watercourse that crosses Precinct 2 which enters from the eastern boundary near Barretts Lane and then crosses Barretts Lane by culverts near the intersection with Mountain Ash Road and enters Precinct 1. The watercourse then crosses Mountain Ash Road some 400m north of Barretts Lane by multiple box culverts past the northern boundary of Precinct 3.

There is a 45m wide easement for electricity which contains overhead transmission lines that passes through the southern portion of Precinct 1, crosses Mountain Ash Road before cutting through the northern corner of Precinct 3.

There are two existing dwellings on the site, one near the northern boundary of Precinct 1 and the other near the southern boundary of Precinct 3. Both these dwellings have a driveway access onto Mountain Ash Road. These are also a number of other driveway entrances onto Mountain Ash Road to serve other existing lots.

An investigation of the site including site inspections has not identified any areas of salinity within the site itself.

The existing roads that the development site has frontages to are Mountain Ash Road, Rosemont Road and Barretts Lane. All these roads are 20.115m wide sealed roads with 80kph speed zones.

1.2. Considerations

The following items were considered as part of the preparation of the road and lot layout:

- Minimal number of intersections with the existing roads
- Roads and common lot boundaries to avoid crossing an incised watercourse
- The proposed lots will have access from the new roads only
- Water NSW's guidelines 'Water Sensitive Design Guide for Rural Residential Subdivisions'
- A minimum lot size of 4,000m² to allow for a sufficient area for dwellings to be separate to an effluent management area (EMA)
- Sufficient area for dwellings which is separate to an allowance for an EMA located above the 100yr ARI flood level
- A 20m front setback for dwellings to comply with the DCP
- EMA's to be setback a minimum 40m upslope from drainage depressions and 100m setback for an incised watercourse

1.3. Road Layout

The proposed road reserve widths are 20m in accordance with Council's Standards for Engineering Works Design Specification 2013. The new roads will incorporate table drains in accordance with Council's standard drawing SD-R 01 A. The table drains can incorporate mitre drains at regular intervals. It is expected that the any intersections with an existing road will incorporate BAR/BAL treatment.

Precinct 1 has two proposed intersections with Mountain Ash Road and one intersection with Barretts Lane. Precinct 2 has the single access with Mountain Ash Road whilst Precinct 3 has just the two intersections with Mountain Ash Road. This reflects the current number of driveway accesses to the existing lots. All of the proposed intersections have suitable separation from any other intersection whether it be existing or proposed.

The locations of the intersections enable suitable sight distance requirements in accordance with the Austroads guidelines.

Some of the roads follow depressions to avoid common boundaries crossing the flow paths. The roads incorporating a cul-de-sac are all less than 200m in length and suitable in terms of any bushfire risk and council's design specifications.

1.4. Earthworks

The proposal does not include any regrading of the site and hence the required earthworks will be restricted to that required for the roads. As the topography is characterized by gently to moderately sloped hillsides, then there will not be any significant cut and fill required. There may be some works relating to stabilizing the existing 3rd order watercourses but this will largely be limited to battering back of embankments which again will only require minimal earthworks and would not require any removal of spoil from the site nor require any additional material to be brought onsite.

1.5. Lot Layout

The plans in Attachment 'A' show a potential yield of 321 lots. The minimum lot size is 4,000m² where the lot is unencumbered. The area of the lots increases to allow for encroachments by watercourse

setbacks and the 100yr ARI flood extents and thereby retain sufficient areas for a dwelling and EMA. Some of the boundaries of the lots have been skewed to avoid boundary fencing across flow paths.

The two existing dwellings have been located within future allotments with allowances for the required minimum setbacks to the new boundaries. The existing effluent treatment systems will be augmented and relocated as necessary to be retained within the existing lot boundaries.

The proposed lots ARE also sized and shaped to enable future dwellings to be suitably orientated for solar access.

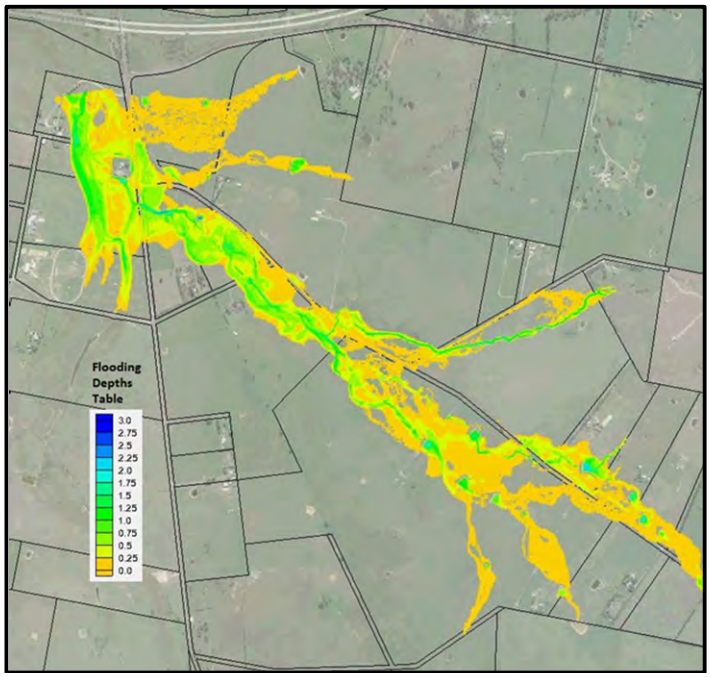
The three 3rd order watercourses are retained within large lots and are crossed by proposed property boundaries on only two occasions. This is to minimise impediments to the flows. Each of these lots contains an area suitable for a dwelling and EMA.

2. Flooding

The extent of the flooding shown on the plans was determined using Hydrological Modeling undertaken using WBNM ('Watershed Bounded Network Model' Boyd et al, 2007) which enables simulation of complex catchment behavior. TUFLOW was then used to model the hydrodynamic behavior in the watercourses and floodplains for the 100yr ARI applying a 120min critical duration.

An analysis was also undertaken of Gundary Creek applying a 720min critical duration. Gundary Creek is a large rural catchment the main channel of which is to the west of Windellama Road. The analysis determined that the rising waters from the Gundary Creek system have little impact on the site.

Below is an extract from the modelling showing the extent and depth of the 100yr ARI inundation. A significant extent of the area subject to flooding during the 100yr ARI is between 0 and 250mm.



A sensitivity analysis was also undertaken for the 50yr ARI which determined that the extent of inundation was largely similar to that determined for the 100yr ARI. The attached drawing T01405-HUB-SITE-FEATURES-SK102 shows 100yr ARI flood extents. The plan also shows the centerlines

of the drainage paths and setbacks of either 40m or 100m dependent upon whether the drainage path has caused an incision into the ground surfaces.

The analysis determined that the rising waters from the Gundary Creek system have little impact on the Planning Proposal site nor potential future layout.

3. State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The subject site is located within the Sydney Drinking Water Catchment Area. Therefore, concurrence will be required from Water NSW for any proposed development of the site relating to achieving a Neutral or Beneficial Effect (NorBE) in regards to stormwater runoff quality and effluent management.

Discussions were held with the local Water NSW officer regarding the site. The site assessment to achieve NorBE incorporated the application of the department's guidelines particularly the *Water Sensitive Design Guide for Rural Residential Subdivisions 2021*. The assessment included site inspections to classify the existing watercourses. Furthermore, there were no indications from the inspections of any areas of salinity and/or possible contamination and there was only the one localized area of rock outcrops.

The result of the assessment is that the development site would be able to support onsite effluent management areas within unencumbered lots of 4,000m².

3.1. Treatment of Stormwater Runoff

As discussed above, the proposed roads will incorporate table drains which will assist in treating the runoff from the roads. To offset any increase in pollutants in the runoff from the site, it is proposed that tree planting is undertaken along the main watercourses. The widths of planting would be in the order of 10-15m wide and will be fenced. This could also be applied in conjunction with modifying the two 3rd order watercourses within Precinct 3 to create one channel.

3.2. Effluent Management

For each lot, an area of up to approximately 2,000m² for an Effluent Management Area (EMA) has been considered in the determination of the proposed lot sizes & layout. A process in accordance with the Water NSW's guidelines 'Water Sensitive Design Guide for Rural Residential Subdivisions' was applied to support this area for an EMA to each lot.

A Site & Soil Evaluation was undertaken by ACT Geotechnical Engineers P/L which included 31 test holes across the proposed development site. The report is included in Attachment 'B'.

The data from the report was then entered into the WaterNSW's NorBE assessment tool for a number of test locations applying:

- Four bedrooms excluding a spa bath
- Rainwater water supply
- Standard Aerated Wastewater Treatment System (AWTS)
- Sub-surface irrigation for disposal
- Ground water generally >1m deep as none test holes encountered any ground water
- The calculated permeability applied where suitable
- Slope gradients were obtained from the terrain model

The AWTS system was trialed as this would be the most likely cost-effective methodology of wastewater treatment but other treatment systems would also be suitable. A spa bath was included for

one of the locations and the required area of treatment was less than 2,000m². The results of the test holes entered into the assessment tool would be indicative of the whole of the site and supported the area of 2,000m² for the EMA's. The proposed lot layout will require some additional refinement during the preparation of a Development Application including identifying the location of table drains to the proposed roads.

Attachment 'C' contains the NorBE assessment summaries with the test hole reference number shown on the top left corner.

4. Contamination

Currently a large area of the site is being used for agriculture which may require the use of fertilisers and possibly pesticides. The planning proposal has the potential to reduce the amount of contaminates that would currently be washed into the existing depressions and watercourses. The Site & Soil Evaluation undertaken by ACT Geotechnical Engineers P/L also included test results for the presence of organochlorine pesticides (OCP) and organophosphorus pesticides (OPP) in three locations. The results of these tests were assessed against the National Environmental Protection Measure (NEPM and were significantly below the required health-based investigation levels for residential development.

Given the results of soils testing, the proposal is considered to be in accordance with the requirements of *SEPP55 – Remediation of Land* and as the results presented are significantly below health requirements, remediation is unlikely to be required.

The site is therefore considered to be low in risk with regard to contamination and is unlikely to present any concerns for future residents.

5. Utility Services

5.1. Water Supply

The nearest Council water main is located on the other side of the Hume Highway approximately 1km away from the intersection of Rosemont Road and Windellama Road. It is understood that the pipe size is 100mm which is expected to have insufficient capacity to service the site.

There is potential for upgrading this reticulated service with provision o pump station and rising main extension, alternatively on site supply of water can be collected via rain water tanks. It is expected that in such circumstances future dwellings will be required to have not less than 46,000 litres of roof water storage for domestic purposes in accordance with the DCP.

5.2. Electrical

There is an overhead electrical service along Mountain Ash Drive from which it is expected that electrical power can be expanded through the proposed road layout to service the new lots.

5.3. Telecommunications

There are existing telecommunication services within Mountain Ash Road, Rosemont Road and Barretts Lane. Telecommunication services to the lots can be reticulated from these existing services.

5.4. Sewer

Connection of the site to an existing sewerage system is unavailable and therefore wastewater will be required to treated and disposed of onsite.

ATTACHMENT A
Layout Plans

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY

DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 1:8000 (A3)
0 20 40 80 120 160 200

DRAWN: SWC	DESIGNED	DATE	
DATE: SEP '20	VERIFIED	DATE	
SCALE	APPROVED	DATE	

S.R.L.E.
SOUTHERN REGION LAND ENGINEERING
telephone (02) 4823 5577
mobile 0417 235 415
167 Bourke Street, Goulburn NSW 2580
P.O. Box 111, Thirroul NSW 2515

PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
LOT LAYOUT

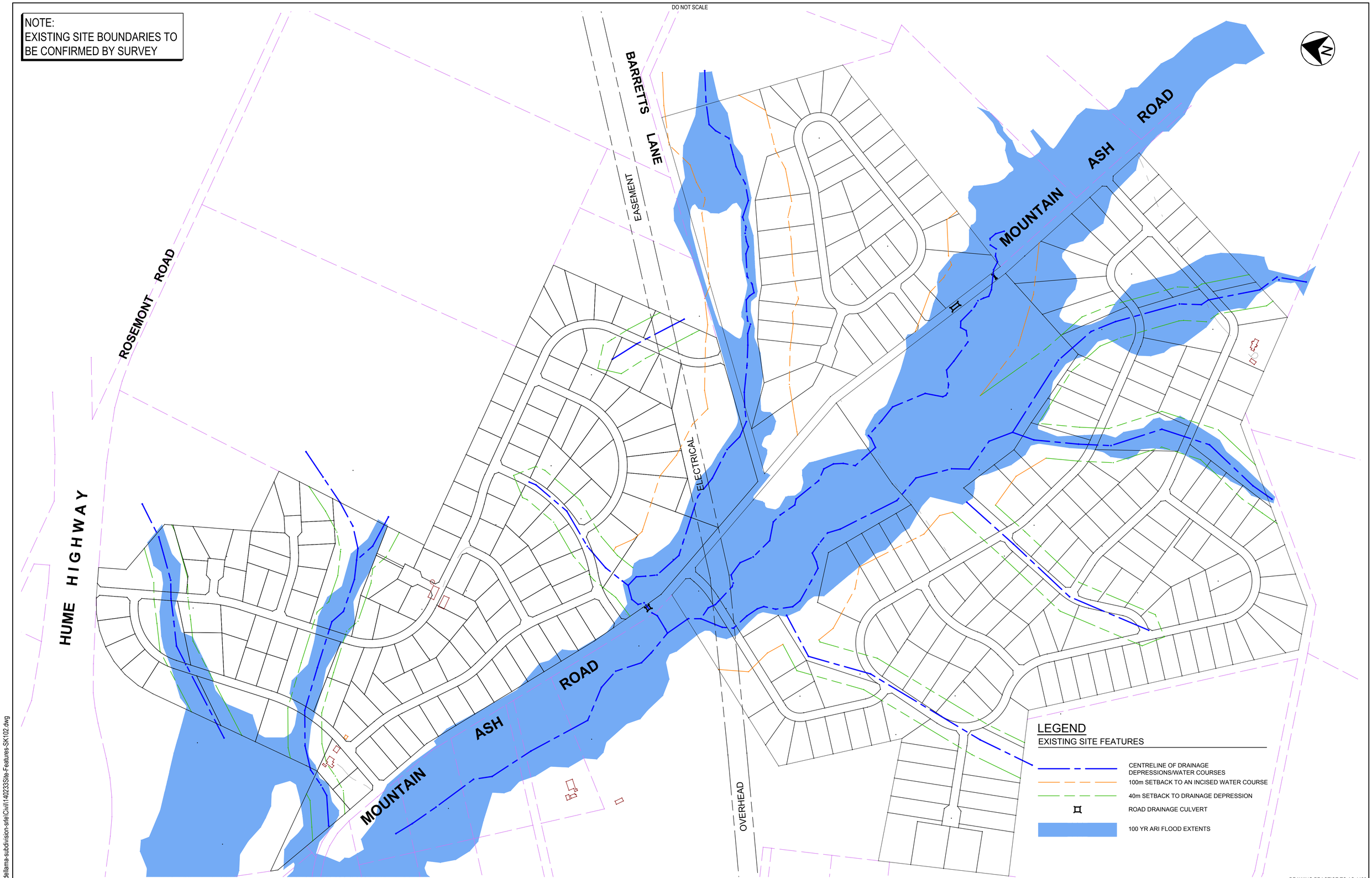
DRG. No. T01405-SK101 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:07:54 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\1140233-windellama-subdivision-srle\Civil\1140233-Lot-Layout-SK101.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
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FUNCTIONAL LAYOUT

SCALE IN METRES
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DRAWN: SWC	DESIGNED:	DATE:
DATE: SEP '20	VERIFIED:	DATE:
SCALE:	APPROVED:	DATE:

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PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
EXISTING
SITE FEATURES

DRG. No. T01405-SK102 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:10:09 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
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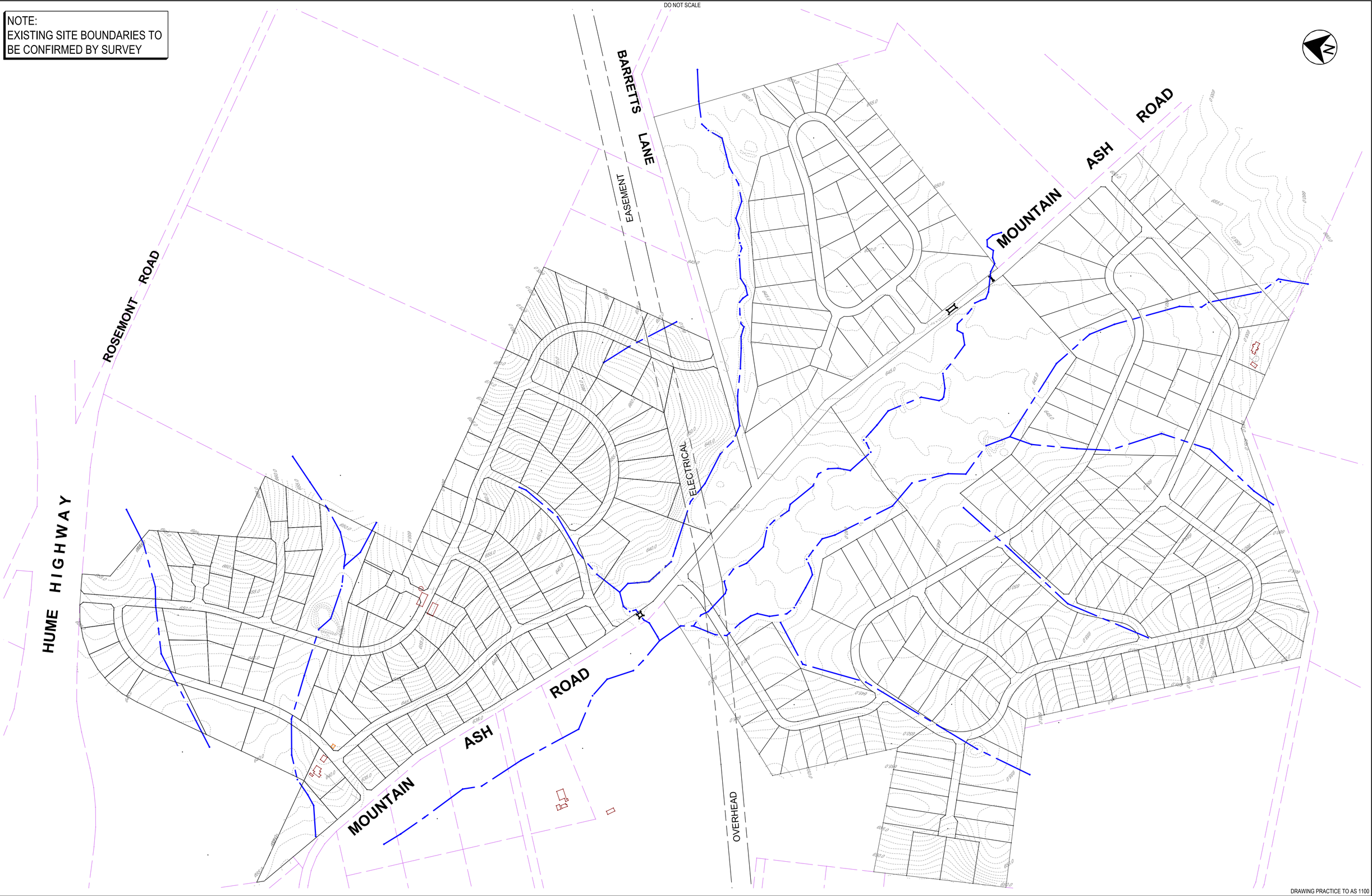
DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 1:8000 (A3)
0 20 40 80 120 160 200

DRAWN: SWC	DESIGNED	DATE
DATE: SEP '20	VERIFIED	DATE
SCALE	APPROVED	DATE

S.R.L.E.
SOUTHERN REGION LAND ENGINEERING
telephone (02) 4823 5577
mobile 0417 235 415
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PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
SITE CONTOURS

DRG. No. T01405-SK103 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:08:10 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\140233-windellama-subdivision-site\Civil\140233 Site Contourss-SK103.dwg

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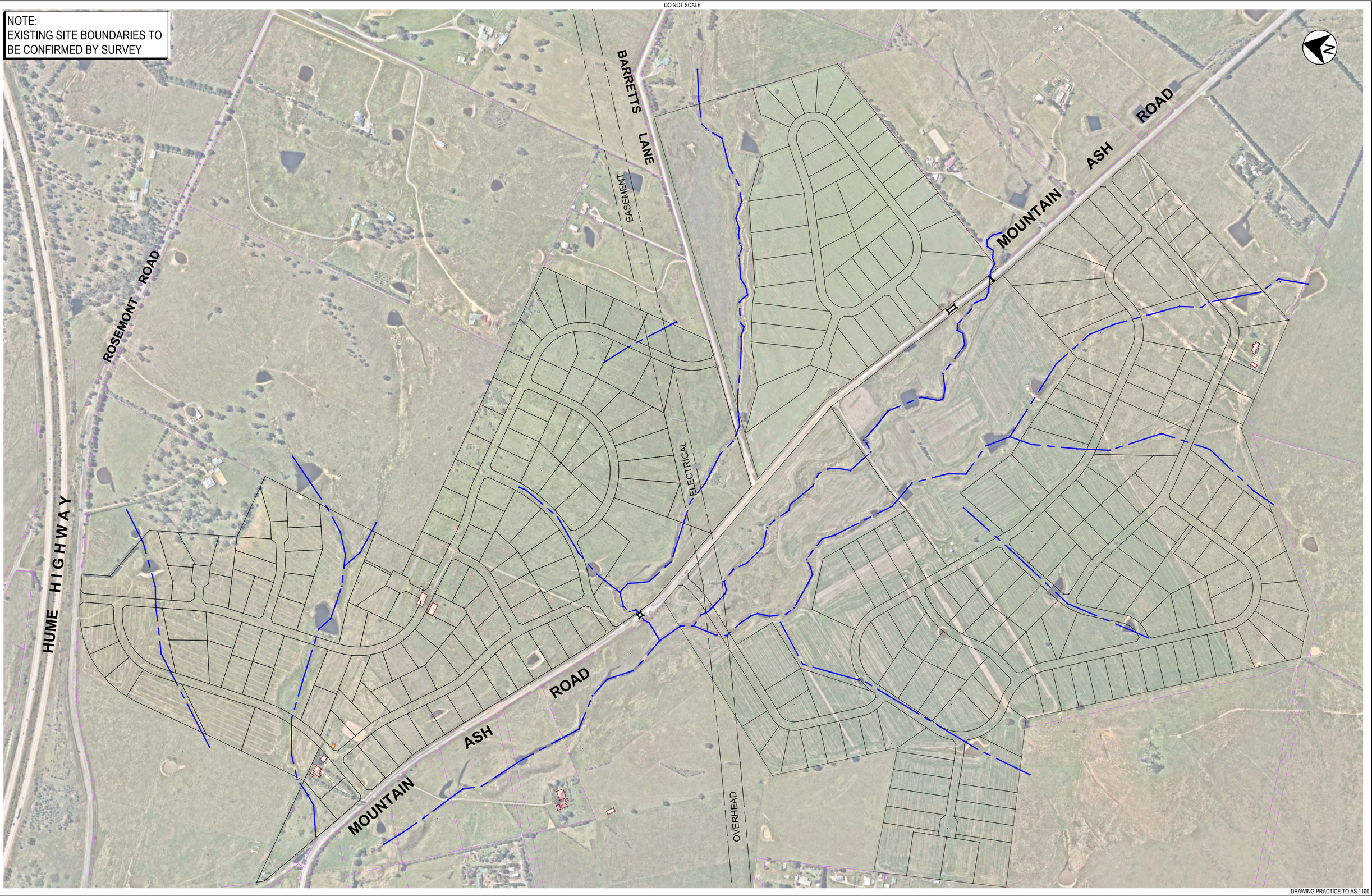
DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 0 20 40 80 120 160 200 1:8000 (A3)

DRAWN: SWC	DESIGNED:	DATE:
DATE: SEP '20	VERIFIED:	DATE:
SCALE:	APPROVED:	DATE:

S.R.L.E.
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PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
SITE AERIAL

DRG. No. T01405-SK104 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:08:19 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\1402233-windellama-subdivision-srle\Civil\140233 Site Aerial-SK104.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL

ATTACHMENT B
ACT Geotechnical Engineers Pty Ltd
Report on Effluent Disposal
Site and Soil Evaluation

Geotechnical Engineers ACT

ACT Geotechnical Engineers Pty Ltd
ACN 063 673 530

5/9 Beaconsfield St, Fyshwick, ACT, 2600
PO Box 9225, Deakin, ACT, 2609
Ph: (02) 6285 1547

5 July 2021
Our ref: KA/C11822

Southern Region Land Engineering
Via email: gregtodd.srle@gmail.com

Attention: Greg Todd

BRISBANE GROVE RURAL SUBDIVISION
ROSEMONT ROAD & MOUNTAIN ASH ROAD, GOULBURN, NSW
EFFLUENT DISPOSAL – SITE AND SOIL EVALUATION

1 Introduction

At the request of Southern Region Land Engineering, ACT Geotechnical Engineers Pty. Ltd carried out an effluent disposal assessment to AS1547 "On-Site domestic wastewater management", for the proposed Brisbane Grove Rural Subdivision along Rosemont Road and Mountain Ash Road, in Goulburn, NSW.

The project comprises a new residential subdivision, and the client would like to maximize the yield by having lot sizes of ~4000m^2. To allow this yield, it must be proved that the land can absorb the wastewater within the desired lot size.

This Site and Soil Evaluation was conducted in general accordance with AS 1547:2012 - "On-site domestic wastewater management", "Designing and Installing On-Site Wastewater Systems: A WaterNSW Current Recommended Practice: 2019", and "The Environment & Protection Guidelines 1998 – On-Site Sewage Management for Single Households" (Silver Book).

The site details and assumptions made to assess the requirements of the effluent disposal system are outlined in Table 1 below.

The details of the site and proposed works are summarized in Table 1 below.

TABLE 1 – SITE DETAILS

Area of Lots	Approx. 4000m^2
Rainfall Station	070330 – Goulburn Airport AWS NSW
Evaporation Station	070263 – Goulburn TAFE

2 Effluent Disposal Site and Soil Assessment

The proposed locations were assessed and the site limitations are addressed below.

The 1:100,000 Goulburn Geology Map documents the area to be covered by Quaternary Age residual and colluvial deposits underlain by Siluro-Devonian aged Mount Fairy Group and Bindook Group bedrock comprising Back Station Ignimbrite, Saltpetre Andesite, and Bullamalita Conglomerate.

2.1 Site Limitation Assessment

Table 2 below is a site assessment of the proposed lot locations, and have been assessed using Table 1 from "On-site Sewage Management for Single Households". The table used for this assessment is attached to this report.

TABLE 2 – SITE ASSESSMENT

Borehole / Location	Slope/ Direction	Exposure to sun/wind	Landform / Slope	Erosion Potential	Presence of Fill	Rock Outcrops (%)	Groundwater
A01	<10% / E	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A02	<10% / N	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A03	10-20% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A04	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A05	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A06	<10% / S	High	Linear/Waning Planar	Low/Not evident	Not found	<10%	Not encountered
A07	<10% / S	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A08	<10% / S	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
A09	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
A10	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B01	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B02	<10% / W & SW	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
B04	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C01	<10% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C02	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
C04	<10% / E	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D01	<10% / N & W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D02	<10%	High	Linear Planar – some ponding encountered	Low/Not evident	Not found	<10%	Not encountered
D03	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D04	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered

Borehole / Location	Slope/ Direction	Exposure to sun/wind	Landform / Slope	Erosion Potential	Presence of Fill	Rock Outcrops (%)	Groundwater
D05	<10% / N	High	Waxing Divergent	Low/Not evident	Not found	<10%	Not encountered
D07	<10% / SW	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D08	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D09	<10% / N	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D10	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
D11	10-20% / S	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E01	<10%	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E02	<10%	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered
E03	<10% / W	High	Linear Planar	Low/Not evident	Not found	<10%	Not encountered

2.2 Sub-surface Conditions

To establish the subsurface conditions, thirty-one (31) test holes were drilled at client-provided locations around the proposed subdivision. Figure 1 shows the site locality, while Figures 2 and 3 are aerial photographs showing the location of the investigation boreholes. The subsurface profiles were logged in terms of the Unified Soil Classification System (USCS). The borehole logs can be found in Appendix B.

2.2.1 Site Soil Properties

Based on the soil encountered and in accordance with AS1547:2012 – "Disposal Systems for Effluent From Domestic Premises" (Reference 2), the properties of the most limiting material are summarised in Table 3 below.

TABLE 3 – SOIL ASSESSMENT

Borehole / Location	Depth of Borehole (m)	Depth of Topsoil (m)	Depth of Bedrock (m)	Soil Texture	Soil Structure	Approx. Bulk Density (g/cm^3)	Indicative Permeability (m/day)
A01	1.3	0.15	>1.3	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
A02	1.3	0.10	>1.3	Light Clays	Moderately-structured	1.8	0.06 – 0.12
A03	1.4	0.25	>1.4	Light Clays	Moderately-structured	1.8	0.06 – 0.12
A04	1.4	0.30	>1.4	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
A05	1.3	0.30	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
A06	1.4	0.20	>1.4	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
A07	1.4	0.25	>1.4	Light Clays	Moderately-structured	1.8	0.06 – 0.12
A08	1.4	0.15	>1.4	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
A09	1.3	0.2	>1.3	Sandy Loams	Weakly-structured	1.6	1.4 – 3.0
A10	1.2	0.2	>1.2	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
B01	1.1	0.2	1.0	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
B02	1.4	0.2	>1.4	Light Clays	Moderately-structured	1.8	0.06 – 0.12
B03	1.2	0.2	>1.2	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
B04	1.4	0.2	>1.4	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
C01	0.9	0.2	0.9	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
C02	1.3	0.15	>1.3	Medium to Heavy Clays	Moderately-structured	2.0	<0.06
C03	1.4	0.2	>1.4	Light Clays	Moderately-structured	1.8	0.06 – 0.12

Borehole / Location	Depth of Borehole (m)	Depth of Topsoil (m)	Depth of Bedrock (m)	Soil Texture	Soil Structure	Approx. Bulk Density (g/cm^3)	Indicative Permeability (m/day)
C04	1.3	0.3	>1.3	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
D01	1.3	0.2	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
D02	1.3	0.3	>1.3	Sandy Loams	Weakly-structured	1.6	1.4 – 3.0
D03	1.3	0.15	>1.3	Light Clays	Moderately-structured	1.8	0.06 – 0.12
D04	1.3	0.2	>1.3	Light Clays	Moderately-structured	1.8	0.06 – 0.12
D05	1.3	0.2	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
D07	1.3	0.2	>1.3	Clay Loams	Weakly-structured	1.6	0.12 – 0.5
D08	1.3	0.2	1.2	Light Clays	Moderately-structured	1.8	0.06 – 0.12
D09	1.3	0.2	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
D10	1.4	0.2	>1.4	Medium to Heavy Clays	Massive/weakly-structured	2.0	<0.06
D11	1.4	0.3	>1.4	Light Clays	Moderately-structured	1.8	0.06 – 0.12
E01	1.3	0.3	>1.3	Loams	Massive/weakly-structured	1.5	0.5 – 1.5
E02	1.3	0.2	>1.3	Clay Loams	High/moderate structured	1.6	0.5 – 1.5
E03	1.3	0.15	>1.3	Light Clays	Moderately-structured	1.8	0.06 – 0.12

2.2.2 Permeability Testing

Soil percolation (falling head) tests were conducted on three areas within the proposed subdivision in order to assess the permeability of the soils in the area. The percolation tests were conducted in general accordance with the falling head test method described in AS1547-1994 "Disposal Systems for Effluent From Domestic Premises".

Three (3) ~0.45m-0.5m deep test holes were excavated using a 100mm diameter hand auger at locations which were considered to be representative of typical soil conditions within the site. 100mm diameter PVC pipes were then placed inside of the test holes to ensure the stability of the walls, and a 50mm thick layer of gravel was placed over the bottom of the test hole to prevent scouring of the bottom when water is added. The holes were filled with water and left for an initial saturation of the ground. Once the falling rate of the water has stabilized, depth and time measurements were taken to calculate the permeability of the soil. The calculated permeability values are summarised in Table 4.

TABLE 4 – PERCOLATION TESTING RESULTS

Test Number	Location	Soil Category	Calculated Permeability (m/day)	Indicative Permeability – from AS1547:2012 (m/day)
P1	Near A2	Light Clays – moderately structured	1.309 m/day	0.06 - 0.12
P2	Near C3	Light Clays – moderately structured	1.019 m/day	0.06 - 0.12
P3	Near D4	Light Clays – moderately structured	1.440 m/day	0.06 - 0.12

2.2.3 Laboratory Results

Five (5) representative samples were sent to a NATA accredited environmental testing laboratory for pH, electrical conductivity, Emerson testing, and phosphorus sorption capacity. The results of these tests are summarized in Table 5. The Laboratory Certificates of Analysis are included in Appendix C.

TABLE 5 – LABORATORY TEST RESULTS ON SOIL PROPERTIES

Soil Test	Borehole / Sample Depth				
	A7 (0.1m – 0.4m)	**A10 (0.0m – 0.3m)**	**B2 (0.3m – 0.6m)**	**D3 (0.15m – 0.4m)**	**D11 (0.3m-0.5m)**
pH	**6.5**	**5.3**	**5.5**	**5.8**	**6.8**
Electrical Conductivity (µS/cm)	**36**	**52**	**34**	**46**	**52**
Emerson Class No.	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
Phosphorus Sorption Capacity (mg/kg)	**510**	**380**	**590**	**940**	**770**

Five (5) samples from client-specified locations were also sent to a NATA accredited environmental testing laboratory to test for the presence of organochlorine pesticides (OCP) and organophosphorus pesticides (OPP). The results of these tests, including assessment against the National Environmental Protection Measure (NEPM) 1999, (as amended 2013) human health guideline values for commercial and industrial land uses, are shown in Table 6.

TABLE 6 – LABORATORY TEST RESULTS ON SOILS FOR PESTICIDES

Contaminant	Borehole / Sample Depth					Required health-based investigation levels (HIL) (mg/kg)	
	A6 (0.0m – 0.2m)	B4 (0.0m – 0.2m)	C2 (0.0m – 0.4m)	D2 (0.0m – 0.2m)	D4 (0.0m – 0.2m)	Residential A[1]	Residential B[2]
OCPs (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<6 (i)	<10 (i)
OPPs (mg/kg)	<0.1	<0.1	<0.1	<0.1	<0.1	<6 (i)	<10 (i)

Notes:

[1] HIL A – Residential with garden/accessible soil (home grown produce

[2] HIL B – Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments

(i) Lowest OCP/OPP specified guideline value

4 Effluent Disposal Recommendations

The local council should be consulted regarding its on-site sewage management policy and required minimum buffer distances (depending on the proposed effluent disposal system).

A fence should be placed around the effluent disposal areas if there is a risk of children, animals or vehicles coming into the area. Signage, complying with AS1319 shall be placed in at least two places at the boundary of the application area, clearly visible to property uses, with wording such as "Recycled Water – Avoid Contact – DO NOT DRINK".

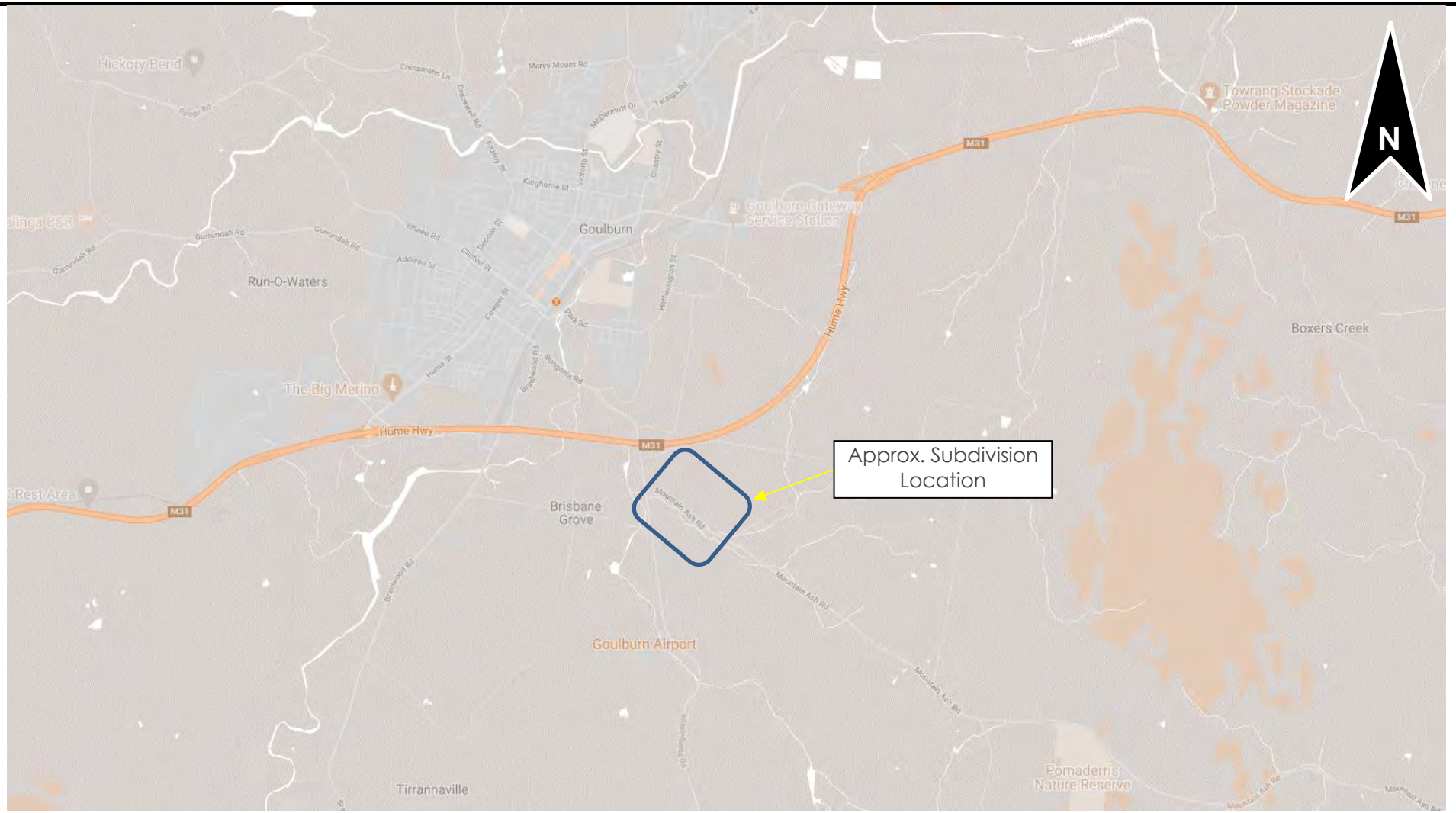
The treated effluent is not suitable for vegetable gardens or areas where people can come in contact with the effluent.

The areas should not be used for any purposes that compromise the effectiveness of the system or access for future maintenance purposes.

Should you require any further information regarding this report, please do not hesitate to contact our office.

Yours faithfully
ACT Geotechnical Engineers Pty. Ltd.

Jeremy Murray
Director
Senior Geotechnical Engineer
Attachments: Figures 1 to 3, Appendix A to D



SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
SITE LOCALITY

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 1**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
AERIAL PHOTOGRAPH AND BOREHOLE LOCATIONS

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 2**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
AERIAL PHOTOGRAPH AND BOREHOLE LOCATIONS

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 3**

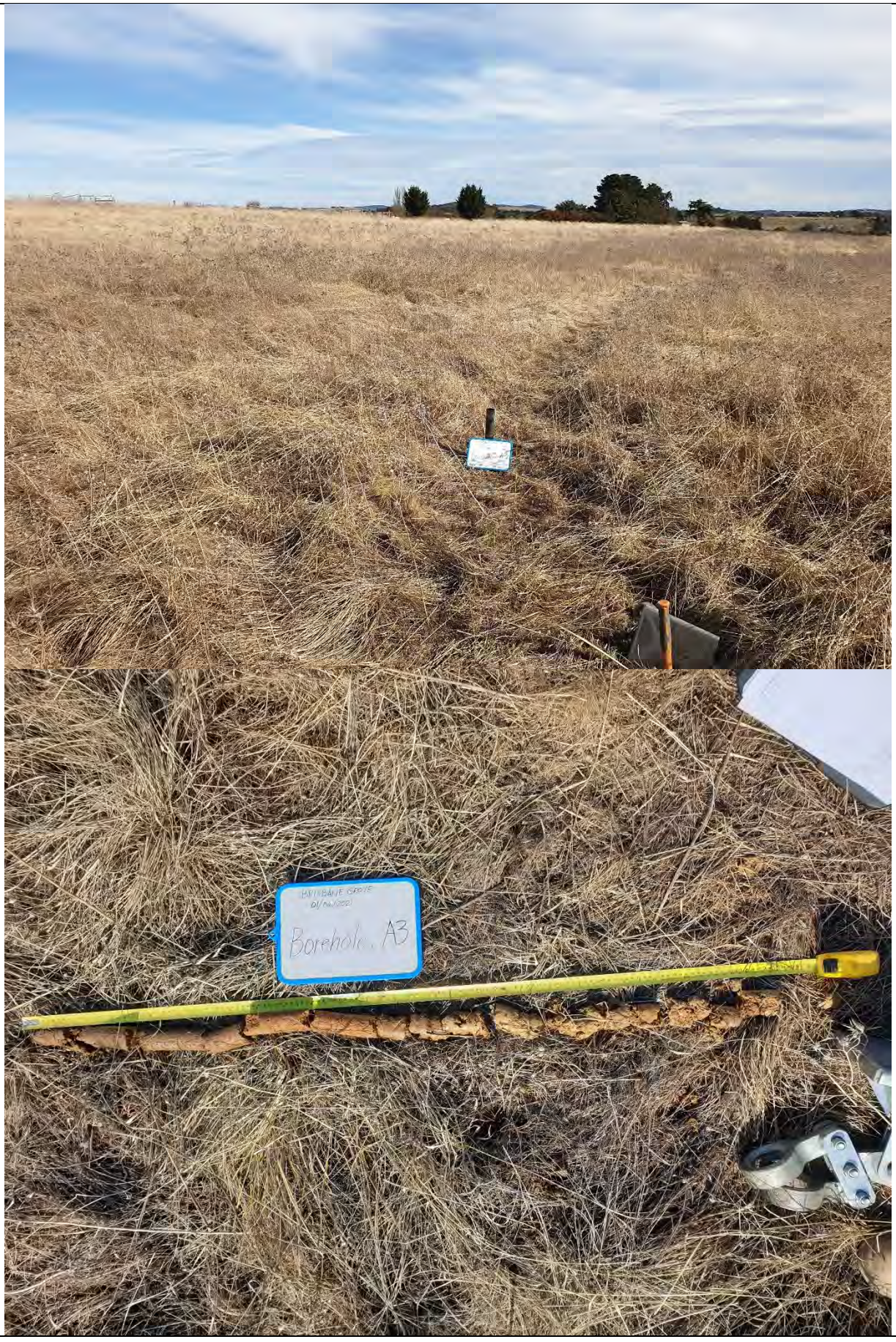
APPENDIX A
Location and Soil Core Photos

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A1)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 1a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A2)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 2a**

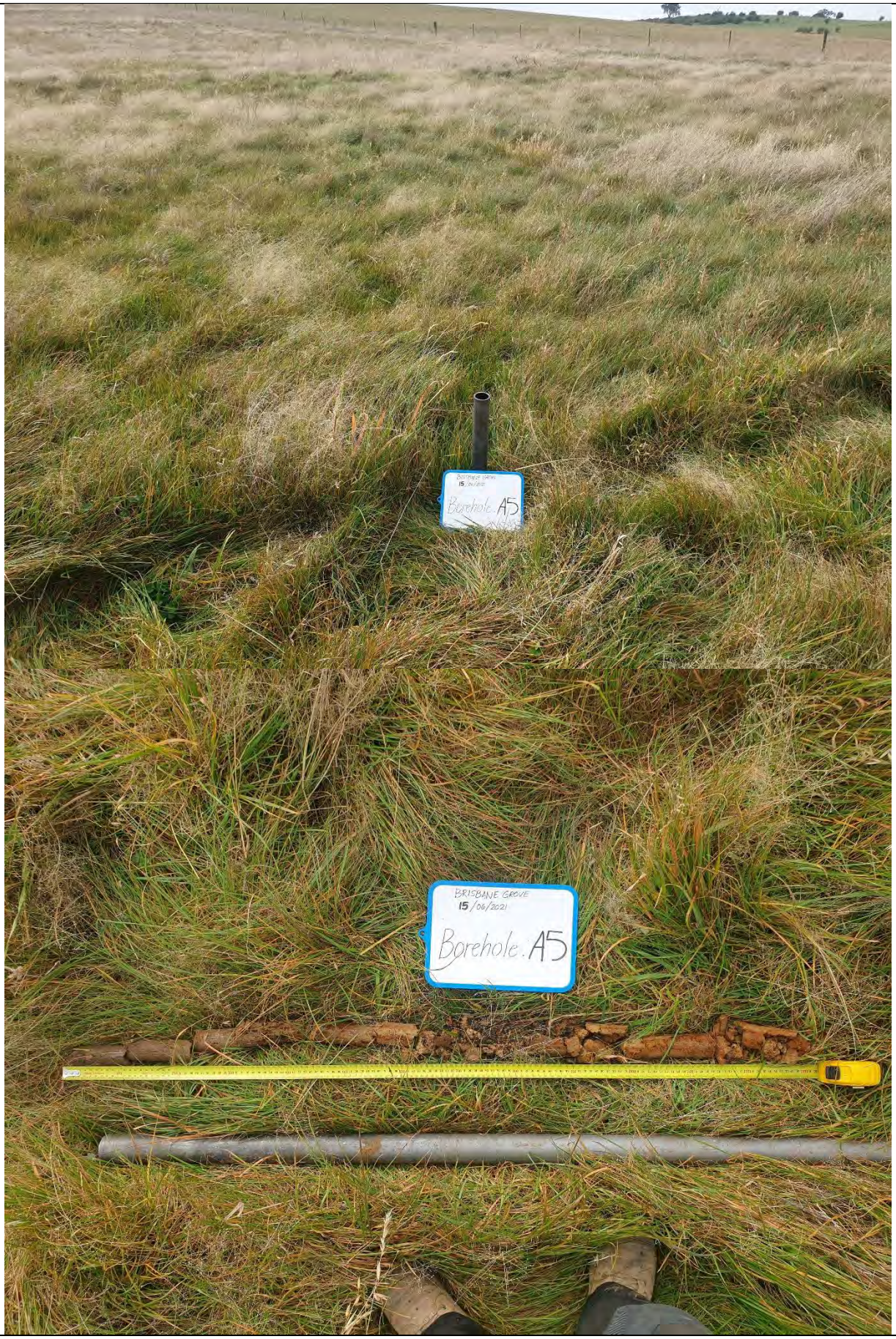


SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A3)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 3a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A4)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 4a**



SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A5)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 5a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A6)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 6a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A7)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 7a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A8)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 8a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A9)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 9a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (A10)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 10a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (B1)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 11a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (B2)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 12a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (B3)

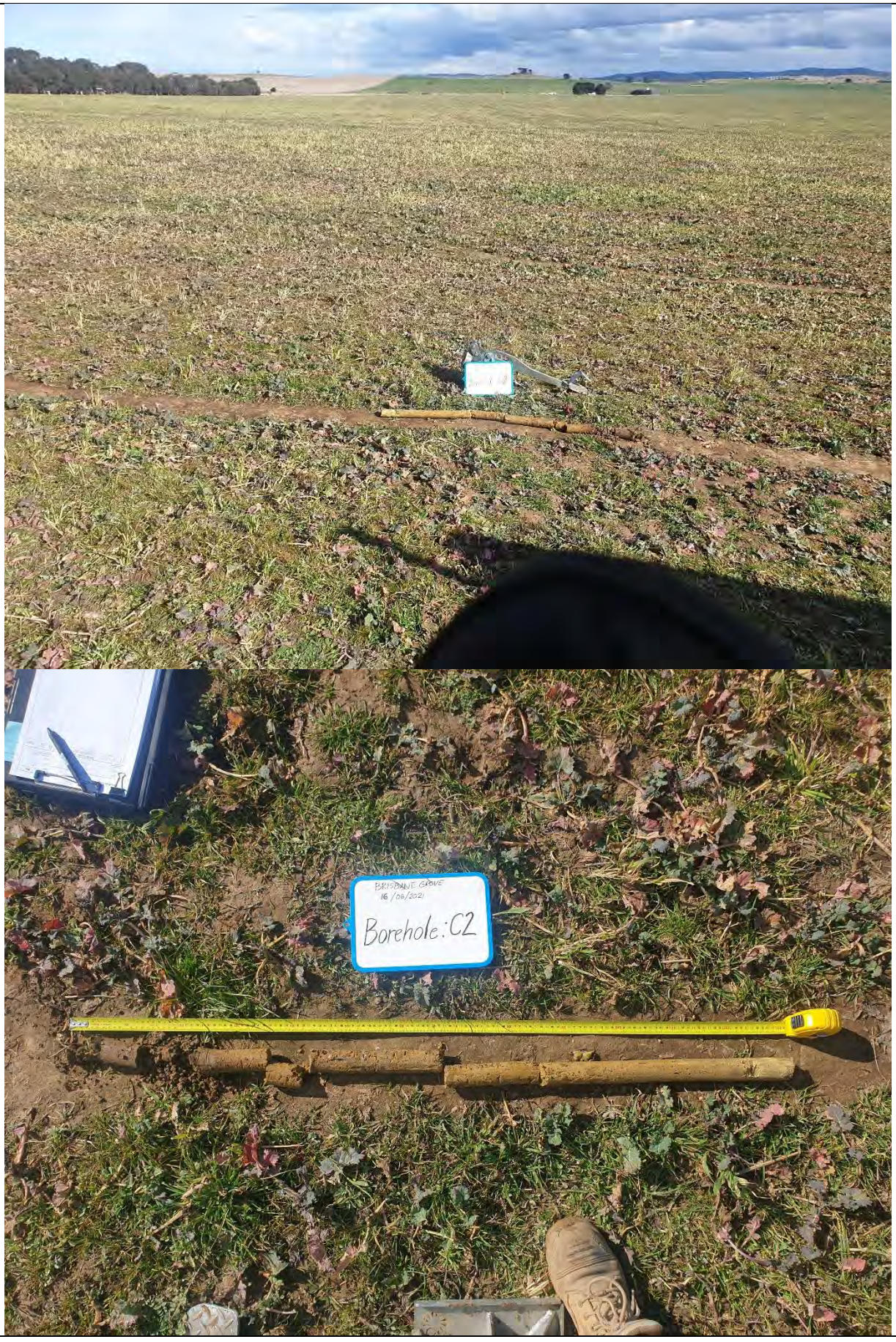
ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 13a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (B4)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 14a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (C1)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 15a**



SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (C2)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 16a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (C3)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 17a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (C4)

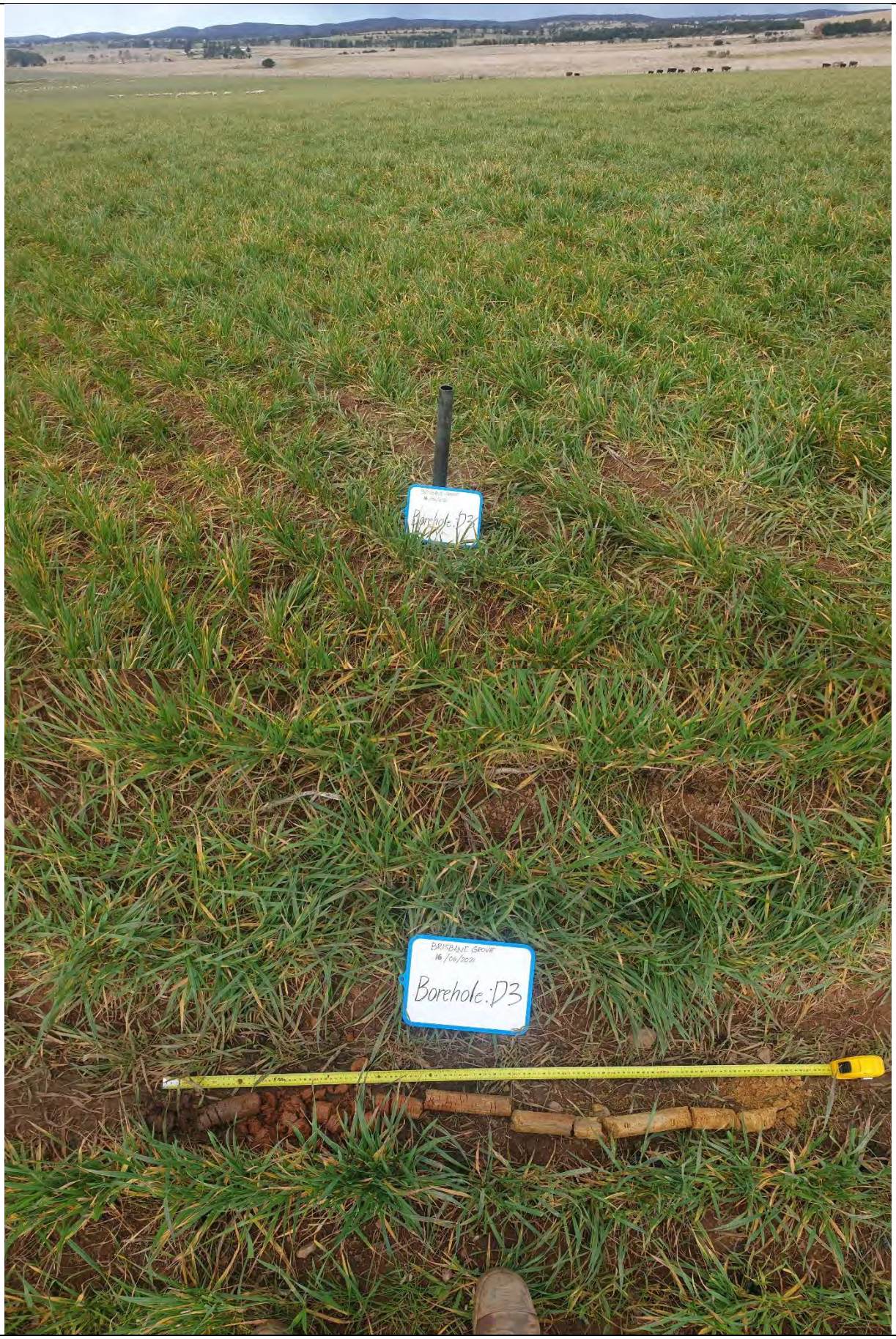
CT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 18a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D1)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 19a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D2)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 20a**



SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D3)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 21a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D4)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 22a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D5)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 23a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D7)

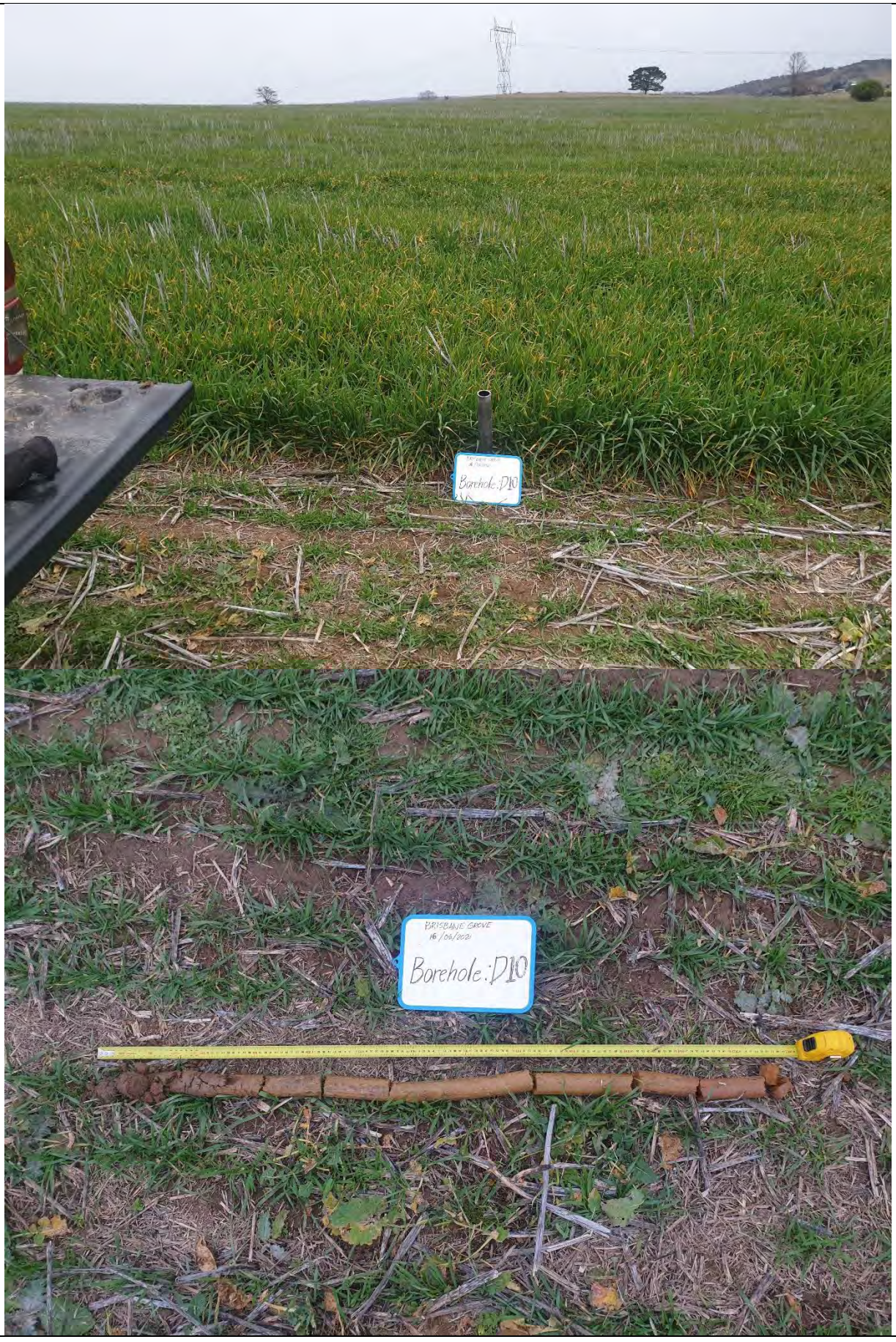
ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 24a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D8)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 25a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D9)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 26a**



SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D10)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 27a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (D11)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 28a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (E1)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 29a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (E2)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 30a**

SOUTHERN REGION LAND ENGINEERING
BRISBANE GROVE RURAL SUBDIVISION
LOCATION AND SOIL CORE PHOTOS (E3)

ACT Geotechnical Engineers Pty Ltd	**C11822**	**FIGURE 31a**

APPENDIX B
Borehole Logs A01 to E03

Borehole Log

Borehole No.	**A01**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.15		ML	Sandy SILT; low plasticity silt, fine to medium grained sand, light brown, light grey, moist.	FIRM		SLOPEWASH
		0.4		CH	CLAY; medium to high plasticity clay, orange-grey mottled, dry to moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		0.8		CH	CLAY; high plasticity clay, orange-grey mottled, dry.	VERY STIFF		
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

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Borehole Log

Borehole No.	**A02**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.1		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.3		ML	Silty Gravelly SAND; fine to medium grained sand, low plasticity silt, fine to medium grained sedimentary gravel, brown, dry to moist.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.6		CL	Sandy Gravelly CLAY; low to medium plasticity clay, fine to coarse sand, fine to medium grained sedimentary gravel, orange-brown, dry.	STIFF		
		1.0		SC	Sandy CLAY / Clayey SAND; fine to coarse sand, low to medium plasticity clay, yellow-brown, orange-brown, dry.	STIFF / MEDIUM DENSE		RESIDUAL SOIL
		1.3		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, yellow-brown mottled orange-brown, dry.	STIFF TO VERY STIFF		
		1.6			BOREHOLE TERMINATED AT 1.3m			

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Borehole Log

Borehole No.	**A03**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.25		CL	Silty Sandy CLAY; low to medium plasticity fines, fine to medium grained sand, orange-brown, moist.	FIRM TO STIFF		ALLUVIUM
		0.5		CL-CH	Sandy CLAY; medium plasticity clay, fine to coarse sand, light brown, moist to wet.	FIRM TO STIFF		
		1.0						
		1.1		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, fine gravel and ferruginous nodules, light brown, brown, dry.	VERY STIFF		
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

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Borehole Log

Borehole No.	**A04**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.3		CL	Silty CLAY; low to medium plasticity clay, some fine to medium grained sand, yellow-brown, light brown, trace fine gravel and ferruginous nodules to 5mm, dry to moist.	STIFF		ALLUVIUM
		0.8		SC	Clayey Gravelly SAND; fine to coarse sand, fine to medium grained sedimentary gravel, low plasticity clay, red-brown, brown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

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Borehole Log

Borehole No.	**A05**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.3		CL	Silty Sandy CLAY; low plasticity fines, fine to medium grained sand, light brown, moist.	FIRM TO STIFF		ALLUVIUM
		0.6		SC	Clayey Gravelly SAND; fine to coarse sand, fine gravel and ferruginous nodules, low plasticity clay, orange-brown, some grey, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**A06**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure (Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure)	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.4		ML	Sandy SILT; low plasticity silt, fine to medium grained sand, light brown, moist.	FIRM		ALLUVIUM
		0.6		CL	Silty Gravelly CLAY; low to medium plasticity fines, fine to medium grained sedimentary gravel, light brown, some red-brown, moist.	STIFF		
		0.9		CH	Sandy CLAY; medium to high plasticity clay, fine to medium grained sand, light brown, moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.0		SC	Clayey Gravelly SAND; fine to coarse sand, fine to medium grained gravel and ferruginous nodules, low to medium plasticity clay, light brown, orange-brown, dry to moist.	DENSE		
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**A07**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.25		ML	Sandy Gravelly SILT; low plasticity silt, fine to coarse sand, low plasticity silt, brown, orange-brown, dry.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.5		SC	Clayey Gravelly SAND; fine to coarse sand, fine to medium grained sedimentary gravel, low plasticity clay, orange-brown, red-brown, dry.	MEDIUM DENSE TO DENSE		RESIDUAL SOIL
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**A08**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.15		CL	Sandy Silty CLAY; low to medium plasticity fines, fine to medium grained sand, red-brown, dry.	FIRM		ALLUVIUM
		0.7		CL	Sandy CLAY; low to medium plasticity clay, fine to coarse sand, yellow-brown mottled orange-brown, dry.	STIFF		RESIDUAL SOIL
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

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Borehole Log

Borehole No.	**A09**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SM	Silty Gravelly SAND; fine to coarse sand, low plasticity silt, fine gravel and ferruginous nodules, grey, dry.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.8		CL	Silty Gravelly CLAY; low plasticity fines, fine gravel and ferruginous nodules, grey/black, dry.	STIFF		RESIDUAL SOIL
		1.0						
		1.2		CL-CH	Sandy CLAY; fine to medium grained sand, medium plasticity clay, orange-grey mottled, dry.	VERY STIFF		
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

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Borehole Log

Borehole No.	**A10**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		CL	Sandy Silty CLAY; low plasticity fines, fine to medium grained sand, light brown, moist to wet.	FIRM		ALLUVIUM
		0.7		CL-CH	Sandy CLAY; medium plasticity clay, fine to medium grained sand, trace ferruginous nodules to 5mm, orange-grey mottled, dry.	STIFF		RESIDUAL SOIL
		1.0		SC	Clayey Gravelly SAND; fine to coarse sand, low plasticity clay, fine to coarse gravel and quartz, orange-grey, dry.	DENSE		
		1.2			BOREHOLE TERMINATED AT 1.2m refusal			
		1.6						

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**B01**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, dark brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.6		SC	Clayey Gravelly SAND; fine to coarse sand, low plasticity clay, fine to medium grained sedimentary gravel, brown, red-brown, moist.	MEDIUM DENSE		COLLUVIUM
		1.0		CL	Sandy CLAY; low to medium plasticity clay, fine to coarse sand, brown, dry.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.1			Extremely Weathered (EW) SANDSTONE; fine to medium grained, light brown, dry.	EXTREMELY WEAK		
		1.6			BOREHOLE TERMINATED AT 1.1m refusal			

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Borehole Log

Borehole No.	**B02**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		CL	Silty Sandy CLAY; low plasticity fines, fine sand, light brown, moist.	FIRM		ALLUVIUM
		0.5		CL	Sandy CLAY; low to medium plasticity clay, fine to coarse sand, trace fine gravel and ferruginous nodules, red-brown, light brown, some orange, dry to moist.	STIFF		
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

Logged By : KA Date : 01/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	B03
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure (Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure)	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.6		CL	Silty Sandy CLAY; low plasticity fines, fine to medium grained sand, light brown, moist to wet.	SOFT TO FIRM		ALLUVIUM
		0.8		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-brown, dry.	STIFF TO VERY STIFF		
		1.0		CL-CH	Sandy CLAY: medium plasticity clay, fine to coarse sand, orange-brown, light brown, dry.	VERY STIFF TO HARD		
		1.2			BOREHOLE TERMINATED AT 1.2m very slow progress			
		1.6						

Logged By : KA Date : 01/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	B04
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure (Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure)	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SC-SM	Silty Clayey SAND; fine to medium grained sand, low plasticity silt, light brown, dry to moist.	LOOSE		SLOPEWASH
		0.3		CL	Sandy Gravelly CLAY; low to medium plasticity clay, fine sand, fine grained gravel and ferruginous nodules, light grey, moist.	FIRM TO STIFF		ALLUVIUM
		0.8		CL-CH	Sandy CLAY; medium plasticity clay, fine to medium grained sand, orange-grey mottled, some red-brown, dry.	STIFF TO VERY STIFF		
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

Logged By : KA Date : 01/06/21 | Checked By : JM Date : 17/06/21

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

Borehole Log

Borehole No.	**C01**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SM	Silty Gravelly SAND; fine to coarse sand, low plasticity silt, fine to medium grained sedimentary gravel, grey/brown, dry to moist.	MEDIUM DENSE		ALLUVIUM
		0.3		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, yellow-brown mottled red-brown, dry.	VERY STIFF		RESIDUAL SOIL
		0.5		SC	Clayey Gravelly SAND; fine to coarse sand, low to medium plasticity clay, fine to medium grained sedimentary gravel, yellow-brown, dry.	DENSE		
		0.9			BOREHOLE TERMINATED AT 0.9m refusal			
		1.0						
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**C02**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.15		SM	Silty Gravelly SAND; fine to coarse sand, fine gravel and ferruginous nodules, low plasticity silt, grey, moist.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.3		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, light brown, some orange-brown, dry to moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		0.85		CH	Sandy CLAY; high plasticity clay, fine to coarse sand, trace sedimentary gravel to 20mm, light brown, dry to moist.	VERY STIFF TO HARD		
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**C03**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SM	Silty Gravelly SAND; fine to medium grained sand, low plasticity silt, fine gravel and ferruginous nodules, dark brown, dry to moist.	LOOSE		ALLUVIUM
		0.5		CL-CH	Sandy CLAY; medium plasticity clay, fine to coarse sand, orange-brown, some red, dry to moist.	STIFF		
		1.0						
		1.1		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, grey-orange mottled, dry.	VERY STIFF		RESIDUAL SOIL
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**C04**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.3		ML	Clayey Sandy SILT; low to medium plasticity fines, fine to medium grained sand, fine gravel and ferruginous nodules, light brown, moist to wet.	FIRM		ALLUVIUM
		0.6		CH	Silty CLAY; medium to high plasticity fines, orange-grey mottled, dry to moist.	VERY STIFF		RESIDUAL SOIL
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**D01**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		ML	Clayey Sandy SILT; low plasticity fines, fine to medium grained sand, brown, moist to wet.	FIRM		ALLUVIUM
		0.5		CL	Silty Gravelly CLAY; low to medium plasticity fines, fine gravel and ferruginous nodules, light brown, moist.	FIRM TO STIFF		
		0.7		CH	Sandy CLAY; medium to high plasticity clay, fine to medium grained sand, orange-brown, orange-grey, dry to moist.	VERY STIFF		RESIDUAL SOIL
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	D02
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.7		SM	Silty Gravelly SAND; fine to medium grained sand, low plasticity silt, fine gravel and ferruginous nodules, light brown, moist.	LOOSE		ALLUVIUM
		1.0		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, some fine gravel and ferruginous nodules, orange-grey mottled, dry to moist.	VERY STIFF		RESIDUAL SOIL
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**D03**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.15		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.5		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, red-brown, dry to moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.0		CH	Silty CLAY; medium to high plasticity fines, some fine to medium grained sand, yellow-brown/grey, dry to moist.	VERY STIFF		
		1.3		CL-CH	Sandy Gravelly CLAY; medium plasticity clay, fine to coarse sand, fine to medium grained sedimentary gravel, yellow-brown, dry.	VERY STIFF TO HARD		
		1.6			BOREHOLE TERMINATED AT 1.3m			

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**D04**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SM	Silty Gravelly SAND; fine to medium grained sand, fine gravel and ferruginous nodules, low plasticity silt, light brown, brown, dry.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.3		CH	Sandy CLAY; medium to high plasticity clay, fine sand, orange-brown, dry to moist.	VERY STIFF		RESIDUAL SOIL
		0.7		CH	CLAY; high plasticity clay, trace fine gravel and ferruginous nodules, light brown, dry.	VERY STIFF TO HARD		
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**D05**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		ML	Gravelly Sandy SILT; low plasticity silt, fine to medium grained sand, fine gravel & ferruginous nodules, light brown, yellow-brown, dry.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.6		SC	Gravelly Clayey SAND; fine to coarse sand, fine to medium grained gravel and ferruginous nodules, low plasticity clay, orange-grey, orange-brown, dry.	MEDIUM DENSE		
		1.0						
		1.1		CH	Sandy CLAY; medium to high plasticity clay, fine to medium grained sand, orange-grey mottled, dry to moist.	VERY STIFF		RESIDUAL SOIL
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	D07
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure (Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure)	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.4		CL	Silty Sandy CLAY; low plasticity fines, fine to medium grained sand, light brown, moist.	FIRM		ALLUVIUM
		0.6		SM	Silty Gravelly SAND; fine to medium grained sand, low plasticity silt, fine gravel & ferruginous nodules, light brown, orange-brown, dry to moist.	MEDIUM DENSE		
		1.0		CH	Sandy CLAY; high plasticity clay, fine to medium grained sand, orange-brown, light brown, dry to moist.	VERY STIFF		RESIDUAL SOIL
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	D08
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		SC-SM	Silty Clayey SAND; fine to coarse sand, low plasticity fines, dark brown, red-brown, dry to moist.	LOOSE TO MEDIUM DENSE		ALLUVIUM
		0.8		SC	Clayey Gravelly SAND; fine to coarse sand, medium plasticity clay, fine to medium grained sedimentary gravel, brown, light brown, dry.	DENSE		RESIDUAL SOIL
		1.0						
		1.2			Extremely Weathered (EW) SILTSTONE; fine to medium grained, light brown, dry.	EXTREMELY WEAK		BEDROCK
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

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BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

Borehole Log

Borehole No.	**D09**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.2		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.4		SM	Silty Gravelly SAND; fine to medium grained sand, low plasticity silt, fine gravel and ferruginous nodules, light brown, moist.	LOOSE		ALLUVIUM
		1.0		CL	Sandy Gravelly CLAY; low to medium plasticity clay, fine to coarse sand, fine gravel and ferruginous nodules, orange-brown, light brown, moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.2		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey, dry.	VERY STIFF		
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	D10
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		CH	Silty CLAY; high plasticity fines, light brown, dry.	VERY STIFF		RESIDUAL SOIL
		0.8		CH	Silty CLAY; high plasticity fines, orange-brown, dry.	VERY STIFF TO HARD		
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

ACT Geotechnical Engineers

Borehole Log

Borehole No.	**D11**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure (Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure)	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.3		CL	Silty CLAY; low to medium plasticity fines, light brown, moist.	FIRM		ALLUVIUM
		0.5		CL	Silty Gravelly CLAY; low plasticity fines, fine gravel and ferruginous nodules, orange-brown, dry to moist.	FIRM		
		0.7		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey mottled, dry.	VERY STIFF		RESIDUAL SOIL
		1.0						
		1.4			BOREHOLE TERMINATED AT 1.4m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

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Borehole Log

Borehole No.	**E01**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
		0.3		SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, dark brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.5		CL	Silty Sandy CLAY; low plasticity fines, fine to coarse sand, trace fine gravel and ferruginous nodules, light brown, moist.	FIRM		ALLUVIUM
		0.7		CL-CH	Sandy Gravelly CLAY; medium plasticity clay, fine to coarse sand, fine to coarse sedimentary gravel, yellow-brown, dry to moist.	STIFF TO VERY STIFF		RESIDUAL SOIL
		1.0		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, orange-grey mottled, brown, dry.	VERY STIFF		
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

ACT Geotechnical Engineers

ACT Geotechnical Engineers

Borehole Log

Borehole No.	**E02**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, dark brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.2		CL	Silty Sandy CLAY; low plasticity fines, fine to medium grained sand, brown, light brown, moist.	FIRM		ALLUVIUM
		0.5		CL	Silty Gravelly CLAY; low to medium plasticity fines, fine gravel and ferruginous nodules, light brown, moist to wet.	FIRM		
		0.9		CH	Sandy CLAY; medium to high plasticity clay, fine to coarse sand, trace fine sedimentary gravel and ferruginous nodules, orange-grey mottled, dry to moist.	STIFF TO VERY STIFF		RESIDUAL
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 17/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

ACT Geotechnical Engineers

Borehole Log

Borehole No.	**E03**
Sheet	1 of 1
Job No.	C11822

CLIENT: Southern Region Land Engineering

PROJECT: Brisbane Grove Rural Subdivision
Rosemont Road & Mountain Ash Road, Goulburn, NSW

Location : SEE REPORT

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Equipment Type : PUSH TUBE DRILL
Hole Diameter : 50mm

Samples	Casing	Depth (Metres)	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
				SM	Silty SAND; fine to medium grained sand, low plasticity silt, brown, dark brown, with grass rootlets, moist.	LOOSE		TOPSOIL
		0.15		CL	Sandy CLAY; low plasticity clay, fine to medium grained sand, orange-brown, trace gravel to 10mm, moist.	FIRM		ALLUVIUM
		0.4		CL-CH	Sandy Gravelly CLAY; medium plasticity clay, fine to coarse sand, fine gravel and ferruginous nodules, dry to moist.	STIFF		RESIDUAL SOIL
		0.8		SC	Clayey SAND / Sandy CLAY; low to medium plasticity clay, fine to coarse sand, fine sedimentary gravel, dry.	VERY STIFF / DENSE		
		1.0						
		1.3			BOREHOLE TERMINATED AT 1.3m			
		1.6						

Logged By : KA Date : 16/06/21 | Checked By : JM Date : 17/06/21

BOREHOLE/EXCAVATION LOG C11822.GPJ ACT GEO.GDT 04/07/21

ACT Geotechnical Engineers

ACT Geotechnical Engineers

APPENDIX C
Laboratory Test Certificates

Organochlorine Pesticides in soil						
Our Reference		272356-6	272356-7	272356-8	272356-9	272356-10
Your Reference	UNITS	A6	B4	C2	D2	D4
Depth		0.0-0.2m	0.0-0.2m	0.0-0.4m	0.0-0.2m	0.0-0.2m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	92	94	92	93

Organophosphorus Pesticides in Soil						
Our Reference		272356-6	272356-7	272356-8	272356-9	272356-10
Your Reference	UNITS	A6	B4	C2	D2	D4
Depth		0.0-0.2m	0.0-0.2m	0.0-0.4m	0.0-0.2m	0.0-0.2m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	92	94	92	93

Misc Inorg - Soil						
Our Reference		272356-1	272356-2	272356-3	272356-4	272356-5
Your Reference	UNITS	A7	A10	B2	D3	D11
Depth		0.1-0.4m	0.0-0.3m	0.3-0.6m	0.15-0.4m	0.3-0.5m
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
pH 1:5 soil:water	pH Units	6.5	5.3	5.5	5.8	6.8
Electrical Conductivity 1:5 soil:water	µS/cm	36	52	34	46	52
Emerson Class No.	-	5.0	5.0	5.0	5.0	5.0
Phosphorus Sorption Capacity	mg/kg	510	380	590	940	770

APPENDIX D
Limitations of Geotechnical Report

ACT Geotechnical Engineers Pty Lt
ACN 063 673 530

5/9 Beaconsfield Street, Fyshwick ACT 2609
PO Box 9225, Deakin ACT 2600
Ph: (02) 6285 1547

Limitations in the Use and Interpretation of this Geotechnical Report

Our Professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The geotechnical report was prepared for the use of the Owner in the design of the subject development and should be made available to potential contractors and/or the Contractor for information on factual data only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the interpretive borehole and test pit logs, cross- sections, or discussion of subsurface conditions contained herein.

The analyses, conclusions and recommendations contained in the report are based on site conditions as they presently exist and assume that the exploratory bore holes, test pits, and/or probes are representative of the subsurface conditions of the site. If, during construction, subsurface conditions are found which are significantly different from those observed in the exploratory bore holes and test pits, or assumed to exist in the excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between conducting this investigation and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, this report should be reviewed to determine the applicability of the conclusions and the recommendations considering the changed conditions and time lapse.

The summary bore hole and test pit logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the test holes progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

The bore hole and test pit logs and related information depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at the other locations may differ from conditions occurring at these bore hole and test pit locations. Also, the passage of time may result in a change in the soil conditions at these test locations.

Groundwater levels often vary seasonally. Groundwater levels reported on the boring logs or in the body of the report are factual data only for the dates shown.

Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, bore holes or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended that the Owner consider providing a contingency fund to accommodate such potential extra costs.

This firm cannot be responsible for any deviation from the intent of this report including, but not restricted to, any changes to the scheduled time of construction, the nature of the project or the specific construction methods or means indicated in this report: nor can our company be responsible for any construction activity on sites other than the specific site referred to in this report.

ATTACHMENT C
NorBE Assessment
Wastewater Effluent Model Summaries

A01-1

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334112**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A01-1

NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551687.974039**	Northing	**4326432.862298**
Slope (m/m)	**0.06959**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**2.00**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**510**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.06**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A01-2 SPA

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334111**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**50.0**	Width (up slope)(m)	**26.0**
Proposed area(m2)	**1300.0**	Minimum Required area (m2)	**1187.0**
Number of trenches	**0**		

WaterNSW

A01-2 SPA
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**1300**
Effluent volume calculated (l/day)	**1300**

WEM Model Inputs

Location

Easting	**9551687.974039**	Northing	**4326432.862298**
Slope (m/m)	**0.06959**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**Yes**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**2.00**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**510**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.31**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A01-3

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334110**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A01-3

NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551687.974039**	Northing	**4326432.862298**
Slope (m/m)	**0.06959**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**2.00**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**510**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Strong**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.31**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A02-1
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334818**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A02-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551146.503076**	Northing	**4326517.820624**
Slope (m/m)	**0.04222**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.80**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**380**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.30**		
Soil texture	**Light clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A02-2
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334823**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A02-2
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551146.503076**	Northing	**4326517.820624**
Slope (m/m)	**0.04222**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.80**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**380**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.06**		
Soil texture	**Light clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A02-3
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334824**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Special design criteria, including soil modification and soil permeability testing, will be required

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**20.0**	Width (up slope)(m)	**3.8**
Proposed area(m2)	**150.0**	Minimum Required area (m2)	**120.0**
Number of trenches	**2**		

WaterNSW

A02-3
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**400**
Effluent volume calculated (l/day)	**600**

WEM Model Inputs

Location

Easting	**9551146.503076**	Northing	**4326517.820624**
Slope (m/m)	**0.04222**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**3 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**Septic tank**	Disposal system	**Absorption trench – primary effluent**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.80**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**380**
Soil depth (to impermeable layer) (m)	**1.30**	Soil structure	**Moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.06**		
Soil texture	**Light clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

WaterNSW

A06-1

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334825**	Associated DA number	
Model description			
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**2//835278**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A06-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551253.127413**	Northing	**4326145.975520**
Slope (m/m)	**0.05111**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.60**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**500**
Soil depth (to impermeable layer) (m)	**1.40**	Soil structure	**Weak**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.00**		
Soil texture	**Clay loams**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Concave side slopes and foot slopes**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

A10-1

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2334828**	Associated DA number	
Model description	**Concept effluent treatment**		
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**1//853498**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

A10-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9550898.493270**	Northing	**4326683.866589**
Slope (m/m)	**0.02291**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.60**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**380**
Soil depth (to impermeable layer) (m)	**1.20**	Soil structure	**Weak**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.20**		
Soil texture	**Clay loams**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

B01-1
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2335120**	Associated DA number	
Model description	**Concept effluent management**		
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**1//853498**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

B01-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551027.485516**	Northing	**4326943.138470**
Slope (m/m)	**0.02561**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.60**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**400**
Soil depth (to impermeable layer) (m)	**1.00**	Soil structure	**High/moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.00**		
Soil texture	**Clay loams**		

Effluent disposal risk factors

Depth to water table	**0.4 - 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

B02-1
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2335121**	Associated DA number	
Model description	**Concept effluent management**		
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**1//853498**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

B02-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9550647.406968**	Northing	**4327243.404693**
Slope (m/m)	**0.01281**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.60**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**590**
Soil depth (to impermeable layer) (m)	**1.00**	Soil structure	**Moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**1.00**		
Soil texture	**Light clays**		

Effluent disposal risk factors

Depth to water table	**0.4 - 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

C01-1
NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2335122**	Associated DA number	
Model description	**Concept effluent management**		
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**1//731427**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**30.0**	Width (up slope)(m)	**28.0**
Proposed area(m2)	**840.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

C01-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9552297.015593**	Northing	**4325911.594827**
Slope (m/m)	**0.01811**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**4000**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**2.00**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**600**
Soil depth (to impermeable layer) (m)	**0.90**	Soil structure	**Weak/massive**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.06**		
Soil texture	**Med-heavy clays**		

Effluent disposal risk factors

Depth to water table	**0.4 - 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

C03-1

NorBE Assessment

WEM Summary

version 3

General Information

WEM model ID	**2335124**	Associated DA number	
Model description	**Concept effluent management**		
Consultancy	**Southern Region Land Engineering**	Consultant	**gregtodd.srle@gmail.com**
Consultant reference number	**T01405**		
Council	**Goulburn Mulwaree**	Assessing officer	
Nominated lot	**1//731427**	Associated lots	
Development class	**Subdivision unsewered >=4 lots**		

Lot	Section	Plan
2		835278
1		835278
1		731427
22		811954
23		811954
24		811954
3		835278
1		779194
103		70346
104		126140
105		126140
1		853498
106		126140

Date of model run

WEM Model Run Summary

Model run outcome **Pending**

Any of the sub-surface plumes reaches:

Lot boundary	**N/A**
Drainage depression	**N/A**
Top bank of watercourse	**N/A**
Another disposal field or onsite stormwater management system	**N/A**
Within 50m, and up gradient of,a licensed drinking water bore	**N/A**

Proposed Front End Design

Length (across slope)(m)	**40.0**	Width (up slope)(m)	**20.0**
Proposed area(m2)	**800.0**	Minimum Required area (m2)	**730.0**
Number of trenches	**0**		

WaterNSW

C03-1
NorBE Assessment

WEM Summary

version 3

Effluent volume proposed (l/day)	**800**
Effluent volume calculated (l/day)	**800**

WEM Model Inputs

Location

Easting	**9551584.606226**	Northing	**4325773.369124**
Slope (m/m)	**0.02065**	Slope is suitable based on site inspection (Applicable to some disposal systems on steep slopes)	**N/A**

Development

Development type	**Dwellings**	Development detail	**4 bedrooms**
Water supply type	**Rainwater**	Spa Bath	**No**
Continuous system use	**Yes**		
Treatment system	**AWTS standard**	Disposal system	**Irrigation sub-surface**

Site

Lot size(m2)	**411741**		
Subject to severe frost	**No**	Bulk density(g/cm3)	**1.80**
Vegetation for nutrient uptake	**Lawn - unmanaged**	Phosphorus sorption (mg/kg)	**500**
Soil depth (to impermeable layer) (m)	**1.40**	Soil structure	**Moderate**
Saturated hydraulic conductivity (Ksat)(m/day)	**0.06**		
Soil texture	**Light clays**		

Effluent disposal risk factors

Depth to water table	**> 1.0**
Flood potential of disposal system	**Above 1 in 50 year ARI**
Landform score	**Hill crests, convex side slopes and plains**
Run-on and upslope seepage	**None-low, diversion possible**
Rock outcrops, scarp and bedrock	**< 5%**
Distance to drainage dpression	**> 50**
Distance to watercourses and water supply reservoirs	**> 120**
Distance to licenced drinking water bores	**> 150**

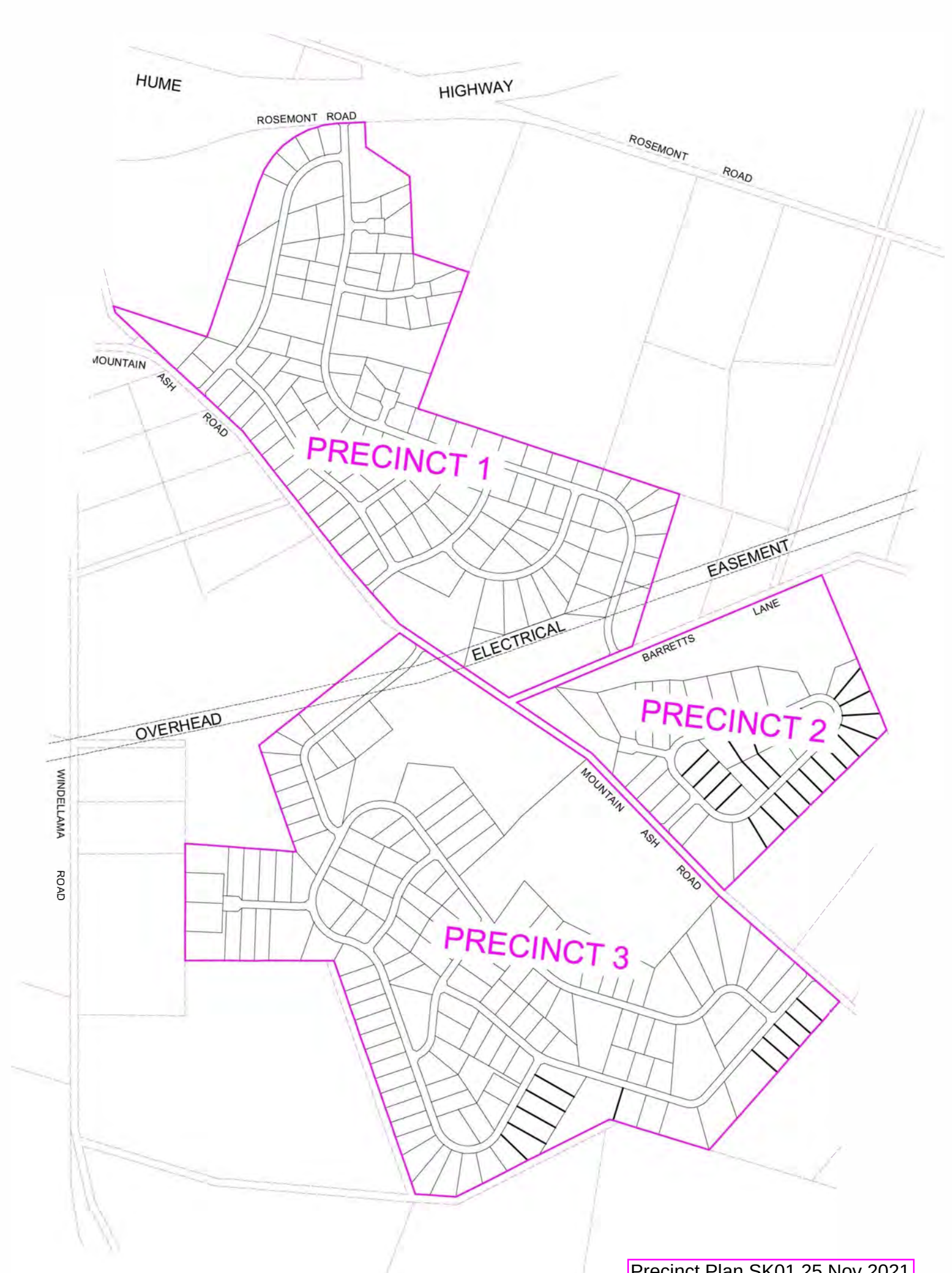
WEM Plume Map

No image of the plumes is available. This may be because the model has not yet been run or because no image was generated when the model ran.

WaterNSW

Attachment 3

Proposal Plans



Precinct Plan SK01 25 Nov 2021

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY

DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 1:8000 (A3)
0 20 40 80 120 160 200

DRAWN: SWC	DESIGNED	DATE	
DATE: SEP '20	VERIFIED	DATE	
SCALE	APPROVED	DATE	

S.R.L.E.
SOUTHERN REGION LAND ENGINEERING
telephone (02) 4823 5577
mobile 0417 235 415
167 Bourke Street, Goulburn NSW 2580
P.O. Box 111, Thirroul NSW 2515

PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
LOT LAYOUT

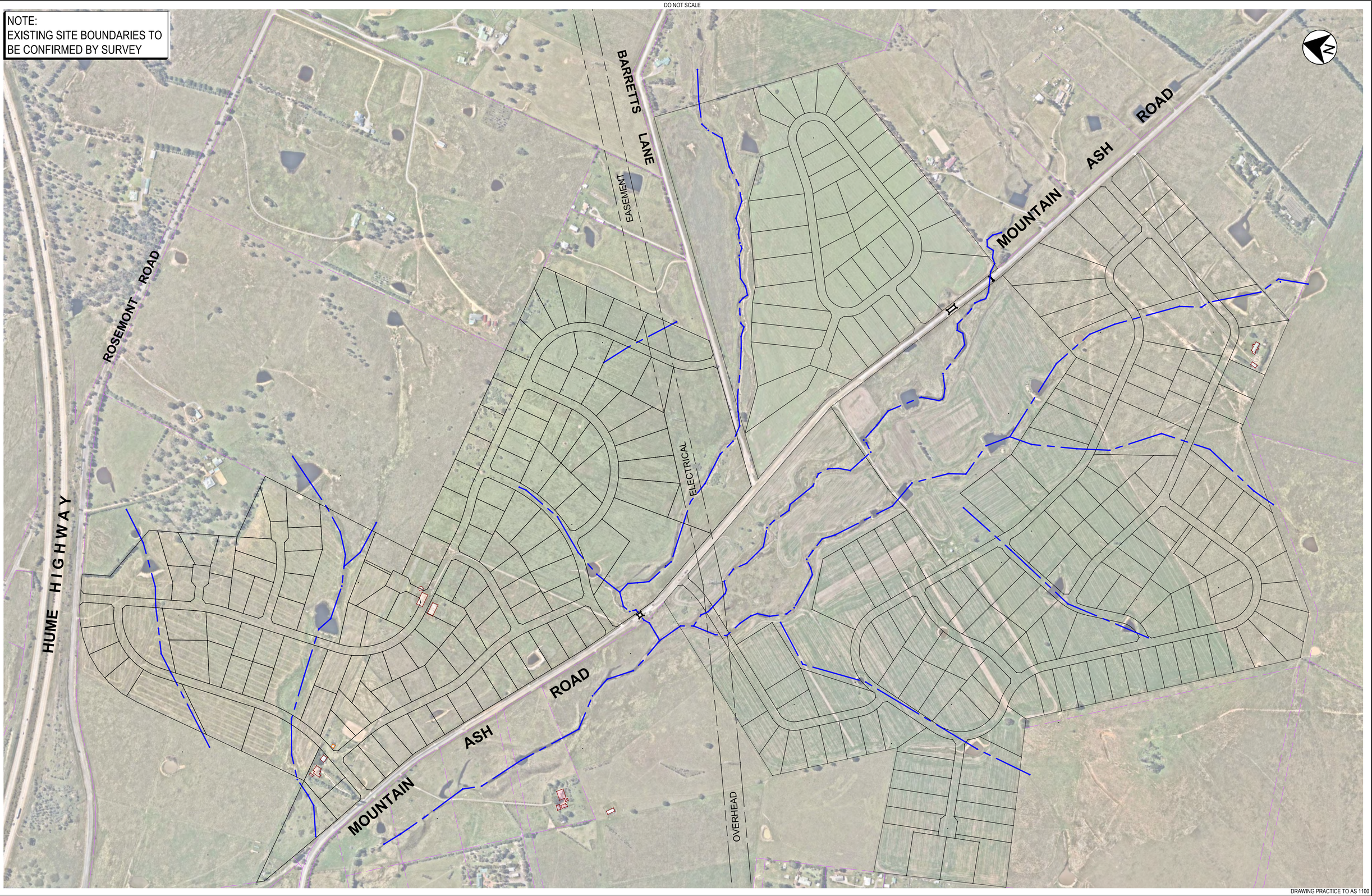
DRG. No. T01405-SK101 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:07:54 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\1140233-windellama-subdivision-srle\Civil\1140233-Lot-Layout-SK101.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 0 20 40 80 120 160 200 1:8000 (A3)

DRAWN: SWC	DESIGNED:	DATE:
DATE: SEP '20	VERIFIED:	DATE:
SCALE:	APPROVED:	DATE:

S.R.L.E.
SOUTHERN REGION LAND ENGINEERING
telephone (02) 4823 5577
mobile 0417 235 415
167 Bourke Street, Goulburn NSW 2580
P.O. Box 111, Thirroul NSW 2515

PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
SITE AERIAL

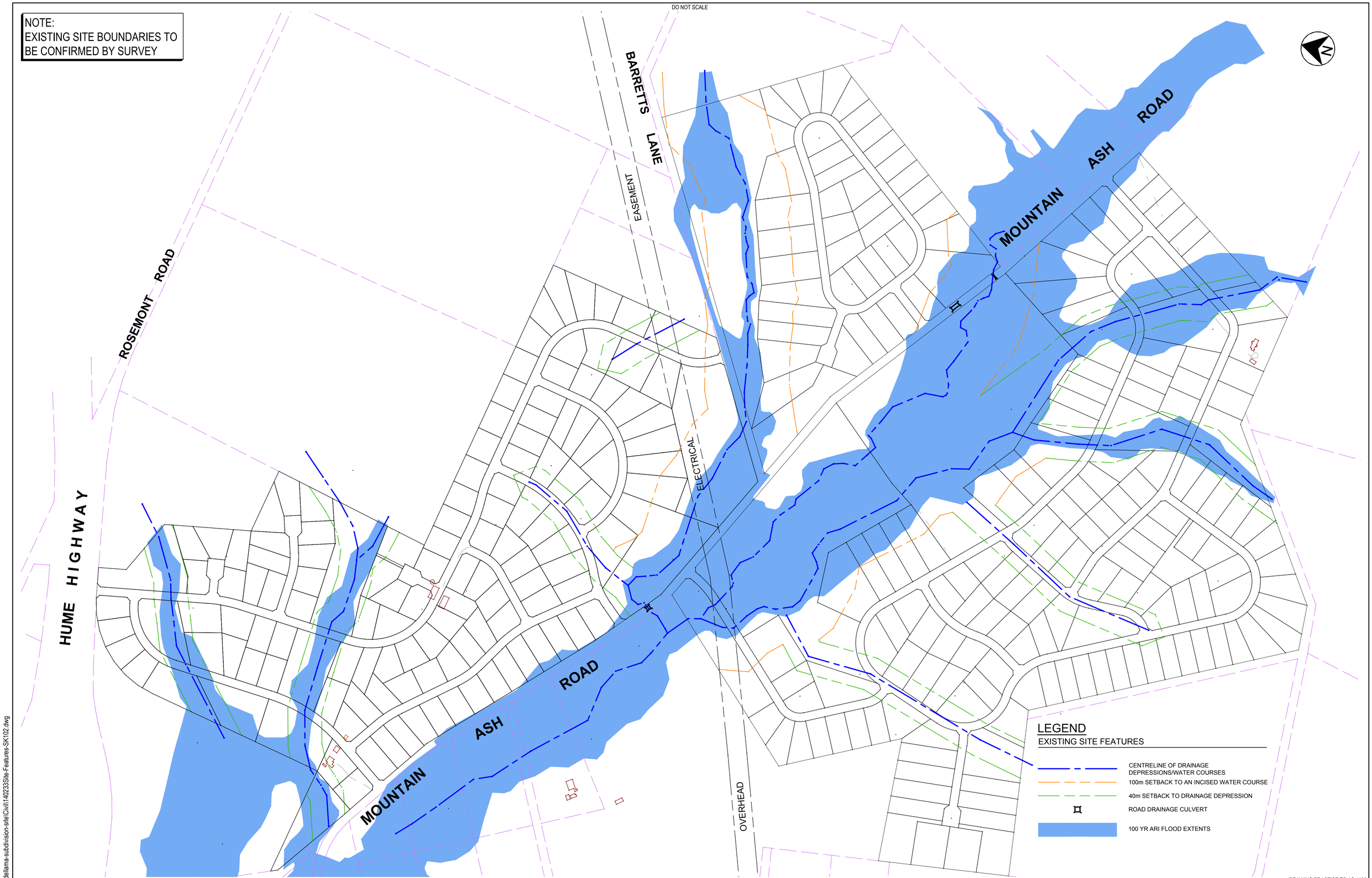
DRG. No. T01405-SK104 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:08:19 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\1402233-windellama-subdivision-srle\Civil\140233 Site Aerial-SK104.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 0 20 40 80 120 160 200 1:8000 (A3)

DRAWN: SWC	DESIGNED:	DATE:
DATE: SEP '20	VERIFIED:	DATE:
SCALE:	APPROVED:	DATE:

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PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
EXISTING
SITE FEATURES

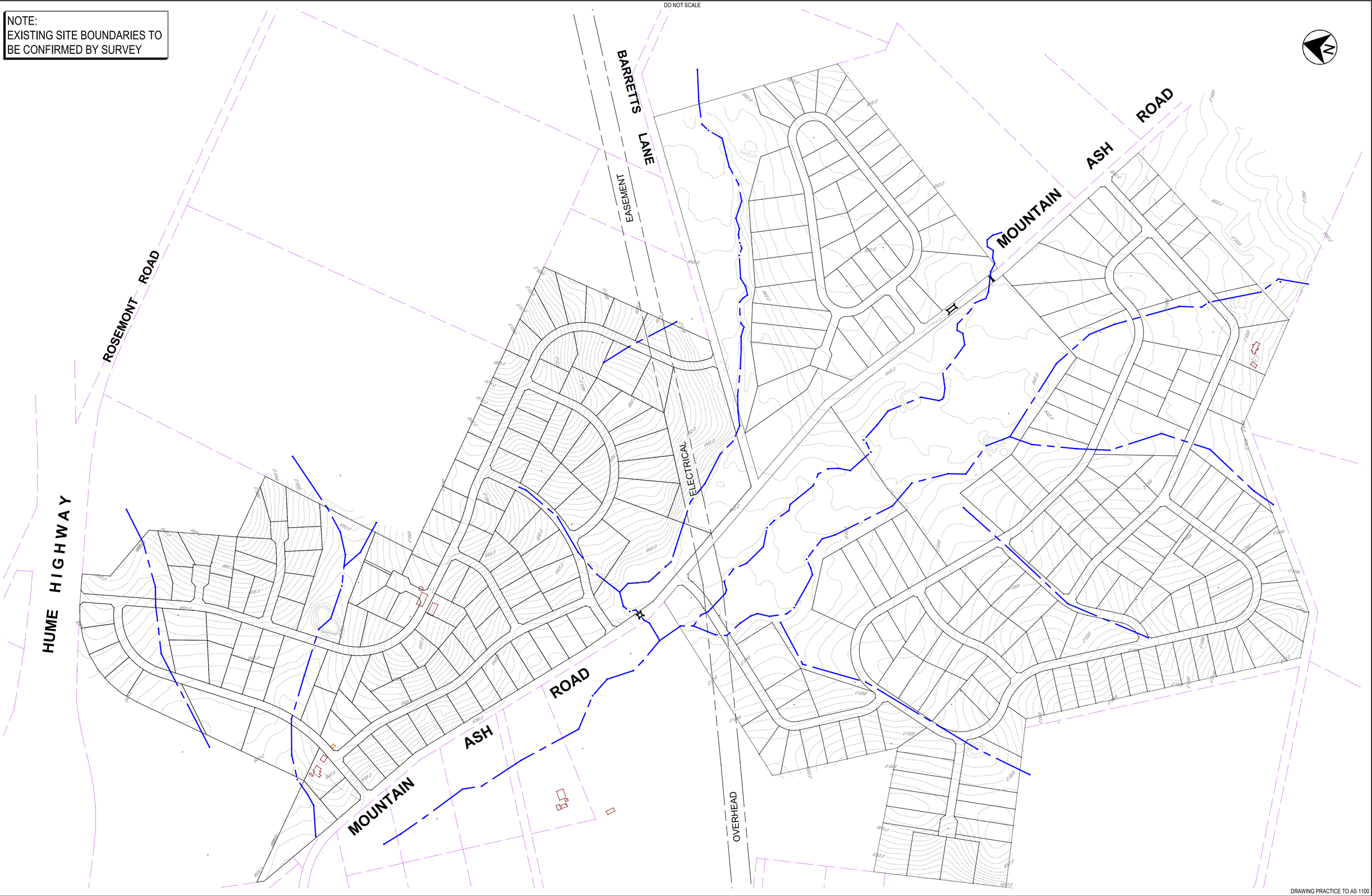
DRG. No. T01405-SK102 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:10:09 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\1402\33-windellama-subdivision-site\Civil\140233Site-Features-SK102.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL

DO NOT SCALE

NOTE:
EXISTING SITE BOUNDARIES TO BE CONFIRMED BY SURVEY



DRAWING PRACTICE TO AS 1100

REV	DESIGN	DATE	AMENDMENT	APP
2	CES	28.10.21	ISSUED FOR SUBMISSION	G.T.

FUNCTIONAL LAYOUT

SCALE IN METRES
1:4000 (A1) 1:8000 (A3)
0 20 40 80 120 160 200

DRAWN: SWC	DESIGNED	DATE
DATE: SEP '20	VERIFIED	DATE
SCALE	APPROVED	DATE

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PRJ. Title.
THE HUB
RURAL SUBDIVISION

PLANNING PROPOSAL
FOR
WINDELLAMA ROAD PTY LTD & GTSMF

DRG. Title.
SITE CONTOURS

DRG. No. T01405-SK103 | Issue IFA | Rev. 2

DATE: 28/10/2021 9:08:10 AM LOGIN NAME: COLEMAN ENGINEERING SERVICES
LOCATION: e:\CES\140233-windellama-subdivision-site\Civil\140233 Site Contourss-SK103.dwg

0 | 5 | 10 | 15 | 20 | 25 mm ON A3 ORIGINAL