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Planning Proposal

for a

Highway Service Centre

at

Murrumbateman, NSW

March 2020

ABN: 72 107 434 417

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Executive Summary

The Planning Proposal has been prepared in accordance with Division 3.4 of the *Environmental Planning and Assessment Act 1979* (Act) and the relevant Department of Planning Guidelines and provides the following:

- Objectives or Intended Outcomes
- Explanation of Provisions
- Justification
- Mapping
- Community Consultation
- Project Timeline

The Planning Proposal seeks to amend Yass Valley Local Environmental Plan 2013 (YVLEP) to facilitate a highway service centre on Lot 12 DP 1158637 (Site) by way of a specific inclusion to 'Schedule 1 – Additional Permitted Uses' of the YVLEP.

The Site is located on the western side of the Barton Highway; approximately 3km to the north of Murrumbateman.

The Lot is dissected by Longrail Gully Road, with the north parcel having an area of approx. 3.542ha and the south parcel an area of approx. 6.74ha.

Subject to final design it is proposed that the highway service centre is located on the northern parcel, with access from Longrail Gully Road, occupying a footprint of approximately 2ha.

The Site has been utilised for grazing and has very few trees and little vegetation.

Ecological, Aboriginal Due Diligence and Traffic Assessments have been completed and they all support the Proposal.

This Planning Proposal outlines the intended effect and justification for the proposed amendment to YVLEP.

Part 1 - Objectives or Intended Outcomes

(s.3.33(2)(a) A statement of the objectives or intended outcomes of the proposed instrument)

The intended outcome of this Planning Proposal is to amend YVLEP to facilitate a highway service centre on the Site by way of a specific inclusion to 'Schedule 1 – Additional Permitted Uses' of the YVLEP.

The Site is known as Lot 12 DP 1158637 and is located on the western side of the Barton Highway; approximately 3km to the north of Murrumbateman.

The Lot is dissected by Longrail Gully Road, with the north parcel having an area of approx. 3.542ha and the south parcel an area of approx. 6.74ha.

Subject to final design it is proposed that the highway service centre is located on the northern parcel, with access from Longrail Gully Road in the approximate location as shown in Figure 7, occupying a footprint of approx. 2ha.

The Site is relatively flat to undulating and has been utilised for grazing as part of a much larger land holding; and the proposed land use will have an insignificant impact on the productivity of the farming operation.

The Site has very few trees and little vegetation and the Ecological, Aboriginal Due Diligence and Traffic Assessments that have been completed, all support the Proposal.

The Site is shown in the following Figures.

Figure 1 - Regional Location

Figure 2 - Location in Relation to Murrumbateman

Figure 3 - Subject Site - Aerial View

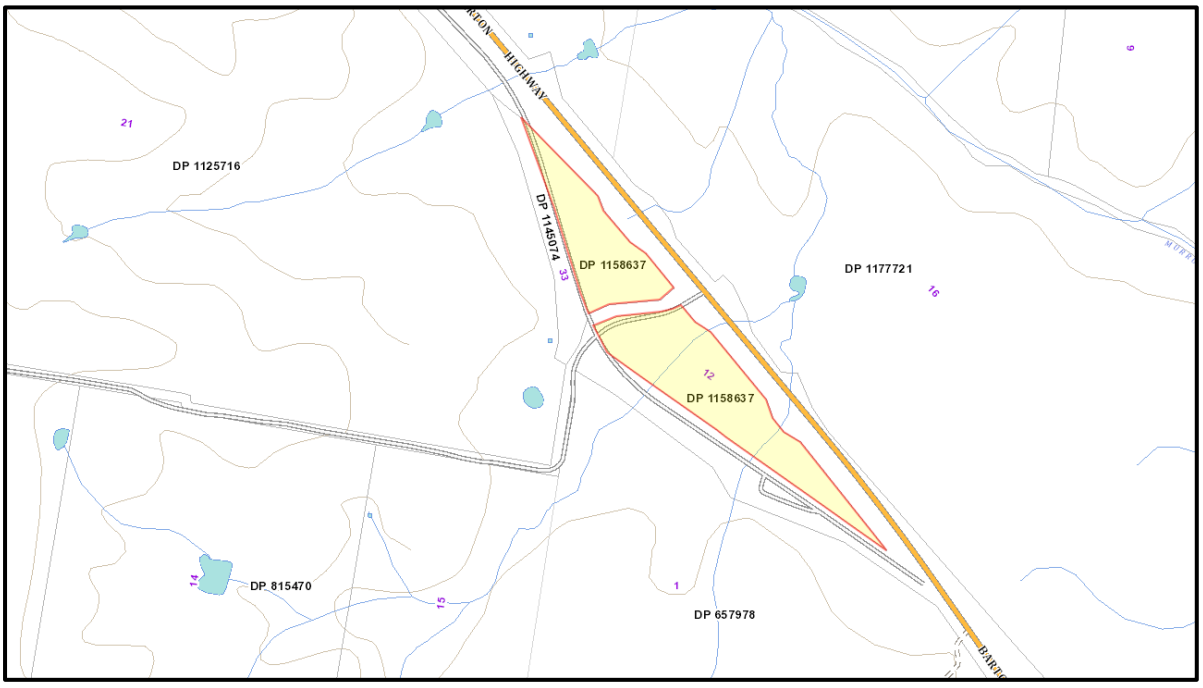

Figure 4 - Subject Site - Lot View

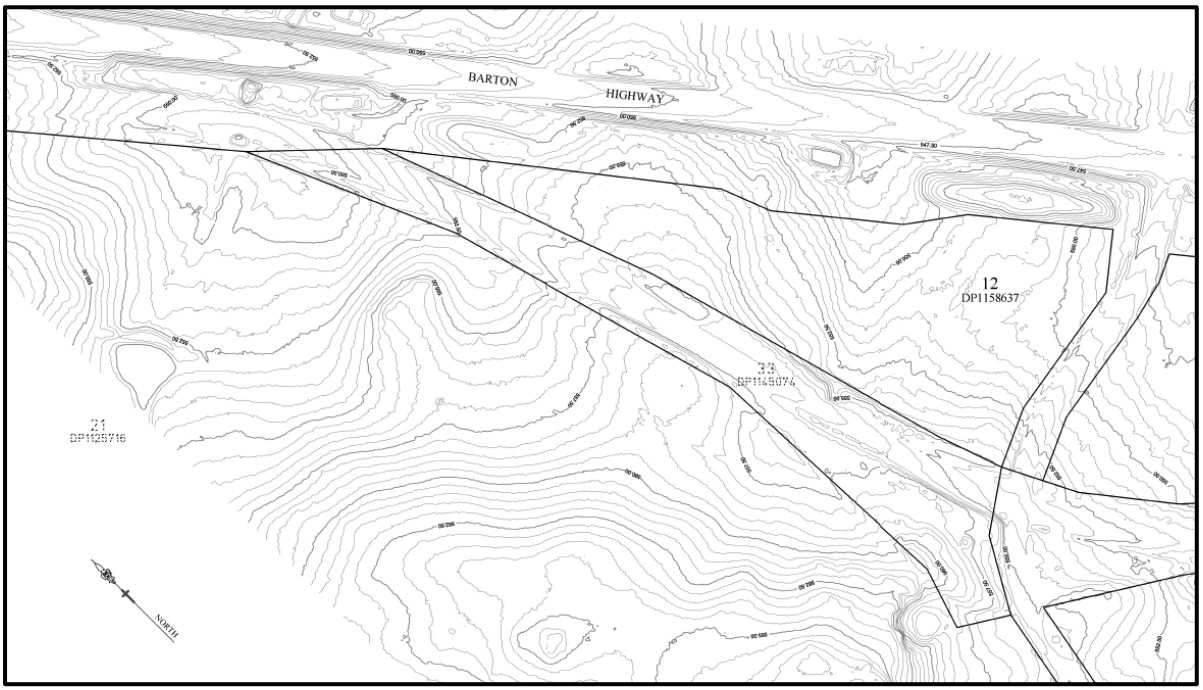

Figure 5 - Northern Portion of the Site

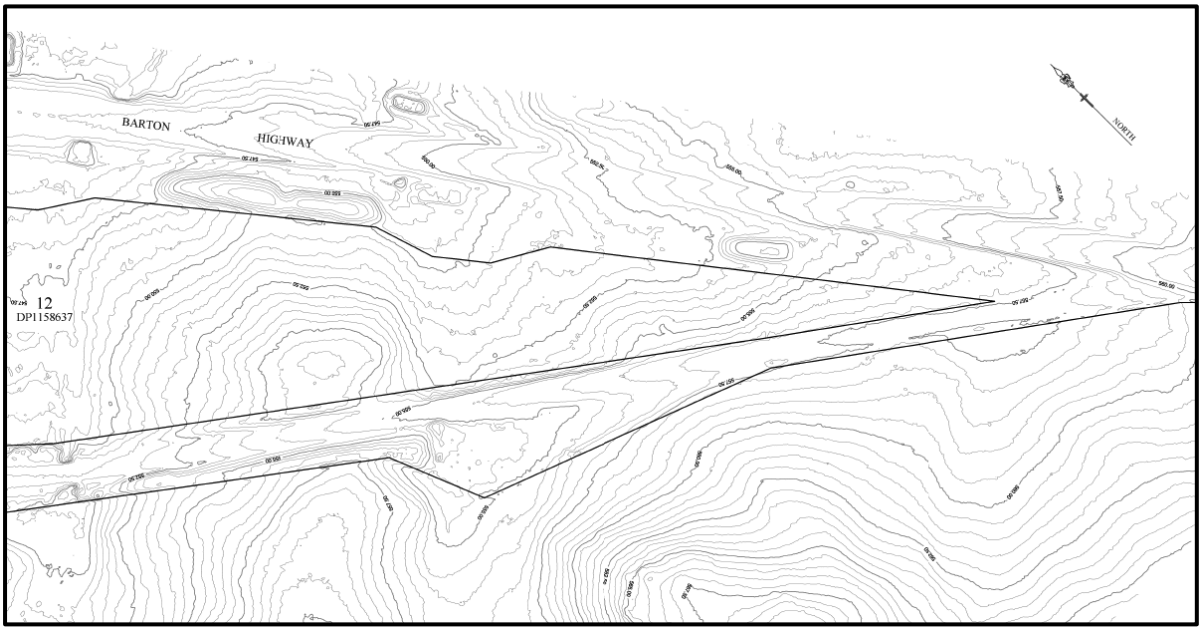

Figure 6 - Southern Portion of the Site

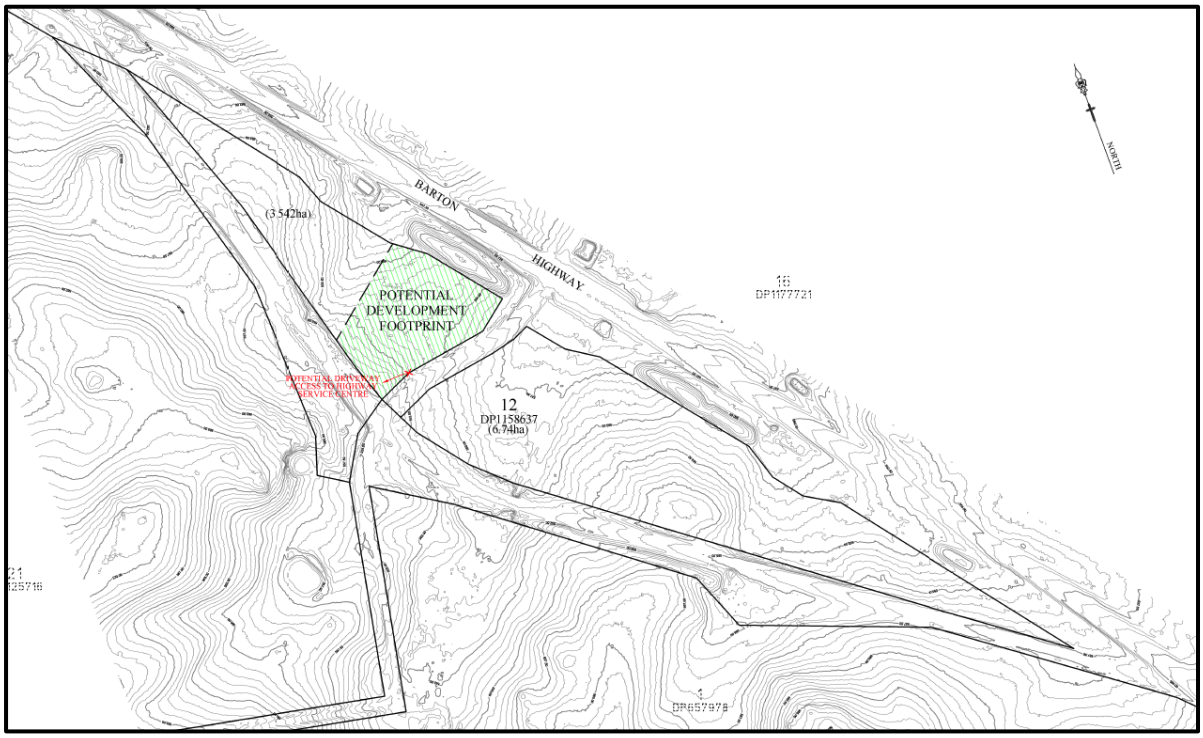

Figure 7 - Potential Development Footprint

Part 2 - Explanation of Provisions

(s.3.33(2)(b) An explanation of the provisions that are to be included in the proposed instrument)

The land is currently zoned RU1 Primary Production pursuant to YVLEP.

To facilitate the highway service centre on the Site, this Planning Proposal seeks to add the following reference under 'Schedule 1 – Additional Permitted Uses' of YVLEP:

2 Use of certain land at Barton Highway, Murrumbateman

(1) This clause applies to land in Zone RU1 Primary Production at Lot 12 DP 1158637 Barton Highway, Murrumbateman that is identified as "2" on the Additional Permitted Uses Map.

(2) Development for the purposes of a highway service centre is permitted with development consent.

Subject to final design, the development footprint is shown at **Appendix D**.

To implement the Proposal an additional map will be required as 'Additional Permitted Uses Map – Sheet APU_005' which marks the Site as "2".

All other Development Standards that currently apply to the Site remain unchanged, and as such there are no other changes to the existing YVLEP Maps.

The proposed extract of new Sheet APU_005 is illustrated below.

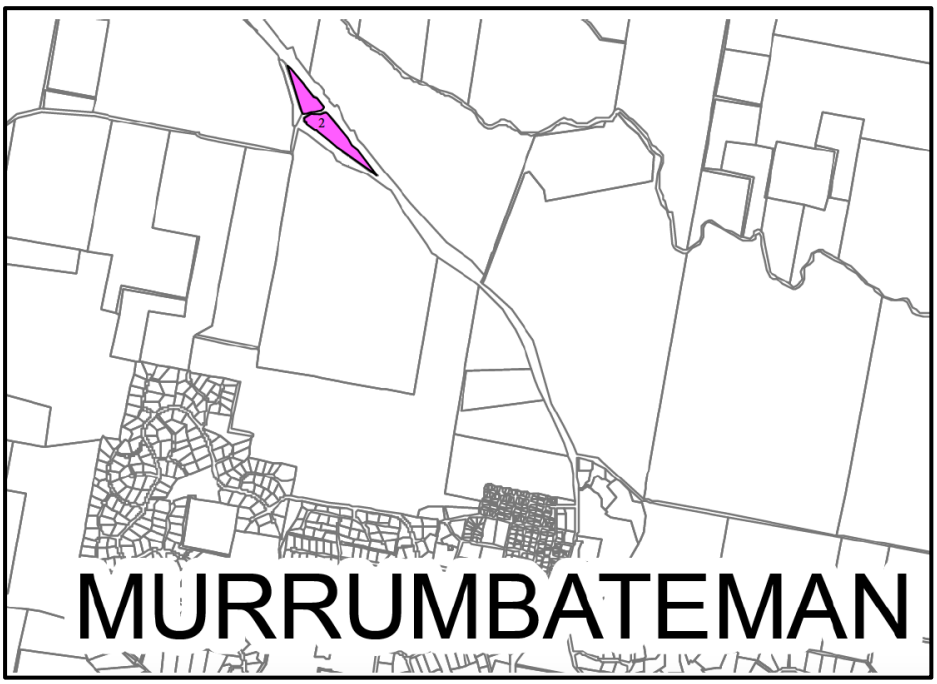

Figure 8 - Proposed Additional Permitted Use Map extract

Part 3 - Justification

(s.3.33(2)(c) Justification for the objectives or intended outcomes and the process for their implementation)

Section A – Need for the Planning Proposal

3.A.1 Is the Planning Proposal a result of any strategic study or report?

No; this Planning Proposal is a result of the unique opportunity this lot presents and that has been identified by the land owners.

The unique characteristics of the Site are as a result of upgrades to the Barton Highway and land resumption. The land owners have been left with an unusual lot in that it is of modest size and has direct frontage to the Barton Highway and indirect access from Longrail Gully Road.

In addition, it is conveniently located between Murrumbateman and Yass to provide a rest point for motorists and truck drivers; without causing any amenity impacts on neighbouring residential properties.

3.A.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

The proposed highway service centre is prohibited within the existing RU1 Primary Production Zone that applies to the Site and therefore a Planning Proposal is the best and only means of achieving the intended outcome.

Theoretically, the highway service centre could be facilitated on the Site if the permissible uses within the RU1 Primary Production Zone were amended to include Highway Service Centres or the underlying zone on the Site was amended to a zone that permitted Highway Service Centres with Development Consent. However, these methods would have wider implications than simply enabling a highway service centre on the Site.

As such, we believe that the proposed method of amending YVLEP to introduce the additional permissible use on this Site is the optimal procedural method of enabling the development to proceed, subject to Development Consent, and achieving the intended outcomes.

Furthermore, given that this Planning Proposal does not propose to change the zone of the Site and will maintain the existing development standards and zone objectives, the opportunity for creating incompatible land uses is reduced.

Section B – Relationship to Strategic Planning Framework

3.B.1 Is the Planning Proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

Yes. The Planning Proposal is considered to be consistent with the Goals and Directions contained within the South East and Tablelands Regional Plan 2036.

A summary of the Planning Proposal's consistency is provided in **Appendix 1** of this Planning Proposal.

3.B.2 Is the Planning Proposal consistent with the local council's Community Strategic Plan, or other local strategic plan?

Yes. This Planning Proposal is consistent with local council's Community Strategic Plan, or other local strategic plan.

The Tablelands Regional Community Strategic Plan 2016-2036 (CSP)

The CSP articulates the community and Council's shared vision, values, aspirations and priorities with reference to other local government plans, information and resourcing capabilities.

This Planning Proposal is considered to be consistent with the Strategic Pillars articulated in the CSP in that:

- It supports economic growth in the Region.
- It will have no adverse impact on the Region's social, cultural and economic diversity.
- It is not inconsistent with the adopted Regional Plan.
- It maintains a balance between sustainable growth, development and environmental protection.

Yass Valley Settlement Strategy

The Yass Valley Settlement Strategy (YVSS) was adopted by Council in 2017 and provides direction for long term growth and development within the Local Government Area.

This Planning Proposal aligns with the Principles of the YVSS specifically in that it recognises and protects the environment and cultural heritage of the area,

complements the hierarchy of settlements and assists in maximising infrastructure and service efficiencies.

In addition, the Planning Proposal supports the YVSS as it encourages growth for Murrumbateman as it will provide jobs for local people and support tourism and freight transport links along the Barton Highway.

3.B.3 Is the Planning Proposal consistent with applicable state environmental planning policies?

The Planning Proposal is considered to be generally consistent with applicable state environmental planning policies.

A summary of the Planning Proposal's consistency with applicable State Environmental Planning Policies is provided in **Appendix 2** of this Planning Proposal.

3.B.4 Is the Planning Proposal consistent with applicable Ministerial Directions (s.9.1 directions)?

The Planning Proposal is considered to be generally consistent with applicable s.9.1 Ministerial Directions.

A summary of the Planning Proposal's consistency with relevant s.9.1 Ministerial Directions is provided in **Appendix 3** of this Planning Proposal.

Section C – Environmental, Social and Economic Impact

3.C.1 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?

Ecological Impacts

An Ecological Assessment Report has been carried out and is attached at **Appendix 5.**

This report is specifically intended to indicate the likelihood of the Proposal having a significant effect on threatened species or ecological communities. Investigations were carried out at the site and via literature and database searches to gather information required to adequately address the requirements of the *Biodiversity Conservation Regulation 2017* (BCR), to address BOS thresholds and address Section 7.3 of the BC Act (5- Part Test).

The Commonwealth EPBC Act and relevant State Environmental Planning Policies (SEPPs) were also considered.

The report states that the Office of Environment and Heritage (OEH) Biodiversity Values Map (BV Map) shows that the site is not mapped as Biodiversity Value (BV) land, as defined by the Biodiversity Conservation Regulation 2017 and confirms that the Proposal does not trigger the requirements for production of a Biodiversity Development Assessment Report (BDAR).

In conclusion, the report states that the site could provide limited potential habitat for some threatened fauna species, however, none were recorded on site during recent fieldwork. One record of a mobile bird species was recorded in the southern end of the lot, where no actions are proposed, via other sources such as the NSW BioNet Atlas.

Consideration of matters pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) revealed that impacts on Matters of National Environmental Significance are considered unlikely to occur.

The report contains a number of general recommendations for consideration to minimise localised impacts on biodiversity as a result of the proposed development.

Aboriginal Due Diligence Assessment

An Aboriginal Due Diligence Assessment has been carried out and is attached at **Appendix 6.**

This assessment concludes that no sites of Aboriginal cultural heritage or areas of archaeological sensitivity were identified across the Site areas and there will be no impacts as a result of the proposed development. This is largely due to the identified historical land use involving modifications and disturbance to the natural landscape. It has been concluded that the proposed works are not likely to impact

upon any Aboriginal objects or places and, as such, works may proceed with caution subject to a number of recommendations.

Traffic and Access Assessment

An assessment of the Traffic and Access Assessment is provided at **Appendix 7.**

This assessment concludes that the proposed highway service centre could be approved by the road authority, with no issues associated for the capacity of the road network to accommodate the turning movements associated with the project site.

Further, it confirms that the site can be designed to accommodate the swept path movements of the appropriate design vehicles with adequate space to provide suitable parking for the highway service centre, including for PBS Level 2a (26 m) and 2b (30 m) vehicles.

It does recommend that a detailed traffic impact assessment is completed to the satisfaction of the RMS prior to their concurrence for the project, taking into account the capacity and road safety issues associated with the Proposal. This will also need to take into account the current intersection controls as well as the future controls as part of the upgrade of the Barton Highway.

Bushfire

The Ecological Assessment Report also considers Bushfire Hazard and is included in this report at **Appendix 5**.

A detailed search of NSW Department of Planning, Industry and Environment's Planning portal has shown that the site is not located within Bush Fire Prone Land, hence the Planning for Bushfire Protection Guidelines (2018) (PBP) do not apply to this Proposal.

However, it does recommend that site specific requirements are established with the RFS at development application stage.

Land Use Compatibility

The Planning Proposal will result in the Site maintaining the same zoning as it currently does along with the adjoining land, with the exception of the additional land use that is permissible.

Given the separation of the Site from its neighbours, there will be no amenity impacts or land use compatibility issues resulting from the Proposal.

3.C.2 Has the Planning Proposal adequately addressed any social and economic effects?

The social and economic impacts of the Planning Proposal are positive for the Local Government Area and the local community.

The proposed highway service centre will create jobs, with opportunities for part-time employees and entry level youth positions, and provide additional services for the local community.

The distance from Yass to Canberra is approximately 71km via the Barton Highway and, with the exception of the town of Murrumbateman, there are no other rest, refuel and revive opportunities between Yass and Canberra. This route has a significant number of daily commuters and the Barton Highway is also part of a significant route to the South Coast and from Canberra to Melbourne and other destinations the south.

The proposal will provide a rest area for heavy vehicles that is currently not provided on the Barton Highway between Yass and Murrumbateman nor at the small 6 pump service station at Murrumbateman. This will assist in providing opportunities for motorists and heavy vehicle operators to stop and revive; making the roads safer for all users.

It is anticipated that the highway service centre will include an electric charging station, which will encourage green transport options.

The location of the Site is remote from existing residences which means there will be no amenity cost to the community in providing a parking and refuelling area for heavy vehicles.

Section D – State and Commonwealth Interests

3.D.1 Is there adequate public infrastructure for the Planning Proposal?

Serving has been discussed with Council Officers and it is proposed that until such a time that town sewer and water are available, the Site will be serviced by bore water and utilise on-site sewer treatment.

In accordance with Council's specification, a test bore has been installed and tested and the results are attached as **Appendix 8.**

This Report concludes and recommends:

- The subject bore was drilled and constructed by Bungendore Water Bores in November 2019. The bore was drilled to a depth of 102 m with 66 metres of solid surface casing and a bentonite clay sanitary seal at the surface to prevent connection with any shallow soil water. The bore was completed with slotted PVC casing and gravel packed in general accordance with the Minimum Construction Requirements for Water Bores in Australia – 3rd Edition (2012). The bore sustained a drillers air lift yield of 1.0 L/s for a minimum of two (2) hours during drilling;

- The bore was subjected to a 48 hour (Bore 1) drawdown and recovery pumping test in peak summer conditions after a prolonged period of low rainfall. The results indicate the subject bore is capable of sustaining an allocation of at least 9.45 ML under the following pumping regime:

  Bore 1 - up to 0.6 L/s; 12 hr Pumping; 12 hrs Recovery; 9.45 ML per year at 50 % duty. A higher pumping rate and operating duty may be realised supported by monitoring of pumping performance and recovery rates.

- The proposal is to convert the test bore to a production bore with a commercial, industrial and domestic groundwater access licence with an annual entitlement of ~10 ML to facilitate the proposed development. The pumping yield of 0.6 L/s exceeds the estimated peak demand for the Site proposal of approximately 20,000 Litres per day (or up to 7.3 ML per year);

- Based on the capable yield the recommended pumping regime is considered low risk for groundwater impacts. Final drawdown in the bore was 19.64 mbgl which is significantly shallower than the available drawdown limit at a depth of 80 m below ground level at the top of the primary aquifer zone. No registered water bores are present within a 1 km radius of the site and similarly no GDEs were identified at the Site

area. Hence, it is assessed that under the proposed operating regime the bore will have no significant measurable impact on the groundwater environment and existing users in the area;

- NATA certificated laboratory results report water quality is generally within the criteria outlined by the ADWG (2018); and

- It is recommended that this report be submitted for final endorsement by the regulator.

We note the bore is located on Lot 21 DP 1125716 and provide a letter as **Appendix 9** from the owner of this property which confirms that they will allow access to the bore and an easement reflecting same will be created.

Power lines are located within 100m of the Site.

Where required necessary services will be augmented in consultation with local service providers.

It is proposed that all details of all proposed servicing infrastructure will be addressed with the Development Application.

3.D.2 What are the views of State and Commonwealth public authorities consulted in accordance with the Gateway Determination?

Formal consultation has not yet been undertaken with State and Commonwealth agencies.

The following public agencies have been identified for consultation during public exhibition:

- NSW Road and Maritime Services

Should the Proposal be significantly amended as a result of agency consultation, it may be reported back to Council and the Department of Planning and Environment for an amended Gateway Determination.

Part 4 - Mapping

(s.55(2)(d) Maps to be adopted by the proposed instrument)

The Planning Proposal will require the additional map for YVLEP being;

- Additional Permitted Uses Map - Sheet APU_005.
- The proposed extract of new Sheet APU_005 is illustrated below.
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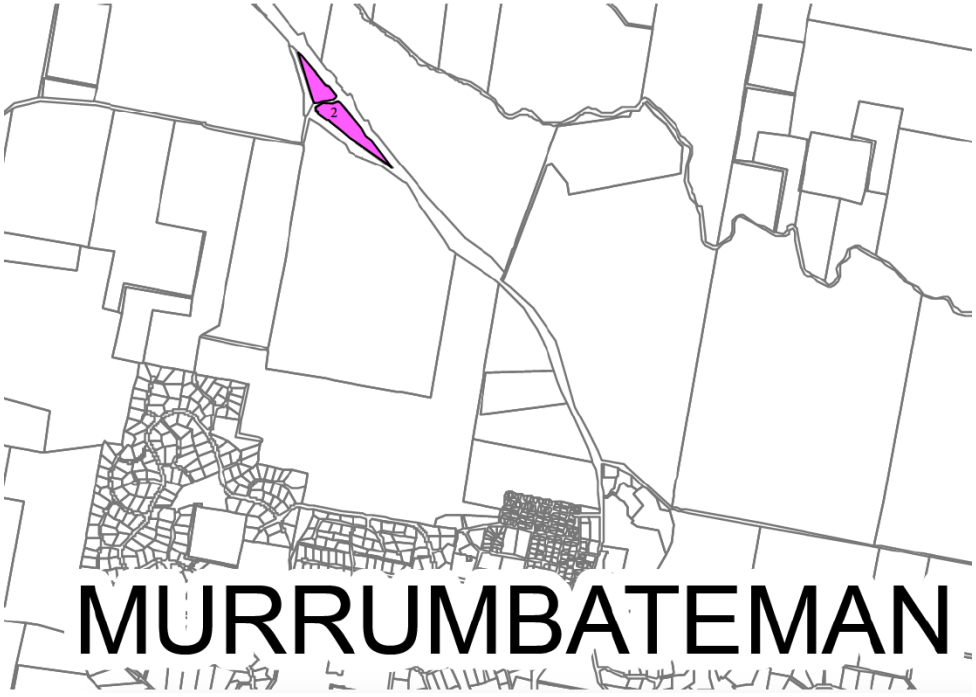

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- Figure 9 - Proposed Additional Permitted Use Map extract

Part 5 - Community Consultation

In accordance with Section 3.34(2)(c) of the *Environmental Planning and Assessment Act* 1979, this Planning Proposal will be made available for public comment for a minimum of 28 days.

In accordance with Council's adopted consultation protocols the following will also be undertaken:

- Notices in the local newspaper;
- Direct mail notification to potentially affected land owners;
- Exhibition material and all relevant documents will be available at Council's Offices;
- Exhibition material and all relevant documents will be available on Council's website.

Any further consultation required by the Gateway Determination will also be undertaken.

Part 6 - Project Timeline

In accordance with the Department of Planning and Environment guidelines, the following timeline is provided, which includes the tasks deemed necessary for the making of this local environmental plan.

Task	**Responsibility**	**Timeframe**	**Date (approximate)**
Council resolution to support the Planning Proposal	Council	-	April2020
Lodgement of Planning Proposal for Gateway Determination	Council	-	April 2020
Gateway Determination Issued	Minister for Planning	-	June 2020
Consultation with Public Authorities in accordance with Gateway Determination	Council	Minimum 21 days	July 2020
Public exhibition of Planning Proposal	Council	Minimum 28 days	July 2020
Report to Council	Council	-	September 2020
Lodgement of Planning Proposal (with any amendments as a result of submissions)	Council	-	October 2020
Making of local environmental plan	Minister for Planning	6 – 8 weeks	December 2020

Part 7 – Conclusion

The primary aim of the Planning Proposal is to amend YVLEP to facilitate a highway service centre on the Site by way of a specific inclusion to 'Schedule 1 – Additional Permitted Uses' of the YVLEP.

The Proposal is considered to have strategic merit as it will:

- Utilise a suitable site to provide services to the local community and motorists.
- Provide an opportunity for heavy vehicle operators to stop, revive and survive.
- Provide an opportunity to establish an Electric Charging Station, which will support greener transport options.
- Provide job opportunities.
- Result in no amenity impacts on residential properties and create no land use conflict.
- Be self-contained in terms of water and sewer provision.
- Have no unacceptable environmental impacts.
- Have no unacceptable impact on Aboriginal Heritage.
- Have no unacceptable impact on traffic.
- Be consistent with the objectives of all significant planning policies and Ministerial Directions.

Appendix 1 – Consistency with Regional Plan

The primary purpose of the South East and Tablelands Regional Plan 2036 (Regional Plan) is to guide the NSW Government's land use planning priorities and decisions over the next 20 years.

The Regional Plan is not intended to be a step-by-step approach to all land use planning. Rather, it is an overarching framework to guide more detailed land use plans, development proposals and infrastructure funding decisions.

Given the small scale and location of the Proposal, many of the Goals and Actions are not relevant. However, the Proposal is consistent with the overall Vision of the Plan.

The relevant matters under the Regional Plan for consideration within this Planning Proposal, are documented within the following table.

A connected and Borderless Canberra Region	
The *South East and Tablelands Regional Plan 2036* represents a new approach. It takes a cross-border approach to economic investment, infrastructure delivery, servicing provision and housing development. This will facilitate sustainable growth and optimise economic prospects.	The Planning Proposal will facilitate a highway service centre that will support and enhance travel to and from the ACT.
Goal 1 – A Connected and Prosperous Economy	
Direction 8: Protect important agricultural land	
8.2 Protect identified important agricultural land from land use conflict and fragmentation and manage the interface between important agricultural land and other land uses through local environmental plans.	The Site is not identified as important agricultural land and will not materially impact on the existing farming operation that it forms part of. There is no land use conflict that results from the Planning Proposal.
Direction 9: Grow tourism in the region	
9.5 Address seasonal transport capacity shortages efficiently through initiatives such as: • branding public transport services; • raising awareness of travel options; • supporting seasonal transport options such as holiday bus services and/or park and ride services; and	The Planning Proposal will facilitate a Service Centre that will support and enhance travel options by providing a bus, truck and motorist rest stop; and support any increased bus services in the future.

• introduce flexible and on-demand transport options.	
Direction 11: Enhance strategic transport links to support economic growth	
11.3 Limit inappropriate adjoining development and direct access points along strategic transport links including the Hume, Federal, Illawarra, Barton and Kings highways.	The Proposal has the unique situation where it has direct frontage to the Barton Highway, but vehicular access is via an existing minor road. As such, it is able to service the highway, without increasing direct private access points to the Barton Highway.
11.4 Investigate options to improve heavy vehicle rest areas appropriate for the demand.	The Proposal will provide the opportunity for a heavy vehicle rest area that has visibility and convenience to the Barton Highway but does not create amenity impacts for neighbouring properties in terms of noise, overshadowing, privacy, litter or contamination. In addition, it does not increase direct private access points to the Barton Highway.
GOAL 2 - A diverse environment interconnected by biodiversity corridors	
Direction 14: Protect important environmental assets	
14.3 Minimise potential impacts arising from development on areas of high environmental value, including groundwater-dependent ecosystems and aquatic habitats, and implement the 'avoid, minimise and offset' hierarchy.	The Ecological Assessment that supports this Planning Proposal concludes that there will be minimal impact arising from the development.
GOAL 3 Healthy and connected communities	
Direction 19: Strengthen cross-border connectivity	The Planning Proposal will facilitate a highway service Centre that will support and enhance travel to and from the ACT.
Direction 20: Enhance access to goods and services by improving transport connections	The Proposal will provide the opportunity for a heavy vehicle rest area that has visibility and does not increase direct private access points to the Barton Highway.
***Local Government Narratives* - Yass Valley**	
Priorities	The Planning Proposal will facilitate a highway service centre that will support and enhance travel to and from the ACT.

• Create efficient cross-border connections.	

Appendix 2 – Consistency with State Environmental Planning Policies

State Environmental Planning Policies		Consistency with SEPP
19	Bushland in Urban Areas	N/A
21	Caravan Parks	N/A
33	Hazardous & Offensive Development	N/A
36	Manufactured Home Estates	N/A
44	Koala Habitat Protection	**N/A**
47	Moore Park Showground	N/A
50	Canal Estate Development	N/A
55	Remediation of Land	✓
64	Advertising & Signage	✓
65	Design Quality of Residential Flat Development	N/A
70	Affordable Housing (Revised Schemes)	N/A
	(Affordable Rental Housing) 2009	N/A
	(Building Sustainability Index: BASIX) 2004	N/A
	(Exempt & Complying Development Codes) 2008	N/A
	(Housing for Seniors or People with a Disability) 2004	N/A
	(Infrastructure) 2007	✓
	(Kosciuszko National Park–Alpine Resorts) 2007	N/A
	(Kurnell Peninsula) 1989	N/A
	(Mining, Petroleum Production & Extractive Industries) 2007	N/A
	(Miscellaneous Consent Provisions) 2007	N/A
	(Penrith Lakes Scheme) 1989	N/A

	(Rural Lands) 2008	✓
	(State & Regional Development) 2011	N/A
	(State Significant Precincts) 2005	N/A
	(Sydney Drinking Water Catchment) 2011	N/A
	(Sydney Region Growth Centres) 2006	N/A
	(Three Ports) 2013	N/A
	(Urban Renewal) 2010	N/A
	(Western Sydney Employment Area) 2009	N/A
	(Western Sydney Parklands) 2009	N/A
	(State and Regional Development) 2011	N/A
	Coastal Management (2018)	N/A
	Concurrences and Consents (2018	N/A
	Aboriginal Land (2019)	N/A

Specific comments in relation to the more relevant SEPPs are provided below:

SEPP 55 – Remediation of Land

This SEPP aims to promote the remediation of contaminated land for the purpose of reducing risks to people and the environment. Relevant to this Planning Proposal, Clause 6 of the SEPP provides that the Council must not allow the rezoning of land for residential or environmental conservation purposes unless:

a. the planning authority has considered whether the land is contaminated, and

b. if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and

c. if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning authority is satisfied that the land will be so remediated before the land is used for that purpose.

The Site has not been subject to development previously and it is considered unlikely that it is affected by contamination; however, a Phase 1 Investigation can be provided post Gateway should the Minister require.

SEPP 64 – Advertising & Signage (SEPP 64)

Signage will be an important element of the development and SEPP 64 will be considered when the DA is lodged and the signage requirements are definitely known.

SEPP (Infrastructure) 2007

Clause 104 of the Infrastructure SEPP 2007 outlines the planning requirements for traffic generating development listed in Schedule 3 of the SEPP.

Given the Proposal does require indirect access from a classified road, it will require referral to RMS.

SEPP (Rural Lands) 2008

Relevantly to this Planning Proposal, SEPP (Rural Lands) 2008 aims to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

Cl. 7 contains the following relevant Rural Planning Principles:

(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,

(h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

In view of these Principles we make the following observations:

- The Proposal will promote economic activity in the area.

- The Proposal will not materially impact the trends, demands and issues in agriculture in the area.

- The Site is not agriculturally significant and the Proposal will not impact the social and economic benefits of rural land use.

- The Proposal will provide a positive social and economic impact for the community through job creation and provision of services.

- The Proposal has been subject to an Ecological Assessment which has confirmed it will not materially impact native vegetation. Water resources will be protected by design and operational safeguards.

- The Proposal will service the local community and provide local employment opportunities.

- The Proposal is consistent with the South East and Tablelands Plan.

On this basis, it is assessed that this Planning Proposal is consistent with the SEPP (Rural Lands) 2008.

Appendix 3 – Consistency with S9.1 Ministerial Directions

S9.1 Ministerial Direction	**Comment**
1.1 Business and Industrial Zones	N/A
1.2 Rural Zones Aims to protect the agricultural production value of rural lands.	The Planning Proposal does not change the existing rural zone nor increase the density. In any event the Proposal is of minor significance and will not decrease the overall capability of the existing farming operation.
1.3 Mining, Petroleum Production and Extractive Industries	N/A
1.4 Oyster Aquaculture	N/A
1.5 Rural Lands Aims to generally protect the agricultural production value of rural lands and facilitate orderly and economic development of rural lands for rural and related purposes.	The Planning Proposal is consistent with the South East and Tableland Regional Plan and local strategic plans. The Proposal has an insignificant impact on agriculture and primary production to the State and rural communities. The Ecological Assessment and Aboriginal Due Diligence Assessment confirms that environmental values, biodiversity, native vegetation and cultural heritage are protected. The location, characteristics and physical constraints of the land, are suitable for the proposed development. The Proposal will lead to investment in the area. The Proposal will have no material impact on farmers in exercising their right to farm. There will be no land use conflict or fragmentation of rural land resulting from the Planning Proposal. The Site is not State significant agricultural land identified in *State Environmental Planning Policy (Primary Production and Rural Development) 2019*. The Planning Proposal will facilitate a positive social and economic outcome for the community at no material environmental cost.

S9.1 Ministerial Direction	**Comment**
2.1 Environmental Protection Zones	N/A
2.2 Coastal Management	N/A
2.3 Heritage Conservation Aims to conserve items and places of heritage significance and indigenous heritage significance.	This Planning Proposal proposes no change to the Heritage Conservation provisions within YVLEP. The Site has been assessed for impact on Aboriginal objects or places and through the Due Diligence Assessment it has been determined works may proceed with caution subject to a number of recommendations.
2.4 Recreation Vehicle Areas	N/A
3.1 Residential Zones	N/A
3.2 Caravan Parks and Manufactured Home Estates	N/A
3.3 Home Occupations	N/A
3.4 Integrating Land Use & Transport	N/A This direction applies to planning proposals that will create, alter or remove a zone or a provision relating to urban land, including land zoned for residential, business, industrial, village or tourist purposes. There is no change to the proposed zoning and this Direction does not apply.
3.5 Development Near Regulated Airports and Defence Airfields	N/A
3.6 Shooting Ranges	N/A
4.1 Acid Sulfate Soils	N/A
4.2 Mine Subsidence and Unstable Land	N/A
4.3 Flood Prone Land	The Site is not mapped as flood prone land pursuant to the LEP.

S9.1 Ministerial Direction	Comment
4.4 Planning for Bushfire Protection Aims to encourage the sound management of bushfire prone areas, and to protect life, property and the environment from bushfire hazards.	The Ecological Assessment Report also assesses Bushfire risk and confirms that the Site is not within Bushfire Prone Land.
5.1 Implementation of Regional Strategies The objective of this direction is to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.	The Planning Proposal is consistent with relevant Regional Strategies and demonstrated in Appendix A.
5.2 Sydney Drinking Water Catchments	N/A
5.3 Farmland of State and Regional Significance on the NSW Far North Coast	N/A
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	N/A
5.5 Revoked	N/A
5.6 Revoked	N/A
5.7 Revoked	N/A
5.8 Revoked	N/A
5.9 North West Rail Link Corridor Strategy	N/A
5.10 Implementation of Regional Plans The objective of this direction is to give legal effect to the vision, land use strategy, goals,	The Planning Proposal is consistent with the relevant Regional Plan as demonstrated in Appendix A.

S9.1 Ministerial Direction	Comment
directions and actions contained in Regional Plans.	
5.11 Development of Aboriginal Council Land	N/A
6.1Approval and Referral Requirements The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	This Planning Proposal does not increase concurrence or referral requirements on the Site.
6.2 Reserving Land for Public Purposes	N/A
1.3 Site Specific Provisions The objective of this direction is to discourage unnecessarily restrictive site-specific planning controls.	No restrictive site-specific provisions are proposed for this Site.
7.1 Implementation of the Metropolitan Plan for Sydney 2036	N/A
7.2 Implementation of Greater Macarthur Land Release Investigation	N/A
7.3 Parramatta Road Corridor Urban Transformation Strategy	N/A
7.4 Implementation of North West Priority Growth Area Land Use and Infrastructure Implementation Plan	N/A
7.5 Implementation of Greater Parramatta Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A

S9.1 Ministerial Direction	Comment
7.6 Implementation of Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan	N/A
7.7 Implementation of Glenfield to Macarthur Urban Renewal Corridor	N/A
7.8 Implementation of Western Sydney Aerotropolis Interim Land Use and Infrastructure Implementation Plan	N/A
7.9 Implementation of Bayside West Precincts 2036 Plan	N/A
7.10 Implementation of Planning Principles for the Cooks Cove Precinct	N/A

Appendix 4 – Survey Plan and Development Area

SHEET 1A

	NAME	DATE	DATUM	MGA94 Zone 55				
DRAWN	TPW	4/12/2019	HEIGHT	AHD				
CHECKED	SJH	4/12/2019	SCALE	1:1500 @ A2				
APPROVED	SJH	4/12/2019	REF	190601				
DATA SOURCE					No.	AMENDMENT	BY	DATE

GPS Geomatic & Property Services
AUSTRALIA PTY LTD
CONSULTING SURVEYORS
32 Comur Street YASS NSW 2582
Ph: 02 6226 3200 Email: gps@gpsaustralia.net.au

CONTOUR PLAN OF LOT 12 DP1158637 AND SURROUNDS

SHEET 1B

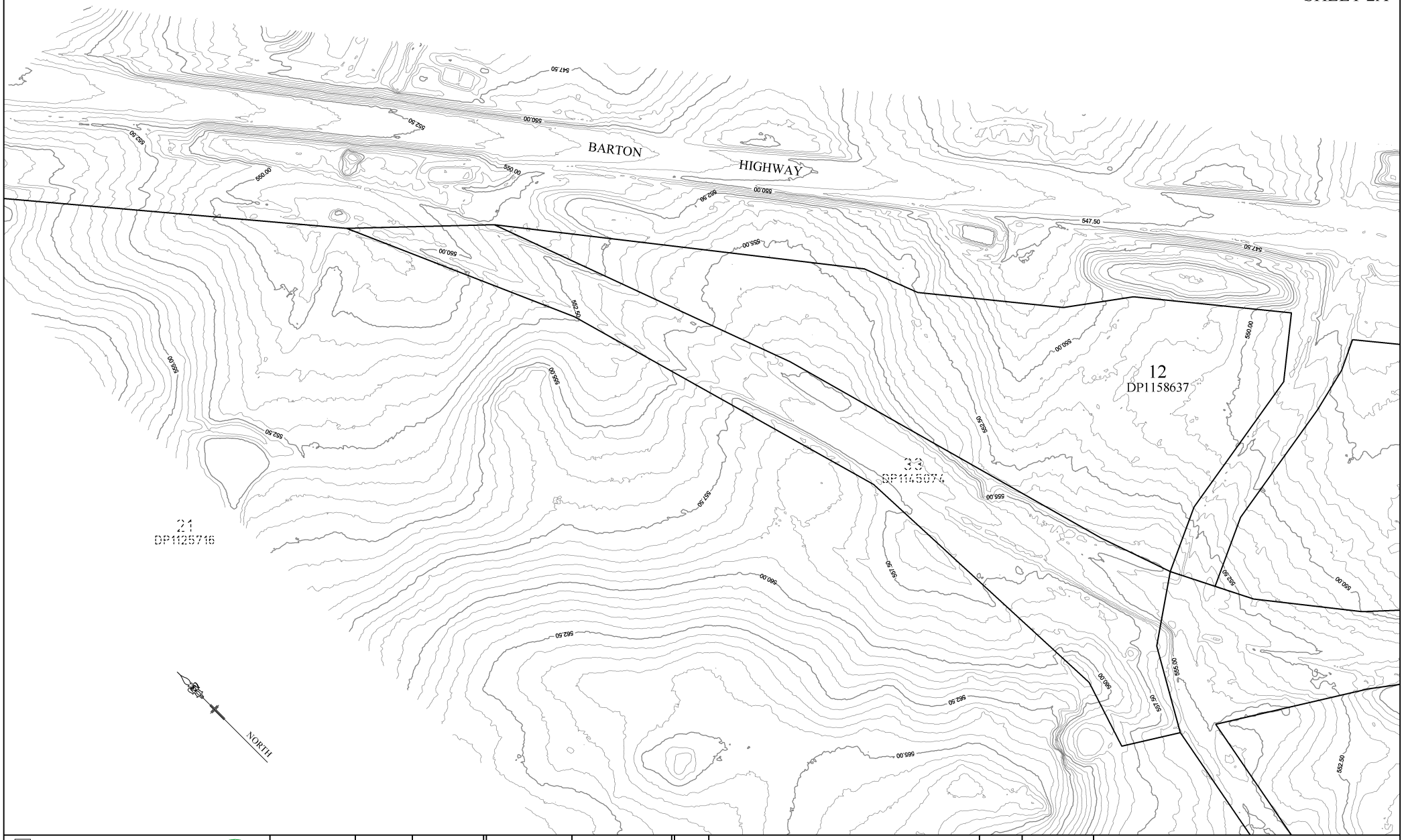
Geomatic & Property Services
AUSTRALIA PTY LTD
CONSULTING SURVEYORS
32 Comur Street YASS NSW 2582
Ph: 02 6226 3200 Email: gps@gpsaustralia.net.au

	NAME	DATE	DATUM	MGA94 Zone 55
DRAWN	TPW	4/12/2019	HEIGHT	AHD
CHECKED	SJH	4/12/2019	SCALE	1:1500 @ A2
APPROVED	SJH	4/12/2019	REF	190601
DATA SOURCE				

No.	AMENDMENT	BY	DATE

CONTOUR PLAN OF LOT 12 DP1158637 AND SURROUNDS

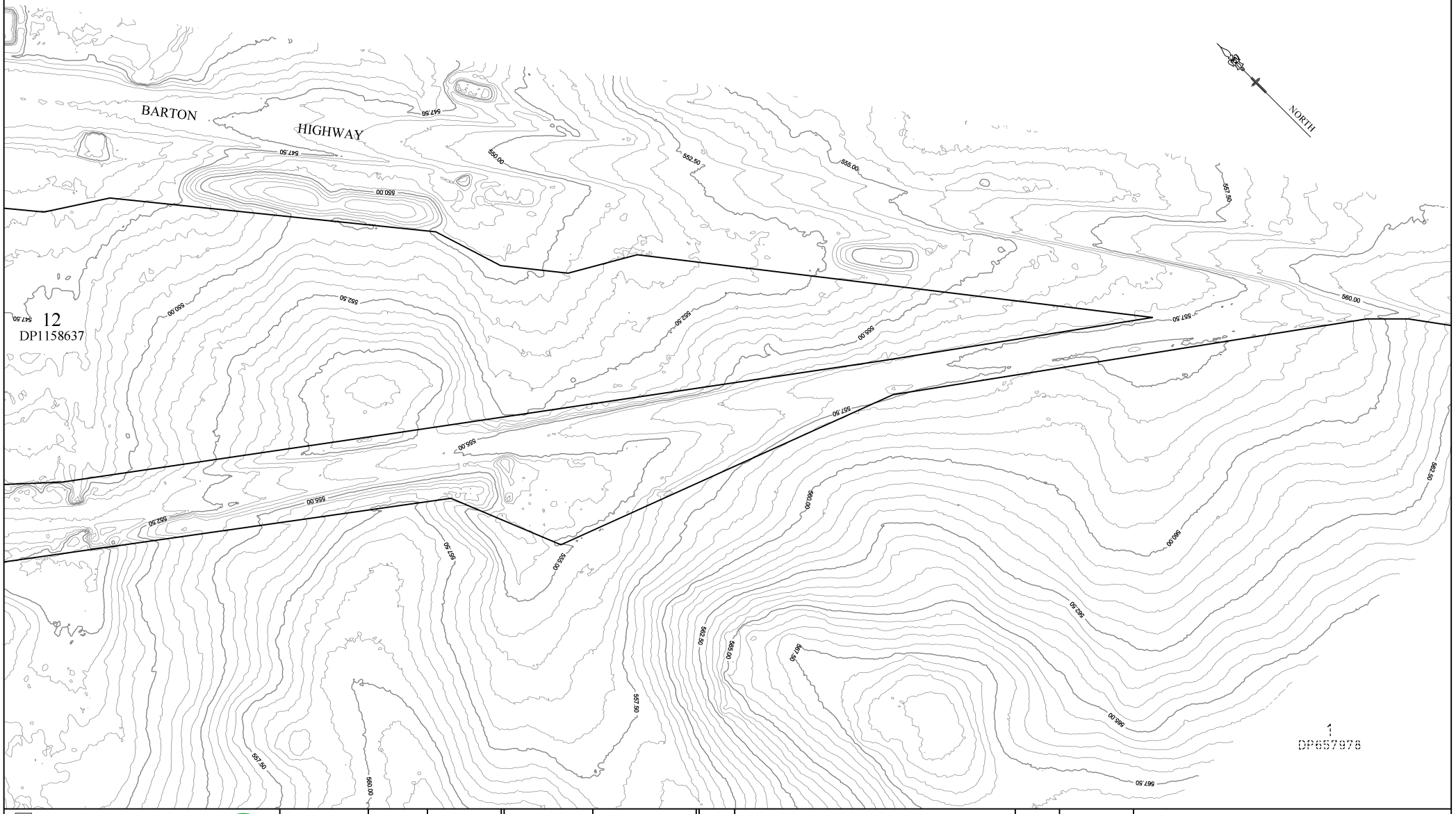
SHEET 2A



Geomatic & Property Services		NAME	DATE	DATUM	MGA94 Zone 55			
AUSTRALIA PTY LTD	DRAWN	TPW	4/12/2019	HEIGHT	AHD			
CONSULTING SURVEYORS	CHECKED	SJH	4/12/2019	SCALE	1:1500 @ A2			
32 Comur Street YASS NSW 2582	APPROVED	SJH	4/12/2019	REF	190601			
Ph: 02 6226 3200 Email: gps@gpsaustralia.net.au	DATA SOURCE					No.	AMENDMENT	BY	DATE

CONTOUR PLAN OF LOT 12 DP1158637 AND SURROUNDS

SHEET 2B



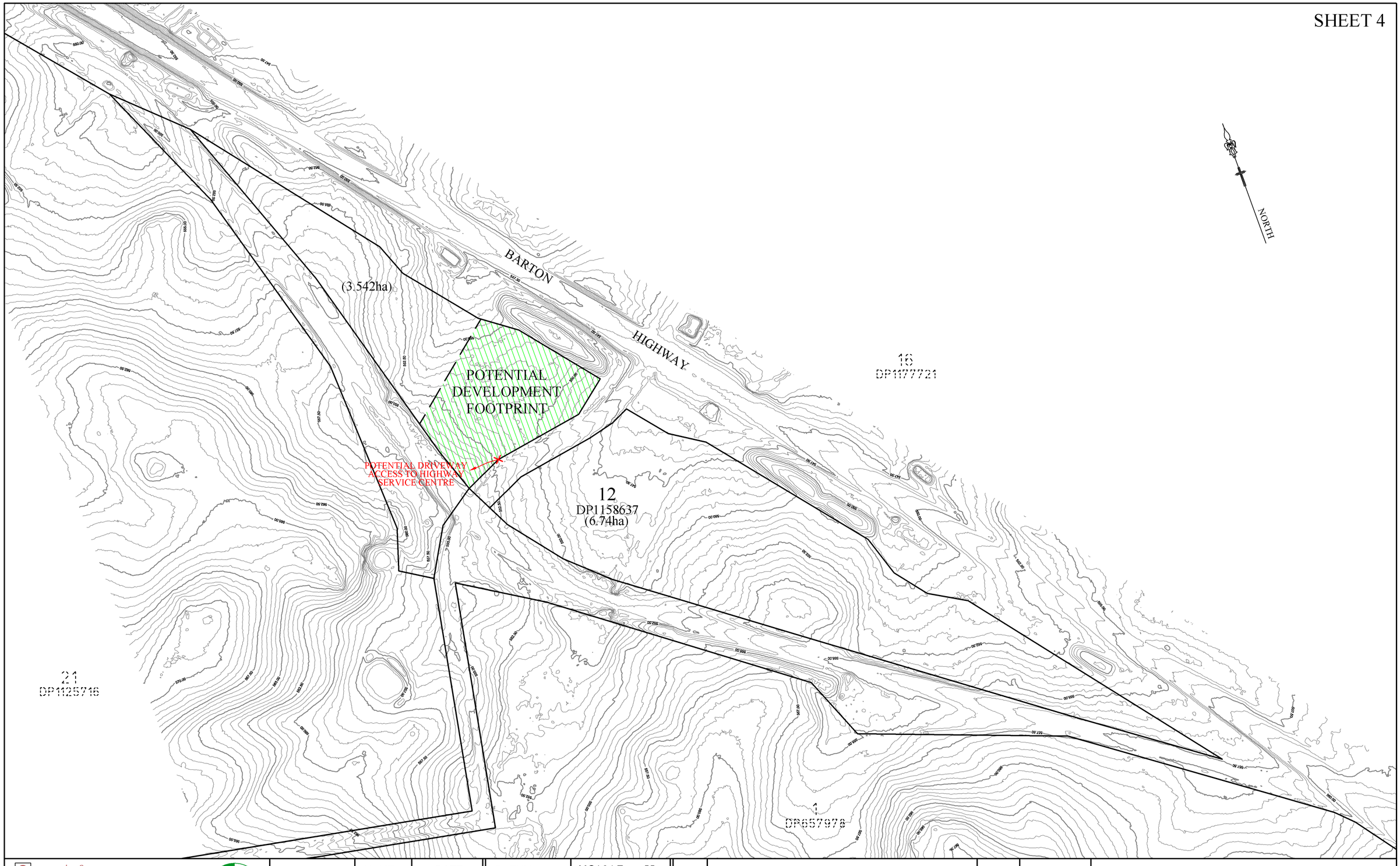
GPS Geomatic & Property Services
AUSTRALIA PTY LTD
CONSULTING SURVEYORS
32 Comur Street YASS NSW 2582
Ph: 02 6226 3200 Email: gps@gpsaustralia.net.au

	NAME	DATE		
DRAWN	TPW	4/12/2019	DATUM	MGA94 Zone 55
CHECKED	SJH	4/12/2019	HEIGHT	AHD
APPROVED	SJH	4/12/2019	SCALE	1:1500 @ A2
DATA SOURCE			REF	190601

No.	AMENDMENT	BY	DATE

CONTOUR PLAN OF LOT 12 DP1158637 AND SURROUNDS

SHEET 4



GPS Geomatic & Property Services
AUSTRALIA PTY LTD
CONSULTING SURVEYORS
32 Comur Street YASS NSW 2582
Ph: 02 6226 3200 Email: gps@gpsaustralia.net.au

	NAME	DATE						
DRAWN	TPW	4/12/2019	DATUM	MGA94 Zone 55				
CHECKED	SJH	4/12/2019	HEIGHT	AHD				
APPROVED	SJH	4/12/2019	SCALE	1:2500 @ A2				
DATA SOURCE			REF	190601				

No.	AMENDMENT	BY	DATE
A	Area and potential driveway access	TPW	7/02/2020

CONTOUR PLAN OF LOT 12 DP1158637 AND SURROUNDS

Appendix 5 – Biodiversity Development Assessment

AEP
ECOLOGY | BIOBANKING | OFFSETS | BUSHFIRE

ECOLOGICAL ASSESSMENT REPORT

FOR A

PLANNING PROPOSAL
AT

LOT 12 DP 1158637
MURRUMBATEMAN

Prepared for: **THE TRUSTEE FOR THE BARTON HIGHWAY TRUST**

10 October 2019

REVISION 2

AEP Ref: 1969

P 0418 681 581 E CRAIG@ANDERSONEP.COM.AU PO BOX 210 ADAMSTOWN NSW 2289 ABN 27 170 660 510

EXECUTIVE SUMMARY

Anderson Environment & Planning (AEP) was commissioned by Catalyze Property Consulting Pty Ltd on behalf of The Trustee for the Barton Highway Trust (the client) to undertake an Ecological Assessment Report (EAR) on a site on the Barton Highway, Murrumbateman, NSW (Lot 12 DP1158637) located in the Yass Valley Council (LGA).

The client proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses to permit a 'highway service centre' on Lot 12 DP1158637 zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway.

At this point, and subject to final design, it is proposed to locate the highway service centre on the section of the site to the north of Longrail Gully Road, occupying approximately 4ha.

The subject site is surrounded by rural agricultural land zoned RU1 Primary Production, comprising of mainly cleared and managed non-native grassland, as well as land zoned SP2 Infrastructure along the Longrail Gully Road which runs along the south-western edge of the study area, and the Barton Highway.

The Site comprises 10.26ha of cleared and highly managed non-native grassland, including one *Eucalyptus melliodora* tree, with previous use as intensive sheep and cattle grazing and a history of interspersed cropping.

The Office of Environment and Heritage (OEH) Biodiversity Values Map (BV Map) showed that the site is not mapped as Biodiversity Value (BV) land, as defined by the *Biodiversity Conservation Regulation 2017*. The Biodiversity Offset Scheme (BOS) threshold of native vegetation clearing associated with the study area is >1ha. The proposal will result in approximately **0.1ha** of native vegetation being removed from the site, therefore this proposal does not trigger the requirements for production of a Biodiversity Development Assessment Report (BDAR).

The results of the Ecological Assessment Report indicate that the site could provide limited potential habitat for some threatened fauna species, however, none were recorded on site during recent fieldwork, while one record of a mobile bird species was recorded in the southern end of the lot, where no actions are proposed, via other sources such as the NSW BioNet Atlas. Assessment under SEPP 44 Koala Habitat Protection revealed there were no tree species listed in Schedule 2 or presence of koalas in the form of scats or tree markings consistent with the species. Based on the absence of evidence no further provision of the policy apply to the site. Consideration of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) revealed that impacts on Matters of National Environmental Significance are considered unlikely to occur.

General recommendations are included for consideration to minimise localised impacts on biodiversity in general as a result of the proposed.

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Tables

Figures

Appendices

1.0 Introduction

Anderson Environment & Planning (AEP) was commissioned by Catalyze Property Consulting Pty Ltd on behalf of The Trustee for the Barton Highway Trust (the client) to undertake the necessary investigations to consider the Biodiversity Offsets Scheme (BOS) and to inform the production of a 5-Part Test of Significance addressing the Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses to permit a 'highway service centre' on Lot 12 DP1158637 zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway.

This EAR is specifically intended to indicate the likelihood of the proposed development having a significant impact on threatened species or ecological communities and/or triggering relevant BOS thresholds. In this regard, the report aims to recognise the relevant requirements of the *Environmental Planning & Assessment Act 1979*, the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of this EAR is to:

- Describe ecological values of the site;
- Explore the potential for threatened species to utilise the site; and
- Assess ecological impacts associated with the proposal against relevant legislation;

Potential ecological impacts on native species in general are also considered, as are recommendations for minimising and mitigating environmental impacts potentially arising from the proposal.

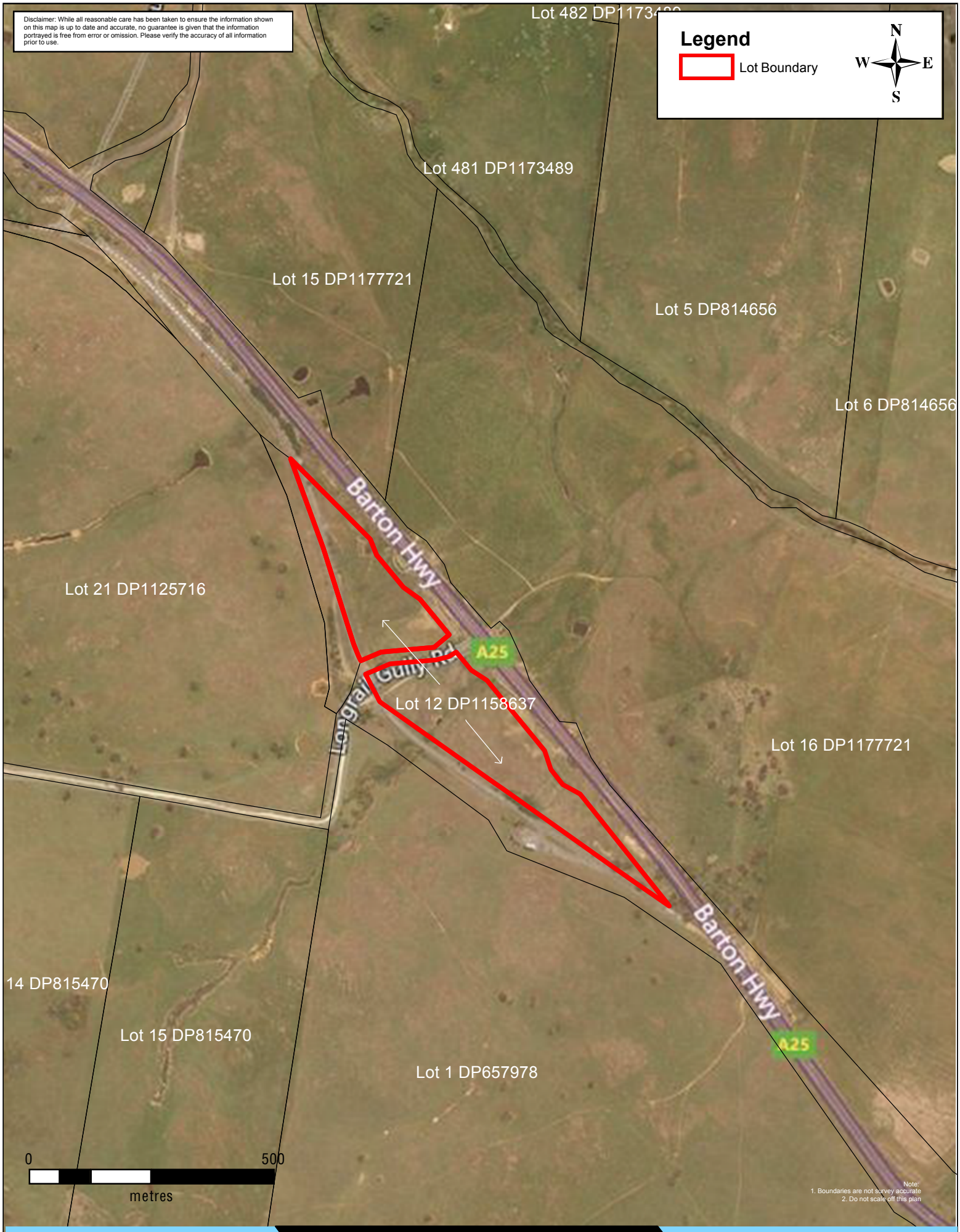
For the purposes of referencing, this document should be referred to as:

> Anderson Environment & Planning (2019) *Ecological Assessment Report for a Planning Proposal on the Barton Highway, Murrumbateman NSW.* Unpublished report for Catalyze Property Pty Ltd, September 2019.

2.0 Site Particulars

- **Location** – Barton Highway, Murrumbateman.
- **Local Government Area (LGA)** – Yass Valley Council.
- **Title Details** - The proposed development is situated within Lot 12 DP 1158637.
- **Site** – The study area occupies Lot 12 DP 1158637 and is approximately 10.26ha as per **Figure 1**.
- **Zoning** – The subject site is zoned RU1 Primary Production.
- **Current Land Use** – The site is currently managed rural agricultural land. The vegetation can be described as cleared and highly managed grassland consisting of mostly exotics herbs and grass, with marginal native grounder, no shrub layer and one *E. melliodora* tree.
- **Surrounding Land Use** – The subject site is bounded by managed farmland zoned RU1 Primary Production, and the Barton Highway which runs along the eastern boundary of the site, zoned SP2 Infrastructure.

  Figure 1 depicts the extent of the study area in the context of the locality.



AEP

Title: Figure 1 - Site Location

Date: October 2019

Location: Barton Highway, Murrumbateman

Client: Catalyze Property Consulting Pty Ltd

Our Ref: 1969

3.0 Proposed Development

The client proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses to permit a 'highway service centre' on Lot 12 DP1158637 zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway.

At this point, and subject to final design, it is proposed to locate the highway service centre on the section of the site to the north of Longrail Gully Road, occupying approximately 4ha.

This report will investigate the environmental impacts of the proposal; that, if successful, will be subject to a development application.

On the basis that the proposal is located on the section of the site to the north of Longrail Gully Road occupying approximately 4ha, the proposal will require the removal of up to 0.1ha of native vegetation comprising of native grasses and one *Eucalyptus melliodora.* The remaining 3.9ha that is to be impacted is highly managed non-native grasslands dominated by exotics.

4.0 Scope and Purpose

This report is specifically intended to indicate the likelihood of the proposal having a significant effect on threatened species or ecological communities. Investigations were carried out at the site and via literature / database searches to gather information required to adequately address the requirements of the *Biodiversity Conservation Regulation 2017* (BCR), to address BOS thresholds and address Section 7.3 of the BC Act (known as the "5-part test").

The Commonwealth EPBC Act, and relevant State Environmental Planning Policies (SEPPs) were also afforded consideration.

The assessment approach was tailored to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development. This was achieved by background research and literature review, database searches, consultation, targeted ecological fieldwork and mapping, detailed habitat assessment, and ultimately impact assessment consideration against the type and form of development proposed.

Impact assessment was undertaken with due reference to the "*Threatened Species Assessment Guidelines*" (DECC, 2007).

Specifically, the scope of this study is to:

- Identify vascular plant species occurring within the site, including any threatened species listed under the BC Act or EPBC Act;
- Identify and map the extent of vegetation communities within the site, including any Endangered Ecological Communities (EECs) listed under the BC Act or EPBC Act;
- Identify any fauna species, including threatened and migratory species, and populations or their habitats, which occur within the site and are known to occur in the wider locality;
- Assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the site; and
- Describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.

In addition to the survey work conducted within the site boundary and its immediate surrounds, consideration has been afforded to the wider locality, via database searches within 10km of the site and via appreciation of habitat areas that may be linked ecologically to the site.

Biodiversity Values Map

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the BCR. The Biodiversity Offsets Scheme (BOS) applies to all local developments, major projects or the clearing of native vegetation where the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 applies. Any of these will require entry into the BOS if they occur on land mapped on the Biodiversity Values Map. Exempt and complying development or private native forestry are not subject to the Biodiversity Offsets Scheme.

The BV Map (**Appendix D**) shows that the site is not mapped as containing BV Land. As such no clearing of native vegetation is to be undertaken within a mapped BV area, therefore this proposal does not trigger the requirement for a Biodiversity Development Assessment Report (BDAR) under these criteria.

Area Clearing Threshold

"The area threshold varies depending on the minimum lot size (shown in the Lot Size Maps made under the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP). The area threshold applies to all proposed native vegetation clearing associated with a development proposal".

Table 1 – Area Clearing Thresholds (BC Act)

Minimum lot size	Threshold for clearing, above which the BAM and offsets scheme apply
< 1ha	>0.25ha
1ha to <40ha	>0.5ha
40ha to <1000ha	**>1ha**
>1000ha	>2ha

In this case, the minimum lot size for the site is 40ha, hence there is a 1ha native vegetation clearing threshold for the development. As the proposed development required the removal of approximately 0.1ha of native vegetation consisting of native grasses and one (1) *Eucalyptus melliodora*, hence it does not exceed the clearing threshold and as such the preparation of a (BDAR) is not required based on the clearing thresholds.

5.0 Study Certification and Licensing

The fieldwork was undertaken by Brooke Corrigan B EnSc and the report was prepared by Justin Chey B Sc, and reviewed by Natalie Black BSc (HONS, Masters Planning & Cert IV TA).

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 14/600(2)) issued by NSW Agriculture.

Certification:

As the principal author, I, Natalie Black, make the following certification:

- The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the subject site;
- Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons; and
- All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the Animal Research Act 1995, BC Act and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Author and Certifier:

Natalie Black

Senior Environmental Manager

Anderson Environment & Planning

16 September 2019

6.0 Methods

The field surveys for the subject area have been prepared and performed with due recognition of the instruments previously discussed.

The size of the subject site, the type and status of native vegetation and habitats remaining, the status of existing and proposed surrounding land use, and the level and type of habitat linkages to other proximate bushland areas were all considered in formulating the methodology employed and described below.

The assessment approach was tailored to undertake sufficient works relating to threatened species, and native species in general, to ensure that legislative requirements were met for the proposal.

To ensure a robust impact assessment approach, where any potential doubt remained over species impact, presence within the study area was assumed to ensure an overly conservative approach was employed.

6.1 Literature Review

Primary information sources reviewed included:

- Aerial Photograph Interpretation (API) of the site and surrounding locality;
- NSW Office of Environment & Heritage (OEH) Threatened Species, Populations and Ecological Communities website;
- OEH Threatened Biodiversity Profiles (https://www.environment.nsw.gov.au/threatenedSpeciesApp/);
- Collective knowledge gained from previous ecological survey and assessment in the Yass Valley area over more than 20 years; and
- Anecdotal records.

In addition, database searches were carried out, namely:

- Review of flora and fauna records held by the NSW Office of Environment & Heritage (OEH) Atlas of NSW Wildlife within a 5km radius of the site (September 2019); and
- Review of flora and fauna records held by the Commonwealth Department of Environment (DoE) Protected Matters Search within a 5km radius of the site (September 2019).

6.2 Field Survey

6.2.1 Vegetation Communities

Vegetation was surveyed utilising a variety of methods, as outlined below:

- Review of the Forest Ecosystems: Vegetation of the Southern Forests (State Government of NSW and Department of Planning, Industry and Environment 2011);
- Consultation of 1:25,000 topographic map series for the area; and
- Subject site inspection to ground truth the unit(s) identified by API.

The final derived vegetation map was based on dominant species present in the over-storey, shrub and ground layers. Given the highly managed nature of the site with a lack of remnant native vegetation, no vegetation communities were identified on site.

Consideration was given for the vestige vegetation on site to constitute EEC, as listed under the BC Act and/or EPBC Act. Study area floristic composition, geomorphological characteristics and geographical extent were considered in this process.

6.2.2 Flora

A general flora survey was undertaken to produce a flora species list for the subject site, to search specifically for threatened flora species known from the wider area, and to gather data necessary to both derive vegetation community type and to meet the survey guidelines of relevant authorities. Survey works included:

- Identification of all vascular plant species encountered during fieldwork. Random Meander Technique (Cropper 1993) within the study area was utilised to maximise species encountered. Specific searches were undertaken within areas proposed for development. A full list of all flora species recorded during fieldwork is included as **Appendix A.**
- Targeted searches in areas of potentially suitable habitat were undertaken for threatened flora species identified by literature searches and hollow-bearing trees (HBTs).

The cleared and managed nature of the subject site permitted this methodology to achieve adequate coverage of the flora therein.

6.2.3 Habitat

An assessment of the relative habitat values present within the site was carried out. This assessment focused primarily on the identification of specific habitat types and resources favoured by known threatened species from the region. The assessment also considered the

potential value of the study area (and surrounding areas) for all major guilds of native flora and fauna.

The assessment was based on the specific habitat requirements of each threatened fauna species in regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

In particular, focus was put on documenting the presence of key habitat features such as tree hollows. Hollows are an important resource utilised by a variety of avian and mammalian fauna, and are particularly relevant for several of the likely key threatened species in this locality. Vertebrate and invertebrate species use hollows as diurnal or nocturnal shelter sites, for rearing young, feeding, thermoregulation, and to facilitate ranging behaviour and dispersal.

No hollow bearing trees were identified on site.

Other important habitat elements for the site have been considered, including use for species such as the Brown Treecreeper and the Superb Parrot. These considerations have been provided in further Sections.

6.2.4 Fauna

Adequate fauna survey effort for the study area was covered by targeted, incidental and opportunistic records of fauna species during fieldwork including:

- Avifauna surveys - Birds were identified by direct observation, by recognition of calls, and by any sightings of secondary distinctive features such as nests, feathers, etc. during fieldwork;
- Records of fauna species observed during targeted searches and fieldwork were noted. This included searches for secondary indications (scratches, scats, diggings, tracks, etc.) that may indicate subject site usage by resident or migratory species. Observation was conducted for whitewash, regurgitation pellets and prey remains from forest owls, and chewed fruit remains from frugivorous birds, koala scats etc.

The small size of the subject site and its highly cleared and managed nature, combined with the fact that only one tree with no hollows is present within the building envelope, with marginal to no other habitat features noted, indicates that a nocturnal survey was deemed unnecessary.

6.2.5 Survey Dates, Times & Activity

Table 2 –Field Survey Effort

Date	Time	Activity	No. of Persons on Site
02/09/2019	12:30 – 15:30	Flora survey (including hollow-bearing tree survey), avifauna and reptile survey and other incidental fauna survey	1
03/09/2019	09:00 – 11:00	Flora survey, single BAM plot and other incidental fauna survey	1

The above survey methodology is considered to provide sufficient understanding of the biodiversity of the subject site and wider study area given the disturbed nature of the vegetation assemblages therein.

In addition, by applying rigorous habitat assessment to more mobile species with OEH Atlas records within the locality, it was ensured that all possible uses of the subject site and wider area by notable species were considered, and hence accommodated within subsequent biodiversity assessment and management recommendations.

7.0 Results

7.1 Database Searches

Updated searches were undertaken of databases within a 10km radius of the site as per latest OEH (BC Act listings) & Department of Environment and Energy (DoEE) (EPBC Act listings) (**Table 3**). Note that any records considered erroneous, historic only, or obviously of no relevance to the site in regards to habitat (e.g. seabirds, marine species etc.) have been omitted.

The potential for the listed threatened species to occur within the site is considered below.

Detailed ecological profile descriptions of species can be found at:

https://www.environment.nsw.gov.au/threatenedSpeciesApp/

Table 3 – Threatened Species Appraisal

Scientific Name	Common Name	BC Act	EPBC Act	Chance of Occurrence
Birds				
Anthochaera phrygia (1)	Regent Honeyeater	E	CE	No sign of this species during fieldwork. The preferred habitats of the Regent Honeyeater (dry open forest, woodland and riparian forests of River Sheoak, and forests with large numbers of mature trees, high canopy cover and abundance of mistletoe) do not occur on-site. One (1) sighting record from 1998 exists 4.4km north-west of the site, within a 10km BioNet Atlas Search radius. Given the above it has been determined that the proposal is not likely to have a significant impact on this mobile species.
Artamus cyanopterus cyanopterus (1)	Dusky Woodswallow	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The size of the one *Eucalyptus* tree on-site is unsuitable for nesting habitat.
Circus assimilis (1)	Spotted Harrier	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The size of the one *Eucalyptus* tree on-site is unsuitable for nesting habitat.

Scientific Name	Common Name	BC Act	EPBC Act	Chance of Occurrence
Climacteris picumnus victoriae (1)	Brown Treecreeper (eastern subspecies)	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat for ants and other invertebrates within a wider home range, as well as offer some linkage between trees. Preferred habitats (eucalypt woodlands, dry open forest, or forest bordering wetlands) are absent from the site. Hollows in live or standing dead trees, essential for nesting, are absent from the site. One record from 2008 exists within a 10km BioNet Atlas search radius, located outside the lot boundary, approximately 800m south-west from the subject site. This record exists on managed farmland, and would be unsuitable as preferred habitat. Further, more mature *Eucalyptus* and poplar trees exist on the adjacent lots, which may provide greater foraging opportunities and/or habitat linkage. Given the scant records within the area, the small size of the site, and the presence of potential habitat opportunities existing outside the site, the proposal would have marginal impacts upon foraging opportunities and connectivity for the Brown Treecreeper. **SUBJECT SPECIES**
Hieraaetus morphnoides (1)	Little Eagle	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The size of the one *Eucalyptus* tree on-site is unsuitable for nesting habitat.
Lophoictinia isura (1)	Square-tailed Kite	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The size of the one *Eucalyptus* tree on-site is unsuitable for nesting habitat.

Scientific Name	Common Name	BC Act	EPBC Act	Chance of Occurrence
Petroica boodang (1)	Scarlet Robin	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The size of the one *Eucalyptus* tree on-site is unsuitable for nesting habitat.
Polytelis swainsonii (28)	Superb Parrot	V	V	No sign of this species during fieldwork. The one *Eucalyptus melliodora* tree on is may provide limited foraging habitat. A, mature stand of *Eucalyptus melliodoraare* are present on the adjoining lots, which would provide greater foraging opportunities. Twenty-eight (28) sighting records exist within a 10km BioNet Atlas Search radius. One record from 2008 exists on the southern Lot (12-A), while the next nearest record is from 2000 and exists 1.4km west of the site. As the site provides scant resources for the Superb Parrot, while greater foraging opportunities exist outside the site, the proposal would have a marginal impact upon this species. **SUBJECT SPECIES**
Tyto longimembris (1)	Eastern Grass Owl	V		No sign of this species during fieldwork. The site may provide marginal foraging habitat within a wider home range. The preferred habitat of the Grass Owl (tussock grasslands, coastal heath, swamps, sugar cane or grain agricultural lands) do not occur on-site. The size of the one *Eucalyptus* tree on-site would be unsuitable for nesting or roosting habitat.
Herpetofauna				
Litoria aurea (1)	Green and Golden Bell Frog	E	V	No sign of this species during fieldwork. The site is predominately a non-native grassland, while a wet managed grassland patch exists in the southern lot (12-A), which could potentially provide marginal habitat opportunities for frog species in periods of high rainfall, however no permanent

Scientific Name	Common Name	BC Act	EPBC Act	Chance of Occurrence
				ponds exist on site. Further, the current proposal intends to avoid developing the southern lot (12-A), thereby avoiding impacts on marginal potential frog habitat.
Mammals				
Miniopterus orianae oceanensis (1)	Large Bent-winged Bat	V		No sign of this species during fieldwork. The preferred habitat of the Large Bent-winged Bat (caves, derelict tunnels, forested areas) does not occur on-site. The one tree on site may provide marginal insect foraging habitat within a wider home range, however mature trees stand in the adjacent lots, which would provide greater foraging opportunities.
Insects				
Synemon plana (3)	Golden Sun Moth	E	CE	No sign of this species during fieldwork. The preferred habitat of the Golden Sun Moth (Temperate Grasslands and grassy Box-Gum Woodlands in which the groundlayer is dominated by wallaby grasses *Rytidosperma* spp.). Three (3) records exists within a 10km BioNet Atlas Search radius, however these are recorded from 1999 (two records 4km south-west) and 2000 (2.8km north). The site is predominately a non-native grassland, and would provide minimal to no habitat for the Golden Sun Moth. **SUBJECT SPECIES**

Notes to Table 3
CE: Critically Endangered (EPBC Act & BC Act)
E: Endangered (EPBC Act & BC Act)
V: Vulnerable (EPBC Act & BC Act)
(#) – Indicates number of Atlas Records within 10km of the subject site

From the above, the following species in **Table 4** are considered the key subject species / indicator species for this site due to either being recorded on site, potentially able to forage and roost on the site, or the site may potentially form an important part of a local home range for resident species and some potential habitat will be removed, or habitat may be impacted upon by indirect impacts of the proposal.

Table 4 – Subject Species

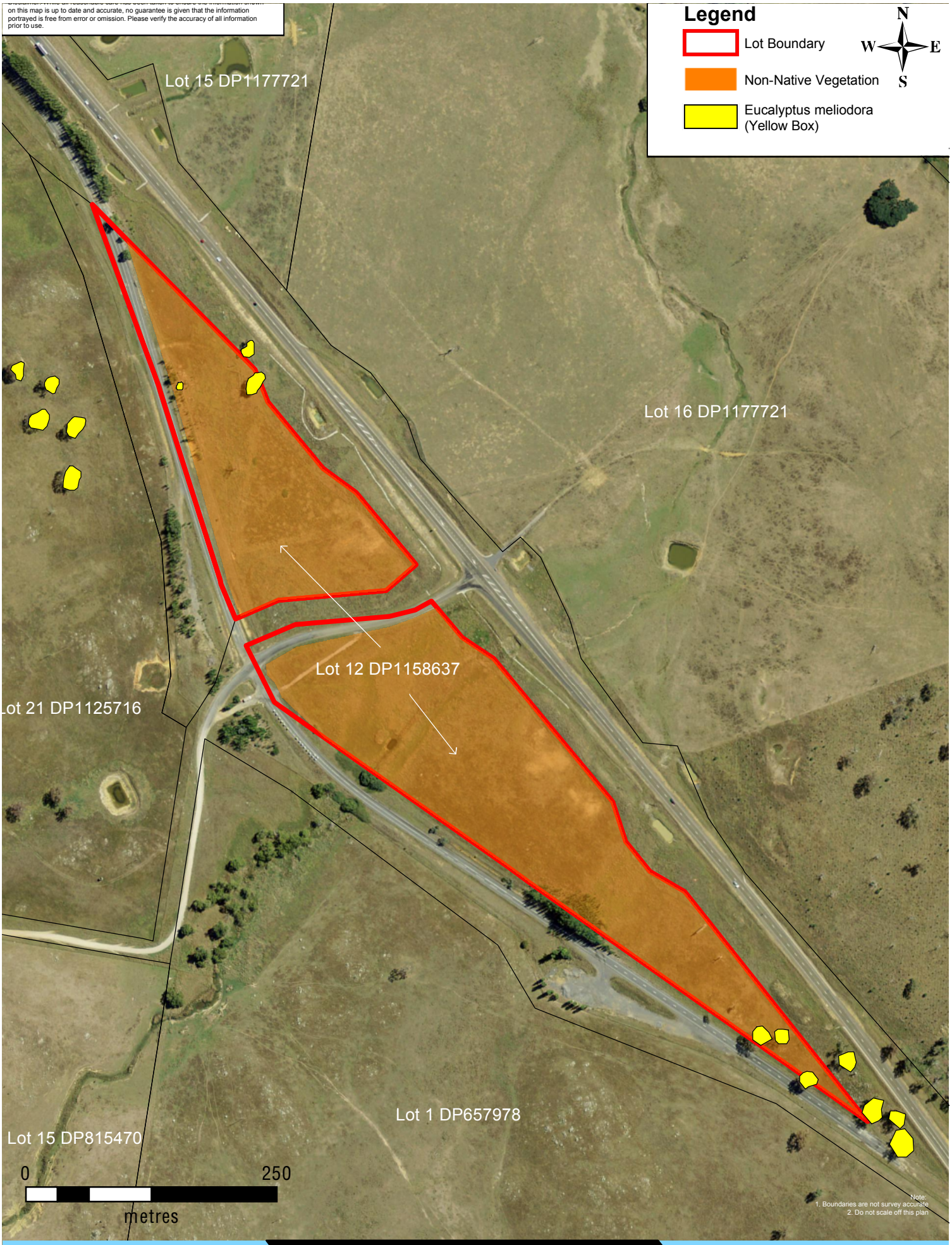
Scientific Name	Common Name	BC Act	EPBC Act
Polytelis swainsonii (28)	Superb Parrot	V	V
Climacteris picumnus victoriae (1)	Brown Treecreeper (eastern subspecies)	V	
Synemon plana (3)	Golden Sun Moth	E	CE

7.2 Vegetation Communities

The site comprises two paddocks and cattle yards with previous use primarily as intensive sheep and cattle grazing with a history of interspersed cropping. This has resulted in the development of an exotic grass and herbaceous pasture primarily comprised of Yorkshire Fog, African Lovegrass, *Briza* sp., *Avena* sp., Paspalum, Needle Grass and Couch with a lesser native component of *Themeda australis*, *Poa* sp. and Wheatgrass (refer to **Figure 2**). Exact composition was difficult to determine at the time of survey due to a lack of seed and the transitional season (i.e. grasses were frost affected, grazed and annual species transitioning between winter and summer).

Native forbs which would be indicative of a derived native grassland were largely absent and limited to places of least disturbance / grazing pressure. Shrub layer was completely absent – only early *Acacia* sp. was present within the road reserve of Longrail Gully. This was consistent with the adjacent landscape.

It is considered that the vegetation on the subject site is not commensurate with any native vegetation community or threatened vegetation community, with previous use primarily as intensive sheep and cattle grazing and interspersed cropping.



AEP

Title: Figure 2 - Vegetation Communities

Date: October 2019

Location: Barton Highway, Murrumbateman

Client: Catalyze Property Consulting Pty Ltd

Our Ref: 1969

7.3 Flora

Flora surveys have resulted in the identification of approximately 52 species within the subject site, 59% of these species are exotic. A full list of flora species identified by the survey conducted on the subject site as well as a list of dominant species in the study area are included in **Appendix A**.

7.4 Threatened plants

No threatened flora species were recorded during the current fieldwork.

While it is recognised that the botanical survey was conducted outside the known flowering / detectability period for some of the threatened flora species known from the wider area, due to a lack of seed and the transitional season particularly for ground layer species, it is considered unlikely that any such species occur given the type of habitats present and the degree of clearing and disturbance within the site.

7.5 Habitat Assessment

The site offers some habitat features for native fauna as outlined below.

- **Trees** – the single *Eucalyptus melliodora* occurring within the subject site may provide limited foraging resources for nectivorous and insectivorous species. The tree is proposed to be removed within the likely development footprint. No hollows were identified on the tree, thus ruling out such habitat options offered by hollows.
- **Shrubs** – a native shrub layer is absent within the subject site and study area.
- **Connectivity** – the study area is mainly non-native grassland, bordering extensive Primary Production lots similar to the study area. The surrounding lots may be used as agricultural stock paddocks. One *E. melliodora* tree stands in the subject site, which may provide mobile species some connectivity between trees. More mature *Eucalyptus* and poplar trees stand in adjacent lots and the surrounding area, which would also provide connectivity for mobile species. Given this, the subject site is unlikely to provide suitable connectivity for wildlife to other wilderness areas.
- **Hollow Bearing Trees** – No hollows were identified in the subject site, nor in the study area within the lot.

7.6 Fauna

During the field survey, fifteen (15) species were observed, which included thirteen (13) native birds, one (1) native mammal, and one (1) introduced animals typical of a rural landscape.

An Expected Fauna Species List has been generated specifically for the site and is included as **Appendix B**, and all fauna species recorded during fieldwork are also noted therein.

8.0 Key Species Consideration

Following all of the works outlined in previous Sections, the species identified for further consideration have been categorised into key species in **Table 5**. By considering these species and their lifecycle needs, many other species are also inadvertently considered as well in identifying key features. The analysis below considers key lifecycle features for each guild of species in more detail, and assists in informing the subsequent 5-part test assessment.

Table 5 – Subject Species Analysis

Species	Key Habitat Feature	Comment
Superb Parrot	Roosting/ nesting habitat	The Superb Parrot nests small colonies, often with more than one nest in a single tree, in open Box-Gum Woodland or large isolated paddock trees. Given the presence of one *Eucalyptus melliodora* tree on-site, bearing no hollows and the presence of more mature *E. melliodora* trees in adjacent lots which may provide potential nesting opportunities, the proposal is unlikely to have any impact upon roosting or nesting habitat for the Superb Parrot.
	Foraging resources	The Superb Parrot mainly inhabits sclerophyll forests and woodlands, dominated by *E. camaldulensis* (River Red Gum), *E. melliodora* (Yellow Box) and *E. macrocarpa* (Grey Box) for feeding habitat. The species often eat the seeds of native grasses, acacias as well as cereal crops. The one *Eucalyptus melliodora* tree on site may provide limited foraging resources within a wider home range, however mature trees of the same species stand in the adjacent lots, which would provide greater foraging opportunities and habitat linkage. The site is predominately a non-native grassland, with marginal to no foraging opportunities on native grasses, or cereal crops. As the site provides limited to no resources for the Superb Parrot, while greater foraging opportunities exist outside the site, it is determined that the proposal is not likely to have a significant impact on the this highly mobile species.

Brown Treecreeper (eastern subspecies)	Roosting/ nesting habitat	Hollows in live or standing dead trees, essential for nesting, are absent from the site. Greater nesting opportunities would exist outside the site in forested areas and in live and standing dead hollow bearing trees.
	Foraging resources	The preferred habitat of the Brown Treecreeper includes eucalypt woodlands, dry open forest, and forest bordering wetlands. The species' forage on the ground in woodlands, and in trees for ants and other invertebrates. Given the site is a cleared and managed farmland lot, with one *Eucalyptus* tree, suitable habitat is largely absent from the lot.
Golden Sun Moth	Mating/ reproductive habitat	Grasslands dominated and Box-Gum Woodlands dominated by *Rytidosperma* spp. (wallaby) grasses are an important microhabitat for the species. In these grasslands, adults search for mates, larvae can be laid, which feed on the roots of wallaby grasses. The site is predominately a non-native grassland, and would provide minimal to no habitat for the Golden Sun Moth, while areas of preferred native habitat would exist outside the site. It is therefore unlikely that the proposed development will impact on habitat for the Golden Sun Moth.

9.0 5 Part Test Assessment

Section 7.3 of the BC Act lists five factors that must be taken into account in determining the significance of potential impacts of proposed activities on threatened species, populations, ecological communities and/or their habitats as listed within the BC Act.

The 5-part test is used to determine whether there is likely to be a significant impact, and thus whether the Biodiversity Offsets Scheme (BOS) is triggered or a Species Impact Statement (SIS) is required.

For the purposes of the 5-part test assessment, the **subject site** is Lot 12 DP1158637, as mapped in **Figure 1**.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Superb Parrot:

The preferred habitats of the Superb Parrot (eucalypt forests and woodlands) are absent from the subject area. The single *Eucalyptus melliodora* tree on-site may provide limited foraging resources within a wider home range. A mature stand of *Eucalyptus melliodora* is located in the adjacent lots and surrounding area, which would likely provide greater foraging opportunities and habitat linkage. The site is predominately a cleared and managed non-native grassland, with marginal to no foraging opportunities (seeds of native grasses, acacias or cereal crops). Twenty-eight (28) records from 1986 to 2008, exist within a 10km BioNet Atlas search radius of the site, which suggests a viable local and/or mobile population of the species within the greater Yarra Valley area. However, the proposal to affect this predominately non-native grassland, and the one *E. melliodora* tree is unlikely to have an adverse effect on the life cycle of this species, such that a viable local population would be placed at risk of extinction.

Brown Treecreeper (eastern subspecies):

The preferred habitat of the Brown Treecreeper includes eucalypt woodlands, dry open forest, and forest bordering wetlands. The species' forage on the ground in woodlands, and in trees for ants and other invertebrates. The subject site may provide sub-optimal, irregular foraging habitat for ants and other invertebrates within a wider home range, and offer some linkage between trees. Further, hollows in live or standing dead trees, essential for nesting, are absent from the site. The proposal to affect this predominately non-native grassland, and the one *E. melliodora* tree is unlikely to have an adverse effect on the life cycle of this species, such that a viable local population would be placed at risk of extinction.

Golden Sun Moth:

Grasslands dominated and Box-Gum Woodlands dominated by *Rytidosperma spp.* (wallaby) grasses are an important microhabitat for the Golden Sun Moth. In these grasslands, adults search for mates, larvae can be laid, which feed on the roots of wallaby grasses. The site is predominately a cleared and managed non-native grassland, and would provide minimal to no habitat for the Golden Sun Moth, while areas of preferred native habitat would potentially exist outside the site. The proposal to affect this predominately non-native grassland is unlikely to have an adverse effect on the life cycle of this species, such that a viable local population would be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

No EECs are present on site.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

As discussed above, the proposed development will remove a single *E. melliodora* tree that may be foraged by mobile threatened species for nectar or invertebrates, on an irregular seasonal basis. Recent fieldwork has revealed that more mature *E. melliodora* and other Box-Gum species stand in adjacent lots and in the surrounding area, which may potentially provide greater foraging resources for those threatened species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

As the subject site is cleared and managed non-native grassland, surrounded by a similar landscape the proposed development will not fragment any existing areas of habitat.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The development footprint proposed on the non-native grassland is very small, while one *E. melliodora* tree is proposed to be removed. This tree may provide occasional and seasonal foraging resources for mobile species, however its removal, given the presence of more mature trees of the same species in the surrounding lots, is unlikely to have a significant impact on any species or ecological community.

(d) whether the proposed development or activity is likely to have an adverse effect on any area of outstanding biodiversity value (either directly or indirectly)

No areas of outstanding biodiversity value will be impacted.

(e) whether the proposed development or action is or is part of a key threatening process or is likely to increase the impact of, a key threatening process

- Anthropogenic climate change

The development as proposed is not considered to contribute to anthropogenic climate change to a notable magnitude.

- Clearing of native vegetation

The development will likely involve the removal of one native tree and a minor proportion of native grasses and herbs. This loss is a direct contribution to this KTP, and contributes to incremental habitat loss in the locality.

- Invasion and spread of aggressive weed species (several listed)

The site currently supports numerous weed species. These areas will be developed, removing such weeds from the site. Standard construction protocols to prevent the spread of exotic weed species should be implemented during construction to further reduce the risk of weed propagation.

10.0 EPBC Act Assessment

A search was conducted in September 2019 of Matters of National Environmental Significance (MNES) as relevant to the Environment Protection & Biodiversity Conservation Act 1999 (EPBC Act). The following MNES are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area, and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage place, and it is not in close proximity to any such places.

Wetlands of International Significance (declared Ramsar wetlands):

The site does not contain Ramsar Wetlands.

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

While two Threatened Ecological Communities are listed as likely to occur within 5km of the site , neither of them are present on site.

Threatened Species:

While 18 terrestrial species were detected in a MNES search within a 5km radius, no threatened species listed within the EPBC Act have been detected on the site, and while only one *Eucalyptus melliodora* is located on site the provision from this single tree are unlikely to offer significant foraging habitat for species such as the Superb Parrot, should they occur, it is unlikely that the removal of approximately predominately non-native grassland and one *E. melliodora* tree will have any meaningful impact of the life cycle of any such threatened species.

Migratory Species:

A number of EPBC listed migratory species have some potential to visit the site on an irregular basis. However, it is not considered that the development of this land as proposed is likely to significantly affect the potential habitat of such species, or disrupt migratory patterns.

EPBC Act Assessment Conclusion:

No MNES (specifically in this instance threatened species, threatened ecological communities or listed migratory species) are expected to be impacted upon significantly as a result of the proposal.

11.0 Bushfire Assessment

A detailed search of NSW Department of Planning, Industry and Environments Planning portal has shown that the site is not located within Bush Fire Prone Land, hence the Planning for Planning for Bushfire Protection Guidelines (2018) (PBP) do not apply to this proposal (refer **Appendix E**).

The vegetation communities within the locality need to be taken into consideration when assessing bush fire risk, given the potential risk with the vegetation communities and the proposed Special Fire Protection Purpose (SFPP) (proposed service station), it is recommended that the objectives and principles for the PBP should be considered for this proposal:

- Provide appropriate operational environment for emergency service personnel during firefighting and emergency management;
- Access and water supplies need to meet current standard
- Provision of required Asset Protection Zones (APZ); and
- Design consideration to ensure sufficient protection to flammable materials.

The slope and vegetation analyse show the flowing requirements for APZs:

- Northeast and Eastern slope is >0-5 degrees downslope requiring a 40m APZ,
- Western slope is flat/upslope requiring a 36m APZ,
- North and north west slopes are flat / upslope requiring a 36m APZ,
- Southern slope is flat / upslope requiring a 36m APZ and
- Southeast slope is >0-5 degrees downslope requiring a 40m APZ.

It is considered that the particular circumstances of this Planning Proposal that the site-specific requirements are established with RFS at development application stage. Relevant requirements of Planning for Bushfire Protection and proposed protection measures, principally the APZs, emergency management plan, access / evacuation points will simultaneously provide adequate protection to life and minimise risk to life within the proposed development.

12.0 Recommendations

The following general recommendations are made for consideration to minimise localised impacts on biodiversity in general as a result of the development of the site:

- Best practice erosion and sedimentation controls should be put in place to limit offsite movement of materials into the surrounding areas;
- Effective weed control should be used on site, ensuring that appropriate methods are used to eliminate and dispose of highly competitive weeds; and
- Landscape tree plantings should use species that are commensurate with the surrounding vegetation community where practical.

13.0 References

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Appendix A – Flora Species List

Family Name	Scientific Name	Common Name
Alliaceae	*Nothoscordum borbonicum**	Onion Weed
Asteraceae	*Bidens pilosa**	Cobbler's Pegs
	*Carthamus lanatus**	Saffron Thistle
	*Cirsium vulgare**	Spear Thistle
	*Conyza bonariensis**	Flax-leaf Fleabane
	*Hypochaeris radicata**	Flatweed
	Onopordum acanthium subsp. acanthium	Scotch Thistle
	*Senecio madagascariensis**	Fireweed
	*Silybum marianum**	Variegated Thistle
	Solenogyne gunnii	Solengyne
	*Sonchus asper**	Prickly Sow-thistle
	*Sonchus oleraceus**	Common Sow-thistle
Boraginaceae	*Echium plantagineum**	Paterson's Curse
Clusiaceae	*Hypericum gramineum*	Small St Johns Wort
Fabaceae	*Acacia genistifolia*	Early Wattle
Geraniaceae	*Erodium sp.**	Crowfoot
	Geranium solanderi	Cutleaf Cranesbill
	*Geranium sp.**	
Iridaceae	*Romulea rosea var. australis**	Onion Grass
Juncaceae	*Juncus bufonius*	Toad Rush
	Juncus filicaulis	
Lomandraceae	*Lomandra filiformis*	Wattle Matt-rush
	Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush
Myrtaceae	*Eucalyptus melliodora*	Yellow Box
Oxalidaceae	*Oxalis perrenans*	Yellow-flowered Wood Sorrel
	Oxalis sp.	
Plantaginaceae	*Plantago lanceolata**	Ribwort
	Plantago varia	
Poaceae	*Avena sp.**	Oats
	*Briza maxima**	Quaking Grass
	Cynodon dactylon	Common Couch
	Dichelachne sp.	A Plumegrass
	Elymus scaber var. scaber	Common Wheatgrass
	*Eragrostis curvula**	African Lovegrass
	Eragrostis leptostachya	Paddock Lovegrass
	*Holcus lanatus**	Yorkshire Fog

Family Name	Scientific Name	Common Name
	*Nassella trichotoma**	Serrated Tussock
	Panicum effusum	Hairy Panic
	*Paspalum dilatatum**	Paspalum
	*Phalaris aquatica**	Phalaris
	Poa seiberiana	Tussock Grass
	Sporobolus creber	Slender Rat's Tail Grass
	Themeda triandra	Kangaroo Grass
	*Vulpia sp.**	Rat's-tail Fescue
Polygonaceae	*Acetosella vulgaris**	Sheep Sorrel
Rosaceae	*Prunus sp.**	Cherry Blossom Tree
	*Rosa rubiginosa**	Sweet Briar
	*Rubus fruticosus agg.**	Blackberry complex
	*Sanguisorba minor subsp. muricata**	Sheep's Burnet
Salicaceae	*Populus nigra**	Lombardy Poplar
Scrophulariaceae	*Verbascum thapsus subsp. thapsus**	Aarons Rod, Great Mullein
	*Verbascum virgatum**	Twiggy Mullein

Appendix B – Expected Fauna Species List

EXPECTED FAUNA SPECIES LIST

The following list includes fauna species that could be reasonably expected to occur on the study site at some point, given site attributes and location.

"●" - species observed or indicated by scats, tracks etc. on, over or near the site during AEP survey (September 2019).

* - Introduced species

? - Unconfirmed record, anecdotal records etc.

Threatened species listed under the *Biodiversity Conservation Act* 2016 (BC Act) or the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) are indicated in **bold font**.

Family	Present	Scientific Name	Common Name
Herpetofauna			
Myobatrachidae		*Crinia signifera*	Common Eastern Froglet
		Limnodynastes tasmaniensis	Spotted Grass Frog
		Uperoleia laevigata	Smooth Toadlet
Hylidae		*Litoria aurea*	Green and Golden Bell Frog
Chelidae		*Chelodina longicollis*	Eastern Snake-necked Turtle
Gekkonidae		*Christinus marmoratus*	Marbled Gecko
Pygopo**didae**		*Delma inornata*	Patternless Delma
Scincidae		*Carlia tetradactyla*	Southern Rainbow-skink
		Ctenotus robustus	Robust Ctenotus
		Morethia boulengeri	South-eastern Morethia Skink
		Tiliqua scincoides	Eastern Blue-tongue
Ag**amidae**		*Pogona barbata*	Bearded Dragon
Elapidae		*Notechis scutatus*	Tiger Snake
		Pseudechis porphyriacus	Red-bellied Black Snake
	•	*Pseudonaja textilis*	Eastern Brown Snake
Birds			
Anatidae		*Anas gracilis*	Grey Teal
		Anas superciliosa	Pacific Black Duck
		Chenonetta jubata	Australian Wood Duck
		Tadorna tadornoides	Australian Shelduck
Podicipedidae		*Tachybaptus novaehollandiae*	Australasian Grebe
Columbidae		*Ocyphaps lophotes*	Crested Pigeon
		Phaps chalcoptera	Common Bronzewing
Podar**gidae**		*Podargus strigoides*	Tawny Frogmouth
Phalacrocoracidae		*Phalacrocorax varius*	Pied Cormorant
Ardeidae		*Ardea pacifica*	White-necked Heron
		Egretta novaehollandiae	White-faced Heron
Threskiornithidae		*Threskiornis molucca*	Australian White Ibis
	•	*Threskiornis spinicollis*	Straw-necked Ibis
Accipitridae		*Accipiter cirrocephalus*	Collared Sparrowhawk
		Accipiter fasciatus	Brown Goshawk

Family	Present	Scientific Name	Common Name
		Circus assimilis	Spotted Harrier
	•	*Elanus axillaris*	Black-shouldered Kite
		Hieraaetus morphnoides	Little Eagle
		^^Lophoictinia isura	Square-tailed Kite
		Milvus migrans	Black Kite
Falconidae		*Falco berigora*	Brown Falcon
		Falco cenchroides	Nankeen Kestrel
		Falco longipennis	Australian Hobby
		Falco peregrinus	Peregrine Falcon
Rallidae		*Gallinula tenebrosa*	Dusky Moorhen
		Porphyrio porphyrio	Purple Swamphen
Charadriidae		*Vanellus miles*	Masked Lapwing
		Vanellus miles novaehollandiae	Spur-winged Plover
Cacatuidae		*Cacatua galerita*	Sulphur-crested Cockatoo
		Cacatua sp.	
		Cacatua tenuirostris	Long-billed Corella
	•	*Eolophus roseicapillus*	Galah
		Eolophus roseicapillus albiceps	
Psittacidae		*Alisterus scapularis*	Australian King-Parrot
		Platycercus elegans	Crimson Rosella
		Platycercus eximius	Eastern Rosella
		^^Polytelis swainsonii	Superb Parrot
		Psephotus haematonotus	Red-rumped Parrot
		Trichoglossus haematodus	Rainbow Lorikeet
Cuculidae		*Chalcites basalis*	Horsfield's Bronze-Cuckoo
		Chalcites lucidus	Shining Bronze-Cuckoo
		Eudynamys orientalis	Eastern Koel
Strigidae		*Ninox novaeseelandiae*	Southern Boobook
Tytonidae		*Tyto javanica*	Eastern Barn Owl
		^^Tyto longimembris	Eastern Grass Owl
Alcedinidae		*Dacelo novaeguineae*	Laughing Kookaburra
		Todiramphus sanctus	Sacred Kingfisher
Climacteridae		*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)

Family	Present	Scientific Name	Common Name
Maluridae	●	*Malurus cyaneus*	Superb Fairy-wren
Acanthizidae	●	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill
		Acanthiza nana	Yellow Thornbill
		Acanthiza pusilla	Brown Thornbill
		Gerygone fusca	Western Gerygone
		Sericornis frontalis	White-browed Scrubwren
	●	*Smicrornis brevirostris*	Weebill
Pardalotidae		*Pardalotus striatus*	Striated Pardalote
Meliphagidae		*Acanthorhynchus tenuirostris*	Eastern Spinebill
		Anthochaera carunculata	Red Wattlebird
		Anthochaera phrygia	Regent Honeyeater
		Caligavis chrysops	Yellow-faced Honeyeater
		Manorina melanocephala	Noisy Miner
		Philemon citreogularis	Little Friarbird
		Philemon corniculatus	Noisy Friarbird
		Ptilotula penicillatus	White-plumed Honeyeater
Campephagidae	●	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike
		Coracina novaehollandiae melanops	
		Lalage sueurii	White-winged Triller
Pachycephalidae		*Colluricincla harmonica*	Grey Shrike-thrush
		Pachycephala rufiventris	Rufous Whistler
Artamidae		*Artamus cyanopterus cyanopterus*	Dusky Woodswallow
	●	*Cracticus tibicen*	Australian Magpie
		Cracticus torquatus	Grey Butcherbird
		Strepera graculina	Pied Currawong
		Strepera versicolor	Grey Currawong
Rhipiduridae		*Rhipidura albiscapa*	Grey Fantail
	●	*Rhipidura leucophrys*	Willie Wagtail
Corvidae	●	*Corvus coronoides*	Australian Raven
		Corvus mellori	Little Raven

Family	Present	Scientific Name	Common Name
Monarchidae	●	*Grallina cyanoleuca*	Magpie-lark
Petroicidae		*Microeca fascinans*	Jacky Winter
		Petroica boodang	Scarlet Robin
Megaluridae		*Cincloramphus cruralis*	Brown Songlark
		Cincloramphus mathewsi	Rufous Songlark
Timaliidae		*Zosterops lateralis*	Silvereye
Hirundinidae	●	*Hirundo neoxena*	Welcome Swallow
		Petrochelidon ariel	Fairy Martin
Turdidae	●	*Turdus merula**	Eurasian Blackbird
Sturnidae		*Sturnus tristis**	Common Myna
		*Sturnus vulgaris**	Common Starling
Nectariniidae		*Dicaeum hirundinaceum*	Mistletoebird
Estrildidae		*Neochmia temporalis*	Red-browed Finch
		Taeniopygia bichenovii	Double-barred Finch
Passeridae		*Passer domesticus**	House Sparrow
Motacillidae		*Anthus novaeseelandiae*	Australian Pipit
Fringillidae		*Carduelis carduelis**	European Goldfinch
Mammals			
Tachyglossidae		*Tachyglossus aculeatus*	Short-beaked Echidna
Vombatidae		*Vombatus ursinus*	Common Wombat
Pseudocheiridae		*Pseudocheirus peregrinus*	Common Ringtail Possum
Phalangeridae		*Trichosurus vulpecula*	Common Brushtail Possum
Macropodidae	●	*Macropus giganteus*	Eastern Grey Kangaroo
		Macropus robustus	Common Wallaroo
		Macropus rufogriseus	Red-necked Wallaby
		Wallabia bicolor	Swamp Wallaby
Pteropodidae		*Pteropus sp.*	Flying-fox
Miniopteridae		*Miniopterus orianae oceanensis*	Large Bent-winged Bat
Molossidae		*Austronomus australis*	White-striped Freetail-bat
Vespertilionidae		*Chalinolobus gouldii*	Gould's Wattled Bat
		Nyctophilus geoffroyi	Lesser Long-eared Bat
		Nyctophilus gouldi	Gould's Long-eared Bat
		Vespadelus darlingtoni	Large Forest Bat
		Vespadelus regulus	Southern Forest Bat
		Vespadelus vulturnus	Little Forest Bat

Family	Present	Scientific Name	Common Name
Canidae		*Vulpes vulpes**	Fox
Leporidae		*Oryctolagus cuniculus**	Rabbit
Bovidae	•	*Bos taurus**	European cattle
		*Ovis aries**	Sheep (feral)
Insects			
Castniidae		*Synemon plana*	Golden Sun Moth

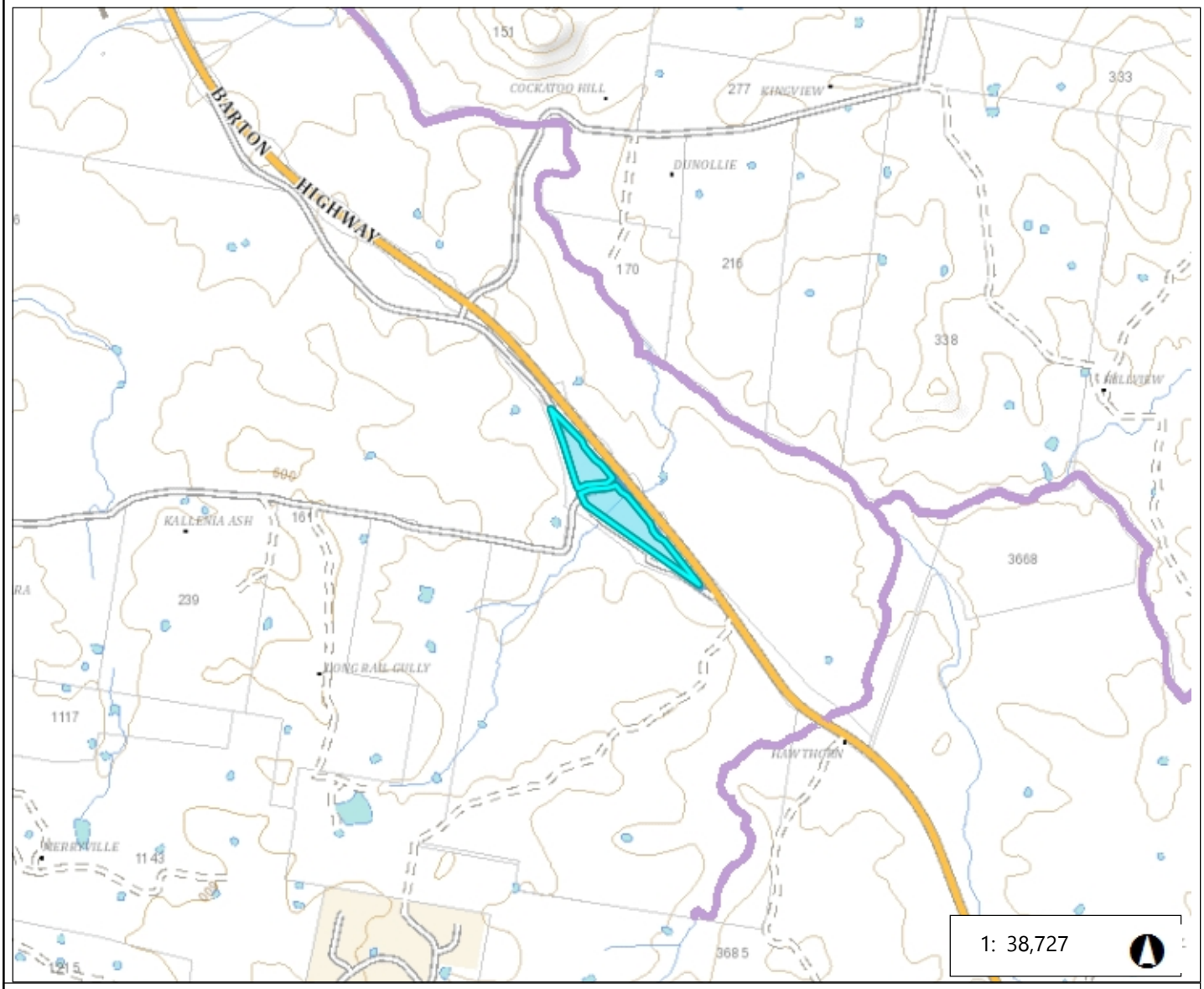
Appendix C – Site Photos

Above: Western view of the subject site; **Below:** Cattle Yards and adjoining vegetations.

Above below: South view of the subject site showing the existing pasture, **Below**: South East view of subject site

Appendix D – BOSET Report

Biodiversity Offset Scheme (BOS) Entry Threshold Map



1,967.3 0 983.65 1,967.3 Metres

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Legend

- Biodiversity Values that have been mapped for more than 90 days
- Biodiversity Values added within last 90 days

Notes

NSW GOVERNMENT

Biodiversity Values Map and Threshold Report

Results Summary

Date of Calculation	04/09/2019 11:30 AM		**BDAR Required***
Total Digitised Area	12.74	ha	
Minimum Lot Size Method	Lot size		
Minimum Lot Size	2.43	ha	
Area Clearing Threshold	0.5	ha	
Area clearing trigger Area of native vegetation cleared	Unknown #		Unknown #
Biodiversity values map trigger Impact on biodiversity values map(not including values added within the last 90 days)?	no		no
Date of the 90 day Expiry	N/A		

*If BDAR required has:

- at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report
- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is '"likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.

Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared - refer to the BOSET user guide for how to do this.

On and after the 90 day expiry date a BDAR will be required.

Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016.*

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

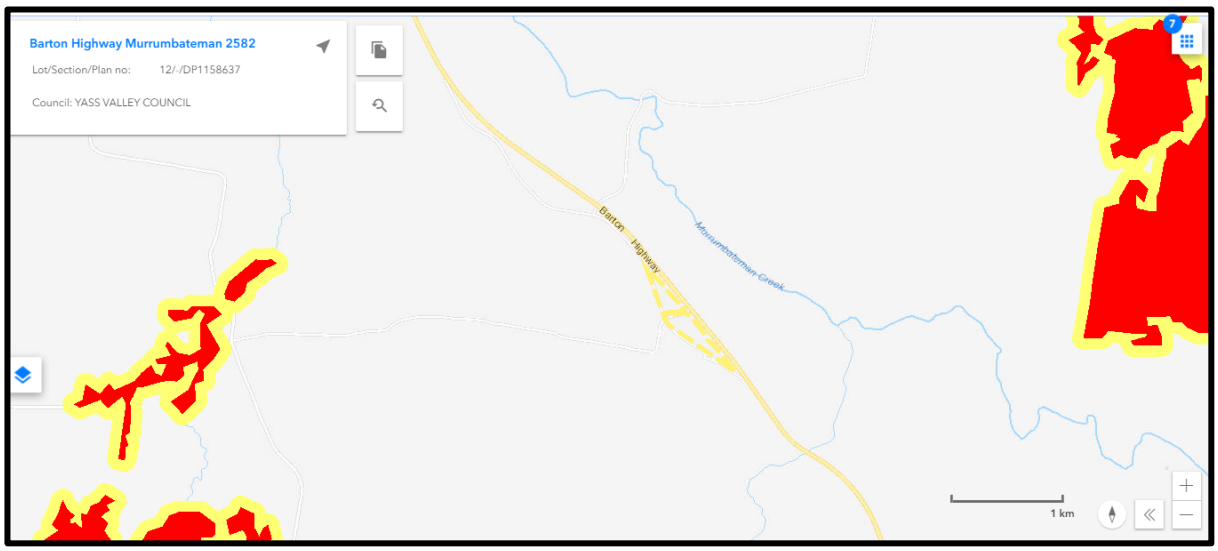
Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature _____ Date: 04/09/2019 11:30 AM

DAVID EKINS

Appendix E – NSW Department of Planning, Industry and Environments (2019) Bush Fire Prone Lands Map



Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

Appendix F – Author CVs

BROOKE CORRIGAN
Curriculum Vitae

Brooke works with AEP in the role of Ecologist. She is an experienced bush regenerator and a regular supervisor of Landcare groups. Brooke has a successful career as an ecosystem restoration specialist focusing on landscape wide management and reconstruction projects, as a project manager with a local firm. Her background in project management and restoration planning combined with her ecological knowledge is utilised in a diverse array of applications in her current role.

Qualifications

- Graduate Diploma in Project Management University of New England (2010)
- Bachelor Environmental Science University of Newcastle (2004)

Further Education & Training (select summary)

- NSW Class C Driver's Licence. Experienced 4WD operator.
- Occupational Health & Safety Training
- Mine Industry Worker
- Rio Tinto Coal and Allied General Induction
- Glencore General Induction
- Chainsaw Operation – fell trees, trim and crosscut
- Certificate 3 in Chemical Application (AQF3)

Fields of Special Competence

- Ecological field survey, covering terrestrial and aquatic flora and fauna
- Highly proficient at botanical surveys, including challenging remote and isolated environs
- Project Management
- Restoration Science

Professional Affiliations / Memberships (past / present)

- Certified Environmental Practitioner Program (CEnvP) (mem# 0656)
- Environment Institute of Australia and New Zealand (EIANZ) (mem# 208228)

Relevant Employment History

2017-present **Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning to assist in the provision of consulting services to land, property, mining industry, legal and government sectors. Covering ecological, project management, environmental, planning services, advices, strategy and representation.

2014-2017 **Special Projects Crew Supervisor**
Toolijooa, Hunter Region

As a crew supervisor with Toolijooa I was responsible - Supervising large environmental rehabilitation planting and weed management programs on mine, power station and suburban development offset and rehabilitation areas. I was responsible for providing technical direction on appropriate bush regeneration methods and chemical application and accurate Flora and Fauna identification, vital in EEC works. I was required to liaise with clients regarding project requirements, project goals and deadlines. I was responsible for the development and implementation of Work Health and Safety Plans as well enforcing company compliance with mining sector and civil clients. This included the development of safe work procedures, safety inspections on site and implementing improved safety procedures with staff. I was responsible for ensuring projects were completed on time and on budget whilst meeting the clients' expectations and achieving quality assurance standards.

2008-2014 **Rehabilitation and Weed Control Consultant**
Hunter Land Management, Maitland.

As a consultant and project manager for Hunter Land Management I was involved in the planning and implementation of environmental restoration projects for a wide range of landholders in the Hunter Valley area. I was primarily involved in development of Vegetation Management Plans, Weed Action Plans, Riparian Management Plans, Seed Collection Strategies, Land Management Plans and intensive site survey. My role also included supervision and management of on-ground crews to implement weed control, landscape, planting and fencing projects and all associated documentation.

Relevant Ecological Experience

2016 - Current **Landcare Supervisor**
Central Coast Council

Paid group support for Wamberal Dune Care and Three Creek Landcare groups providing professional guidance and heaving lifting/chemical application.

JUSTIN CHEY
Curriculum Vitae

Justin works with AEP in the role of Ecologist. He is a graduate of environmental science and management, and has considerable experience in paid and voluntary roles in environmental fields, involving fauna and flora surveying, GIS mapping, reporting, community volunteering and a variety of essential consultancy tasks. His background in environmental fields with his growing ecological knowledge is utilised in a diverse array of applications in his current role.

Qualifications

- Bachelor Environmental Science & Management (Sustainability) University of Newcastle (2004)
- Diploma Conservation & Land Management TAFE Online (expected 2021)

Further Education & Training (select summary)

- NSW Class C Driver's Licence
- Work Health & Safety General Construction Induction
- Work Safely at Heights

Fields of Special Competence

- Ecological field survey, covering terrestrial flora and fauna
- Growing proficiency at botanical surveys

Professional Affiliations / Memberships (past / present)

- Newcastle University Student Environmental Club

Relevant Employment History

2018-present **Ecologist**
Anderson Environment & Planning, Newcastle

Currently employed by Anderson Environment & Planning to assist in the provision of consulting services to land, property, legal and government sectors. Covering ecological, project management, environmental, planning services, advices, strategy and representation.

2014-2015 **Trainee Bush Regenerator**
Green Army

As a bush regenerator, I undertook a variety of tasks to regenerate and maintain bushland sites, such as weed removal, planting, rubbish removal, fertilising and watering. Work as frequently undertaken in difficult terrain or weather conditions.

Natalie Black
Curriculum Vitae

Natalie works with AEP in the role of Senior Environmental Manager. She has extensive knowledge in environmental management, environmental planning, and report writing and assessment. With a detail understanding of planning, catchment management, coastal management and rehabilitation. Natalie has had a successful career with both state and local government in conservation, planning and field investigation roles.

Qualifications

- B.Sc (Hons), University of Newcastle, 2002 Sustainable Resource Management and Marine Science.
- Master Planning, University of Technology Sydney 2007.
- Certificate IV Training and Assessment at NSW TAFE 2012.

Certification

- Evidence Gathering and Legal Process (Australian Institute of Environmental Health).
- Conflict Resolution Course (LGSA).
- Report Writing Course (LGSA).
- Powerful Presentation (LGSA).
- NSW Rural Fire Services Bush Fire Assessment
- Relocation of Threatened Species (Botanical Gardens Sydney).
- Sustainable Home Assessment Reduction Revolution.
- Flora and Fauna Survey Assessments Niche Environment and Heritage.
- First Aid TAFE.

Fields of Special Competence

- Environmental Planning
- Environmental Management and rehabilitation of catchments coastal waterways. Statement of Environmental Effects (preparation and assessing).
- Communicating with a wide range of stakeholders.
- Development Application
- Education in both Environmental and Planning industries.
- Fish Passage and marine vegetation.
- Koala Plans of Management.
- Policy Development.

Employment History

2019 to present AEP Senior Environmental Manager

2010 to 2019

Natalie Black was the Principal Environmental Planner for Black EARTH Environmental. Working on a range of projects including; Bush Fire Assessments, Landscaping, Development Applications, Statements of Environmental Effect's, Environmental Management Plans, Sustainability Assessment of both private and businesses, sustainable gardens, environmental assessments for proposed projects and environmental advice and volunteering for local Sustainable Community Group and Landcare. During this time Natalie also lectured at Hunter TAFE teaching a range of environmental units both face to face and on-line to a varying range of qualification and levels.

2003 to 2010

Natalie was the Natural Resource Manager and Development Assessment Officer at Lismore City Council working with diverse range of professions such as engineers, town planners, environmental health officer, accountants, building surveyors, arborists, councillors. During this time the main projects were grants application, restoration projects, flora and fauna assessments, environmental legal adviser, bush fire assessments, strategic work, development application assessment (ranging from sheds to Designated Developments) and council development application team for internal projects, Council's for climate change, water wise programs and others.

2002 to 2003

This was a step into the Policy Unit within DPI where Natalie was part of the team working on the Jervis Bay Indigenous Fishing Strategy, and the closure of Port Botany. Dealing with many stakeholders and running workshops with Ministers and community. During 2003 with Natalie was the North Coast Fish Passage Officer. Managing an Environmental Trust Grant of $1 million to remove 50 structures that block fish passage within the catchments of the North Coast. This project had all 50 sites contracted by the end of the 12 months with 70% of these projects commenced. This role allowed for the development of field assessments, independent work and communication with a range of stakeholders.

2000 -2002

The commencement of Natalie's career with NSW Department of Primary Industries (Fisheries Unit) in the Office of Conservation in Sydney. Natalie was part of the Conservation team that reviewed integrated development applications in the Sydney Region. The assessments ranged from jetties to the Lane Cove Tunnel, North West T-Way and the expansion of the M7 and fish ladders.

Appendix 6 – Traffic Impact Assessment

SECAsolution
Ground Floor, 161 Scott St
Newcastle NSW 2300
Ph: (02) 40327979
admin@secasolution.com.au

8 April 2020

P1546 CPC Barton Highway services Yass

Catalyze Property Consulting Pty Ltd
PO Box 44
Islington NSW 2296

Attn: Craig McGaffin

Dear Craig,

Planning Proposal in relation to Lot 12 DP 1158637

Proposed Highway Service Station, Barton Highway adjacent to Longrail Gully Road, south of Yass, NSW

Further to your request we have now completed our review of the documentation for the proposed Highway Service Centre development located to the immediate north of Longrail Gully Road on the Barton Highway, south of Yass. We have also discussed the project with the RMS and completed our site observations to determine the current traffic demands in this location as well as review the layout of the intersection of the Barton Highway and Longrail Gully Road. The findings our of project work are provided below.

Background

Seca Solution was commissioned by Catalyze Property Consulting Pty Ltd on behalf of The Trustee for the Barton Highway Trust (Client) to undertake a review of traffic and access issues for the site on the Barton Highway, Murrumbateman, NSW (Lot 12 DP1158637) located in the Yass Valley Council LGA.

The applicant proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses to permit a 'highway service centre' on Lot 12 DP1158637 zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway. At this point, and subject to final design, it is proposed to locate the highway service centre on the section of the site to the north of Longrail Gully Road, occupying approximately 4ha.

The subject land is bounded by the Barton Highway along the eastern boundary and the old road corridor along its western boundary, with Longrail Gully Road slitting the sterilised land in half. Subject to final design, the project site for the proposed service station is located to the immediate north of Longrail Gully Road.

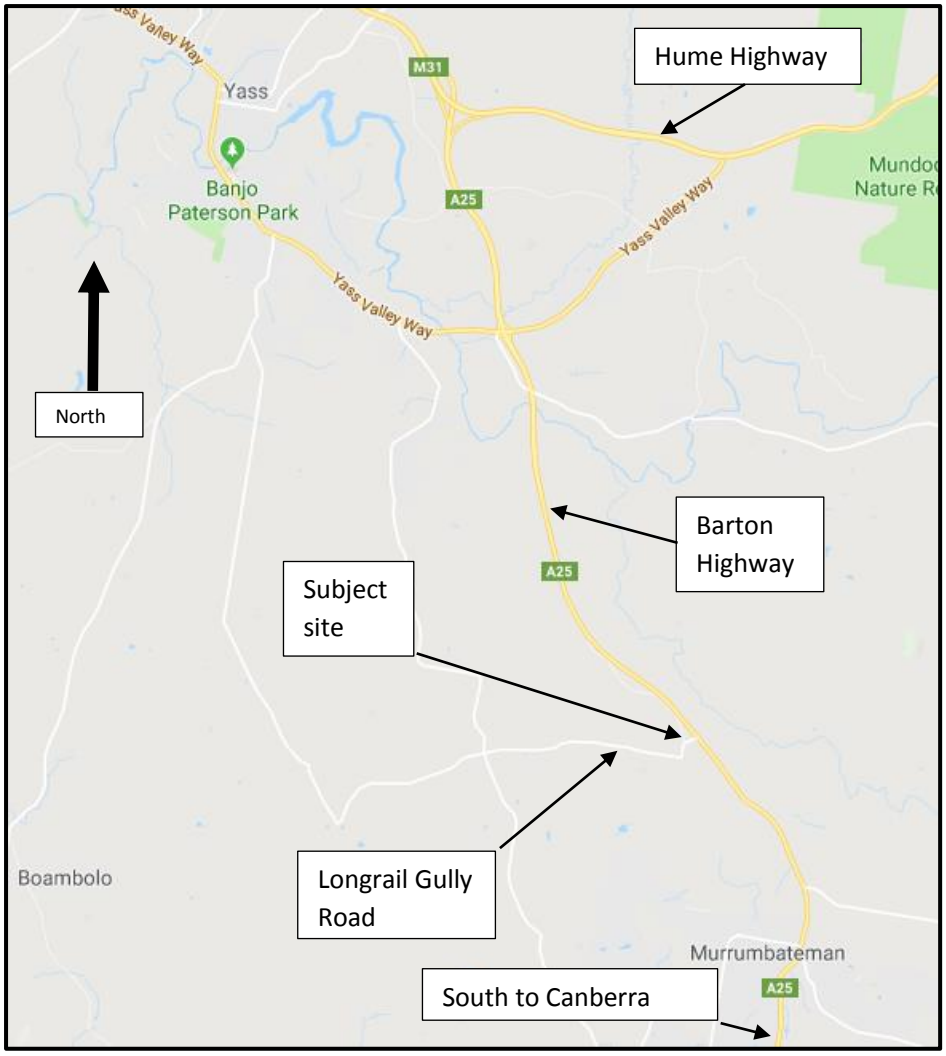


Figure 1 – Site location

Current situation

The Barton Highway in this location provides an important link in the road network, providing a direct route between Canberra and Yass for connection to the Hume Highway. In the vicinity of the subject site is provides a single lane of travel in each direction with a sealed shoulder. It operates under the posted speed limit of 100 km/h and carries a mixture of local and regional traffic. As part of the project work, Seca Solution collected traffic data at the intersection of the Barton Highway and Longrail Gully Road to determine the morning peak hour flow along the Barton Highway. Between 8.00 and 9.00 AM the 2-way traffic movement was 710 vehicles, with 400 vehicles southbound (56%). Heavy vehicles represented 4.2% of the total traffic flows. A single vehicle turned right out of Longrail Gully Road and a single heavy vehicle turned right into Longrail Gully Road from the Barton Highway.

The intersection of the Barton Highway and Longrail Gully Road allows for all turning movements with a sheltered right turn lane for southbound traffic turning right into Longrail Gully Road and a left turn deceleration lane on the Barton Highway for traffic turning into Longrail Gully Road. The right turn lane is 175 metres long including the taper whilst the left turn slip is 145 metres long. The Barton Highway in this location provides a straight horizontal alignment and a relatively flat vertical alignment, ensuring good visibility is available for drivers turning in and out of Longrail Gully Road.

The RMS web page shows that in Murrumbateman the daily traffic flow in 2012 was 9,283 vehicles per day. The Barton Highway Duplication Economic Evaluation Report (dated November 2013 prepared by SKM) shows that the daily traffic flows in 2013 were 10,884 and allowed for 2-3% growth in traffic. This would indicate that current daily traffic flows on the Barton Highway could be in the order of 12,800 vehicles per day.

For the posted speed limit of 100 km/h, the sight distance required form Austroads Guidelines is 248 metres and for a limit of 110 km/h the sight distance requirement is 300 metres. The sight distance available at this intersection has been measured on site and exceeds 500 metres in both directions.

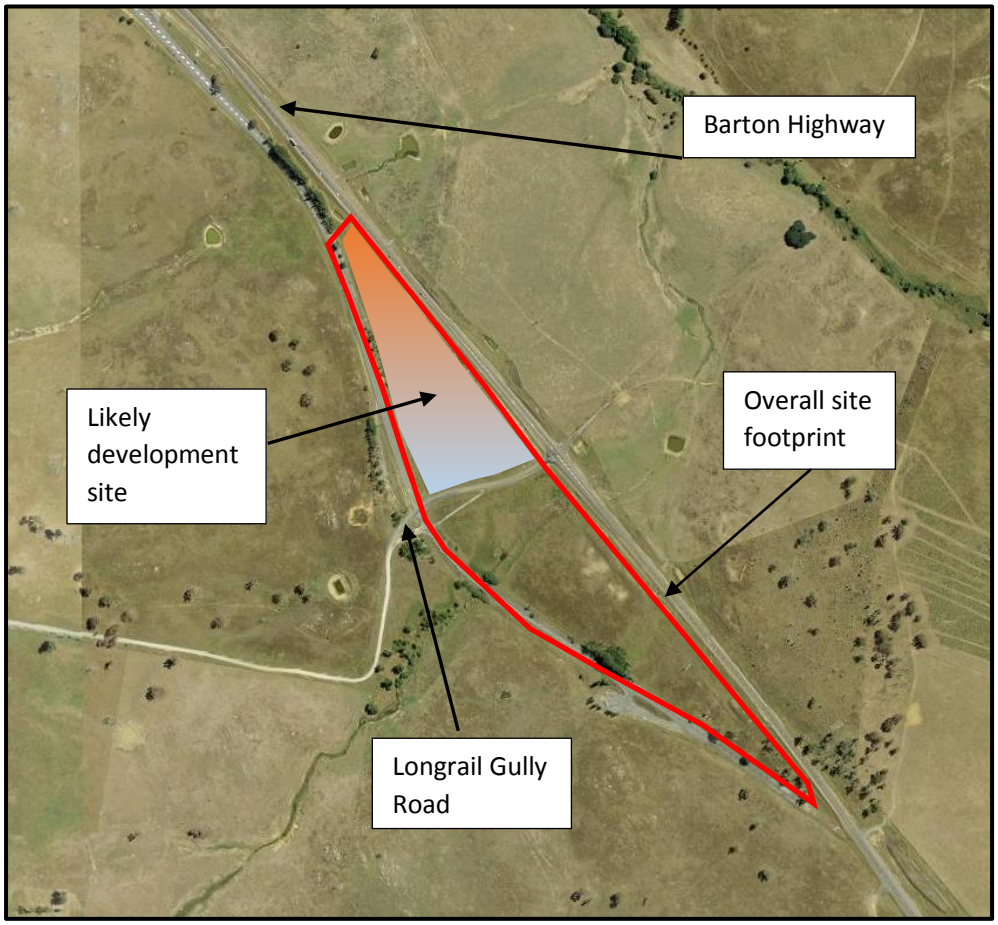


Figure 2 – Site location relative to intersection of Barton Highway and Longrail Gully Road

Photo 1 – View to right for driver exiting Longrail Gully Road

Photo 2 – View to left for driver exiting Longrail Gully Road

Photo 3 – Existing deceleration lane for vehicles turning left into Longrail Gully Road

Photo 4 – Existing right turn lane for vehicles entering Longrail Gully Road

Consultation with RMS

As part of the project work, Seca Solution has discussed the proposal with Maurice Morgan from the RMS Wagga Wagga office and the following points were made:

- The RMS are continuing to review the performance of the Barton Highway and the intention is to duplicate the full length of the Barton Highway between the ACT and Yass, to improve traffic conditions between Canberra and the Hume Highway;
- The current intersection controls at the intersection of the Barton Highway and Longrail Gully Road are considered adequate for the current traffic demands. A proposal for a service station at this location will require a detailed traffic assessment to the satisfaction of Council as the road authority and this will also be reviewed by the RMS for their concurrence. The assessment will need to take into account the future plans for the road upgrades in this location, in consultation with the RMS;
- The RMS stated that all vehicle access will be via Longrail Gully Road only and no direct vehicle access to the Barton Highway will be permitted in accordance with Clause 101 from the SEPP (Infrastructure) 2007;
- The RMS further stated that the plans for the upgrade of the Barton Highway have not yet been fully developed and the exiting controls and movements at this intersection will be reviewed as part of the upgrades at this location. The future upgrades at this could provide restrictions on the turns at this location especially the right turn out of Longrail Gully Road onto the Barton Highway. The upgrade may also only allow for future left in and left out turns for Longrail Gully Road;
- As part of the upgrade of the Barton Highway, the RMS will review the various intersections along this section of the road to reduce the number of conflicts for right turns, which would then be catered for at U-turn facilities.

The Proposal

The proposal will allow for a highway service centre to be provided on the site, providing a fuel outlet, together with food / retail outlet and parking for light and heavy vehicles. All vehicle access will be provided on Longrail Gully Road only and the footprint of the site will allow all vehicles to be able to enter and exit the site in a forward direction. In accordance with RMS requirements for this type of facility, access and parking will allow for PBS Level 2a (26 m) and 2b (30 m) vehicles.

No detailed plans are available for the project site, but when determining the traffic impacts of the project it is important to note that the vast majority of the traffic will be passing trade and as such the project will not generate any significant additional traffic movements. While the majority of the movements will be left in and left out, the traffic southbound on the Barton Highway will require right turn movements in and out and these will need careful consideration in terms of road safety. As discussed with the RMS, the future upgrade of the Barton Highway in this location may restrict the movements at this location to left in and left out only. If this restriction is imposed, then the development will typically only service the northbound traffic movements along the highway, depending on where U-turn facilities are provided.

The design of the highway service centre will be completed in accordance with the road authority requirements and AS2890. The design will allow for all vehicles to enter and exit the site in a forward direction and allow for safe and appropriate circulation around the site.

Traffic Impacts

It can be seen that the traffic impacts for the project will need to take into account the current intersection layout as well as the future layout / controls. For the future layout and controls, this will need to allow for detailed discussion with the RMS to determine the potential access restrictions that could apply to the site due to the potential removal of turn options at this intersection. As part of the assessment the capacity of the intersection will be reviewed but more importantly the impacts upon road safety will be assessed. This will include the impact of the development flows at the U-turn facilities if the intersection upgrade removes the right turn movement out (and / or in) to Longrail Gully Road.

Conclusion

From our study work it is concluded that the proposed highway service centre could be approved by the road authority, with the no issues associated with the capacity of the road network to accommodate the turning movements associated with the project site. However, a detailed traffic impact assessment will need to be completed to the satisfaction of Council as the consent authority and the RMS will need to review this assessment prior to being able to provide any concurrence for the project, taking into account the capacity and road safety issues associated with the proposal. This will also need to take into account the current intersection controls as well as the future controls as part of the upgrade of the Barton Highway. This will be completed in consultation with the RMS.

The site can be designed to accommodate the swept path movements of the appropriate design vehicles with adequate space to provide suitable parking for the service centre, including for PBS Level 2a (26 m) and 2b (30 m) vehicles.

Overall it is considered that the proposal can be provided to the satisfaction of the road authority with traffic, access and parking being able to be provided in a safe and acceptable manner.

Please feel free to contact me on (02) 40327979 should you have any further queries.

Yours sincerely,

Sean Morgan
Director

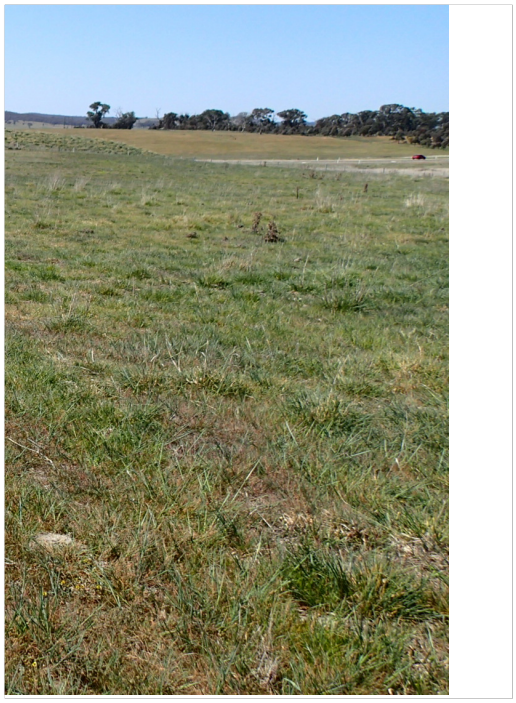
Appendix 7 – Cultural Heritage Assessment

ABORIGINAL DUE DILIGENCE ASSESSMENT

Lot 12 DP1158637, Barton Highway

October 2019

Project Number: 19-475



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DOCUMENT VERIFICATION

Project Title:	Lot 12 DP1158637, Barton Highway
Project Number:	19-475
Project File Name:	19-475 Murrumbateman DD v1.1

Revision	Date	Prepared by	Reviewed by	Approved by
Draft v1.0	25/10/2019	Kirsten Bradley and Amy Ziesing, Matthew Barber		Matthew Barber
Final	16/11/2019	Kirsten Bradley and Amy Ziesing, Matthew Barber	Matthew Barber	Matthew Barber

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ABN 31 124 444 622 ACN 124 444 622

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ACRONYMS AND ABBREVIATIONS

Aboriginal object	"any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains" (DECCW 2010:18)
Aboriginal place	"a place declared under s.84 of the NPW Act that, in the opinion of the Minister, is or was of special significance to Aboriginal culture" (DECCW 2010:18). Aboriginal places have been gazetted by the minister.
AHIMS	Aboriginal heritage information management system
AHIP	Aboriginal Heritage Impact Permit
BCD	Biodiversity and Conservation Division of DPIE (formerly OEH)
DPIE	Department of Planning Industry and Environment
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
ha	Hectares
km	Kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environment Plan
LGA	Local Government Area
m	Metres
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
PAD	Potential Archaeological Deposit

EXECUTIVE SUMMARY

NGH Pty Ltd (NGH) was commissioned by Catalyze Property Consulting Pty Lty (Catalyze) on behalf of the Trustee for the Barton Highway Trust (Client) to undertake an Aboriginal Heritage Due Diligence assessment for the proposed construction of a highway service centre on Lot 12 DP1158637 located on the Barton Highway Murrumbateman, NSW in the Yass Valley Council Local Government Area.

PROJECT DESCRIPTION

The Client proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses of Yass Valley LEP 2013 to permit a 'highway service centre' on Lot 12 DP1158637 currently zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway. At this point, and subject to final design, it is proposed to locate the highway service centre on the section of the site to the north of Longrail Gully Road, occupying approximately 4ha.The proposed works would involve ground disturbance to Lot 12 DP1158637.

FIELD ASSESSMENT

The field inspection, carried out on the 3rd of October 2019 by qualified NGH archaeologist Matthew Barber, assessed Lot 12 DP1158367.

The visual inspection found no Aboriginal sites and identified no areas where intact deposits could occur for the presence of subsurface cultural material. The project area has been partially disturbed through historic activities but also erosion of the soil profile has provided little remaining deposit in areas where Aboriginal occupation may have occurred.

It has been concluded that no further heritage investigations will be required, and the proposed Barton Highway rezoning can proceed with caution.

IMPACT ASSESSMENT

As no sites of Aboriginal cultural heritage or areas of archaeological sensitivity were identified across the proposal areas, there will be no impacts as a result of the proposed development. This is largely due to the identified historical land use involving modifications and disturbance to the natural landscape. It has been concluded that the proposed works are not likely to impact upon any Aboriginal objects or places and, as such, works may proceed with caution following the recommendations outlined below.

RECOMMENDATIONS

The following recommendations are based on the results of Aboriginal Heritage Due Diligence Assessment:

1. The proposal area within the development footprint is deemed to have low archaeological potential and works may proceed with caution.
2. Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment.
3. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and DPIE notified.
4. In the event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, DPIE must be notified by ringing the Enviroline (131 555).

1. INTRODUCTION

NGH Pty Ltd (NGH) was commissioned by Catalyze Property Consulting Pty Lty (Catalyze) on behalf of the Trustee for the Barton Highway Trust (Client) to undertake an Aboriginal Heritage Due Diligence assessment. The Client proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses of Yass Valley LEP 2013 to permit a 'highway service centre' on Lot 12 DP1158637 currently zoned RU1 Primary Production Zone located north of Murrumbateman and fronting the Barton Highway Murrumbateman, NSW (see Figure 1-1 and Figure 1-2). Lot 12 DP1158637 (the proposal area) is located within the Yass Valley Shire Council Local Government Area (LGA). This assessment would accompany Planning Proposal to the Yass Valley Shire Counci.

1.1. PROJECT AREA

The rural town of Murrumbateman lies between Yass and Canberra in the Yass Valley Shire Council LGA in the NSW South Western Slopes. The small town is located approximately 18 km south east of Yass, and 22 km north east of Gundaroo. Located in the Parish of Nanima, County of Murray, the proposal area is within the borders of the Murrumbateman 1:50,000 topographic map sheets (GDA 94, Zone 55).

1.2. PROJECT PARTICIPANTS

This Due Diligence assessment was carried out by qualified archaeologist Kirsten Bradley and Matthew Barber of NGH. Matthew Barber undertook the field inspection and the review of this report. NGH Archaeologist Kirsten Bradley conducted the background research and completion of this report. Amy Ziesing also assisted to comply the background research for this report.

The due diligence process does not formally require consultation with Aboriginal community groups. No Aboriginal groups were contacted for this due diligence level assessment. The project area is within the boundaries of the Onerwal Local Aboriginal Land Council.

1.3. APPROACH AND FORMAT OF THIS REPORT

This report has been drafted in keeping with the sequence of steps identified in the NSW *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH 2010). The Code of Practice provides a five-step approach to determine if an activity is likely to cause harm to an Aboriginal object, as defined by the NSW *National Parks and Wildlife Act 1974*. The steps follow a logical sequence of questions, the answer to each question determines the need for the next step in the process.

Table 1-1 Aboriginal Heritage Due Diligence Steps.

Due Diligence Steps
Step 1. Will the activity disturb the ground surface?
Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware
Step 2b. Are activities proposed in areas where landscape features indicate the presence of Aboriginal objects?
Step 3. Can you avoid harm to the object or disturbance of the landscape feature?

Step 4. Undertake a desktop assessment and visual inspection. Is it likely that Aboriginal objects will be impacted by the proposed works?
Step 5. Further investigations and impact assessment

The Due Diligence Code of Practice sets out the steps which the Proponent is required to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present in the study area;
- Determine whether or not their activities are likely to harm Aboriginal objects (if present) in the study area; and
- Determine whether an AHIP application is required.

Each section within this report follows the relevant step outlined in the Code of Practice.

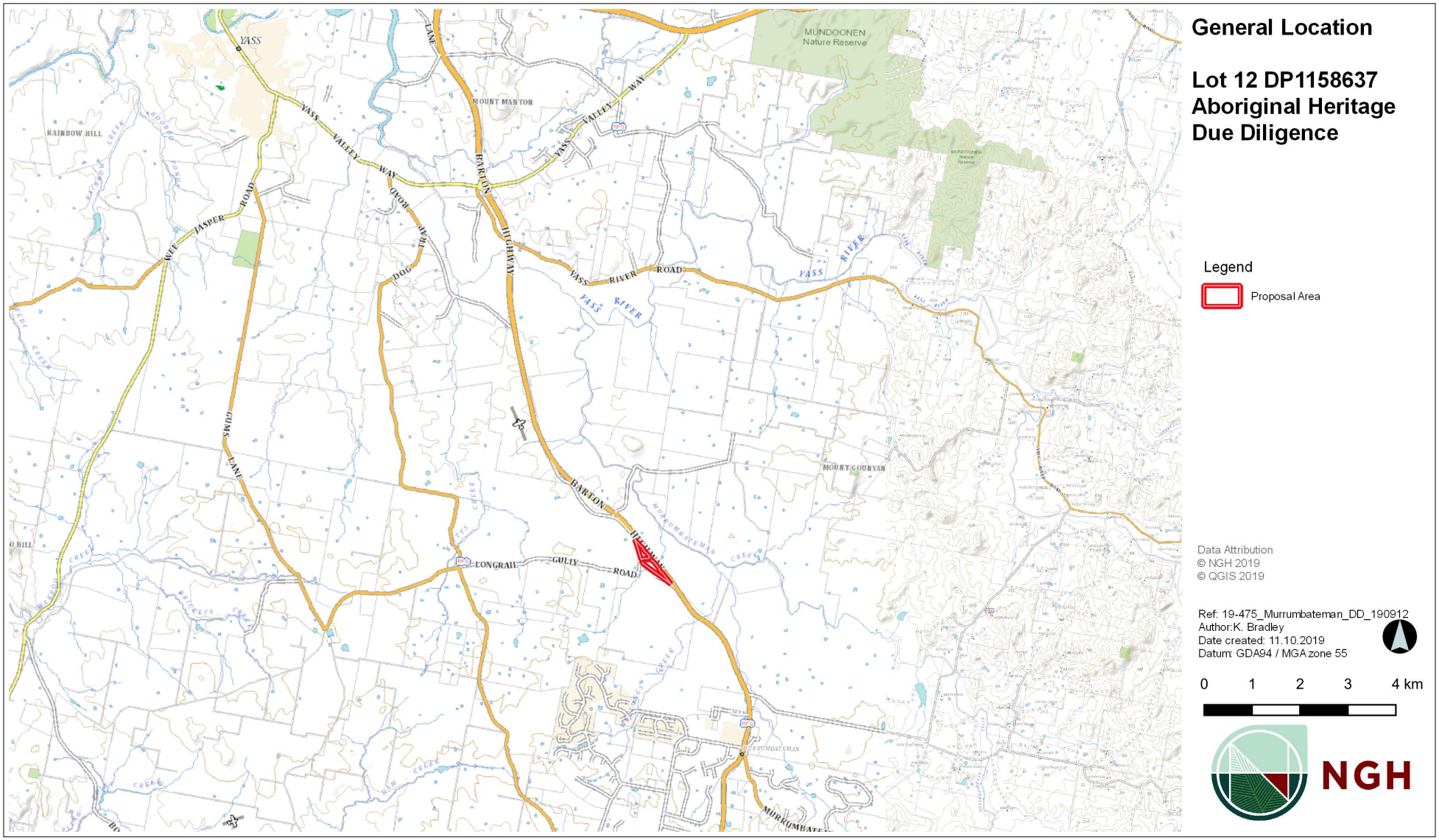

Figure 1-1 General location of subject site

Figure 1-2 Close up of proposal area

2. LEGISLATION

In NSW, Aboriginal heritage is principally protected by two legislative Acts:

- *National Parks and Wildlife Act 1974* (NPW Act); and
- *Environmental Planning and Assessment Act 1979* (EP&A Act)

2.1. NSW *NATIONAL PARKS AND WILDLIFE ACT 1974*

Part 6 of the NPW Act concerns Aboriginal objects and places and various sections describe the offences, defences and requirements to harm an Aboriginal object or place. All Aboriginal objects receive blanket protection under the NPW Act of NSW. The main offences under section 86 of the NPW Act are:

- A person must not harm or desecrate an object that the person knows is an Aboriginal object.
- A person must not harm an Aboriginal object.
- For the purposes of this section, "circumstances of aggravation" are:
    - that the offence was committed in the course of carrying out a commercial activity, or
    - that the offence was the second or subsequent occasion on which the offender was convicted of an offence under this section.
- A person must not harm or desecrate an Aboriginal place.

Under section 87 of the NPW Act, there are specified defences to prosecution including authorisation through an Aboriginal Heritage Impact Permit (AHIP) or through exercising due diligence or compliance through the regulation.

Section 89A of the Act also requires that a person who is aware of an Aboriginal object, must notify the Director-General in a prescribed manner. In effect, this section requires the completion of OEH AHIMS site cards for all sites located during heritage surveys.

The strict liability offence of harming Aboriginal objects has a number of defences, including the statutory defence of due diligence through complying with an adopted industry code of practice, or compliance with the conditions of an AHIP.

2.2. NSW *ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979*

The EP&A Act is legislation for the management of development in NSW. It sets up a planning structure that requires developers (individuals or companies) to consider the environmental impacts of new projects. Under this Act, cultural heritage is considered to be a part of the environment. It provides for the identification, protection and management of heritage items through inclusion of these items into schedules of planning instruments, such as Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). This Act requires that Aboriginal cultural heritage and the possible impacts to Aboriginal heritage that development may have are formally considered in land-use planning and development approval processes.

2.2.1. Yass Valley Local Environmental Plan 2013

LEPs are prepared by a local authority in accordance with Part 3 of the EP&A Act and their purpose is to guide planning decisions for local government areas. Clause 5.10 of the Yass Valley LEP refers to matters of heritage conservation and requires that consent be obtained for demolition, movement, disturbance or excavation of Aboriginal objects or places of heritage significance.

3. GROUND DISTURBANCE

Step 1. *Will the activity disturb the ground surface or any culturally modified trees?*

The current proposal area is located over two portions of land divided by Longrail Gully Road. The proposal area consists of cleared land used for farming that is now an island surrounded by adjacent roads including the former and current Barton Highway alignments.

The proposed works would involve ground disturbance of Lot 12 DP1158637 for a Highway Service Centre. Subject to final design, the Highway Service Centre would likely include the elements listed below.

- a fuel retail shop;
- a quick service restaurant;
- a quick service restaurant with drive-thru;
- pumping stations under a fuel canopy
- pumping stations under a truck canopy;
- a car parking area;
- a caravan parking area;
- a truck parking area; and
- waiting bays.

The construction of the proposed Highway Service Centre on a portion of Lot 12 DP1158637 would require significant ground disturbance works including the use of heavy machinery. Any Aboriginal sites within the disturbance footprint would therefore be subject to harm. The affirmation that ground disturbance will occur required the next step in the due diligence process to be addressed.

4. REGISTER SEARCH AND LANDSCAPE ASSESSMENT

4.1. AHIMS DATABASE AND HERITAGE REGISTER SEARCHES

Step 2a. *Search the AHIMS Database and other information sources*

A search of relevant heritage registers for Aboriginal sites and places provides an indication of the presence of previously recorded sites. It is to be noted that a register search is not conclusive, as it reflects only those areas that have been surveyed and that sites recorded are added to the register. As a starting point the search will indicate whether any sites are known within or adjacent to the investigation area. The Aboriginal Heritage Information Management System (AHIMS) provides a database of Aboriginal heritage sites registered previously. The results of the search are valid for 12 months for the purposes of a due diligence level assessment.

On the 12th of September 2019 a search of the AHIMS database was undertaken over an area approximately 10 km by 10 km centred over the proposal area (from latitude -34.8761, longitude 148.9167 to latitude -35.0020, longitude 149.0951 with a buffer of 1 km). The AHIMS Client Service Number was 449046. There were 41 Aboriginal sites recorded within this search area and no declared Aboriginal Places. The modified tree site AHIMS#51-5-0025 was listed on the AHIMS data base as a duplicate of the modified tree site AHIMS#51-5-0059. Table 4-1 below shows the breakdown of the site types and Figure 4-1 shows the location of the AHIMS sites in relation to the proposal area.

Table 4-1 Breakdown of previously recorded Aboriginal sites in close proximity to the proposal area.

Site Type	Number
Artefact	26
Modified Tree (Carved or Scarred)	8
Potential Archaeological Deposit	6
Artefact; Potential Archaeological Deposit	1
TOTAL	**41**

None of the archaeological sites currently recorded in AHIMS are located within the proposal area however nine Aboriginal Heritage sites (including a duplicate) occur within 2 km of the proposal area including the sites AHIMS# 51-5-0150 and AHIMS# 51-5-0151 which are located on the eastern side of the Barton Highway. The sites AHIMS# 51-5-0150 and AHIMS#51-5-0151 are both modified trees recorded approximately 130 to 260m south-east of the proposal area.

The nine sites (including a duplicate) recorded on AHIMS within 2 km of the proposal area included five modified trees, two Potential Archaeological Deposits (PADs) and an isolated stone tool. These sites are detailed in Table 4-2 below and shown in Figure 4-2.

Table 4-2 Previously recorded Aboriginal sites within 2 km of the proposal area.

Site Number	Site Name	Site Type	Distance to Project Area (m)	Site Status on AHIMS
51-5-0150	Gounyan Curves 1 (Barton Hwy)	Modified Tree	130	Valid
51-5-0151	Gounyan Curves 2 (Barton Hwy)	Modified Tree	260	Valid
51-4-0103	Gounyan Curves Survey Unit 2/Locale 1	Artefact	900	Valid
51-4-0234	Gounyan Curves 3 (Barton Hwy)	Modified Tree	620	Valid
51-50054	LRG-ST-1	Modified Tree	1600	Valid
51-5-0059 (includes duplicate 51-5-0025)	LR6-ST-2	Modified Tree	1300	Valid
51-5-0186	BH40 (Murrumbateman)	Potential Archaeological Deposit	1200	Valid
51-5-0211	PAD 2 (Gunning)	Potential Archaeological Deposit	1200	Valid

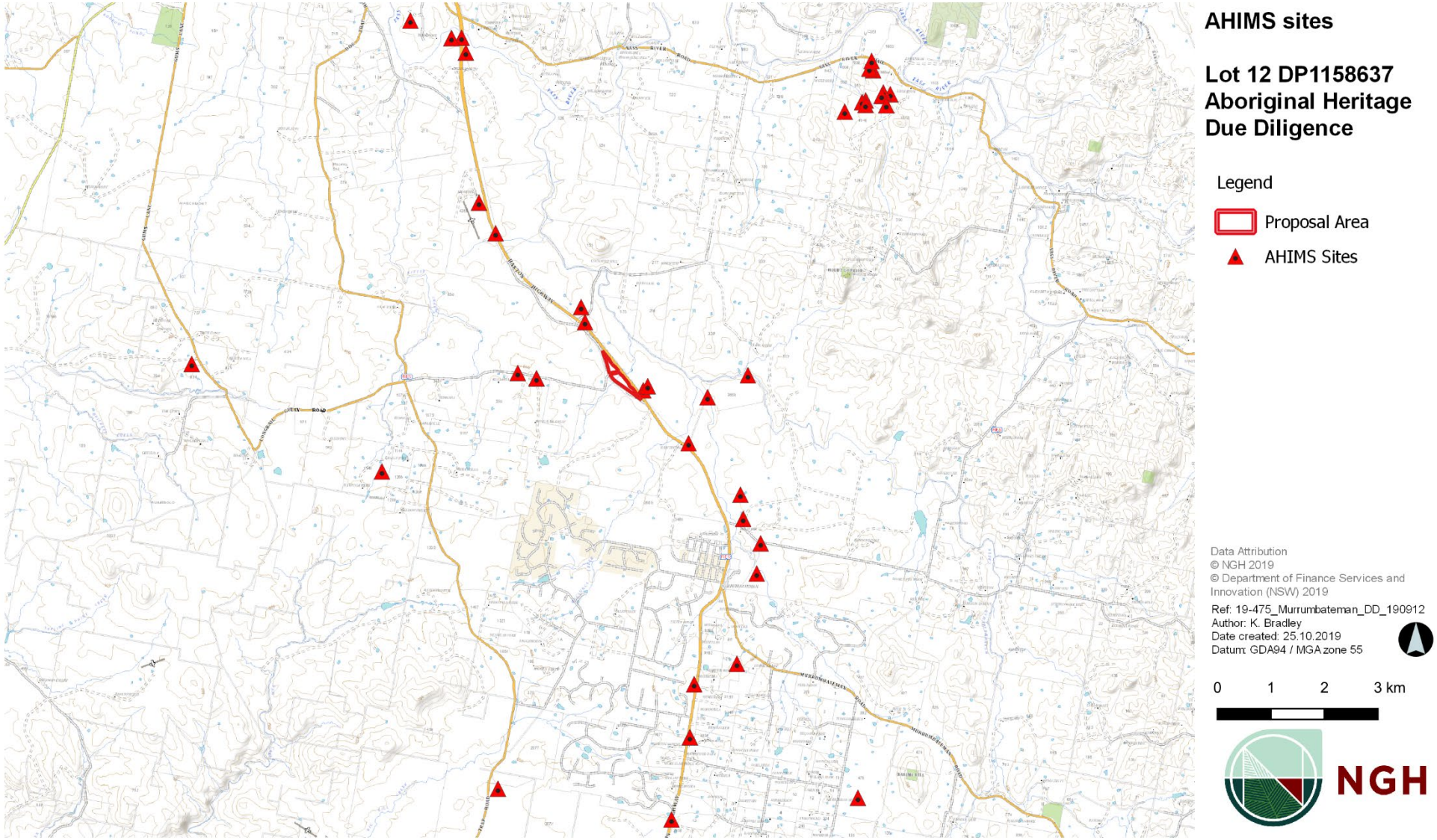

Figure 4-1 AHIMS sites

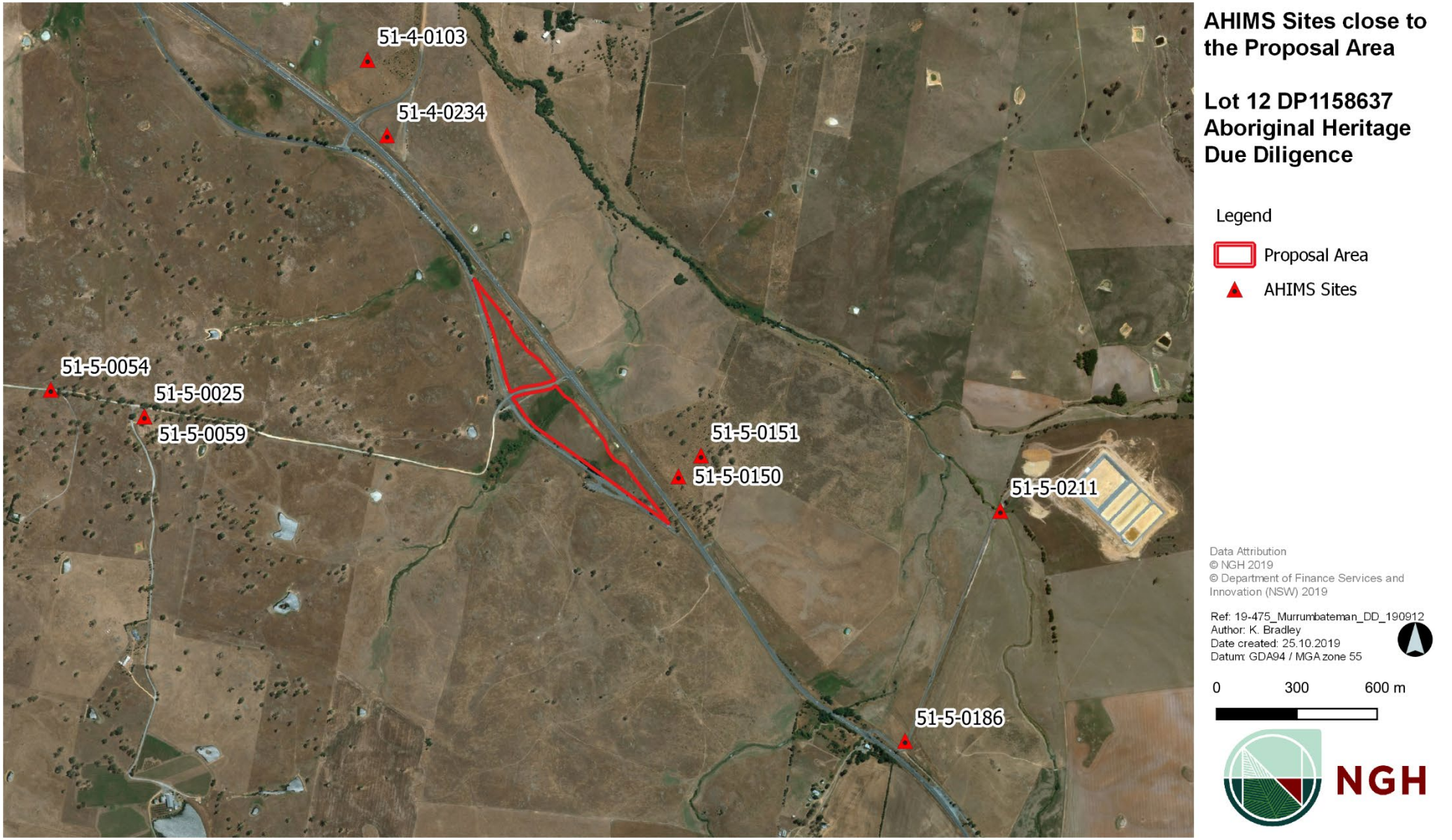

Figure 4-2 AHIMS sites in close proximity to the proposal area.

4.2. LOCAL ARCHAEOLOGICAL CONTEXT

The local Murrumbateman area and the wider Yass region have been the subject of several archaeological assessments, primarily conducted through the requirement of archaeological heritage impact assessments prior to land development. An overview of the relevant studies undertaken in the area is provided below.

In 1983 Koettig and Silcox surveyed a 14 km long corridor for the proposed freeway bypass north and east of Yass. During the survey eight low density stone artefact scatters were located, as well as 50 isolated finds. Four European sites were also recorded. The majority of sites recorded were located on low ridges and slopes and were within 200 m of water. The recorded artefacts included flakes, broken flakes, flaked pieces and a hammerstone axe. The artefacts recorded were manufactured from silcrete, quartz and quartzite.

In 1985 Silcox and Koettig surveyed an alternate route for the Yass bypass, including a proposed Barton Highway extension. Three surface artefacts, two subsurface and six isolated finds were recovered. About 90% of artefacts were unmodified flakes and flake pieces, with quartz being the dominant material. They also found that 80% of sites were located along ridges or slopes within 200 m of creek lines.

In 1986 Koettig completed an assessment of Aboriginal sites in the Yellow Creek Road area in Yass, recording five open artefact scatters and two isolated finds on the banks of a shallow drainage channel, spur and on the top of a knoll. The recorded artefacts consisted of flakes, broken flakes, flaked pieces, retouch/use wear, bipolar and multi-platformed cores. Artefacts were made from indurated mudstone, chert, silcrete, quartz and volcanic stone. The artefacts recorded were located 6 to 300 m from a water source.

In 1988 Silcox and Koettig (as cited in Dibden 2006:21) conducted surveys and test excavations along a 6 km proposed alternate route for the Barton Highway at Yass. They recorded five isolated finds and a surface scatter of >150 artefacts, including two sites located through subsurface testing. One of the subsurface test sites produced 21 artefacts from a total of 10 test pits. The artefacts consisted of flakes, flaked pieces, cores and a single backed blade, with 57% of the assemblage being silcrete. Other raw materials recorded included quartz, indurated mudstone, volcanic stone and chert.

In 1995 the Australian Archaeological Survey Consultants Pty (AASC) conducted an archaeological survey of six areas along the Barton Highway which had been zones for road improvements. Site 4 and 5 investigated as part of this study are in close proximity to the current assessment area. Site 4 appears to be adjacent to the current assessment area however the maps provided in the report are of low quality and the exact location is difficult to determine. No Aboriginal sites were identified during the survey of the six areas along the Barton Highway proposed for works.

In 2001 Navin Officer Heritage Consultants conducted an archaeological assessment of the Yass substation located within a landscape characterised by low gradients, drainage lines and alluvial flats. One small low density artefact scatter was located along a spur crest which consisted of three flakes and a flaked piece. The raw materials included volcanic, silcrete and chert. It was concluded that the spur crest had archaeological potential.

In 2009 Cultural Heritage Management Australia (CHMA) conducted an Aboriginal Heritage Assessment for the proposed realignment of the Barton Highway between Murrumbateman and Yass at an area known as Gounyan Curves. This survey was undertaken adjacent to the current assessment area. The road realignment was noted to impact an area approximately 4 km in long and 0.2 km wide. The survey identified four new Aboriginal sites and relocated a previously recorded isolated quartz artefact (AHIMS #51-4-0103). The new Aboriginal sites recorded included three modified trees (AHIMS # 51-5-0150/ GC1, AHIMS # 51-5-0151/ GC2 and AHIMS# 51-4-0234/ GC 3) and an isolated silcrete flake (GC4 which was subsequently incorporated into the site AHIMS #51-4-0103). While both stone artefact sites were noted to have limited potential for subsurface deposits based on the soil profile visible at erosion points it was recommended that a program of subsurface testing be undertaken to determine the existence and extent of any subsurface Aboriginal objects and/or cultural material. It was specifically noted that the subsurface testing program should be undertaken on a gentle rise above a drainage channel located near AHIMS# 51-4-0103 and continue for a distance of 20m

north and south of the site. None of the sites recorded during this survey are within the current assessment area however two of the modified trees are located 130 to 260 m south-east of the current assessment area.

In 2009 following on from the Aboriginal Heritage Assessment for the proposed realignment of the Barton Highway between Murrumbateman and Yass at an area known as Gounyan Curves CHMA conducted a subsurface testing program to investigate the site AHIMS# 51-4-0103. The test pitting program was focused on low rises either side of an ephemeral drainage line. A total of 18 test pits were excavated however no artefacts were recovered from the program of works. The testing program identified a shallow duplex soils consisting of a humic light grey brown silty loam overlaying a degrading granite gneiss base. Given the absence of subsurface material recovered from the testing program and shallow deposits encountered it was concluded that there was unlikely to be significant subsurface material present at site AHIMS# 51-4-0103. The site AHIMS# 51-4-0103 is located 900 m north-east of the current assessment area and has similar topography.

In 2010 Archaeological and Heritage Management Solutions (AHMS) conducted a preliminary heritage assessment for the proposed Barton Highway Duplication. The area assessed included a 200 m wide corridor centred on the existing Barton Highway which extended over 30 km from the ACT boarder to Kirkton Road near Yass. The study area however excluded a section of highway known as Gounyan Curves which is located near the current assessment area between Kirkton Road and Murrumbateman. AHMS developed a predictive model for the study area and noted that the majority of the previously recorded sites occurred on reasonably flat benched or terrace areas, raised above creek lines and in soils with significantly deep and/or undisturbed soil profiles. The predictive model developed by AHMS identified several areas of high archaeological potential which included and area from the ACT border to Spring Range Road, the areas around Jeir Creek and Gooda Creek, and an area northeast of Murrumbateman. The steep hills near Murrumbateman were noted to have low archaeological potential. During the initial survey of the study area nine PADs, three modified trees and 21 sites with Aboriginal stone objects (isolated finds and artefact scatters) were recorded. Eleven historic sites were also recorded. The Aboriginal sites recorded were noted to predominantly be artefact scatters and isolated finds with flakes, broken flakes and cores. Several manuports, two hand axes, a backed artefact and a blade core were also recorded. The artefacts were manufactured from quartz with a lesser number of chert, quartzite and silcrete.

4.3. LANDSCAPE ASSESSMENT

Step 2b. *Are there undisturbed landscape features likely to contain Aboriginal objects?*

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* outlines a range of landscape features that have higher potential to contain Aboriginal objects. It is also necessary to consider whether there are landscape features of undisturbed land that may contain Aboriginal objects. These include land that is:

- Within 200 m of water;
- Located within a sand dune system;
- Located on a ridge top, ridge line or headland;
- Located within 200 m below or above a cliff face; or
- Within 20 m of a cave, rock shelter or cave mouth.

Two ephemeral water courses intersect the southern portion of Lot 12 DP1158637. Given that water courses intersect the southern portion of Lot 12 DP1158637 the proposal area is considered to be within 200 m of water, and the area also contains low spur crests, both landscapes noted to have higher potential to contain Aboriginal sites. The next step in the due diligence process, a visual inspection is therefore required.

Geology

The proposal area is underlain by Douro volcanics. Coarse porphyritic rocks with generally 50% phenocrysts comprising coarse crystals of quartz-feldspar-biotite, quartz-feldspar-biotite-hornblende, or quartz-feldspar-hornblende in a fine-grained blue grey to greenish matrix. Textures are frequently tuffaceous, occasionally brecciated or agglomeratic. They are usually massive rocks, sometimes interbedded with fine acid tuffaceous

sandstone and siltstone. Soils have probably formed *in situ* and from alluvial-colluvial material on an old surface overlying the volcanics. There may also be aeolian influences in relation to soil deposition (from espade.environment.nsw.gov.au 2019). There are some outcrops within the project area of these rocks and indicating a generally shallow soil profile. It was noted however that the course nature of the outcropping bedrock was not conducive for use in stone tool manufacture by Aboriginal people.

Topography

The proposal area is comprised of undulating low hills and gently sloping spurs between mostly ephemeral drainage lines, draining north east to Murrumbateman Creek, about 650 m to the north east, which is a tributary of Yass River. Two spur crests are present within the northern block, the northern one slightly higher than the southern one and within the southern block the topography is dominated by a low hill crest and either side are drainage depressions. The slopes are generally of low to moderate gradient of 5-15 degrees and the area is about 550 m AHD in elevation.

Soils

Two soil landscapes exist within the proposal area, the Boorowa Soil Landscape (bw) and the Binalong Soil Landscape (bi). These are described below.

The Boorowa Soil Landscape is present in the northern half of proposal area and comprises a topsoil of fine sandy loam to fine sandy clay loam, overlying a bleached fine sandy clay loam. The subsoil is comprised of reddish-yellow to grey-yellow mottled medium to heavy clays.

The Binalong Soil Landscape is present in the southern half of proposal area and comprises a topsoil of fine sandy loam to fine red clay loam, overlying a yellow clay loam. The subsoil is comprised of yellow to grey mottled medium to heavy clays (from espade.environment.nsw.gov.au 2019).

Observations in the field showed soils to be variable with some erosion revealing a thin A horizon of sity clays over gravelly clays in most instances on the spurs and slopes. Within the main drainage line on the southern block, the soils comprised a grey clay, heavily churned through cattle trampling and at the time of survey wet and boggy.

Flora and Fauna

The original vegetation of the local area probably included Savannah woodlands dominated by white box (*Eucalyptus albens*), red gum (*E. camaldulensis*), yellow box (*E. melliodora*) and grey box (*E. microcarpa*). Spear grass (Heteropogon contortus) communities occur in low lying land which is subject to frost. In addition, this vegetation community would have provided a habitat to a wide variety of arboreal and terrestrial mammals, birds, reptiles and other animals which would have been sources of food, clothing, implements and ornamentation for the Aboriginal occupants of the land.

Historic Land Use

The historic land uses of the proposal area include land clearing and farming practices for livestock grazing and crop production. The western boundary has been impacted by the construction of the original Barton Highway including road cuttings and the eastern side (outside the project area) has significant disturbance through cuttings for the current Barton Highway alignment. Longrail Gully Road bisects the two blocks but there is also disturbances from a dam, fencing, stock yards and general farm use.

Aboriginal Site Prediction Statements

Based on the assessment of information for the environmental context and results from previous archaeological studies the local and regional area the general pattering of site location in the area shows most sites to be identified on creek banks or high ground adjacent to permanent or semi-permanent water courses. In regard to the current proposal area several predictive modelling statements can be ascertained which are noted in Table 4-3 below.

Table 4-3 Aboriginal site predictive modelling statements for proposal area.

Site Type	Site Description	Potential
Stone artefact scatters and isolated finds	Artefact scatter sites can range from high-density concentrations through to isolated finds.	Potential to occur in low to moderate densities on level crests or adjacent to creeklines.
Potential Archaeological Deposits (PADs)	Potential subsurface deposits archaeological material	Some potential to occur in association with flat raised areas in close proximity to drainage lines.
Modified trees	Trees that have undergone cultural modification.	Potential to occur in areas where there are remnant mature native trees or as isolated paddock trees.
Grinding grooves	Grooves created in stone platforms as a result of stone tool manufacture.	Associated with sandstone outcrops, unlikely to occur.
Burials	Aboriginal burial sites	Associated with soft alluvial soils and sands, unlikely to occur.

5. IMPACT AVOIDANCE

Step 3. *Can any AHIMS listed objects, or landscape features be avoided?*

The development of a Highway Service Centre is likely to require extensive and total modification of the landscape. The presence of ephemeral drainage line in the southern block and the spur crests in the northern block are areas that have some potential to contains Aboriginal sites. Although the proposed service centre is likely to be situated in the northern block, impacts to the spur crests would be unavoidable.

Therefore, the next step in the process a visual inspection must be conducted to properly appraise the presence and potential for Aboriginal sites to occur within Lot 12 DP1158637.

6. VISUAL INSPECTION

Step 4. *Does the desktop assessment and visual inspection confirm that there are likely to be Aboriginal objects present or below the ground surface?*

The assessment process is primarily a desktop exercise, using available information such as the AHIMS results, environmental context and relevant archaeological reports that have been previously completed in the area. The desktop assessment revealed that the subject site contains landscape features considered to have potential to contain Aboriginal objects and sites.

A visual inspection of the subject site was undertaken by NGH Principal Archaeologist Matthew Barber on 3 October 2019.

The norther block was surveyed with pedestrian transects traversing low gradient spur slopes at the extreme northern end of the lot. Visibility in this area was generally fair at about 20% but the area was considered to have relatively low archaeological potential (Plate 6-1).

The high spur crest in the northern block contained disturbances including a set of stock yards as well as fenceline and some old farm equipment. Overall the crest area was generally level and soils were a silty clay. Visibility was variable but on average about 15%, due to grass cover. This area had some archaeological potential as a spur crest slightly elevated above the surrounding landscape but the soils would be expected to be shallow with outcropping bedrock also present (Plate 6-2).

The southern slopes of the spur had poor visibility due to thicker grass cover but also contained a fenceline and some dead blackberry. This slopes of this section was about 8-12 degrees and this portion of the area was considered to have low archaeological potential. There was a shallow drainage depression between this spur and the lower spur to the south and overall this area had about 10% visibility.

The second but lower spur crest within the northern block was characterised by a broad flat area, but outside the eastern boundary was a stockpile of soil left from construction of the new Barton Highway alignment. The western end of this spur crest contained an extensive outcrop of bedrock. The most topographically sensitive area for Aboriginal sites would have been the western end of the spur, as a broad flat elevated above the creekline to the south. However, on inspection of this flat, it was apparent that much of the topsoil had been removed, with a gravelly clay layer being exposed. It is not certain when this occurred but it was likely a part of the construction of the new highway alignment, and may have been a stockpile or other area associated with the construction phase. It appears the area has been stripped deliberately as the remaining surface is level and consistent and provided visibility of over 40%. Any Aboriginal site that may have been present has been destroyed (Plate 6-3).

Although the southern lock of Lot 12 is not part of the development proposal, it was inspected as part of the brief. The creekline flowing in a north easterly direction through the northern part of the southern block has been dammed and there appears to be a wide area of overflow on the northern side of the dam. This area is very boggy and not conducive to any Aboriginal occupation and the visibility was about 10%.

South of the creekline the terrain was dominated by a hill with moderate gradient slopes. The hill crest and slopes were heavily eroded exposing a gravelly clay deposit providing visibility of approximately 25%. The slopes were generally of low potential to contain sites while the crest was elevated and generally level but with the level of erosion present no deposit for subsurface material remained and no surface artefacts were identified (Plate 6-5).

The southern portion of the southern block comprised low gradient basal slopes within a gently undulating topographic context. There were no notable landscape features, slopes generally about 3-6 degrees and no drainage liens or crests where Aboriginal sits may have been found. This area did have some mature trees present and a light grass cover providing visibility on average about 15%. Soils were also thin, clearly partly eroded with gravels and clayey B horizon evident across most of the area (Plate 6-6).

No Aboriginal objects or areas of high archaeological potential were identified within the project area during the visual inspection. While the general landscape of the project area contained some landforms that may have once been a focus of Aboriginal occupation, most notably the crests, each area was heavily eroded, most likely in the modern period as a result of tree clearing and as a consequence, there was very little potential for buried archaeological material to occur.

Plate 6-1. View south from northern extent of project area.

Plate 6-2.View north across crest of high spur showing outcropping bedrock.

	
Plate 6-3. View west from 'stripped' area at eastern end of spur, also showing outcropping bedrock at western end near former road.	Plate 6-4. View north west from basal slope of hill showing eroded surface across to creekline dam and boggy areas.
	
Plate 6-5. View north west from hill crest across drainage line.	Plate 6-6. View north west across southern end of project area.

6.1. SUMMARY

The desktop assessment and visual inspection failed to find any Aboriginal heritage sites. While the terrain and topographic features were conducive in a general modelling sense to contain sites, the survey found that much of those areas had either been modified through historic landuse practices or had eroded to the point where little topsoil remained. Where erosion had stripped much of the topsoil, if there were stone artefacts present, they would have most likely been found as a lag deposit on the present surface but none were identified.

It may be concluded therefore, that the construction of the service centre is unlikely to impact on Aboriginal heritage objects and can proceed with caution.

7. FURTHER ASSESSMENT

Step 5. *Is further investigation or impact assessment required?*

The Due Diligence Code of Practice states that if, after the desktop research and visual inspection is completed, it is evident that harm will occur to Aboriginal objects or heritage places, then further and more

detailed assessment is required. If, however, the research and inspection conclude that there are no, or unlikely to be any, objects impacted by the proposed activity, then the activity can proceed with caution.

As no sites of Aboriginal Cultural Heritage or areas of archaeological potential were identified across the proposal area, it is concluded that the proposed works for the Barton Highway service station will not require any further heritage investigation.

8. RECOMMENDATIONS

The following recommendations are based on the results of this Aboriginal Heritage Due Diligence Assessment, having taken into account the:

- Background research into the area;
- Landscape assessment;
- Field inspection;
- Consideration of the proposed works, and
- Legislative context for the development proposal.

It is recommended that:

1. The proposal area within the development footprint is deemed to have low archaeological potential and works may proceed with caution.
2. Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment.
3. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and DPIE notified.
4. In the event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, DPIE must be notified by ringing the Enviroline (131 555).

The Client is reminded that it is an offence under the NSW *National Parks and Wildlife Act 1974* to disturb, damage or destroy an Aboriginal object without a valid Aboriginal Heritage Impact Permit (AHIP).

9. REFERENCES

Archaeological and Heritage Management Solutions 2010 *Barton Highway Duplication: Preliminary Environmental Investigation Aboriginal & Historic Heritage.* Report prepared for Aurecon Group Pty Ltd on behalf of the Roads ad Traffic Authority NSW.

Cultural Heritage Management Australia 2009 *Gounyan Curves Aboriginal Heritage Assessment.* Prepared for Roads and Traffice Authority, NSW

Cultural Heritage Management Australia 2009 *Gounyan Curves Aboriginal Heritage Assessment Addendum: Subsurface Investigation.* Prepared for Roads and Traffice Authority, NSW

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Appendix 8 – Bore and Water Analysis

REPORT - HYDROGEOLOGICAL ASSESSMENT INCORPORATING 48 HOUR PUMP TEST

BARTON HIGHWAY, MURRUMBATEMAN, NSW,
LOT 12 DEPOSITED PLAN 1158637 &
LOT 21 DEPOSITED PLAN 1125716

Prepared For:	**Catalyze Property Consulting Pty Ltd**
Project Number:	**ENRS1406**
Date:	**December 2019**

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1 x PDF	ENRS1406_HA48hrPT_Barton Hwy Murrumbateman	Rev.1	23th Dec. 2018	Catalyze Property Consulting Pty Ltd

EXECUTIVE SUMMARY

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent groundwater consultants to prepare a Hydrogeological Assessment (HA) incorporating the results of a 48 Hour Pump Test for a new production Bore at Lot 21 in DP 1125716, Barton Highway, Murrumbateman, NSW, 2582 (herein referred to as the Site).

ENRS understand this HA is required to document the groundwater supply at the Site in anticipation of development of a Highway Service Centre. The Client proposes to lodge a Planning Proposal seeking to amend Schedule 1 Additional Permitted Uses to permit a 'highway service centre' on Lot 12 DP1158637 currently zoned RU1 Primary Production Zone, located north of Murrumbateman and fronting the Barton Highway. At the time of this report and subject to final design, it is proposed to locate the Highway Service Centre on the section of the site to the north of Longrail Gully Road, occupying approximately 4 hectares (ha).

The Centre will not be connected to the Yass Shire reticulation system. The proposal is to utilise groundwater at the Site to meet the anticipated design peak daily demand of approximately 20 Kilolitres per day (KL/d) equivalent to approximately 7.3 ML/year.

Test drilling during the scope of work culminated in the construction and airlift testing of one (1) proposed production bore. The bore has intersected fractured and porous rock aquifers at depths between 80 and 94 metres with a cumulative yield of 1.0 L/s (900 GPH) demonstrated during air lifting by the driller. The bore was subject to a 48 hour drawdown and recovery pump test at a rate of 0.6 L/s which reported a final drawdown level of 19.64 mbgl which significantly shallower than the available limit at the primary aquifer at 80 metres.

This report documents the findings of a hydrogeological assessment incorporating aquifer testing in general accordance with requirements for water bores outlined by the *NSW Office of Water (NOW)* and consistent with the spirit and principles of the *NSW State Groundwater Policy Framework Document* (NSW Government 1997), the *NSW State Groundwater Quality Protection Policy* (NSW Government 1998) and the *NSW State Groundwater Dependent Ecosystems Policy* (NSW Government 2002).

The project objectives were to prepare a site-specific hydrogeological assessment to document the hydrogeological setting and aquifer properties, and provide an assessment if the bore is capable of meeting the project water supply requirements supported by a 48 Hour Pump Test. Provide recommendations on bore yield, sustainable pumping regimes and assess potential impacts, if any, in context of the Site proposal.

A hydrogeological assessment was conducted for the site by undertaking the following scope of work:

- Preliminary review of the site proposal, water demand and operational requirements;
- Document results of borehole drilling, construction and minimum two (2) hour airlift to measure cumulative bore yield by licensed Driller;
- Document the results of a 48 hour drawdown and recovery pump test;
- Review the NATA laboratory results of bore water testing collect at completion of pump testing. Tabulate and compare the laboratory results against the Australian Drinking Water Guidelines (ADWG;2018);

- Review the drilling and aquifer testing results. Identify any potential impacts from the proposed bore operations on existing bores, groundwater users (if any) and groundwater dependent ecosystems (GDEs), if any; and
- Compile the investigation results, prepare a Hydrogeological Assessment (HA) report including recommendations for bore licensing, groundwater management, and pumping regimes.

Based on the findings obtained during the scope of work the following conclusions and recommendations may be made:

- The subject bore was drilled and constructed by *Bungendore Water Bores* in November 2019. The bore was drilled to a depth of 102 m with 66 metres of solid surface casing and a bentonite clay sanitary seal at the surface to prevent connection with any shallow soil water. The bore was completed with slotted PVC casing and gravel packed in general accordance with the *Minimum Construction Requirements for Water Bores in Australia* – 3rd *Edition* (2012). The bore sustained a drillers air lift yield of 1.0 L/s for a minimum of two (2) hours during drilling;
- The bore was subjected to a 48 hour (Bore 1) drawdown and recovery pumping test in peak summer conditions after a prolonged period of low rainfall. The results indicate the subject bore is capable of sustaining an allocation of at least 9.45 ML under the following pumping regime:
  - **Bore 1** - up to 0.6 L/s; 12 hr Pumping; 12 hrs Recovery; **9.45 ML** per year at 50 % duty. A higher pumping rate and operating duty may be realised supported by monitoring of pumping performance and recovery rates.
- The proposal is to convert the test bore to a production bore with a commercial, industrial and domestic groundwater access licence with an annual entitlement of ~10 ML to facilitate the proposed development. The pumping yield of 0.6 L/s exceeds the estimated peak demand for the Site proposal of approximately 20,000 Litres per day (or up to 7.3 ML per year);
- Based on the capable yield the recommended pumping regime is considered low risk for groundwater impacts. Final drawdown in the bore was 19.64 mbgl which is significantly shallower than the available drawdown limit at a depth of 80 m below ground level at the top of the primary aquifer zone. No registered water bores are present within a 1 km radius of the site and similarly no GDEs were identified at the Site area. Hence, it is assessed that under the proposed operating regime the bore will have no significant measurable impact on the groundwater environment and existing users in the area;
- NATA certificated laboratory results report water quality is generally within the criteria outlined by the ADWG (2018); and
- It is recommended that this report be submitted for final endorsement by the regulator.

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1.0 INTRODUCTION

Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent groundwater consultants to prepare a Hydrogeological Assessment (HA) incorporating the results of a 48 Hour Pump Test for a new production Bore at Lot 21 in DP 1125716, Barton Highway, Murrumbateman, NSW, 2582 (herein referred to as the Site).

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1.1 OBJECTIVES

The project objectives were to prepare a site specific hydrogeological assessment to document the hydrogeological setting and aquifer properties, and provide an assessment if the bore is capable of meeting the project water supply requirements supported by a 48 Hour Pump Test. Provide recommendations on bore yield, sustainable pumping regimes and assess potential impacts, if any, in context of the Site proposal.

1.2 SCOPE OF WORK

A hydrogeological assessment was conducted for the site by undertaking the following scope of work:

- Preliminary review of the site proposal, water demand and operational requirements;

- Document results of borehole drilling, construction and minimum two (2) hour airlift to measure cumulative bore yield by licensed Driller;
- Document the results of a 48 hour drawdown and recovery pump test;
- Review the NATA laboratory results of bore water testing collect at completion of pump testing. Tabulate and compare the laboratory results against the Australian Drinking Water Guidelines (ADWG);
- Review the drilling and aquifer testing results. Identify any potential impacts from the proposed bore operations on existing bores, groundwater users (if any) and groundwater dependent ecosystems (GDEs), if any; and
- Compile the investigation results, prepare a Hydrogeological Assessment (HA) report including recommendations for bore licensing, groundwater management, and pumping regimes.

2.0 SITE DESCRIPTION

2.1 LOCATION

The Site is located on the western side of the Barton Highway and north of Longrail Gully Road approximately three and a half (3.5) kilometres north of the Township of Murrumbateman. The site location is shown in **Figure 1**. The key features required to identify the Site are summarised in **Table 1**.

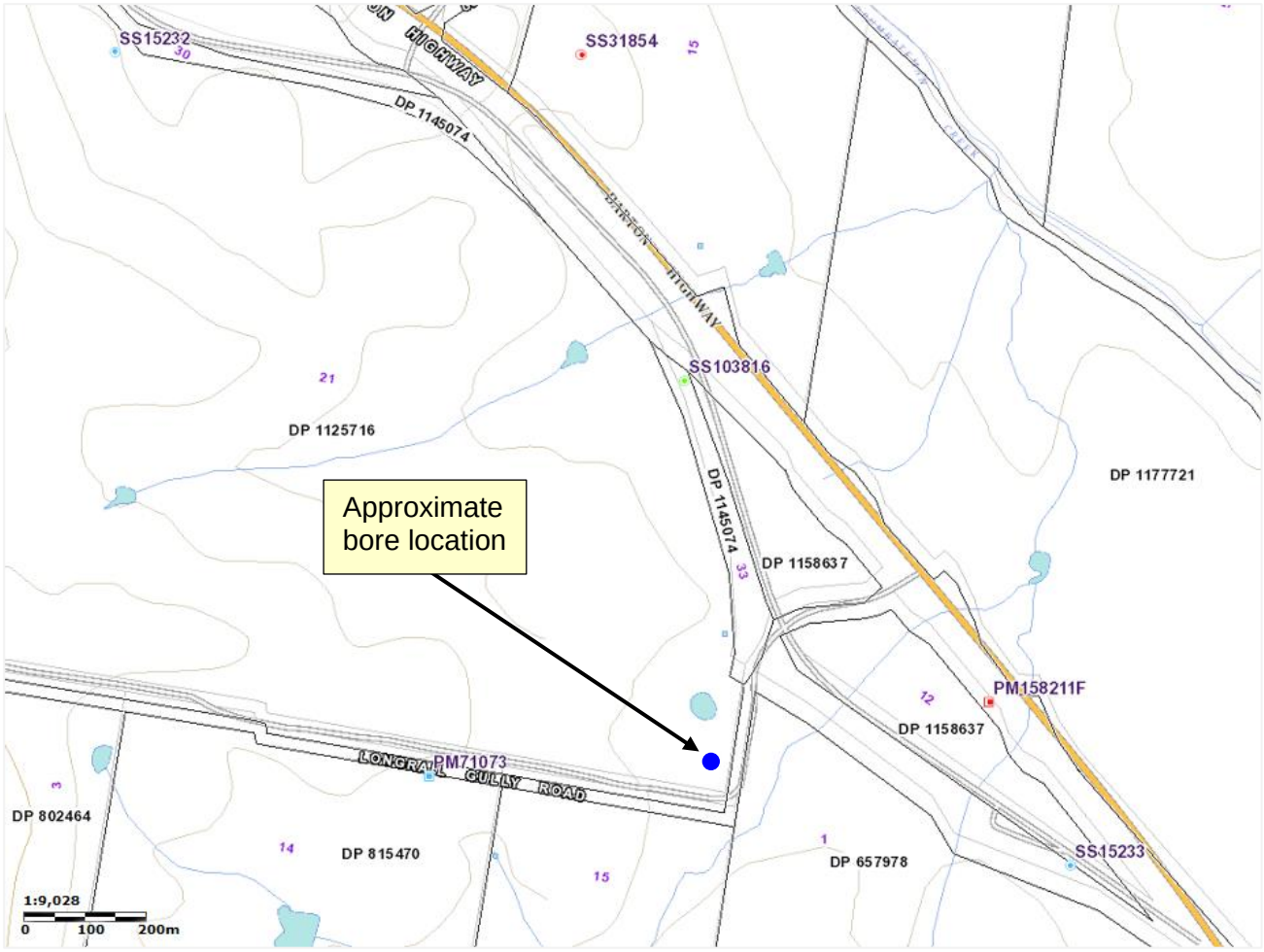
Table 1: Site Identification

SITE	DESCRIPTION
Street Address	836 Dog Trap Road Barton Highway, Murrumbateman, NSW, 2582
Lot / Deposited Plan	12 / 1158637 (Proposed Highway Service Centre 21 / 1125716 (Bore Locations)
Local Government Area	Yass Valley

2.2 TOPOGRAPHY

A review of the Site topography was conducted with reference to the online sixmaps topographic basemap to assess the regional topography and identify potential groundwater controls including the location of structural lineaments, paleo-channels, recharge and discharge zones, and groundwater flow gradients. The Site is situated in a relatively flat and undulating area with a subtle regional gradient to the east as illustrated by drainage features mapped as blue lines on the topography sheet in **Figure 1**. The drainage features mapped to the north and south of the bore Site are expected to be ephemeral.

Figure 1: Site Location Map



2.3 GEOLOGY

Review of the geological setting was conducted with reference to the Gunning 1:100,000 geological series sheets. The site geology is provided in **Figure 2**. The assessment area is mapped as underlain by Hawkins Volcanics (Sdh). The stratigraphy is summarised in **Table 2** below:

Table 2: Stratigraphic Formations

Period	Stratigraphy / Formation	Symbol	Lithology
Quaternary	Quaternary	Qa	Alluvial gravel, sand silt and clay.
Quaternary	Quaternary	Qr	Residual deposits
Siluro-Devon	Hawkins Volcanics	Sdh	Blue-grey massive medium to coarse grained often welded porphyritic crystal vitric biotite cordierite-garnet rhyolitic to dacitic ignimbrite with occasional quartz and diorite xenoliths. Flow banded vesicular rhyodacitic to dactic lava, volcanic sandstone, minor rhyodacitic agglomerate and rhyolitic lapilli tuff are also present.

Figure 2: Geological Setting

Source: NSW Government. Gunning 1:100,000 Geological Series Sheet 8728.

2.4 HYDROGEOLOGY

Based on the site geology, groundwater resources in the area are expected to be associated with two (2) primary forms of aquifer systems:

- *Shallow unconfined* systems hosted in unconsolidated alluvium and colluvium deposits, generally less than 10 m in depth with low to moderate yields, and variably salinity. These shallow systems are strongly controlled by rainfall recharge and are not considered a reliable source of long-term water supply. Flow regimes are expected to mimic the topographic gradient pending any structural or geological barriers; and
- *Deep fractured rock* and dual porosity aquifers hosted by the underlying rock sequences. Typically deeper than 40 m with variable yields and water quality controlled by geological faults, fractures, and joints from local and district faulting. Enhanced hydraulic conductivity is largely dependent on the scale and density of primary (void space between sediments grains) and secondary (fractures) porosity.

A review of *NOW* registered bore records was conducted to develop a conceptual model of regional groundwater conditions, including aquifer depths, yields, and water quality. The search did not identify any registered bores within a one (1) kilometre radius of the site (

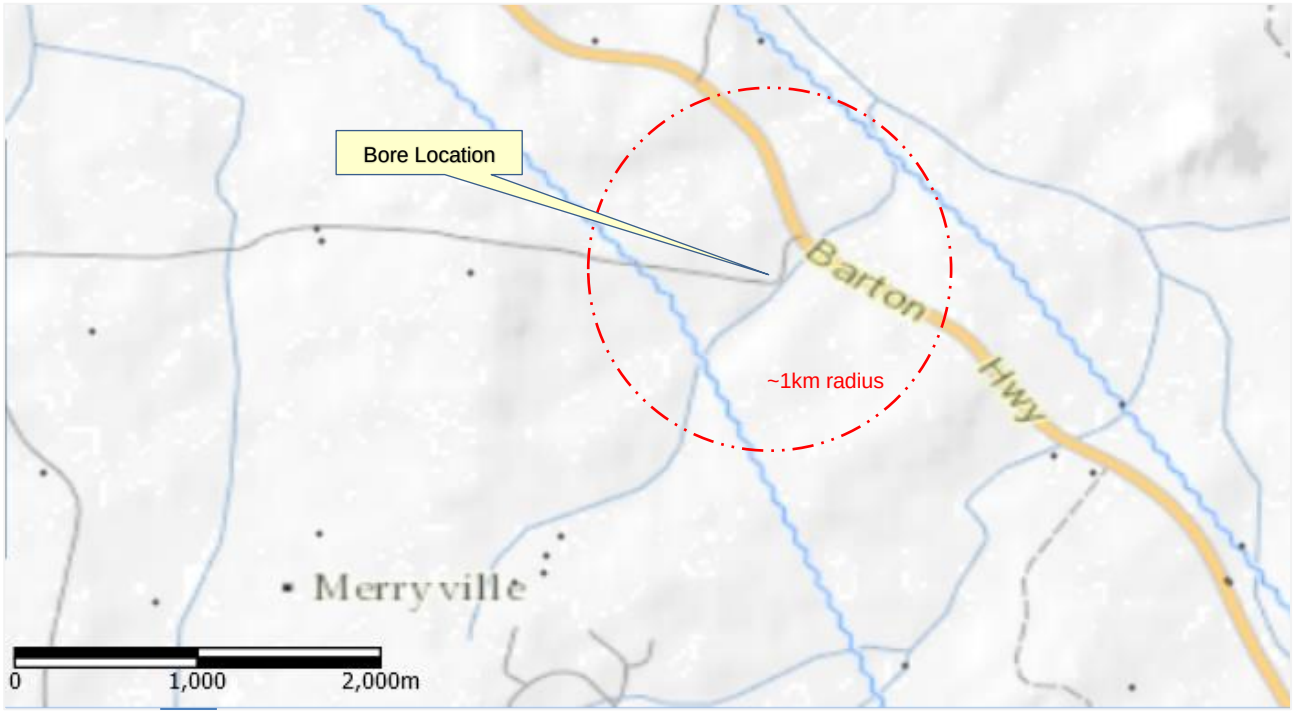
Figure 3) which is expected to be well beyond the maximum radius of any potential drawdown due to the low proposed pumping rate at the Site. The bore search area was expanded to include bores within a 5 km radius of the Site to assess groundwater conditions in other bores within the area. A summary of the available hydrogeological records is summarised below in **Table 3**.

- Bore depths in the area ranged between 19.5 to 90 metres,;
- Yields ranged from 0.18-0.95 L/s;
- Standing Water Levels ranged from 3-14m below ground level (mbgl) and
- Host units are listed as both volcanic and igneous rocks.

Table 3: Registered Bores within 2 km of the Site

Bore ID	Latitude	Longitude	Date	Depth (m)	Purpose	Status
GW009953	-34.952129	148.994123	1952	110	Unknown	Unknown
GW401221	-34.920692	149.01047	2000	63	Water Supply	Unknown
GW400868	-34.953926	148.993289	1998	68	Water Supply	Unknown
GW400899	-34.953071	148.993356	1998	68	Irrigation	Unknown
GW020876	-34.954385	148.991789	-	32	Unknown	Non-functional
GW401757	-34.945735	149.021461	2001	73	Monitoring	Abandoned
GW416011	-34.927923	149.003852	2011	138	Commercial and Industrial	Functioning
GW020682	-34.948998	149.020091	1963	28.7	Water Supply	Unknown
GW416012	-34.927921	148.995752	2011	150	Commercial and Industrial	Proposed
GW044463	-34.948165	149.018147	-	17.1	Water Supply	Unknown
GW401756	-34.958435	149.010833	2001	79	Monitoring	Abandoned
GW401376	-34.939272	148.989728	1991	55	Water Supply	Unknown

Figure 3: Registered bore locations (Water NSW online database)



3.0 BORE DRILLING & CONSTRUCTION

Drilling and borehole construction was conducted by *Bungendore Water Bores* during November 2019 in general accordance with the minimum construction requirements for water bores in Australia (3rd ed. 2012). Details of the bore construction are documented in the 'Form A' reports contained in **Appendix A** with a summary provided in **Table 4** below.

- The bore was sealed near the surface with a **bentonite clay sanitary seal** to prevent connection with surface water and shallow aquifers; and
- The bore casing extends above the surface and ***fitted with a sealed cap*** to prevent surface water ingress.

Bore 1 was airlift tested for a minimum of two (2) hours at an average rate of 1.0 L/s. The bore sustained a constant flow throughout the duration of the airlift and no significant variation in water quality (pH and EC) observed.

Table 4: Bore Construction Summary

Bore ID	Production Bore 1
Easting (MGA 56)	683035
Northing (MGA)	6131857
Drilled Depth (m)	102 m
Final Depth (m)	102 m
SWL (metres below ground level - mbgl)	2.5 mbgl (12/11/2019)
Casing (150mm Cl 9)	0-102 m
Slots (150mm Cl 9)	66-102 m
Bentonite Clay Seal	0-5.0 m
Gravel pack (4-6mm)	20-102m
TDS Lab	735 mg/L
EC Lab	1,260 µS/cm
pH Lab	7.93 pH

4.0 AQUIFER TESTING

4.1 PUMP TEST METHODOLOGY

Pumping test design and methodology was developed and conducted in accordance with the Australian Standard for Test Pumping of Water Wells (AS 2368-1990). The pumping rate, duration and depth setting was selected following detailed review of the hydrogeological conditions including depth of target aquifers, aquifer type, available drawdown, and bore construction. Testing was conducted using a submersible pump. Water level data was collected in the pumping bore both manually and automatically with a submersible water level data logger programmed to record water levels at 10 minute intervals.

4.2 PUMP TEST RESULTS

A summary of the drawdown and recovery test results is provided in **Table 5**. Drawdown and recovery data was tabulated and plotted to produce aquifer response curves. The drawdown and recovery curves (refer to **Appendix B**) demonstrate high quality aquifer response data to support graphical analysis of aquifer properties.

No monitoring bores were constructed at the Site during this assessment. Monitoring was conducted in the pumping bore. Transmissivity (T) values for late drawdown and early recovery data is approximately 6.78 m^2/day.

The drilling and aquifer test results indicate the subject bore is capable of sustaining discharge rates up to 1.0 L/s supported by equipping the bore with cut out transducers to prevent drawdown below the available limit at the depth of the primary aquifer at 80 mbgl. Based on the test results it is recommended to operate the bore under the following pumping regime:

- **Bore 1** – up to 0.6 L/s; 12 hrs Pumping; 12 hrs Recovery; 9.45 Mega Litres (ML) per year at 50 % pumping duty. A higher pumping rate and duty may be realised supported by monitoring of pumping performance and recovery rates.

Table 5: Summary of Drawdown and Recovery Test Results

Bore ID	Bore 1
Test Date	27-29 / 11 / 2019
Drawdown Test Duration (hrs)	2 Day (48 Hours)
Recovery Test Duration (hrs)	2 Day (48 Hours)
Pump Test Flow Rate (Litres per second)	0.6 L/s
Static Water Level (SWL) (mbgl)	3.27 (at start of pump test)
Aquifers m-m~L/s (reported by driller)	80-82 m ~0.5 L/s 88-90 m ~0.3 L/s 92-94 m ~0.2 L/s
Indicative Yield (driller L/s)	1.0 L/s sustained during min. 2 hour airlift
Available Drawdown	80 mbgl to top of the primary aquifer zone.
Final Drawdown during testing	19.64 mbgl (15.37 mbSWL)
Transmissivity (m^2/day)	~6.78 m^2/day
Recommended discharge rate (L/s)	~0.6 L/s (or Up to 1.0 L/s)
Recommended pump setting (mbgl)	80 m at top of primary aquifer with shroud
Recommended pumping schedule (hrs on – hrs off)	12hr On – 12hr Off
Pump Duty %	50 %
Capable Annual Yield (ML)	9.45 ML per year (~10 ML/year)

Bore 1 was pump tested for 48 hours at a rate of 0.6 L/s with a maximum drawdown to 19.64 mbgl (or 15.37 mbSWL). The drawdown curve indicates a minimal drawdown with no significant barrier or boundary effects. The driller's aquifer intercepts and pump test results indicate the available drawdown is to a depth of 80 mbgl to the top of the primary aquifer zone. Initial water level recovery at completion of pumping is noted to be rapid becoming gradual. Groundwater yields are supported

by the intersection of dual porosity regional scale aquifers supported by an extensive recharge area with no existing users within one (1) kilometre of the Site.

The drilling and aquifer test results indicate the subject bore is capable of sustaining discharge rates up to 1.0 L/s. It is recommended to operate the bore under the following pumping regime:

- **Bore 1 – pumping at 0.6 L/s; 12 hours on followed by 12 hours recovery; 9.45 ML per year at 50 % duty.**

4.3 CAPABLE YIELD

Groundwater investigations comprised drilling of one (1) test bore culminating in the construction of one (1) production bore. The bore has intersected deep fractured rock aquifers supported by an extensive recharge area and no competing registered groundwater users. Based on the drillers airlift results the bore has a **capable yield of ~10 ML** per annum operating at 50 per cent duty. The pumping yield of 0.6 L/s exceeds the estimated peak daily demand for the Site of approximately 20,000 Litres per day (or up to 7.3 ML per year).

It should be noted that the indicated groundwater extraction regimes are based on the aquifer response during a 48 hour period of testing and simulation stress. Groundwater extraction should be supported by appropriate groundwater management practices including regular water level monitoring. Bore performance may alter as a result of structural and chemical changes within the bore or due to variations in aquifer recharge, namely extended droughts or reductions in recharge from rainfall. It is recommended that groundwater bores be pumped on a cyclic pump duty such as (12 hours on and 12 hours off) to provide for sufficient water level recovery between pumping cycles and ensure the long-term sustainability of the groundwater resources. The Bore should also be equipped with cut-out probes to prevent dewatering below the primary aquifer.

5.0 WATER QUALITY

Water samples were collected after 48 hour pumping and submitted to a NATA accredited laboratory for analysis. The reader is referred to **Appendix C** for copies of Laboratory Certificates of Analysis (COA). The following section summarises the key water quality results. In general, the results report concentrations of key analytes within the criteria set by the Australian Drinking Water Guidelines (2018). Minor levels of iron and manganese are expected to decrease during long term pumping as residual sediments from drilling reduce. These minerals may also be managed through primary treatment and storage:

5.1 POTENTIAL HYDROGEN

pH is a measure of hydrogen activity. pH determines the balance between positive hydrogen ions (H+) and negative hydroxyl ions (OH-) and provides a test of water acidity (low pH) or alkalinity (high pH). Most natural freshwaters have a pH in the range 6.5 to 8.0. ***pH in the bore was reported at 7.57 (B1***) which is within the Australian Drinking Water (ADWG;2018) guideline of 6.5-8.5 pH.

5.2 SALINITY

Salinity reported as TDS is within the ADWG aesthetic criteria which is suitable for the proposed use (industrial, commercial and domestic). The ADWG note that typical values for TDS in regional water supplies can be up to 1,000 mg/L or higher due to groundwater characteristics. A summary of the salinity guidelines for palatability is provided in **Table 6**.

Table 6: Water Salinity Criteria

Bore ID	TDS Criteria (ADWG;2018)	Palatability
	0 – 600 600 – 900 900 – 1200 >1200	Good Fair Poor Unacceptable
Bore 1	735 mg/L (1260 uS/cm)	Fair

5.3 METALS AND METALLOIDS

Water samples were analysed for a broad suite of heavy metals and metalloids including:

- Aluminium (Al);
- Arsenic (As);
- Boron (B);
- Barium (Ba);
- Cadmium (Cd);
- Calcium (Ca);
- Total Chromium (T.Cr.)
- Copper (Cu);
- Iron (Fe);
- Lead (Pb);
- Magnesium (Mg);
- Manganese (Mn);
- Molybdenum (Mo);
- Mercury (Hg);
- Nickel (Ni);
- Selenium (Se);
- Silver (Ag); and
- Zinc (Zn).

Analysis for Heavy Metals and Metalloids reported concentrations below the health and aesthetic limits stipulated in the Australian Drinking Water Guidelines (ADWG;2018). The reported concentrations of trace metals indicate the water is suitable for the proposed use (industrial, commercial and domestic).

6.0 IMPACT ASSESSMENT

6.1 DISTANCE DRAWDOWN

A search of the *NOW* groundwater database did not identify any licensed water bores within one (1) kilometre of the assessment site which indicates there is no existing users in proximity to the site. Given the significant distance from registered bores and minor drawdown in the bore after continuous pumping for 48 hours it is assessed that there is a low risk for distance drawdown impacts on existing groundwater users in the area. No further impact assessment or calculations are considered necessary.

6.2 GROUNDWATER DEPENDENT ECOSYSTEMS (GDE)

Review of the property and surrounding landuse indicates that the site is located within the NSW Murray Darling Basin Fractured Rock Groundwater - Yass Catchment. An online search of the Bureau of Meteorology (BOM) GDE atlas was conducted to identify any potential Groundwater Dependent Ecosystems (GDE) within 5 km of the Bore. Information held in the GDE atlas includes:

- The supplied ecosystem type;
- The GDE potential, which is a measure of the assessed dependence potential of the ecosystem on groundwater resources; and
- The Inflow Dependent Ecosystem (IDE) likelihood, which is a measure of the likelihood of the landscape accessing water in addition to rainfall.

A summary of identified potential ecosystems within 5km of the bore is presented below in **Table 7**.

Table 7: Identified Potential GDEs

Distance from Bore Site	Name	Type	GDE Potential	IDE LIkelihood
~4,5 km	Kittys	River	Moderate potential GDE - from national assessment	7
~2.2 km	Mcclungs	River	High potential GDE - from national assessment	7
~2.7 km	Murrumbateman	River	High potential GDE - from national assessment	10

The GDEs in the area are located greater than two (2) kilometres from the Site and are associated with River systems which are assessed not to be in direct hydraulic connection with the deep groundwater intersected by the Bore. Review of the Site's hydrogeological setting and aerial imagery did not identify any GDE's at the Site. Furthermore, given the borehole has been constructed with solid casing to 66 metres and a bentonite clay sanitary seal to prevent inflow of shallow soil water, this assessment considers the bore to be adequately constructed so as not to be in direct hydraulic connection with any overlying shallow aquifers. Hence, the proposed pumping from the deep fractured rock aquifers is not assessed to present any measurable impact on Groundwater Dependent Ecosystems (GDE's) in connection with the colluvial systems.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings obtained during the scope of work the following conclusions and recommendations may be made:

- The subject bore was drilled and constructed by *Bungendore Water Bores* in November 2019. The bore was drilled to a depth of 102 m with 66 metres of solid surface casing and a bentonite clay sanitary seal at the surface to prevent connection with any shallow soil water. The bore was completed with slotted PVC casing and gravel packed in general accordance with the *Minimum Construction Requirements for Water Bores in Australia* – 3rd *Edition* (2012). The bore sustained a drillers air lift yield of 1.0 L/s for a minimum of two (2) hours during drilling;

- The bore was subjected to a 48 hour (Bore 1) drawdown and recovery pumping test in peak summer conditions after a prolonged period of low rainfall. The results indicate the subject bore is capable of sustaining an allocation of at least 9.45 ML under the following pumping regime:
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- The proposal is to convert the test bore to a production bore with a commercial, industrial and domestic groundwater access licence with an annual entitlement of ~10 ML to facilitate the proposed development. The pumping yield of 0.6 L/s exceeds the estimated peak demand for the Site proposal of approximately 20,000 Litres per day (or up to 7.3 ML per year);
- Based on the capable yield the recommended pumping regime is considered low risk for groundwater impacts. Final drawdown in the bore was 19.64 mbgl which is significantly shallower than the available drawdown limit at a depth of 80 m below ground level at the top of the primary aquifer zone. No registered water bores are present within a 1 km radius of the site and similarly no GDEs were identified at the Site area. Hence, it is assessed that under the proposed operating regime the bore will have no significant measurable impact on the groundwater environment and existing users in the area;
- NATA certificated laboratory results report water quality is generally within the criteria outlined by the ADWG (2018); and
- It is recommended that this report be submitted for final endorsement by the regulator.

8.0 REFERENCES

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9.0 REFERENCES

Air-lift yield: a yield obtained using compressed air (via a compressor normally coupled to a drilling rig) to lift water flowing into a well to the surface, to enable measurement of its flow.

Alluvium: Sediment (gravel, sand, silt, clay) transported by water (i.e. deposits in a stream channel or floodplain).

Anisotropy: The condition of a porous medium where the permeability is different in different directions.

Aquiclude: A low-permeability unit that forms either the upper or lower boundary of a groundwater flow system.

Aquifer: Rock or sediment in a formation, group of formations, or part of a formation which is saturated and sufficiently permeable able to transmit quantities of water to wells and springs. An aquifer may be porous rock, unconsolidated gravel, fractured rock, or cavernous limestone.

Aquitard: A low-permeability unit than can store ground water and also transmit it slowly from one aquifer to another.

Beneficial Use: general categorization of groundwater uses based on water quality and the presence or absence of contaminants. Beneficial use is the equivalent to the environmental value of water.

Bore: A deep hole of small diameter bored into the aquifer, through which water equilibrates and may rise under hydrostatic pressure.

Colluvium: Sediment (gravel, sand, silt, clay) transported by gravity (i.e. deposits at the base of a slope).

Cone of Depression: The depression in the water table around a well or excavation defining the area of influence of the well. Also known as cone of influence.

Confined Aquifer: an aquifer that is overlain by a confining bed. The confining bed has a significantly lower hydraulic conductivity than the aquifer.

Drawdown: A lowering of the water table of an unconfined aquifer or the potentiometric surface of a confined aquifer caused by pumping of ground water from wells or excavations.

Dual porosity aquifer: upon pumping releases water from both intergranular pores and fractures

Environmental flow: A water regime provided within a river, wetland or estuary to improve or maintain ecosystems and their benefits where there are competing water uses and where flows are regulated.

Groundwater Dependant Ecosystems (GDE): GDEs are ecosystems that use groundwater as part of survival, and can potentially include wetlands, vegetation, mound springs, river base flows, cave ecosystems, playa lakes and saline discharges, springs, mangroves, river pools, billabongs and hanging swamps. The groundwater dependence of ecosystems will range from complete reliance to those that partially rely on groundwater, such as during droughts.

Groundwater recharge: Inflow of water to an aquifer from the surface. Infiltration of precipitation and its movement to the water table is one form of natural recharge.

Hanging swamps: ancient freshwater wetlands often rich in biodiversity. The soil structure is fragile generally with low fertility and a loose structure that is highly susceptible to erosion and fire. Hanging Swamps rarely show surface water, but large amounts of water are often held in

the soil beneath the surface, filtering through the swamp and flowing into the downstream creek. The Hanging swamps in the Hawkesbury-Nepean catchment have been identified as an Endangered Ecological Community under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Hydraulic Conductivity The ease with which a fluid will flow through a porous medium. It is a function of the pore size and fluid properties of viscosity and density.

Hydraulic gradient: The hydraulic gradient is a vector gradient between two or more hydraulic head measurements over the length of the flow path. The distribution of hydraulic head through an aquifer determines where groundwater will flow.

Hydrogeology: The branch of geology that deals with the occurrence, distribution, and effect of groundwater.

Igneous intrusions: Igneous intrusions are rocks which form when magma cools and solidifies before it reaches the earth's surface. Three common types of intrusion are sills, dykes, and batholiths.

Infiltration: The flow of water downward from the land surface into and through the upper soil layers.

Losing Stream A stream in which the water surface is lower than the adjacent water table, thus causing water to flow from the groundwater system into the stream.

Packer test: An aquifer test performed in an open borehole; the segment of the borehole to be tested is sealed off from the rest of the borehole by inflating seals, called packers, both above and below the segment.

Perched aquifer: A region in the unsaturated zone where the soil or rock may be locally saturated because it overlies a low-permeability unit.

Permeability The property of a porous medium to transmit water. It is a function of pore diameter.

Piezometer: A non-pumping well, generally of small diameter, that is used to measure the elevation of the water-table or potentiometric surface. A piezometer generally has a short well screen through which water can enter.

Porosity: ratio of pore spaces and voids to that of solid aquifer matrix.

Potentiometric surface: a pressure head surface commonly, but sometimes incorrectly referred to as the water table. The movement of groundwater is largely driven by elevation (pressure head). Aka as piezometric head – a piezometer being a special bore that monitors pressure head.

Primary Porosity The porosity characteristic of a rock or soil when first formed.

Pumping Test: A test made by pumping a well for a period of time and observing the response/change in hydraulic head in the aquifer.

Secondary Porosity The porosity that is added to a rock or soil after formation; it can include faults, fissures, fractures, etc.

Semi-Confined Aquifer An aquifer overlain or underlain by a semi-permeable aquitard which will allow limited flow of water to pass through.

Slug Test: A test made by the instantaneous addition, or removal, of a known volume of water to or from a well. The subsequent well recovery is measured.

Specific yield: effective or drainable porosity – a measure of the ratio of groundwater that may be extracted from an aquifer relative to the solid matrix.

Spring: a location where groundwater naturally emerges from the earth's subsurface in a seep or defined flow. Occurs when the water table is higher than the ground surface. Pressure head forces the water out of the land at a weak point which creates the spring. The existence of a spring requires that below the subsurface, the infiltrating water encounters a low-permeability zone and is unable to continue to percolate downward as fast as it is supplied at the surface. As a result, the water spreads laterally until it intersects the land surface where erosion has lowered the topography to the water's level (e.g., on the side of a gully, hill or valley). For many people, springs are the most obvious and interesting evidence of groundwater.

Standing Water Level: Depth to groundwater (m) below a datum point or reference point, usually from the top of casing or natural surface.

Storativity: The volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer, per unit change in head.

Sustainable yield: volume of groundwater that may be abstracted from an aquifer without detrimentally affecting existing supplies or flows / fluxes to the environment including groundwater dependent environments. The estimation of sustainable yield takes into account rainfall amount, recharge as a proportion of rainfall and environmental water requirements (environmental flows to creeks as 'baseflow' and groundwater dependent ecosystems).

Transmissivity: A measure of the rate at which water moves through an aquifer of unit width under a unit hydraulic gradient.

Unconfined Aquifer: An aquifer in which there are no confining beds between the saturated zone and the surface. There will be a water-table in an unconfined aquifer.

Unsaturated zone: The zone between the land surface and the water table. It includes the root zone, intermediate zone, and capillary fringe. The pore spaces contain water at less than atmospheric pressure, as well as air and other gases. Saturated bodies, such as perched ground water, may exist in the unsaturated zone. Also called zone of aeration and vadose zone.

Water budget: An evaluation of all the sources of supply and the corresponding discharges with respect to an aquifer or a drainage basin.

LIMITATIONS

This report and the associated services performed by ENRS are in accordance with the scope of services set out in the contract between ENRS and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to Site.

ENRS derived the data in this report primarily from visual inspections, and, limited sample collection and analysis made on the dates indicated. In preparing this report, ENRS has relied upon, and presumed accurate, certain information provided by government authorities, the Client and others identified herein. The report has been prepared on the basis that while ENRS believes all the information in it is deemed reliable and accurate at the time of preparing the report, it does not warrant its accuracy or completeness and to the full extent allowed by law excludes liability in contract, tort or otherwise, for any loss or damage sustained by the Client arising from or in connection with the supply or use of the whole or any part of the information in the report through any cause whatsoever.

Limitations also apply to analytical methods used in the identification of substances (or parameters). These limitations may be due to non-homogenous material being sampled (i.e. the sample to be analysed may not be representative), low concentrations, the presence of 'masking' agents and the restrictions of the approved analytical technique. As such, non-statistically significant sampling results can only be interpreted as 'indicative' and not used for quantitative assessments.

The data, findings, observations, conclusions and recommendations in the report are based solely upon the state of Site at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may render the report inaccurate. In those circumstances, ENRS shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of the report.

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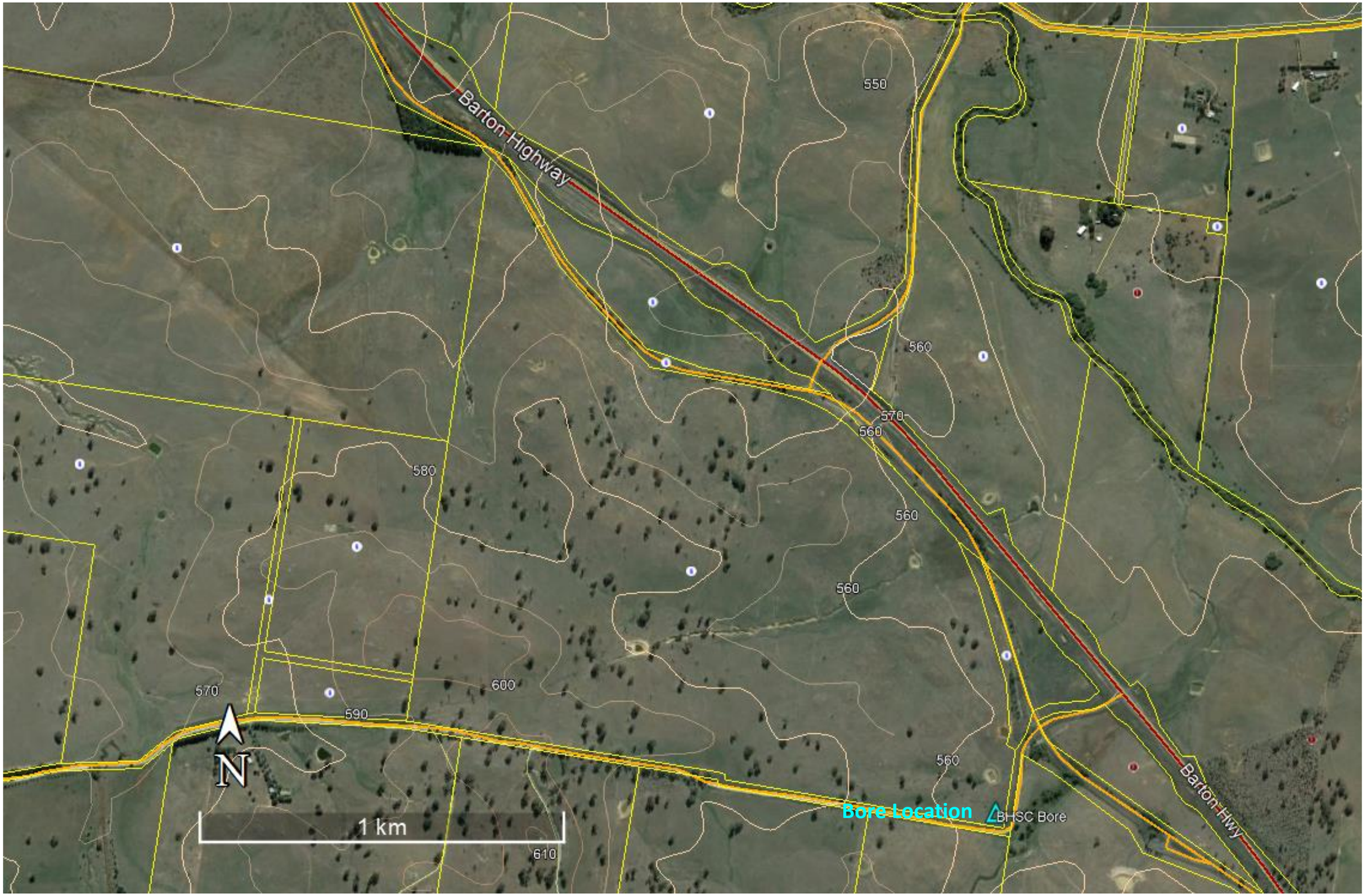

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Client:	**Landowner**	Drawn:	**RL**	Figure:	**4**
Project:	**ENRS1406**	Source:	**G.E.**	Date:	**21/12/2019**
Location:	**Barton Highway, Murrumbateman**	Scale:	**Scale Bar**	Title:	**Site Plan**
		Status:	**Rev 1**		

Appendix A

Form A Drillers Logs

Barton Hwy Murrumbateman Supply Bore

NSW DEPARTMENT OF WATER & ENERGY

Natural Resource Products

FORM A
PARTICULARS OF COMPLETED WORK

Driller's Licence No:	1623	Work Licence No:	40 WA 417842
Class of Licence:	4	Name of Licensee:	The Trustee for the Barton Highway Trust
Driller's Name:	Danny Hill	Intended Use:	Domestic, commercial & industrial
Assistant Driller:	Gerry Hill	Completion Date:	12/11/2019
Contractor:	Bungendore Water Bores		

New bore [X] Replacement bore [ ]
Deepened [ ] Enlarged [ ]
Reconditioned [ ] Other (specify)

Final Depth 102.0 m

DRILLING DETAILS

From (m)	To (m)	Hole Diameter (mm)	Drilling Method Code
0	102	200	5

WATER BEARING ZONES

From (m)	To (m)	Thickness (m)	S W L (m) 0.5	Estimated Yield (L/s) Individual Aquifer	Estimated Yield (L/s) Cumulative	Test method Code	D D L at end of test (m)	Duration Hrs	Duration min	Salinity (Conductivity or TDS) Cond. (µS/cm)	Salinity (Conductivity or TDS) TDS (mg/L)
80	82	2	2.5	0.5	0.5	1					
88	90	2		0.3	0.8	1					
92	94	2		0.2	1.0	1				1260	735

CASING / LINER DETAILS

Material Code	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Method Fixing Code
5	150		0	102	1

Casing support method Code 2
Type of casing bottom Code 2
Centralisers installed No [ ] Yes [ ] (indicate on sketch)
Sump installed No [X] Yes [ ] From m To m
Pressure cemented No [X] Yes [ ] From m To m
Casing Protector cemented in place No [ ] Yes [ ]

WATER ENTRY DESIGN

General: Material Code	OD (mm)	Wall Thickness (mm)	From (m)	To (m)	Opening type Code	Fixing Code	Screen: Aperture (mm)	Slot Details: Length (mm)	Width (mm)	Alignment Code
5	150		66	102	5	1				V

GRAVEL PACK

Type	Grade	Grain size (mm) From	Grain size (mm) To	Depth (m) From	Depth (m) To	Quantity Litres or m^3	
Rounded [X]	Graded [X]	4	6	20	102		
Crushed [ ]	Ungraded [ ]						
Bentonite/Grout seal No [ ] Yes [X]				0	5		

Method of placement of Gravel Pack Code 1

For D W E use only: G W [ ][ ][ ][ ][ ][ ]

Barton Hwy Murrumbateman Supply Bore

NSW DEPARTMENT OF WATER & ENERGY

Natural Resource Products

FORM A .....
PARTICULARS OF COMPLETED WORK

Work Licence No: 4 0 WA 417842

BORE DEVELOPMENT 8

Chemical used for breaking down drilling mud No [X] Yes [ ] Name:

Method	Bailing/Surging [ ]	Jetting	Airlifting [X]	Backwashing [ ]	Pumping [ ]	Other:
Duration	hrs	hrs	2 hrs	hrs	hrs	hrs

DISINFECTION ON COMPLETION 9

Chemical/s used	Quantity applied (litres)	Method of application

PUMPING TESTS ON COMPLETION 10

Test type		Date	Pump intake depth (m)	Initial Water Level (SWL) (m)	Pumping rate (L/s)	Water Level at end of pumping (DDL) (m)	Duration of Test (hrs)	Recovery: Water level (m)	Recovery: Time taken (hrs)	Recovery: Time taken (mins)
Multi stage (stepped drawdown)	Stage 1									
	Stage 2									
	Stage 3									
	Stage 4									
Single stage (constant rate)										

Height of measuring point above ground level _____ Test Method **Code** [ ] See Code Table 4

WORK PARTLY BACKFILLED OR ABANDONED 11

Original depth of work: _____ metres Is work partly backfilled: No [x] Yes [ ]

Is work abandoned: No [x] Yes [ ] Method of abandonment: Backfilled [ ] Plugged [ ] Capped [ ]

Has any casing been left in the work No [ ] Yes [ ] From _____ m To _____ m

Sealing / fill type Code	From depth (m)	To depth (m)	Sealing / fill type Code	From depth (m)	To depth (m)

Site chosen by: Hydrogeologist [X] Geologist [ ] Driller [ ] Diviner [ ] Client [ ] Other _____ 12

Lot No **21** DP No **1125716** 13

Work Location Co ordinates Easting **683035** Northing **6131857** Zone **55**

GPS: No [ ] Yes [x] >> AMG/AGD [ ] or MGA/GDA [X] (See explanation)

Please mark the work site with "X" on the DWE CLID map.

Indicate also the distances in metres from two (2) adjacent boundaries, and attach the map to this Form A package.

Signatures:

Driller: *Danny Hill* **Licensee:** *Barton Highway Service Centre Pty Limited*

Date: *12/11/2019* **Date:** *12/11/2019*

 Barton Hwy Murrumbateman Supply Bore

NSW DEPARTMENT OF WATER & ENERGY

Natural Resource Products

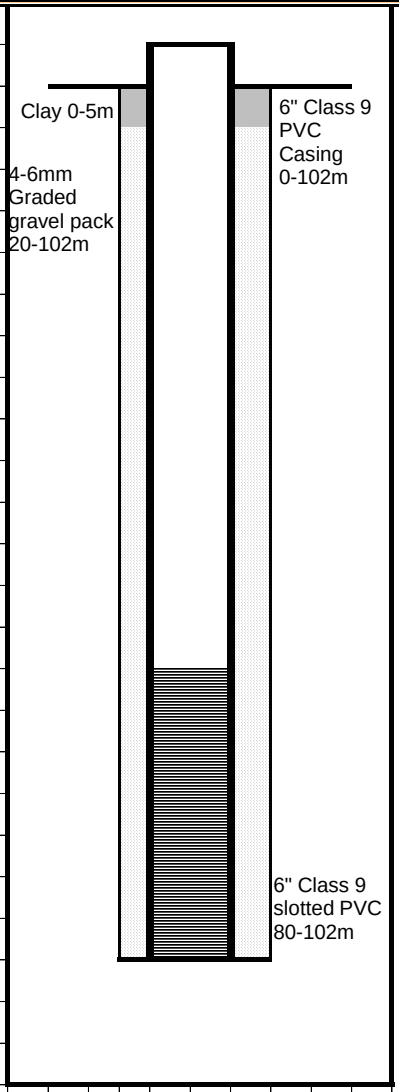
FORM A ……..
PARTICULARS OF COMPLETED WORK

Work Licence No: 4 0 WA 417842

DRILLER'S ROCK/STRATA DESCRIPTION (LITHOLOGY) — 15

Depth From (m)	Depth To (m)	Description
0	4	Soil, Red Clay
4	12	Light grey-brown granite
12	38	Fine grain grey Granite
38	102	Grey Granite, fractured volcanics

WORK CONSTRUCTION SKETCH



WORK NOT CONSTRUCTED BY DRILLING RIG — 16

Method of excavation: Hand dug ☐ Back hoe ☐ Dragline ☐ Dozer ☐ Other ……

Depth (m)	Length (m)	Width (m)	Diameter (m)	Lining material	Dimentions of liner (m)	From Depth (m)	To Depth (m)

Please attach copies of the following if available — 17

Geologist log	No [X]	Yes [ ]	Laboratory analysis of water Sample	No [ ]	Yes [X]	Pumping test(s)	No [ ]	Yes [X]
Geophysical log	No [X]	Yes [ ]	Sieve analysis of aquifer material	No [X]	Yes [ ]	Installed Pump details	No [X]	Yes [ ]

Appendix B

Pump Test Results

TABLE 1

DRAWDOWN ANALYSIS DATA

SINGLE RATE PUMP TEST

Test date :	27/11/2019	**PROJECT :**	Longrail Gully Road
Start time :	9:20 AM	**CLIENT :**	-
Pump Off:	29/11/2019 9:20 AM	**BORE No #**	Pumping Bore #1
Casing I.D.:	150 mm	**Tested by:**	Hydroilex
Pump type/mod:	-	**Av.Pump Rate (L/sec):**	0.60 L/s
Pump O.D.:	-	**SWL (mbtoc):**	4.27
Pump Intake m:	90m	**Ref. Point (m):**	1.00

Real time	***Hours***	***Time minutes T***	***Drawdown metres S1***	***Depth to water metres below ground level mbgl***	***Discharge Rate L/sec Q***	***Time to fill 200L Secs***	***Comments / Observations***
9:20 AM		**0**	0.00	3.27	-	-	**= SWL**
		10	7.83	12.10	33.00	20.0	
		20	9.52	13.79	-	-	Note: Data recorded at
		30	10.30	14.57	-	-	10 minute intervals
		40	11.04	15.31	-	-	on Diver Logger
		50	11.49	15.76	33.00	20.0	
10:20 AM	**1**	**60**	11.61	15.88	-	-	
		70	11.76	16.03	-	-	
		80	11.89	16.16	-	-	
		90	12.01	16.28	33.00	20.0	
11:20 AM	**2**	**120**	12.19	16.46	-	-	
		130	12.31	16.58	-	-	
		150	12.35	16.62	-	-	
12:20 PM	**3**	**180**	12.29	16.56	-	-	
		210	12.21	16.48	-	-	
1:20 PM	**4**	**240**	12.34	16.61	-	-	
		270	12.43	16.70	-	-	
2:20 PM	**5**	**300**	12.37	16.64	-	-	
		330	12.48	16.75	34.00	20.0	
3:20 PM	**6**	**360**	13.02	17.29	33.00	20.0	
	7	**420**	13.90	18.17	-	-	
	8	**480**	13.83	18.10	-	-	
6:20 PM	**9**	**540**	13.76	18.03	-	-	
	10	**600**	13.51	17.78	-	-	
	11	**660**	14.13	18.40	-	-	
	11	**670**	14.10	18.37	-	-	
9:20 PM	**12**	**720**	14.10	18.37	-	-	
	14	**840**	13.98	18.25	-	-	
	16	**960**	14.11	18.38	-	-	
3:20 AM	**18**	**1080**	14.03	18.30	-	-	
5:20 AM	**20**	**1200**	13.96	18.23	32.50	20.0	
9:20 AM	**24**	**1440**	14.54	18.81	-	-	
	28	**1680**	14.96	19.23	33.00	20.0	
	32	**1920**	14.63	18.90	-	-	
	36	**2160**	15.07	19.34	33.00	20.0	
	40	**2390**	14.99	19.26	-	-	
	44	**2640**	14.98	19.25	-	-	
9:20 AM	**48**	**2880**	15.37	19.64	-	-	

TABLE 2

RECOVERY ANALYSIS DATA

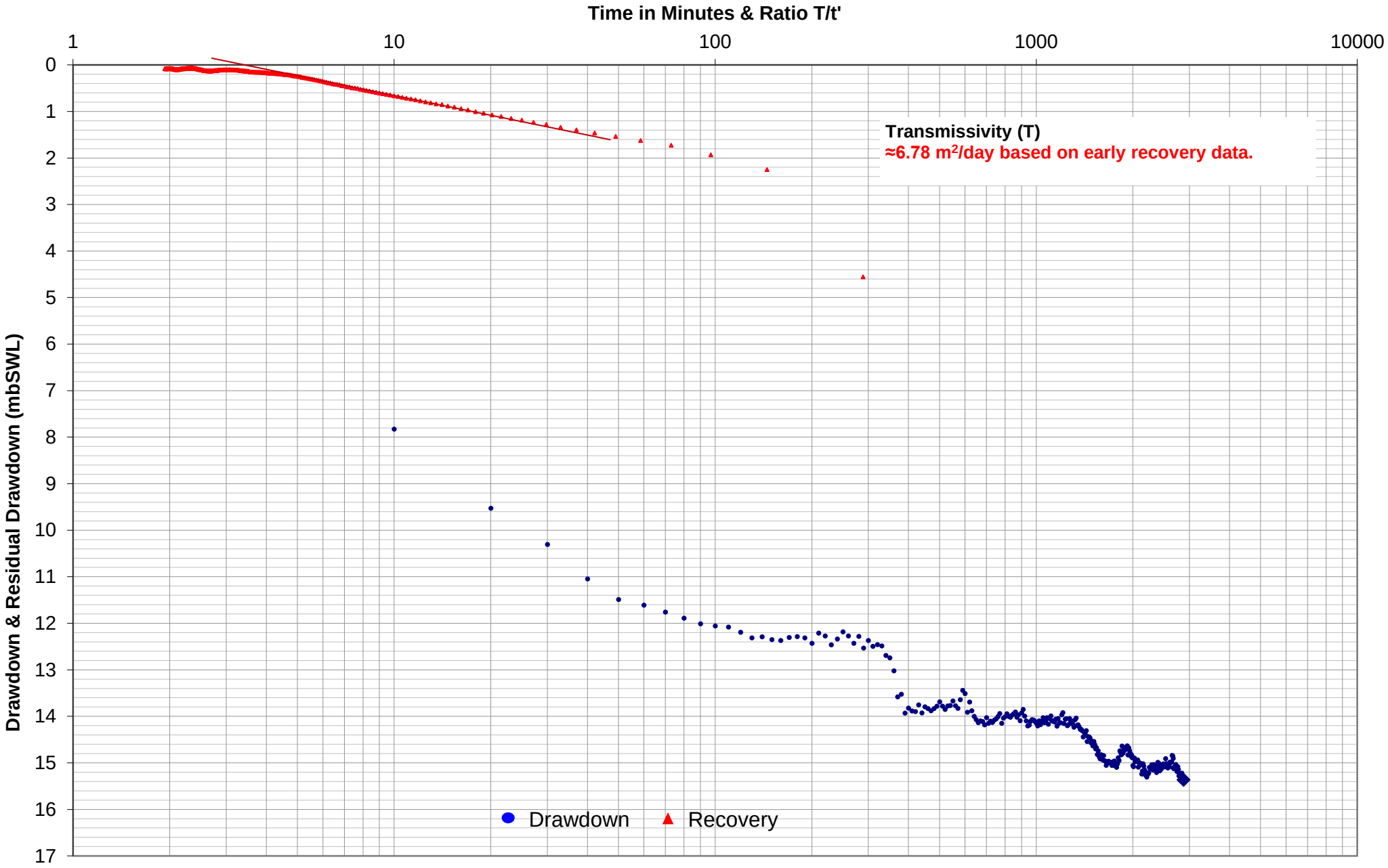
SINGLE RATE PUMP TEST

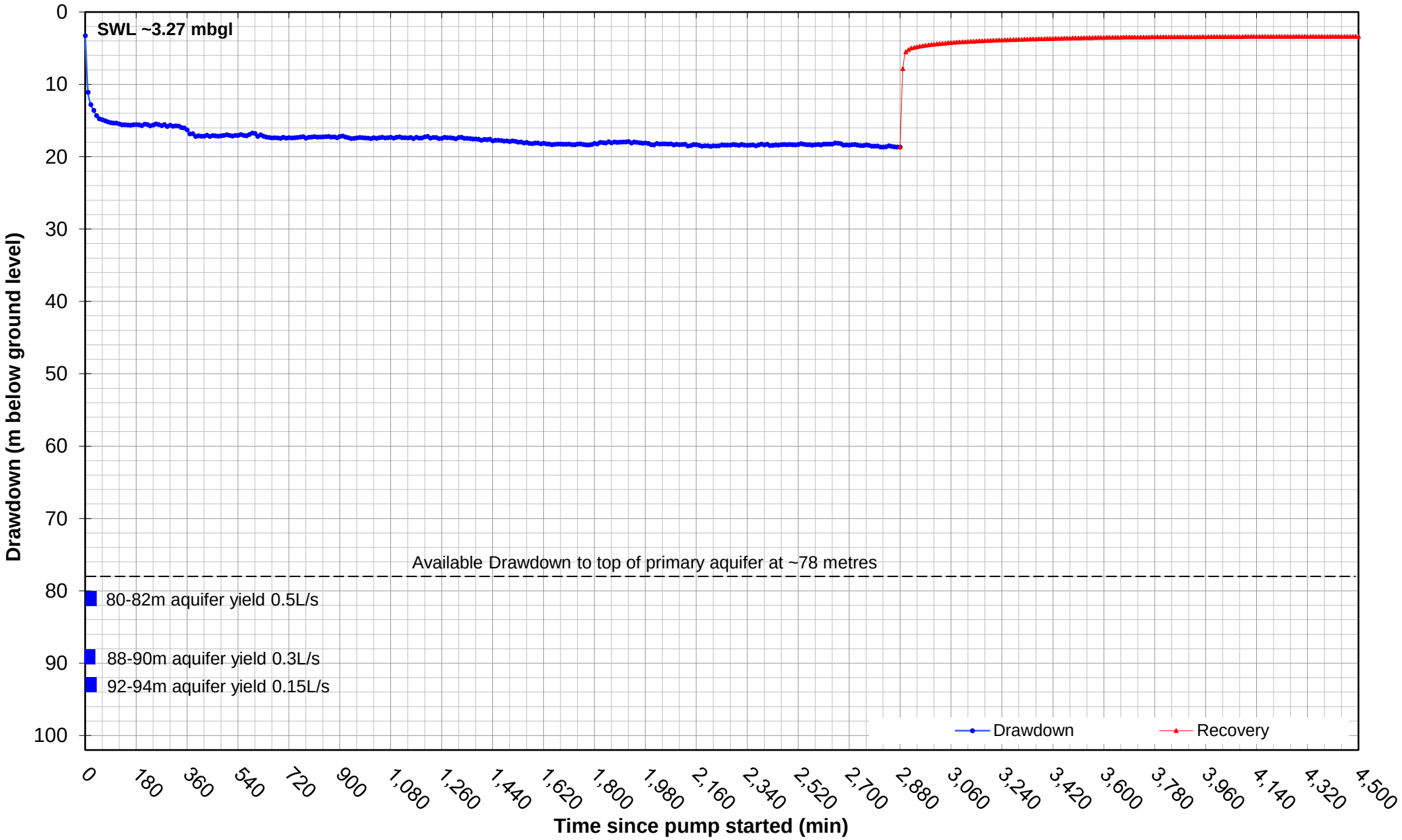
Test date : 27/11/2019
Start time : 9:20 AM
Pump Off: 29/11/2019 9:20 AM
Casing I.D.: 150 mm
Pump type/mod: -
Pump O.D.: -
Pump Intake m: 90m

PROJECT : Longrail Gully Road
CLIENT : -
BORE No # Pumping Bore #1
Tested by: Hydroilex
Av.Pump Rate (L/sec): 0.6
SWL (mbtoc): 4.27
Ref. Point (m): 1.00

Real time	***Minutes since pump Started*** **t**	***Time since pump stopped*** ***Hrs***	***Minutes*** **t'**	***Depth to water metres below ground level mbgl***	***Ratio t/t'***	***Residual Drawdown metres S'***	***Comments / Observations***
9:20 AM	2880		**0.1**	19.64	28801	15.37	**= depth to water at**
	2890		**10**	8.82	289	4.55	**instant pump stopped**
	2900		**20**	6.52	145	2.25	
	2910		**30**	6.20	97.0	1.93	
	2920		**40**	6.00	73.0	1.73	
	2930		**50**	5.90	58.6	1.63	
10:20 AM	2940	**1**	**60**	5.81	49.0	1.54	
	2950		**70**	5.73	42.1	1.46	
	2960		**80**	5.67	37.0	1.40	
	2970		**90**	5.61	33.0	1.34	
11:20 AM	3000	**2**	**120**	5.46	25.0	1.19	
	3030		**150**	5.34	20.2	1.07	
12:20 PM	3060	**3**	**180**	5.24	17.0	0.97	
	3090		**210**	5.15	14.7	0.88	
1:20 PM	3120	**4**	**240**	5.08	13.0	0.81	
	3150		**270**	5.02	11.7	0.75	
2:20 PM	3180	**5**	**300**	4.97	10.6	0.70	
	3210		**330**	4.92	9.7	0.65	
3:20 PM	3240	**6**	**360**	4.88	9.0	0.61	
4:20 PM	3300	**7**	**420**	4.80	7.9	0.53	
5:20 PM	3360	**8**	**480**	4.72	7.0	0.45	
6:20 PM	3420	**9**	**540**	4.66	6.3	0.39	
7:20 PM	3480	**10**	**600**	4.60	5.8	0.33	
8:20 PM	3540	**11**	**660**	4.56	5.4	0.29	
9:20 PM	3600	**12**	**720**	4.52	5.0	0.25	
11:20 PM	3720	**14**	**840**	4.46	4.4	0.19	
1:20 AM	3840	**16**	**960**	4.44	4.0	0.17	
3:20 AM	3960	**18**	**1080**	4.43	3.7	0.16	
5:20 AM	4080	**20**	**1200**	4.40	3.4	0.13	
9:20 AM	4320	**24**	**1440**	4.38	3.0	0.11	
11:20 AM	4440	**26**	**1560**	4.38	2.8	0.11	
1:20 PM	4560	**28**	**1680**	4.40	2.7	0.13	
5:20 PM	4800	**32**	**1920**	4.37	2.5	0.10	
9:20 PM	5040	**36**	**2160**	4.34	2.3	0.07	
5:20 AM	5520	**44**	**2640**	4.37	2.1	0.10	
9:20 AM	5760	**48**	**2880**	4.35	2.0	0.08	
-	-	**-**	**-**	-	-	-	
-	-	**-**	**-**	-	-	-	
-	-	**-**	**-**	-	-	-	

Drawdown & Recovery Curves - Bore 1 Pumping at 0.6 L/s for 48 Hours




Time-Drawdown & Recovery - Bore 1 Pumping at 0.6 L/sec for 48 Hours
SWL ~3.27 mbgl
Drawdown (m below ground level)
0
10
20
30
40
50
60
70
80
90
100
Available Drawdown to top of primary aquifer at ~78 metres
80-82m aquifer yield 0.5L/s
88-90m aquifer yield 0.3L/s
92-94m aquifer yield 0.15L/s
Drawdown
Recovery
0
180
360
540
720
900
1,080
1,260
1,440
1,620
1,800
1,980
2,160
2,340
2,520
2,700
2,880
3,060
3,240
3,420
3,600
3,780
3,960
4,140
4,320
4,500
Time since pump started (min)

Appendix C

NATA Laboratory Certificates of Analysis (CoA)

		Sample	ID 1			Barton Hwy Bore 1
			Project#			ENRS1406
			Date Sampled			29/11/2019
			Order #			CA1907855001
Analyte	**CAS #**	**Units**	**LOR**	**Health**	**Aesthetic**	**Results**
EA005P: pH by PC Titrator						
pH Value		pH Unit	0.01	-	6.5-8.5	**7.93**
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		µS/cm	1	-	-	**1260**
EA015: Total Dissolved Solids dried at 180 ± 5 °C						
Total Dissolved Solids @180°C		mg/L	10	-	600	**735**
EA041: Colour (True)						
Colour (True)		PCU	1	-	15	<1
pH Colour		pH Unit	0.01	-	-	
EA045: Turbidity						
Turbidity		NTU	0.1	-	5	**1.8**
EA065: Total Hardness as CaCO3						
Total Hardness as CaCO3		mg/L	1	-	-	
ED037P: Alkalinity by PC Titrator						
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1	-	-	**327**
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1	-	-	<0.1
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1	-	-	<0.1
Total Alkalinity as CaCO3		mg/L	1	-	-	**327**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA						
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1	-	250	**18.9**
ED045G: Chloride by Discrete Analyser						
Chloride	16887-00-6	mg/L	1	-	250	**162**
ED093F: Dissolved Major Cations						
Calcium	7440-70-2	mg/L	1	-	-	**71.8**
Magnesium	7439-95-4	mg/L	1	-	-	**56.8**
Potassium	7/09/7440	mg/L	1	-	-	**2.3**
Sodium	7440-23-5	mg/L	1	-	180	**117**
EG020T: Total Metals by ICP-MS						
Aluminium	7429-90-5	mg/L	0.01	-	0.2	**0.041**
Antimony	7440-36-0	mg/L	0.001	0.003	-	<0.003
Arsenic	7440-38-2	mg/L	0.001	0.01	-	<0.001
Barium	7440-39-3	mg/L	0.001	2	-	**0.0176**
Boron	7440-42-8	mg/L	0.05	4	-	**0.02**
Cadmium	7440-43-9	mg/L	0.0001	0.002	-	<0.00005
Chromium	7440-47-3	mg/L	0.001	0.05	-	<0.001
Copper	7440-50-8	mg/L	0.001	2	1	<0.001
Iron	7439-89-6	mg/L	0.05	-	0.3	**0.06**
Lead	7439-92-1	mg/L	0.001	0.01	-	<0.0002
Manganese	7439-96-5	mg/L	0.001	0.5	0.1	**0.0026**
Molybdenum	7439-98-7	mg/L	0.001	0.05	-	<0.001
Nickel	7440-02-0	mg/L	0.001	0.02	-	<0.005
Selenium	7782-49-2	mg/L	0.01	0.01	-	<0.001
Silver	7440-22-4	mg/L	0.001	0.1	-	<0.001
Zinc	7440-66-6	mg/L	0.005	-	3	**0.006**
EG035T: Total Recoverable Mercury by FIMS						
Mercury	7439-97-6	mg/L	0.0001	0.001	-	<0.0001
EK025G: Free cyanide by Discrete Analyser						
Total Cyanide	57-12-5	mg/L	0.004	0.08	-	<0.004
EK040P: Fluoride by PC Titrator						
Fluoride	16984-48-8	mg/L	0.1	1.5	-	**0.28**
EK055G: Ammonia as N by Discrete Analyser						
Ammonia as N	7664-41-7	mg/L	0.01	-	0.5	<0.1
EK057G: Nitrite as N by Discrete Analyser						
Nitrite as N	14797-65-0	mg/L	0.01	3	-	<0.01
EK058G: Nitrate as N by Discrete Analyser						
Nitrate as N	14797-55-8	mg/L	0.01	50	-	**16.2**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Nitrite + Nitrate as N		mg/L	0.01	-	-	**16.2**
EK085M: Sulfide as S2-						
Sulfide as S2-	18496-25-8	mg/L	0.1	-	-	<0.02

Australian Drinking Water Guidelines 6, 2011 (Version 3.5 Updated August 2018)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **CA1907855**

Client	: **Environmental & Natural Resources Solutions**	Laboratory	: ALS Water Resources Group
Contact	: Mr Rohan Last	Contact	: Client Services
Address	: 25 River Road Shoalhaven Heads NSW 2535	Address	: 16B Lithgow Street Fyshwick ACT Australia 2609
E-mail	: rohan@enrs.com.au	E-mail	: ecowisecustomerservice@alsglobal.com
Telephone	: 02 9037 4708	Telephone	: +61 2 6202 5404
Facsimile	: ----	Facsimile	: +61 2 6202 5404
Project	: ----	Page	: 1 of 3
Order number	: ----	Quote number	: ----
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 29-Nov-2019 15:50	Issue Date	: 03-Dec-2019
Client Requested Due Date	: 10-Dec-2019	Scheduled Reporting Date	: **10-Dec-2019**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 23.6°C
Receipt Detail	: Analysis instructions received at 5pm 29/11/19.	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EA045 Turbidity	WATER - ED009 Standard Anions - by IC	WATER - ED037 Alkalinity	WATER - EK055A Ammonia as N	WATER - EK057A Nitrite as N	WATER - EK058A Nitrate as N High Level	WATER - EK059A Nitrite and Nitrate as N (NOx)
CA1907855-001	29-Nov-2019 14:30	Barton HWY LGR	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EA005 pH	WATER - EA010 Conductivity	WATER - EA016 Total Dissolved Solids (by Calc.)	WATER - EA041 Colour (True)	WATER - EG020A-T Total Metals (Extended Suite)	WATER - EK040 Fluoride by ISE	WATER - EK085 Sulfide as S2-
CA1907855-001	29-Nov-2019 14:30	Barton HWY LGR	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EA015H Total Dissolved Solids (High Level)	WATER - EK026SF Total Cyanide by Segmented Flow Analyser
CA1907855-001	29-Nov-2019 14:30	Barton HWY LGR	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Lab

- A4 - AU Tax Invoice (INV)	Email	lab@enrs.com.au
- AU Certificate of Analysis - NATA (WRG) (AU_COA_2_A4_ENV_NATA)	Email	lab@enrs.com.au
- Chain of Custody (CoC) (COC)	Email	lab@enrs.com.au
- WRG Legacy Format (XTAB_WRGLEG)	Email	lab@enrs.com.au

Rohan Last

- A4 - AU Sample Receipt Notification - Environmental (WRG) (SRN)	Email	rohan@enrs.com.au
- A4 - AU Tax Invoice (INV)	Email	rohan@enrs.com.au
- AU Certificate of Analysis - NATA (WRG) (AU_COA_2_A4_ENV_NATA)	Email	rohan@enrs.com.au
- Chain of Custody (CoC) (COC)	Email	rohan@enrs.com.au
- WRG Legacy Format (XTAB_WRGLEG)	Email	rohan@enrs.com.au

ALS Water

CERTIFICATE OF ANALYSIS

Work Order	: **CA1907855**	Page	: 1 of 4
Client	: **Environmental & Natural Resources Solutions**	Laboratory	: ALS Water Resources Group
Contact	: Mr Rohan Last	Contact	: Client Services
Address	: 25 River Road Shoalhaven Heads NSW 2535	Address	: 16B Lithgow Street Fyshwick ACT Australia 2609
Telephone	: 02 9037 4708	Telephone	: +61 2 6202 5404
Project	: ----	Date Samples Received	: 29-Nov-2019 15:50
Order number	: ----	Date Analysis Commenced	: 02-Dec-2019
C-O-C number	: ----	Issue Date	: 11-Dec-2019 09:39
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
Accreditation No. 992
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Amanda Gonzalez	Laboratory Technician	Inorganics, Fyshwick, ACT
Clare Kennedy	Analyst	Inorganics, Fyshwick, ACT
Joel Nicholson	Laboratory Manager	Inorganics, Fyshwick, ACT
Teresa Rand	Client Services	ALS Environmental, Fyshwick, ACT
Titus Vimalasiri	Metals Teamleader	Inorganics, Fyshwick, ACT

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **For samples collected by ALS WRG, sampling was carried out in accordance with Procedure EN67**
- EK026SF Performed at ALS Sydney
- Result for pH in water tested in the laboratory may be indicative only as holding time is generally not achievable.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	----	----	----	----	----
					Barton HWY LGR				
				Client sampling date / time	29-Nov-2019 14:30	----	----	----	----
Compound	CAS Number	LOR	Unit		CA1907855-001	--------	--------	--------	--------
					Result	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	----	----	----	----
EA005CA: pH									
pH	----	0.01	pH Unit		**7.93**	----	----	----	----
EA010CA: Conductivity									
Electrical Conductivity @ 25°C	----	2	µS/cm		**1260**	----	----	----	----
EA041CA: Colour - True									
Colour (True)	----	1	PCU		<1	----	----	----	----
EA045CA: Turbidity									
Turbidity	----	0.1	NTU		**1.8**	----	----	----	----
ED037CA: Alkalinity									
Hydroxide Alkalinity as CaCO3	DMO-210-001	0.1	mg/L		<0.1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	0.1	mg/L		<0.1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	0.1	mg/L		**327**	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		**327**	----	----	----	----
EK085CA: Sulfide									
Sulfide as S2-	18496-25-8	0.02	mg/L		<0.02	----	----	----	----
ED009CA: Anions									
Chloride	16887-00-6	0.1	mg/L		**162**	----	----	----	----
Sulfate	14808-79-8	0.4	mg/L		**18.9**	----	----	----	----
EK040CA: Fluoride									
Fluoride	16984-48-8	0.05	mg/L		**0.28**	----	----	----	----
EA015CA: Total Dissolved Solids									
Total Dissolved Solids	----	10	mg/L		**735**	----	----	----	----
EA016CA: Total Dissolved Solids - Calculated									
ø Total Dissolved Solids (Calc.)	----	2	mg/L		**823**	----	----	----	----
EK055CA: Ammonia as N									
Ammonia as N	7664-41-7	0.1	mg/L N		<0.1	----	----	----	----
EK057CA: Nitrite as N									
Nitrite as N	14797-65-0	0.01	mg/L N		<0.01	----	----	----	----
EK058CA: Nitrate as N									
ø Nitrate as N	14797-55-8	0.01	mg/L N		**16.2**	----	----	----	----
EK059CA: Nitrite plus Nitrate as N									
Nitrite + Nitrate as N	----	0.05	mg/L N		**16.2**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	----	----	----	----	----
					Barton HWY LGR				
				Client sampling date / time	29-Nov-2019 14:30	----	----	----	----
Compound	CAS Number	LOR	Unit		CA1907855-001	--------	--------	--------	--------
					Result	----	----	----	----
EG005CA: Total Metals by ICP-OES									
Boron	7440-42-8	0.01	mg/L		**0.02**	----	----	----	----
Calcium	7440-70-2	0.05	mg/L		**71.8**	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Iron	7439-89-6	0.01	mg/L		**0.06**	----	----	----	----
Magnesium	7439-95-4	0.05	mg/L		**56.8**	----	----	----	----
Nickel	7440-02-0	0.005	mg/L		<0.005	----	----	----	----
Potassium	7440-09-7	0.1	mg/L		**2.3**	----	----	----	----
Sodium	7440-23-5	0.1	mg/L		**117**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		**0.006**	----	----	----	----
EG020CA: Total Metals by ICP-MS									
Aluminium	7429-90-5	9	µg/L		**41**	----	----	----	----
Antimony	7440-36-0	3	µg/L		<3	----	----	----	----
Arsenic	7440-38-2	1	µg/L		<1	----	----	----	----
Barium	7440-39-3	0.5	µg/L		**17.6**	----	----	----	----
Cadmium	7440-43-9	0.05	µg/L		<0.05	----	----	----	----
Copper	7440-50-8	1	µg/L		<1	----	----	----	----
Lead	7439-92-1	0.2	µg/L		<0.2	----	----	----	----
Manganese	7439-96-5	0.5	µg/L		**2.6**	----	----	----	----
Molybdenum	7439-98-7	1	µg/L		<1	----	----	----	----
Selenium	7782-49-2	1	µg/L		<1	----	----	----	----
Silver	7440-22-4	1	µg/L		<1	----	----	----	----
Mercury	7439-97-6	0.1	µg/L		<0.1	----	----	----	----

Appendix 9 – Owners Consent to Bore Easement

Yass Council

209 Comur Street

Yass NSW 2582

Re: Easement for Access to Bore

To whom it may concern,

This letter is to confirm we are in the process of creating an access easement through a block of land on "Vale View" on the Long Rail Gully Rd (Folio 21/1125716) to the owner of Barton Highway Service Centre (Folio 12/1158637 and Folio 33/1145071), David Ekins to access the Bore. The Barton Highway Service Centre is the owner and operator of the bore licence number 40 WA417842.

Please contact us on 62275519 or mobile 0427008152 if you have any questions.

Kind Regards

Frank Hodgkinson

Janice Hodgkinson

"Vale View"
Dog Trap Road
Yass NSW 2582