26 March 2018

Jemena Gas Networks
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Goulburn Mulwaree Council
184-194 Bourke Street,
GOULBURN NSW 2580

Attention: Louise Thom
Goulburn Mulwaree Heritage Advisor

Dear Louise,

Re: Heritage Referral Response – Development Application No. DA/0276/1718

I refer to the Goulburn Mulwaree Heritage letter titled *Goulburn Mulwaree Council - Heritage Referral Response* dated 16 March 2018 which was prepared in response to Jemena Gas Networks (NSW) Limited (**Jemena**) planned remediation of contaminated soil and groundwater on the former Goulburn Gasworks Site & adjacent foreshore area (the **Project**) located at 1 Blackshaw Road, Goulburn, NSW.

The letter presents the Goulburn Mulwaree Council's statements regarding the planned works and subsequent environmental controls which were detailed within the *Remediation of the former Goulburn Gasworks site Statement of Environmental Effects* (SEE) (GHD, 2018) with respect to indigenous and non-indigenous heritage. A review of the letter highlighted the overall support for the Project subject to three (3) conditions which were detailed as follows:

1. *Prior to commencement of any site works a copy of the Archaeological Excavation Permit issued by the Office of Environment and Heritage, together with a copy of the original Permit Application made by the Excavation Director must be submitted to Goulburn Mulwaree Council.*
2. *Prior to commencement the applicant must provide Council with a plan for the reinstatement of the fence in the centre of the site once the remediation work is completed.*
3. *Prior to completion of the remediation a schedule of conservation works to stabilise and secure the store building must be submitted to Council for approval. The work detailed in the schedule must be implemented prior to the release of the final certificate.*

This letter aims to address your request with responses provided to each condition provided in detail below:

1. Jemena is in the process of procuring the engagement of qualified specialist JCIS Consultants who will provide expert heritage management and archaeological services for the Project. The application of the Excavation Permit under section 140 of the Heritage Act will be obtained prior to the commencement of remediation.

2. Due to the nature of the remediation and size of the excavation the fence will be moved and stored for the duration of the works. It is envisaged that a decision as to the future fence location not be able to be made until the site's future use is determined, following the successful completion of remediation, Site Audit Report and Site Audit Statement. As such, it will be difficult to detail the future utilisation of the fence for example the location of driveways and entrances to maximise the visual appeal. Jemena will, for the duration of the remediation works, store the fence securely and safely in accordance with Section 2.2 of the Statement of Environmental Effects.

3. Jemena is committed to ensuring the 'store building', which was identified as having potential local heritage significance, will be stabilised and secured for the duration of the remediation works. As such, in addition to the requirements outlined within the SEE the engaged Contractor will complete:
    - a retaining wall adjacent the store building to protect its foundations through the installation of temporary sheet pile walls;
    - barricading around the entirety of the store building giving 1 m clearance between the store and site works where possible; and
    - vibration monitoring when piling sheet pile walls and when excavation works are undertaken nearby the store building.

    The temporary sheet piling and barricading will be removed on the completion of the remediation works.

Jemena believes the mitigation measures have satisfactorily met the requirements of the conditions outlined within the letter and as such looks forward to receiving the support for the Project from the Goulburn Mulwaree Council Heritage Advisor.

If you have any queries in relation to the contents of this letter, or require any further information about this site, please contact the undersigned.

Yours faithfully,

Jarrod Irving
Project Manager – Remediation
jarrod.irving@jemena.com.au
(02) 9867 7529 | 0439 430 600

24 April 2018

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Goulburn Mulwaree Council
Locked Bag 22
GOULBURN NSW 2580

Attention: Dialina Day
Senior Development Assessment Officer

Dear Dialina,

Re: Water treatment and beneficial re-use of water

I refer to emails with WaterNSW and Goulburn Mulwaree Council dated 18 April 2018, in relation to Jemena Gas Networks (NSW) Limited (**Jemena**) planned remediation of contaminated soil and groundwater on the former Goulburn Gasworks Site and adjacent foreshore area (the **Project**) located at 1 Blackshaw Road, Goulburn, NSW. Jemena understands that there are some concerns surrounding specific items around water treatment and the planned beneficial re-use of water from the Project site at the Goulburn Golf Course. As a concurrence authority for integrated development, Water NSW must indicate its terms of approval of the Project as a pre-condition to the grant of any development consent by Council.

This letter discusses proposed changes to the water treatment and beneficial re-use of water arising from the Project and to clarify the issues raised by WaterNSW. This information is set out below:

WaterNSW issue	Jemena Response
Treatment method and proposed layout	The proposed layout of the water treatment plant on the Project site, which includes information on the treatment method, has been provided in **Attachment A** of this letter.
Treatment capacity	The proposed treatment capacity is 3 L/s.
Anticipated volumes	Although Jemena is unable to provide volumes of the amount of groundwater to be treated, previous groundwater modelling (GHD) indicated overall flows to Mulwaree River through the site are likely to range between approximately 4 and 14 m^3/day (or between 4,000 and 14,000 L/d). As such, Jemena considers it unlikely that dewatering requirements at the Project site would exceed approximately 14 kL/day (excluding extended periods of significant wet weather).
Proposed disposal option	Jemena will work with the Goulburn Golf Course to utilise the opportunity to beneficially re-use treated wastewater on the golf course. The Goulburn Golf Course currently utilises 10 L/s for irrigation purposes during the day – well above the treatable capacity. It is proposed that the

WaterNSW issue	Jemena Response
	treated water is diverted to a new lined 5 ML storage pond containing both treated water and Mulwaree River water used for irrigation. The following is anticipated with the design: • pipework connecting the Project site to the Golf Course either: a) to be anchored to the base of the Mulwaree River; or b) anchored to the Goulburn Golf Course bridge. • testing pipes during commissioning with freshwater; and • daily checks on pipe connections and fittings. A figure showing the proposed piping layout has been provided in **Attachment B**.
Treatment quality	Water will be treated on the Project site, to ensure it meets the requirements of the following: • Goulburn Mulwaree Concil Trade Waste criteria • Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) short-term trigger values (STV) for irrigation water; • site specific guidelines developed in accordance with ANZECC 2000; and • sustainability in agricultural practice (DEST State of the Environment Advisory Council 1996), which aims to ensure that: ○ the quality of natural resources is not degraded; ○ the environment is not irreversibly harmed; and ○ yields and produce quality are maintained and improved. Should water not meet the adopted criteria it the will be re-processed, or, if approved (by Council) batch processed to trade waste. Last treatment option and least preferable will be off-site treatment and disposal.
Water treatment testing and sampling	It is proposed that a phased approach to commissioning and ongoing testing is planned, an approach that has been utilised for several water treatment facilities under strict EPL requirements, is detailed as follows: • during commissioning each batch (to be determined from inflow 10kL up to 40kL) (up to ten) will be sampled to ensure it meets the adopted criteria; and • following successful processing, each batch will be sampled and analysed (likely every 3 days based on groundwater modelling). In addition to the Contractor sampling regime above, Jemena's appointed environmental consultant will be undertaking verification sampling periodically.
Ongoing management of treated water for re-use	For the duration of water treatment, it is proposed that the following management controls are in place: • site specific guidelines to be approved by the appointed contaminated land Site Auditor; • weekly reporting monitoring results, to be reviewed by the site auditor; and • environmental management plan which details plans, spill management and environmental controls.
Storage capacity	The proposed holding capacity of the Project site will be 2 x 46,000L. Based on anticipated volumes, the treated water storage capacity is sufficient for up to 2 x 3 days dewatering during normal periods.
Transfer mechanism	The plant has the capability to undertake batching or continuous treatment. During commissioning the process will be batched and an option between both during excavation

WaterNSW issue	Jemena Response
Additional waste streams	It is anticipated as with all water treatment plants that a solid streams will be created. The settled sludge within the various treatment process units will be transferred to a central sludge thickening tank, once again located on the Project site. In the thickening tank the sludge will be further concentrated and will be fed through the sludge dewatering system (belt filter press or geotube). The two waste streams from the sludge dewatering system will be; 1. Sludge cake – appropriately classified in accordance with the guidelines and disposed off-site to a licensed receiving facility; and 2. Filtrate (liquid) – which will be recirculated through the water treatment plant.

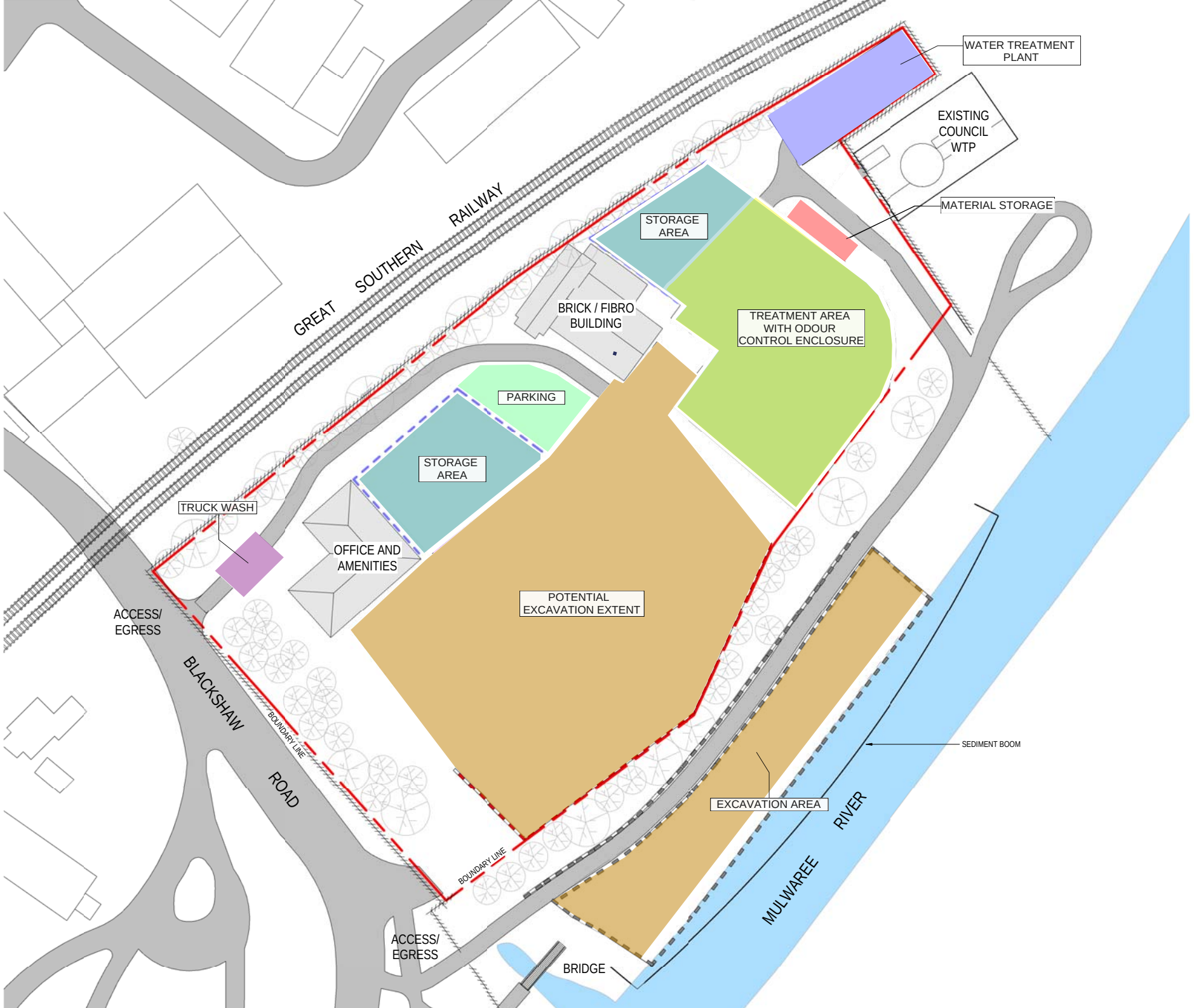
Jemena is of the opinion that the beneficial re-use of treated water in the manner set out in this letter is of benefit to the Mulwaree River and Goulburn Mulwaree Council. The treatment and re-use of water from the site will be periodically reviewed by the Project's Site Auditor, whose role is to "*independently review reports on assessment, remediation and validation actions to ensure that the methodology used by consultants and their interpretation of data are consistent with current EPA regulations and guidelines.*" – NSW EPA 2018.

If you have any queries in relation to the contents of this letter, or require any further information about the Project, please contact the undersigned.

Yours faithfully,

Jarrod Irving
Project Manager – Remediation
jarrod.irving@jemena.com.au
(02) 9867 7529 | 0439 430 600

Attachment A – Site and Water Treatment Layout


WATER TREATMENT PLANT
EXISTING COUNCIL WTP
MATERIAL STORAGE
STORAGE AREA
GREAT SOUTHERN RAILWAY
BRICK / FIBRO BUILDING
TREATMENT AREA WITH ODOUR CONTROL ENCLOSURE
PARKING
STORAGE AREA
TRUCK WASH
OFFICE AND AMENITIES
POTENTIAL EXCAVATION EXTENT
ACCESS/ EGRESS
BLACKSHAW ROAD
BOUNDARY LINE
BOUNDARY LINE
SEDIMENT BOOM
EXCAVATION AREA
MULWAREE RIVER
ACCESS/ EGRESS
BRIDGE

PERSONNEL DECONT.

SLAB AREA

WHEEL WASH

EXCAVATION

COAGULANT

POLYMER

CLARIFIER (TK-0201)
DUTY: 1X 100%
CAPACITY: 35kL/Hrs

FLOW BALANCE TANK (TK-0202)
CAPACITY: 2X 46kL
TANK MATERIAL: GFTS

COAGULANT

POLYMER

CAUSTIC

IMPINGING STREAM REACTOR
DUTY: 1X 100%
CAPACITY: 11m³/Hrs

ZEOLITE GAC FILTER VESSEL (FY-403)
DUTY: 1X 100% (D/S)

CLEAN WATER/ BACKWASH TANK (TK-0501)
CAPACITY: 22 kL
TANK MATERIAL: HDPE

SLUDGE THICKENING TANK (TK-601)
NOMINAL CAPACITY: 10 kL
MATERIAL: HDPE

ENVITUBE IN PERFORATED SKIP BIN
(ENV-0701& ENV-0702)
DUTY: 1X100%
STANDBY: 1X100%
MODEL: TBC
CAPACITY: TBC days

PLANT SUMP (TK-0801)
DUTY: 1X100%
CAPACITY: 2 kL

NTU

PH

FIT

TO SEWER

M

REV	DATE	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No
B	5.12.17	INITIAL DRAFT-IFT	A Ataabady	S.A	S.A	-	-	-	-
A	10.08.17	INITIAL DRAFT-IFT	S.P	S.A	S.A	-	-	-	-

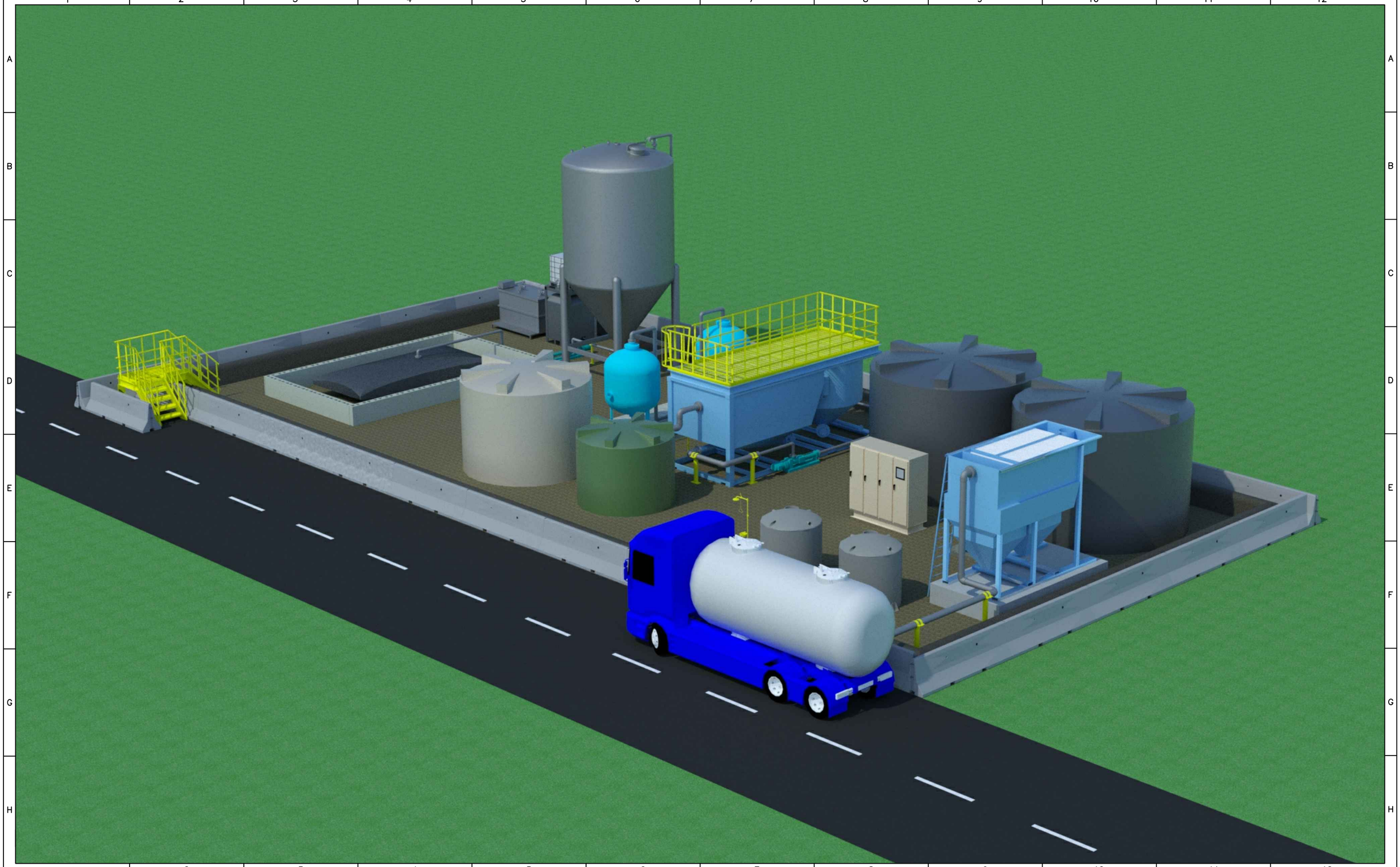
ENVIROPACIFIC SERVICES

Jemena Goulburn Gasworks Remediation

PRELIMINARY PROCESS FLOW DIAGRAM

DRG No.: YMT8005-01

Tender No.:YMT8005



REV	DATE	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CUSTOMER	REF DRAWING No
A	11.12.2017	INITIAL ISSUE	S.E.	S.A.	S.A.				

ENVIROPACIFIC SERVICES

ALL DIMENSIONS ARE IN METRES

JEMENA GOULBURN GASWORKS REMEDIATION

3D LAYOUT-1

DRG No.: YMT8005-01

Job No.: YMT8005

Attachment B – Proposed Pipe Layout


Water treatment plant
Direct into pump and current irrigation lines
Water piped to 5 ML storage

21 May 2018

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Goulburn Mulwaree Council
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GOULBURN NSW 2580

Attention: Dialina Day
Senior Development Assessment Officer

Dear Dialina,

Re: Development Application No. DA/0276/1718 –Supporting Information

This letter details Jemena Gas Networks (NSW) Limited (**Jemena**) addenda to the submission of the Development Application (DA) to the Goulburn Mulwaree Council (**Council**) for the consent to undertake the remediation of contaminated soil and groundwater on the former Goulburn Gasworks Site and adjacent foreshore area (the **Project**) located at 1 Blackshaw Road, Goulburn, NSW. Jemena understands that information regarding increased environmental controls and design changes to minimise waste will be beneficial to supporting the consent for the DA.

The letter presents the works which will be supplementary to the *Remediation of the former Goulburn Gasworks site Statement of Environmental Effects* (SEE) (GHD, 2018) with respect to strengthening environmental controls regarding the planned works.

The clarifications and additional information have been provided below:

SEE References	Clarifications / Additional Information
Surface water runoff	All surface water runoff from site areas / excavations / stockpiles / hardstand areas will be collected and treated through the wastewater treatment plant. Staged excavation will be undertaken on the Foreshore Area to ensure contaminated material is not exposed to overnight rainfall or at risk during flooding periods. Potential impacts due to surface water runoff, erosion and sedimentation would be managed through the mitigation measures provided in the SEE Sections 5.1.3 and 5.3.5.
Proposed site layout	The proposed site layout is provided within **Attachment A**.
Remediation in the vicinity of the Council sewer main	Consultation has been undertaken with Council regarding potential impacts to the sewer main. The sewer main will be relined prior to the works to ensure its integrity is maintained and Contractors will maintain safe working distances in accordance with Council's *Clearance & Easement Requirements for Structures Adjacent to Sewer & Stormwater Mains Policy* requirements.

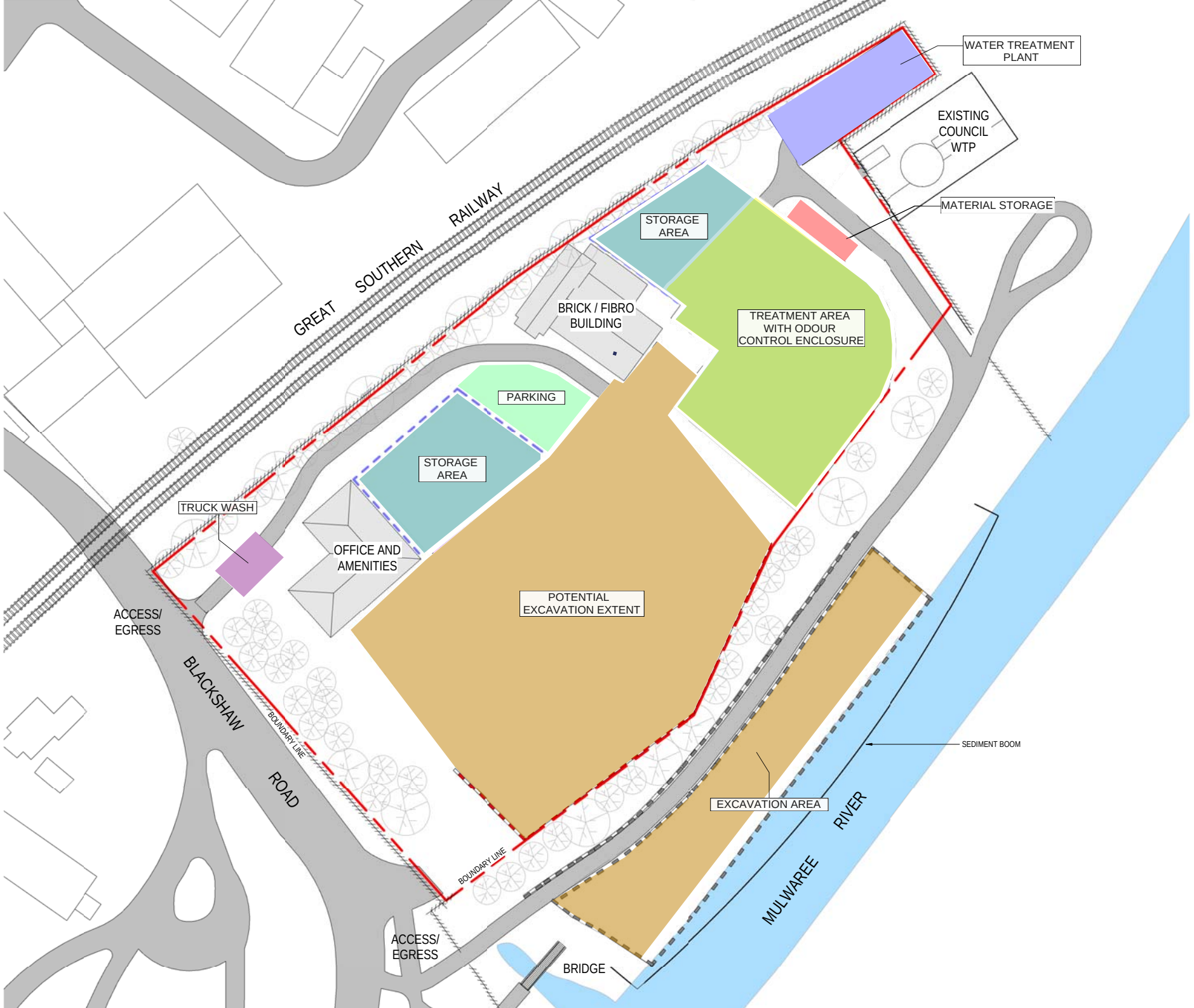
SEE References	Clarifications / Additional Information
Treatment area controls	To ensure odour and runoff are maintained for air/water quality and odour, it is planned that during remediation a temporary odour control enclosure (OCE) will be completed over the treatment pad area, this will be kept under negative pressure. Although not required in accordance with the results of the odour modelling within the SEE, Jemena believes that it will be significant environmental benefit from the likely reduction in contaminated water runoff and improvements in odour and air quality around the treatment area. The location of the OCE is shown in the proposed site layout within **Attachment A.**

If you have any queries in relation to the contents of this letter, or require any further information about the Project, please contact the undersigned.

Yours faithfully,

Jarrod Irving
Project Manager – Remediation
jarrod.irving@jemena.com.au
(02) 9867 7529 | 0439 430 600

Attachment A – Proposed Site Layout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POTENTIAL EXCAVATION EXTENT
ACCESS/ EGRESS
BLACKSHAW ROAD
BOUNDARY LINE
BOUNDARY LINE
SEDIMENT BOOM
EXCAVATION AREA
MULWAREE RIVER
ACCESS/ EGRESS
BRIDGE

Remediation of former Goulburn Gasworks: Aboriginal Cultural Heritage Due Diligence Assessment

FINAL REPORT

Prepared for GHD

14 May 2018

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Document information

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Prepared by:	Samantha Keats
Biosis project no.:	27213

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Document control

Version	Internal reviewer	Date issued
Draft version 01	Amanda Markham	03/04/2018
Final version 01	Samantha Keats	14/05/2018

Acknowledgements

Biosis gratefully acknowledges the contributions of the following people and organisations (listed alphabetically) in preparing this report:

- Ayrel Pyliotis, GHD
- Delise Freeman, Pejar Local Aboriginal Land Council

Biosis staff involved in this project were:

- Amanda Atkinson and Lian Flannery for field survey

Contents

Tables

Figures

Plates

Glossary

AHIMS	Aboriginal Heritage Information Management System
AMBS	Australian Museum Business Services
DECCW	Department of the Environment, Climate Change and Water
Due diligence code	*Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010)
EP&A Act	*Environmental Planning and Assessment Act 1979*
GSV	Ground Surface Visibility
ICOMOS	International Council on Monuments and Sites
LEP	Local Environment Plan
LGA	Local Government Area
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
Study area	Lot 1 DP 986690, Lot 1 DP 743211, Lot 2 DP 168412, and Lots 1, 2, 4, 5 and 6 of Section 21A DP 758468
The Code	The *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010)

Summary

Biosis Pty Ltd has been commissioned by GHD on behalf of Jemena Gas Networks (NSW) Ltd to undertake an Aboriginal Cultural Heritage Due Diligence Assessment for the former Goulburn Gasworks and adjacent foreshore area at Goulburn, NSW (the Project). The project involves the proposed remediation of contaminated soil and groundwater for the key objective of remediating the former Goulburn Gasworks site so that it is suitable for future commercial or industrial use.

Background research did not identify any Aboriginal sites registered with Aboriginal Heritage Information Management System (AHIMS) within the study area; and a review of the soil landscapes and landforms indicate that the primary geomorphological agents are likely to be sheet wash and stream flow causing a process of erosion and aggradation. Combined with exposure of soils by land clearing and the development of the site as a gasworks and foreshore area over the past 140 years, the potential for cultural material and potential archaeological deposits to remain is low.

An archaeological survey was conducted on 21 March 2017. The overall effectiveness of the survey for examining the ground for Aboriginal sites was considered to be low, due to both low ground surface visibility (GSV) predominantly due to vegetation cover and relatively few ground surface exposures. No new sites were discovered during the archaeological survey.

Based upon the desktop assessment and archaeological survey, the entire study area is assessed as having low potential and the following recommendations made:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act 1974*. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.

1 Introduction

1.1 Project background

Biosis Pty Ltd has been commissioned by GHD on behalf of Jemena Gas Networks (NSW) Ltd to undertake an Aboriginal Cultural Heritage Due Diligence Assessment for the former Goulburn Gasworks and adjacent foreshore area at Goulburn, NSW (the Project). The project involves the proposed remediation of contaminated soil and groundwater for the key objective of remediating the former Goulburn Gasworks site so that it is suitable for future commercial or industrial use.

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b) ('the Code') was conducted, in order adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Goulburn Mulwaree Local Government Area (LGA), Parish of Goulburn, County of Argyle (refer to Figure 1). The study area incorporates Lot 1 DP 986690, Lot 1 DP 743211, Lot 2 DP 168412, and Lots 1, 2, 4, 5 and 6 of Section 21A DP 758468; which covers an area of approximately 1.35 hectares. To the south of the gasworks site is Council owned land along the foreshore of the Mulwaree River, which is used as a public cycle path and walkway and is part of the study area. The study area is bounded by Alfred Street and the Mulwaree River to the east, the Sydney-Canberra railway line to the west and north, and Blackshaw Street to the south (refer to Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 4 of the *Environmental Planning and Assessment Act 1979* NSW (EP&A Act). Other relevant legislation and planning instruments that will inform the assessment include:

- *National Parks and Wildlife Act 1974* (NSW) *(*NPW Act)
- *National Parks and Wildlife Amendment Act 2010* (NSW)
- *Goulburn Mulwaree Local Environmental Plan 2009* (LEP)

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
- Undertake archaeological survey as per Requirement 5 of the Code, with particular focus on landforms with high potential for heritage places within the study area, as identified through background research.

- Record and assess sites identified during the survey in compliance with the guidelines endorsed by the NSW Office of Environment and Heritage (OEH).
- Determine levels of archaeological and cultural significance of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

1.5 Aboriginal consultation

Dru McAlister and Aryssa McAlister of Pejar Local Aboriginal Land Council attended the archaeological survey. They agreed with the assessment that there were no Aboriginal cultural heritage constraints for the project and that the study area is assessed as having low archaeological potential.

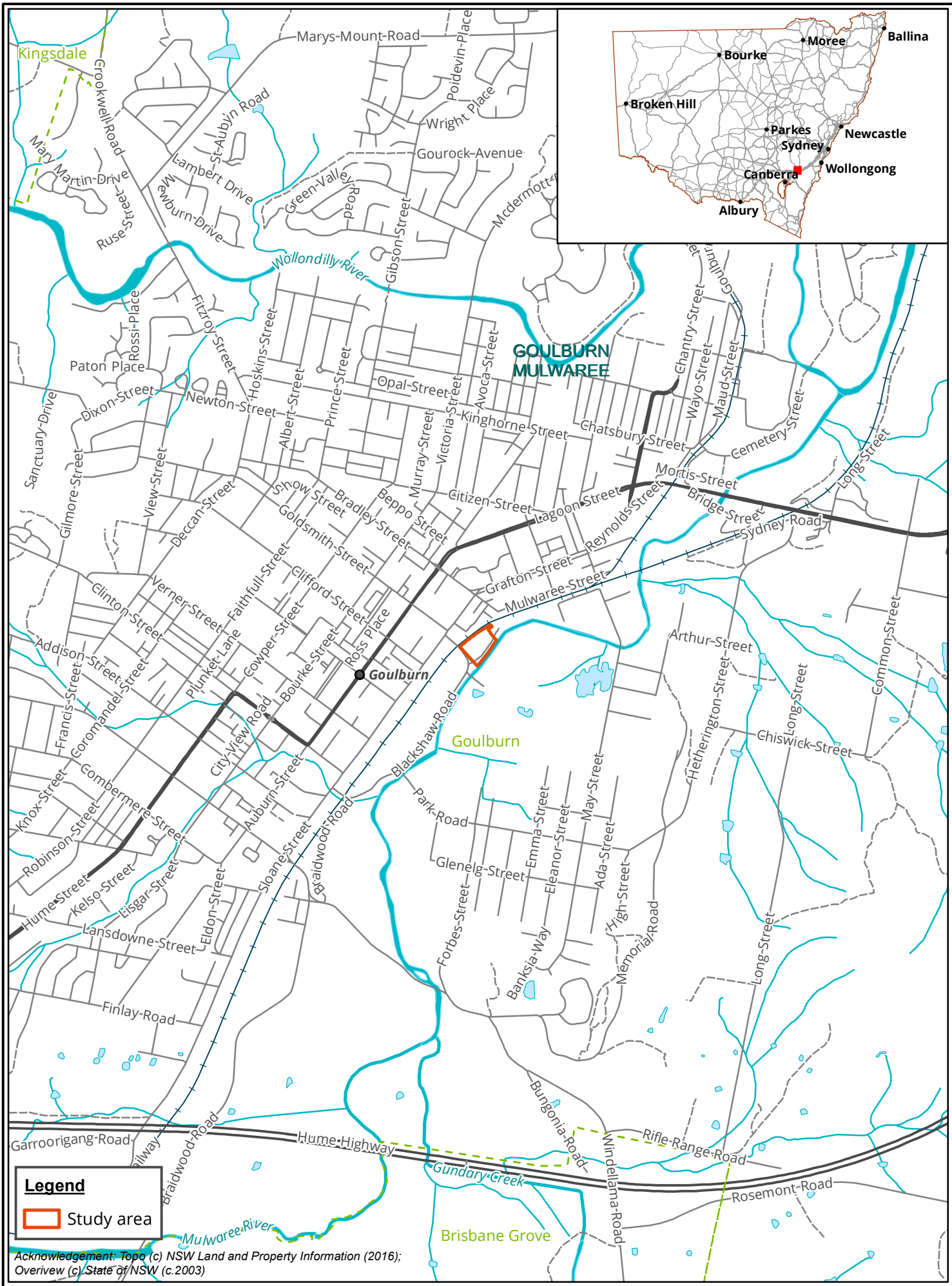
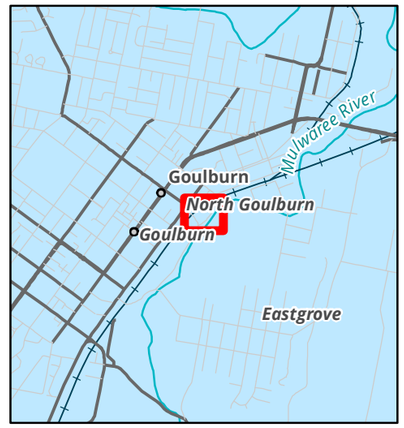


Figure 1: Location of the study area

Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27213
Date: 05 April 2018,
Checked by: SJK, Drawn by: LW, Last edited by: lwilson
Location:P:\27200s\27213\Mapping\

0 250 500 750 1,000
Metres
N
Scale 1:25,000 @ A4, GDA 1994 NSW Lambert



Legend

Study area

Acknowledgements: Basemap © Land and Property Information 2016

Figure 2: Study area detail

0 10 20 30 40 50

Metres

Scale: 1:1,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27213
Date: 05 April 2018,
Checked by: CLA, Drawn by: LW, Last edited by: lwilson
Location:P:\27200s\27213\Mapping
27213_ADD_F2_StudyArea

2 Desktop assessment

A brief desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and identify known Aboriginal sites and/or Places recorded in the study area. This desktop assessment has been prepared in accordance with requirements 1 to 4 of the Code.

2.1 Landscape context

The study area is located on the western bank of the Mulwaree Riverina floodplain landform, which is characterised by frequently active erosion and aggradation by channelled or overbank stream flow (Hird 1991). It is situated on the edge of the Goulburn CBD between the train line and the Mulwaree River.

2.2 Geology, soils and landforms

The study area occurs within the Southern and Central Highlands Fold Belt, which is the most complex geological province in New South Wales. During its history, it was affected by four major series of orogenic movements and its complexity is the result of granitic intrusions and the long history of vulcanism. The oldest strata if the region is the Ordovician sediments, which are dominated by quartz sandstone and shales, and these lithologies were subsequently metamorphosed to quartzite, slate and schist. The Mulwaree River flats have been infilled with Quaternary Alluvial Deposits up to 2.5 million years old. These are predominantly made up of current and recent mud, silt, sand and gravel deposited by the Mulwaree River system. These deep alluvial soils have the potential to yield stratified subsurface deposits.

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. Because they are defined by a combination of soils, topography, vegetation and weathering conditions, soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

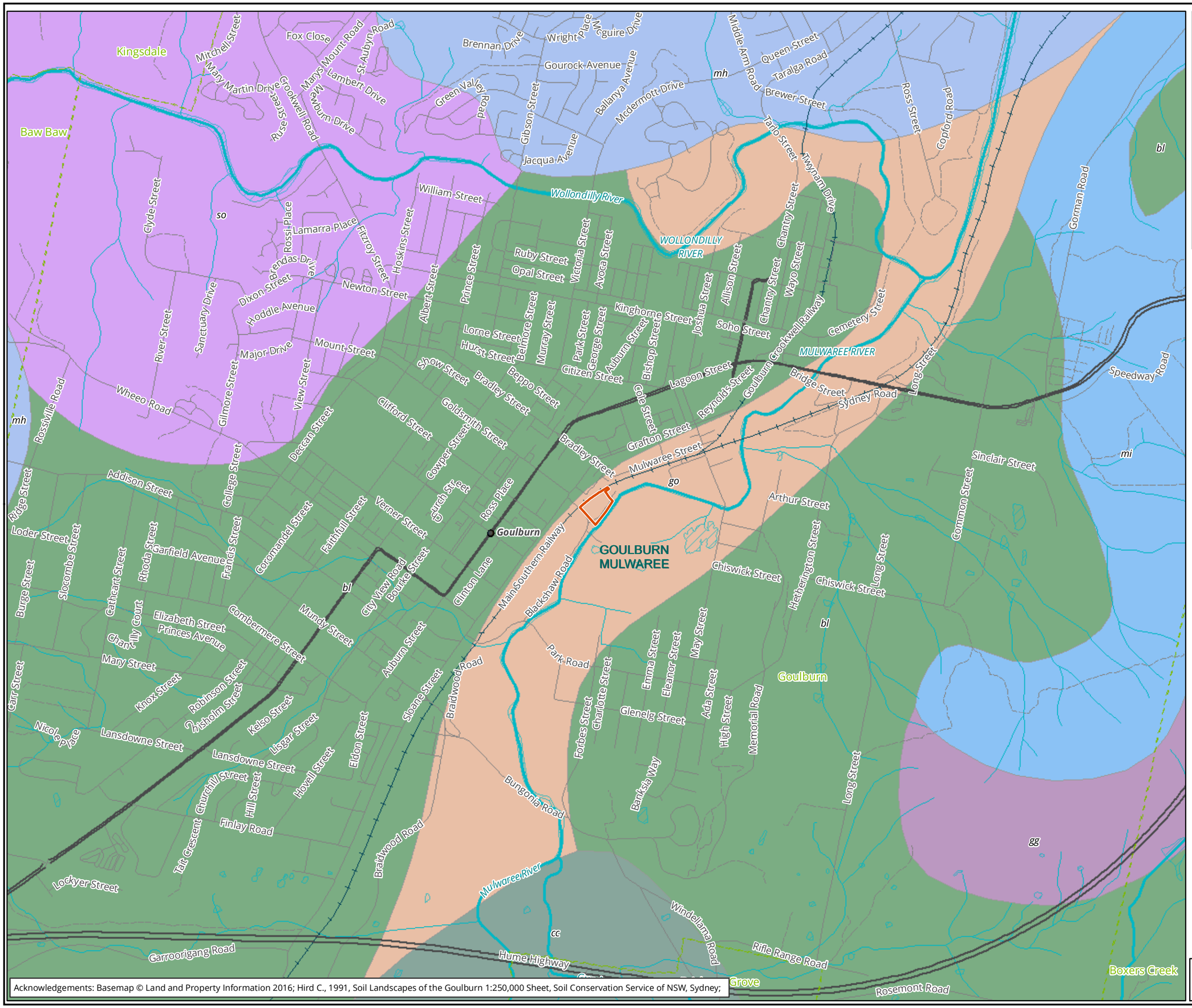
The Goulburn Soil Landscape is present within the study area. It is characterised by alluvial plains and associated terraces that is frequented by active erosion and aggradation caused by channelled or overbank stream flow. This landscape is the result of the depositions of alluvium around creeks and small river systems such as the Mulwaree River. The soils show little evidence of soil forming processes apart from the accumulation of organic matter at the soil surface. Distant bands of alluvial material can be observed throughout the soil profile. Soil textures vary from gravels and course sands to silts and light clays, and yellow earths, minimal prairie soils and red podzolic soils are found on terraces. Soil depths can be up to 3 metres and erodability is high (Hird 1991, p. 53).

2.3 Flora and fauna

The wider region includes distinct ecological zones, including open forest and open woodland, with riparian vegetation extending along many of the watercourses. Each ecological zone hosts a different array of floral and faunal species, many of which would have been utilised according to seasonal availability. Aboriginal inhabitants of the region would have had access to a wide range of avian, terrestrial and aquatic fauna and repeated firing of the vegetation would have opened up the foliage allowing ease of access through and between different resource zones.

The study area would have comprised of a savannah woodland of Yellow Box and Blakelys Red Gum. The open grasslands comprise both spear grass and kangaroo grass, while the around seepage areas and swamps common reed, cumbungi, rushes and sedges occur (Mitchell 2002). Women traditionally constructed nets from plant fibres which were used to carry items slung over the body – this could also include children and infants. Govett (1977) recalls this practise of 'slinging' babies behind a mother's shoulders. Digging sticks consisting of hard wood approximately 1.5m long, burnt at one end to create a hardened point were carried by the women who gathered as they passed through country storing their cache in nets about them till the meal (Govett 1977, Lhotsky 1979). Spear grass, tussock grass, wallaby grass and a stand of Yellow Box are the only remaining flora within the study area.

As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. According to Govett (1977) the Wollondilly River was a focus of activity with eels, swans, ducks and other water birds being staples along with kangaroos, wallabies, possums, bandicoots, and emus. Govett also described the practice of fire stick farming to herd kangaroos for hunting that also has the benefit of encouraging new growth and attracting kangaroos to specific areas. Boswell (1890) described the clothing of the Mulwaree tribe which consisted of long possum cloaks, worn with the fur turned in for warmth and the tanned skins on the outside for waterproofing, while string belts for fastening the cloaks were made from possum or kangaroo hair. Personal adornment consisted of kangaroo incisors and possum tails for head dresses, headbands and necklaces, while white and red ochre was used to decorate the upper body and face (Bennett 1967).



Acknowledgements: Basemap © Land and Property Information 2016; Hird C., 1991, Soil Landscapes of the Goulburn 1:250,000 Sheet, Soil Conservation Service of NSW, Sydney;

Legend

Study area

Soil Landscape units

- bl - BULLAMALITA
- cc - COLLECTOR CREEK
- gg - GORDONS GULLY
- go - GOULBURN
- mh - MONASTRY HILL
- mi - MIDGEE
- so - SOOLEY

Figure 4: Soil landscapes of the study area

0 200 400 600 800 1,000

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

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Matter: 27213
Date: 14 March 2018,
Checked by: CLA, Drawn by: LW, Last edited by: lwilson
Location:P:\27200s\27213\Mapping
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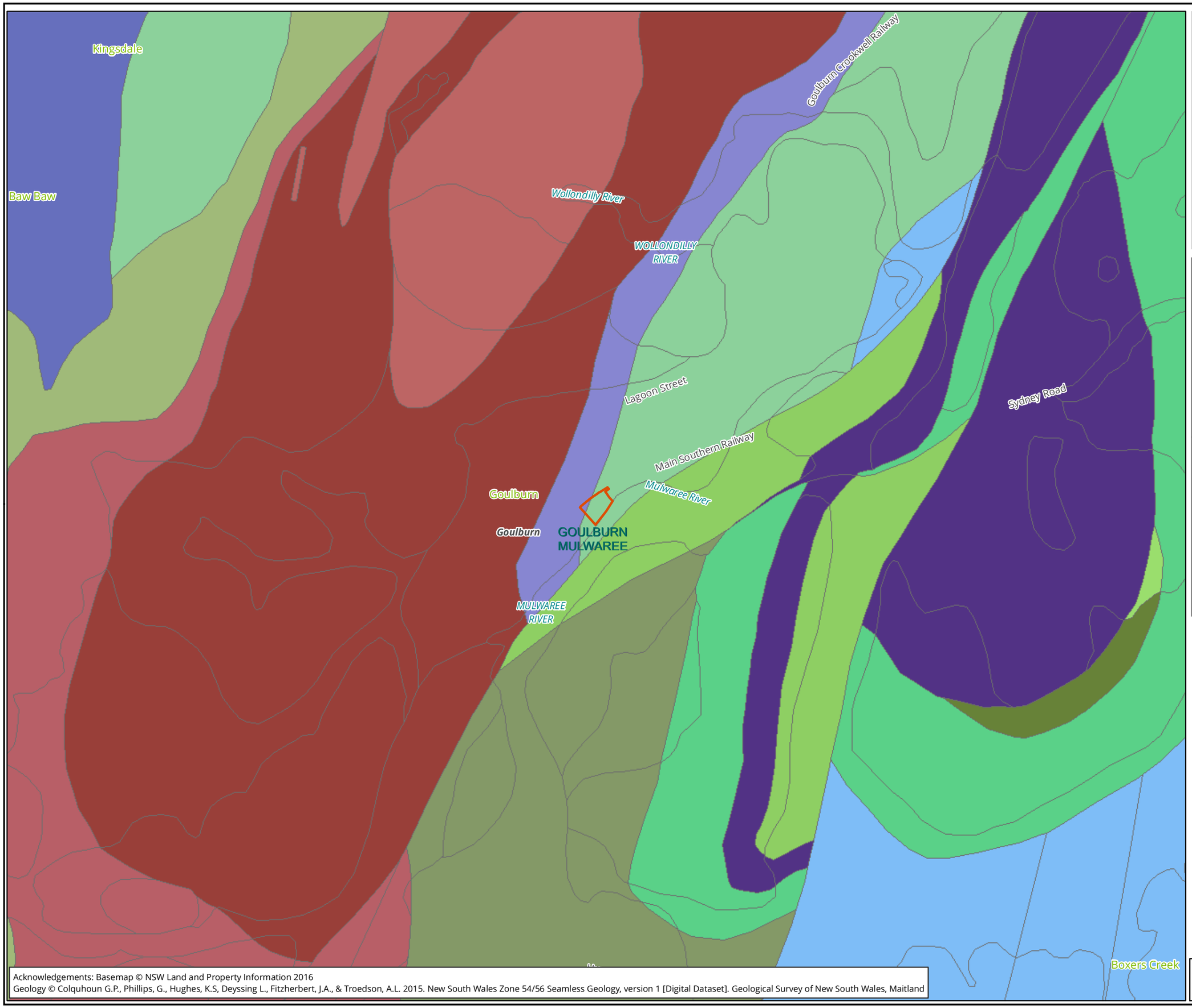

Legend

Study area

Geological Units

- Back Station Ignimbrite
- Bishopthorpe Dolerite
- Boxers Creek Formation
- Bradfordville Volcaniclastic
- Cookbundoon Formation
- Covan Creek Formation
- Cowpers Creek Conglomerate
- Forest Lodge Quartz
- Joppa Siltstone Member
- Rhyanna Formation
- Strathaird Formation
- Tarlo Formation
- Wiarborough Formation

Acknowledgements: Basemap © NSW Land and Property Information 2016
Geology © Colquhoun G.P., Phillips, G., Hughes, K.S, Deyssing L., Fitzherbert, J.A., & Troedson, A.L. 2015. New South Wales Zone 54/56 Seamless Geology, version 1 [Digital Dataset]. Geological Survey of New South Wales, Maitland

Figure 3: Geology of the study area

0 200 400 600 800 1,000

Metres
Scale: 1:20,000 @ A3
Coordinate System: GDA 1994 NSW Lambert

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Sydney, Newcastle, Wangaratta & Wollongong

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3 Aboriginal context

3.1 Ethnohistory and contact history

Two major language groups were identified in the Goulburn region by Norman Tindale in his seminal work on Aboriginal tribal boundaries. There were the Gundungurra (Gandangara) to the north of Goulburn, and the Ngunawal (Ngunnawal) also known as the Yass tribe, Lake George Blacks or Molonglo tribe to the south. The boundaries of the Ngunawal ran to the south east where they met the Ngarigo at the Molonglo and the Wiradjuri in the Yass region (Tindale 1974).

Linguists have observed that a majority of the word lists from the Ngunawal and Gundungurra languages are identical (Koettig and Lance 1986, p. 13) with a difference in syntax. This similarity can either be a result of long contact between the two groups or as a result that Matthews, one of Tindale's main source of information, was not working in the region until the 1890s when the Aboriginal people of the area had already been impacted by the results of white settlements (Flood 1980, p. 27)

One of the best sources for observations of the Indigenous inhabitants of the Goulburn region is Charles MacAlister, who lived in the district from the 1830s and noted many features and traditions of Aboriginal life. His observations must be viewed from a white perspective and filtered through his cultural traditions as with all cross cultural ethnography; however, his work is a valuable reference for the region. MacAlister notes that the impact of white settlement was a general adoption of words and phrases to enable increased communication between the groups (MacAlister 1907, p. 89). He records that three tribes resided in the district, the Cookmai or Mulwarrie (Mulwaree), the Tarlo, and the Burra Burra (MacAlister 1907, p. 82). MacAlister notes that Aboriginal people travelled from the Lachlan River to visit Goulburn.

Gatherings of Aboriginal people occurred regularly in the area and records of corroborees are known from Rocky Hill near the East Goulburn Church of England, the old railway quarry on the Wollondilly River, Mulwaree Flats near the historic brewery, the All Saints church in Eastgrove and the Goulburn Railway Station (AMBS 2012, p.13; Tazewell 1991, p. 243; Wyatt 1972, pp. 111-112). The siting of two churches at known corroboree locations may not be coincidental as appropriation of cultural areas for church structures is a long standing practice in both the Anglican and Catholic missionary and establishment traditions.

The flat, rolling topography of the Goulburn region and the lack of natural physical barriers would have facilitated contact and movement through the region. In 1834, Lhotsky crossed the Breadalbane Plains meeting a party of approximately 60 Aboriginal people at Fish River. This group told Lhotsky that they travelled as far as Goulburn and Yass Plains but not so far as Limestone (Lhotsky 1979, p. 104-105). At a large gathering at Bathurst in 1837, Aboriginal people were present from Goulburn, the Monaro and as far away as the Hunter Region (Boswell 1890, pp. 7-8).

Smith (1992) states that Goulburn was an Aboriginal cross roads with six or more different bands within a day's travel from the town site. Some of these bands included the Cookmai, Parramarragoo, Tarlo, Burra Burra, Pajong and Wollondilly.

The Ngunawal gathered in the Southern Alps for the annual Bogong Moth gatherings and ceremonies. The Bogong moth that inhabits the mountain areas in great numbers was an important food source for the local Indigenous people, and it is believed the people travelled great distances during summer months to exploit this resource and participate in related ceremonial activity (Flood 1980, pp. 111-112). At these times, groups in the area are likely to have co-operated and participated in each other's ceremonies, as utilisation of the resource would have meant that groups would have more than likely crossed boundaries in their travels. Groups were able to trade with neighbours, and obtain resources from other areas, including the coast.

Disease followed the settlement of the area, however, there is some evidence that it may have preceded it, with a smallpox epidemic originating in Sydney in 1789 possibly spreading throughout the region (Flood 1980, p. 32). This disease would have decimated the Aboriginal population and was followed by influenza in 1846. The notable decline of the number of the Aboriginal people was noted in 1845 at Bungonia and in 1848 at Goulburn by the Bench of Magistrates (Tazewell 1991, p. 244).

Violence between the white settlers and the Aboriginal populations occurred periodically as a result of land appropriation and barring of access to traditional sites. Conflicts reported in the newspapers and letters of prominent people in the district centre on the taking of women from the local tribes and the retaliatory actions of the men. Incidents of this nature occurred in 1824 at Bungendore and in 1826. The 1826 gathering of Aboriginal people resulted in the death of two white stockmen and fear and apprehension of attack were widespread through the region due to the large number of Aboriginal people who had gathered at Lake George and Inverary Park. In response, a detachment of troops were despatched to the County of Argyle to restore peace. The groups dispersed on the arrival of armed troops against which they stood no chance of success (Jackson-Nakano 2001, p. 25-26).

3.2 Regional context

The study area is located in the Goulburn Plains area of the Southern Tablelands district. A number of previous archaeological investigations have been undertaken in this region, and models for predicting the location and type of Aboriginal sites within t region have been developed, some as a part of these investigations and others from cultural heritage investigations for relatively large developments (Koettig and Lance 1986, Fuller 1989). These large scale assessments have indicated a general concentration of large sites adjacent to water bodies and sand bodies (Koettig 1983, Packard 1986) with smaller sites distributed in proximity to permanent water ways (Attenborough 1983).

Packard (1986) was commissioned by the National Parks and Wildlife Service to investigate the archaeological potential of sand deposits in the region. He located a number of large artefact scatters (+50 artefacts), small surface scatters and isolated finds on sand bodies. The sites were generally located on midslopes in conjunction with water courses and reflected camp sites with generalised utilisation activities. He concluded that a predictive model that located sites on midslopes and crests was applicable to areas containing sand deposit landscapes which were also located with access to water resources. The relationship between water and sand deposit sites was not considered conclusive at this time but later studies (Packard 1988, 1992, Hughes and Shawcross 1988) have shown a high correlation of identified sites and proximity to water and have classified areas of potential accordingly.

McIntyre (1993) completed the archaeological assessment for the proposed 132kV transmission line between Marulan and Goulburn. Survey effort was concentrated on high potential landforms such as creek lines in the area following the ranking of landforms developed by Fuller for the Goulburn region. The survey resulted in the identification of eight surface scatters, four isolated finds and one scarred trees all located on the Wollondilly River floodplain. This concentration on the Wollondilly River is a consistent finding of archaeological research in the region.

Sefton (1995 and 1996) undertook work for the proposed sewerage augmentation project for Marulan, which included linear pipelines 3 kilometres in length. The study area covered approximately 41 hectares on gently undulating terrain. The assessment resulted in the identification of seven artefact scatters and three isolated finds. All of the sites were located adjacent to a major local water sources. It was concluded that water resources provided a focus for camping locations.

Jo McDonald Cultural Heritage Management (1998) conducted salvage excavations at the Crookwell 1 wind farm site in Crookwell. A number of sites were identified from the field studies undertaken for the

project, with one large site comprising over 2000 artefacts interpreted as a single knapping event along a spur line. The site was located on a secondary spur with a westerly aspect and 1km from a major creek line.

Navin Officer Heritage Consultants (2002) completed a survey for the proposed quarry services depot near Marulan covering an area of approximately 40 hectares. Three surface scatters and four isolated finds were located within the undulating landscape. The sites were located adjacent to creek line features and gentle slopes.

Navin Officer Heritage Consultants (2003) conducted an archaeological sub-surface testing program at Wombeyan Caves within the area of a proposed treatment plant. An artefact scatter, Wombeyan One, was found to include extensive sub-surface archaeological deposit with areas of moderate to high density. A total of 244 stone artefacts were recovered from three test pits. Site occupation was dated to approximately 11,300 and 14,000BP, which suggests that late Pleistocene environments at these altitudes did not prevent small-scale occupation.

Umwelt (2005) undertook an Aboriginal archaeological survey and assessment for the proposed Lynwood Quarry to the west of Marulan, 27 kilometres north-east of Goulburn. Fifty two new Aboriginal sites were identified. The majority of these sites were artefact scatters followed by isolated finds and scarred trees. Site distribution pattern conformed to the predictive model, with the majority of sites being located along watercourses, with 50% within 30 metres of a watercourse, while crests or saddles contained 30% of the sites.

Austral Archaeology (2005) undertook the field survey for the proposed Capital Wind Farm Site. This study was extended in 2008 to cover additional areas of expansion of the Wind Farm. Only one isolated artefact was identified and several areas of low potential for sub surface deposits. This conforms to the predictive model with high hilltops away from water courses being classified as low potential for both surface sites and subsurface deposits.

Dibden (2008) undertook an Aboriginal archaeological assessment for Hawksbury/Nepean Catchment Management Authority of two areas for proposed erosion control works. The assessment included a background review and survey across two localities: "Hillview" property off Rhyanna Road north of Goulburn, and "Roseview" property south of Tarago. A total of 12 sites were located in the Goulburn area and three sites in Tarago area. Overall archaeological sensitivity was deemed as low to low/moderate. It was concluded that both areas were utilised for episodic Aboriginal occupation in accordance with availability of local resources.

Biosis (2010) completed surveys for the Woodlawn Wind Farm on the shores of Lake George at Bungendore. This survey was focused on ridge top where power turbine tower were to be located, and in areas of road construction which covered a range of land forms. The results showed sparse, small density sites often located along ridge lines that connected across the site allowing for movement along a level topography. No large sites were located, confirming a model of transient occupation along the ridge lines.

3.3 Local context

Regional studies that resulted in site location models for the Goulburn Plains, centred on the township of Goulburn, are discussed in the following section. Only the most relevant projects have been summarised, due to the large body of work in the area.

Koettig and Lance (1986) undertook the Aboriginal Resources Planning Study for the City of Goulburn. Based on all available data, they developed an Aboriginal site location model for Goulburn. Four landscape zones based on topography (major watercourse, undulating hills and plains, hills and residential areas) were assigned archaeological sensitivity ratings. A review of previously identified sites within the Goulburn region found artefact scatters were the predominant site within the undulating hills and plains zones. The majority of

these sites are located on basal slopes close to major waterways. Lance and Koettig's predictive model is shown in the following table.

Table 1 Lance and Koettig's 1986 Model

Zone	Landform	Sensitivity/Potential	Significance
1	Major watercourses	High	High
2a	Undulating Hills and Plains – Lower slopes	High	Moderate
2b	Undulating Hills and Plains - Middle Slopes	Low	Low
3	Hill Slopes	Low	High
4	Built Up Areas	Moderate	Low

Fuller (1989) was engaged by Goulburn City Council to test Lance and Koettig's 1986 model by undertaking subsurface investigations in areas designated as high sensitivity by the model. The results of this large excavation program, although supporting the overall model, concluded that all areas apart from major watercourses were of low potential and that further divisions were necessary in the undulating hills category if it was to be useful for predicting site locations. Fuller's refined model is shown in Table 2,with *sensitivity* refering to the likelihood of a site occurring, and *significance* to the importance of the site when identified.

Table 2 Fullers 1989 Site Distribution Model

Zone	Landform	Sensitivity	Significance
1	Major Watercourses	High	High
2a	Lower slopes adjacent to major watercourses	High	Moderate
2b	Gently undulating land, or plains	Low	Low
2c	Hills – Low (<700 metres AGD)	Medium	Low
2d	Hills – Moderate (700-750 metres AGD)	Low	Low
2e	Hills – High (>750 metres AGD)	Low	High
3	Hill Tops	Low	High
4	Built up areas	Medium	Low

Paton (1990) undertook investigations for the Goulburn Bypass and excavated site AHIMS 51-6-0021 on the eastern banks of the Mulwaree River. He excavated in excess of 15,000 artefacts within a section of the site due to be destroyed by the construction of the Hume Highway. His analysis concluded that quartz made up 85% of the assemblage with silcrete (10%), chert, quartzite and volcanics making up the remainder. He interpreted the site to be a regularly visited base camp on the banks of the river providing access to resources across the region. The location of a large site within this context conformed to the revised model of Fuller (1989).

Williams (2004) undertook a surface survey for the Tall Timbers Residential Development in south east Goulburn. He located one large surface scatter (AHIMS 51-6-0123) that consisted of approximately 300 artefacts. Located on upper undulating slopes close to a watercourse, Williams considered the area to

possess high potential for subsurface artefacts. The area overlooks the Mulwaree River Flats, a rich resource area noted to be an attractive place to camp. The site was subsequently salvaged prior to development.

Heritage Concepts (2004) completed a Cultural Heritage Risk Assessment for a development at 48 Common Street, Goulburn on behalf of Parsons Brinckerhoff. Three low density artefact scatters and two isolated finds were identified across the 15 hectare study area. Heritage Concepts followed the predictive modelling of Fuller 1989, following review of work undertaken since the 1980s when the model was formulated. They concluded that the model was valid and the sites were located within Fuller's (1989) category 2a – Undulating Hills and Plains – Lower Slopes. No subsurface testing was undertaken to confirm the presence or absence of subsurface deposits and the sites were classified as low significance.

New South Wales Archaeology (2007) was commissioned by Laterals Planning to undertake an Aboriginal archaeological assessment for a proposed subdivision of five rural residential lots in Kingsdale. During the survey that was conducted across a range of landforms, a total of 13 Aboriginal artefact locales were recorded and 153 artefacts discovered. The majority of artefacts were found on either spur or ridge crests, and small artefact locales were located on basal slopes and creek margins. Overall low density artefact distribution was explained by people moving through the country for a variety of purposes including hunting and gathering forays, but not on long term or repeated basis.

Saunders (2007) conducted an archaeological assessment for proposed subdivision of a property south-west of the current study area. The area is located within rolling to hilly country. Five new Aboriginal sites and one PAD were identified during the survey. All the sites were located within crest, lower or upper slope landforms. The highest density artefact scatter consisted of 53 artefacts and was located on the upper slope of a ridge (Saunders 2007, p. 20). Saunders undertook a body of work during this time in similar landforms for further residential developments with similar results of isolated finds and small artefact scatters. All of these assessments used the predictive model developed by Fuller in 1989 for a ranking of land form potential.

Mills Archaeological and Heritage Services Pty Ltd (2009) undertook an Indigenous Heritage Assessment of a Powerline easement from the Rocky Hill Substation to the North Goulburn Substation. This assessment identified eight Aboriginal sites and five European sites. The assessment explicitly states that it follows the landform predictive model of Lance and Koettig (1986) and Fuller (1989). This study was followed by subsurface testing of the proposed route with additional small density sites being located within the footslopes above a tributary of Gundary Creek, within 600 metre of the creek line.

AMBS (2012) conducted an Aboriginal Heritage Study for the entire Goulburn Mulwaree LGA for the Goulburn Mulwaree Council. This study followed on from the work of Lance and Koettig (1986) and Fuller (1989) and assessed the general importance of different landforms to the Aboriginal community and their sensitivity for archaeological potential. Previous work undertaken within the Goulburn region was concluded to support the predictive model of Fuller, finding that the model was still applicable. The findings of Fuller were used as the basis for classification of landform potential for predictive archaeological sensitivity mapping within the boundaries of the Goulburn LGA.

Biosis (2013) undertook an Aboriginal cultural heritage assessment on Mary Mount Road. The field survey did not identify any new Aboriginal sites and the two AHIMS sites located in the study area could not be relocated. Two areas of PAD were test excavated to determine the presence and significance of any subsurface deposits. Sixteen test pits were excavated. The testing of sub surface potential resulted in nil findings for PAD 2 and has led to a re-assessment of the PAD as holding low potential for subsurface sites or deposits to be present. Following test excavations, it was determined that AHIMS 51-6-0294 was a low density site with further archaeological potential, but that the site holds low scientific significance.

Biosis (2015) completed test excavations at 13 Clyde Street, Goulburn for residential development. A previous heritage assessment had been undertaken over the study area, resulting in the identification and registration of one surface scatter (AHIMS 51-6-0208) and three areas of PAD. Three areas of PAD were test

excavated to determine the presence and significance of any subsurface deposits, which consisted of 24 test pits. This testing of subsurface potential resulted in nil findings for CSPAD 1 and CSPAD2 and has led to a re-assessment of the PADs as holding low potential for subsurface sites or deposits to be present. These test excavations also resulted in the findings that CSPAD 3 contains a low density site with further potential but that the site holds low scientific significance.

Biosis (2016) was commissioned by Southern Region Land Engineering (SRLE) Pty Ltd to undertake an Aboriginal Cultural heritage assessment report over Lot 7 DP1184830 on Clyde Street Goulburn NSW. Two areas of PAD were test excavated to determine the presence and significance of any subsurface deposits, which consisted of 16 test pits. This testing of subsurface potential resulted in nil findings for PAD 2 and has led to a re-assessment of the PAD as holding low potential for subsurface sites or deposits to be present. These test excavations also resulted in the findings that AHIMS 51-6-0294 contains a low density site with further potential but that the site holds low scientific significance.

Biosis (2018) was commissioned by Fraish Consulting to undertake an Aboriginal Cultural Heritage Due Diligence Assessment for the proposed subdivision at Lot 28 DP 479, Marys Mount Road, Bradfordville. Background research did not identify any Aboriginal sites registered with AHIMS; however, there are two AHIMS sites located within 200 metres. In addition, a review of the soil landscapes and landforms indicates that the primary geomorphological agents are likely to be sheet wash and stream flow causing a process of erosion and aggradation. Combined with exposure of soils by land clearing and agricultural practices over the past 130 years, the potential for cultural material and potential archaeological deposits to remain is low. The archaeological survey identified two Aboriginal objects; however, they were located in highly disturbed contexts, were not in situ, and were likely imported. This portion of the study area where the artefacts were discovered will be retained as a residential property; therefore, no impacts will occur to these sites.

3.3.1 Identified Aboriginal archaeological sites

An extensive search of the AHIMS database was conducted on 13 March 2017 (Client service ID: 333220). The search identified 51 Aboriginal archaeological sites within a 5 kilometre search area, centred on the proposed study area (Figure 5 and Table 3). None of these registered sites are located *within* the study area (Figure 3). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied where notable discrepancies occurred.

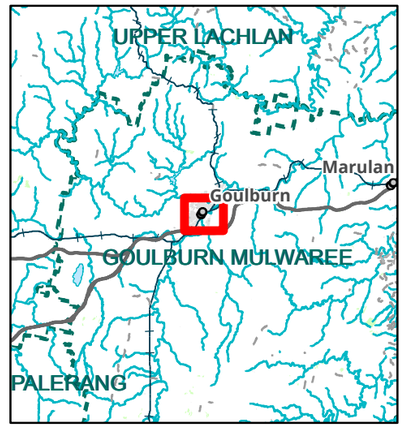
It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area.

Table 3 AHIMS sites within the study area

Site type	Occurrences	Frequency (%)
Artefact	49	96.08
Burial	1	1.96
Modified tree	1	1.96
TOTAL	**51**	**100**

A simple analysis of the Aboriginal cultural heritage sites registered within 5km of the study area indicates that the dominant site type is artefacts representing 96.08% (n=49), followed by burials and modified trees,

which were represented by 1.96% each (n=1 each). All the sites were located within close proximity to reliable sources of water and were either exposed by the land clearing works (artefact scatters) or in areas with remnant native vegetation (scarred trees).



Legend

- Study area
- AHIMS sites

Figure 5: AHIMS sites in the vicinty of the study area

0 160 320 480 640 800

Metres

Scale: 1:16,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

N

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Date: 27 March 2018,
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3.3.2 Predictive statements

A series of statements been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

This model is based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area;
- Potential Aboriginal use of natural resources present or once present within the study area; and
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a predictive model has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 4). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 4 Aboriginal site prediction statements

Site Type	Site Description	Potential
Flaked Stone Artefact Scatters and Isolated Artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	High: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Due to the distance from permanent fresh water resources, the potential for artefacts to be present within the study area is assessed as high.
Shell Middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: Shell midden sites have not been recorded within the vicinity of the study area.
Quarries	Raw stone material procurement sites.	Low: There is no record of any quarries being within or surrounding the study area.
Potential Archaeological Deposits (PADs)	Potential sub surface deposits of cultural material.	Moderate: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms.
Modified Trees	Trees with cultural modifications	Moderate: Scarred trees have been recorded within the vicinity of the study area. Due to extensive vegetation clearance only a small number of mature native trees have survived within the study area.

Site Type	Site Description	Potential
Grinding Grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: Suitable horizontal sandstone rock outcrops do not occur along drainage lines.
Burials	Aboriginal burial sites.	Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. The soil profiles associated with the study area are not commonly associated with burials.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present within the study area.
Aboriginal Ceremony and Dreaming Sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area.
Post-Contact Sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one.
Aboriginal Places	Aboriginal places may not contain any "archaeological" indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.

4 Archaeological survey

An archaeological survey of the study area was undertaken on 21 March 2018. The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims of the survey were to:

- To undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially have been exploited by Aboriginal people.
- Landform elements, distinguishable areas of land approximately 40m across or with a 20m radius (CSIRO 2009).
- Photographs of the site indicating landform.
- Ground surface visibility (GSV) and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities; and,
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, ground surface visibility and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

4.3 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the

study area were ground surface visibility. The study area has a low GSV due to the extensive grass coverage across the study area and relatively small areas of exposure.

4.4 Visibility

In most archaeological reports and guidelines visibility refers to ground surface visibility, and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010b). Ground surface visibility across the study area was typically low (10%) due to extensive grass coverage (Plate 1) and large expanses of bitumen pathways and car parking areas (Plate 2). Small areas of GSV were present around fence lines and trees, garden neglected garden beds, access tracks, areas of vehicular movement, and along the embankment of Malwaree River.

Plate 1 North facing photo showing extensive grass coverage and low visibility

Plate 2 East facing photo showing large expanses of bitumen resulting in low GSV

4.5 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed, and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke and Smith 2004: 79, DECCW 2010b). Overall, the study area displayed areas of exposure of less than 10% due to extensive grass coverage and built landscape (Plate 3). Areas of limited exposure were located along vehicle tracks and the embankment of the Malwaree River where erosion was high (Plate 5 and Plate 6).

Plate 3 North facing photo showing areas of exposure

Plate 4 North facing photo showing areas of exposure

4.6 Disturbances

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action are prevalent in the study area and cover large sections of the land surface. The agents include

industrial development such as construction of the gasworks and associated buildings, along with landscaping practices.

There were a number of disturbances observed within the study area, which would have resulted in the removal of topsoil and its replacement with introduced materials of varying degrees. These areas include an L-shaped single storey office block (Plate 5), a former brick workshop and storeroom (Plate 6), gas metre compound, gas vehicle refueling station, a number of small sheds, numerous bitumen and gravel pathways and car parking areas (Plate 7), and drainage lines and a culvert (Plate 8).

Plate 5 West facing photo showing the L-shaped office block

Plate 6 North facing photo showing the former brick workshop and storeroom

Plate 7 South facing photo showing extensive bitumen driveways and paths

Plate 8 East facing photo showing the drainage and culvert

4.7 Survey results and discussion

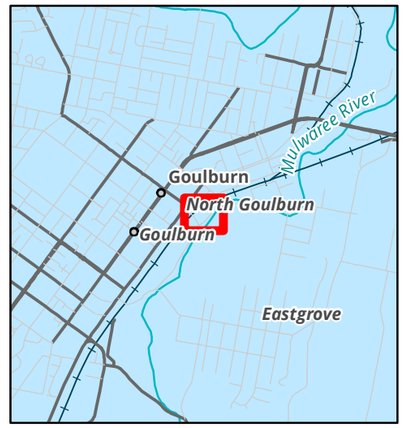
The archaeological survey consisted of a random foot transect across the entire study area. The results of the field survey are provided in Figure 6. The survey did not identify any Aboriginal sites or objects, possibly as a result of thick vegetation coverage, low surface visibility, and significant disturbances across the study area. The assessment for areas that have low, moderate or high archaeological potential within the study area are based on a number of factors, including environmental conditions, geomorphological processes, past land use activities, and results of previous archaeological studies, surveys and test excavations. The study area has been assessed as low potential, which is due to a number of factors discussed below.

The study area is located within a river flats landform that is adjacent to the Malwaree River. A review of the soil landscape and landforms indicates the primary geomorphological agents are likely to be sheet wash and stream flow causing a process of erosion and aggradation. Within the study area, the soil landscape indicates that older material is being washed down slopes to form alluvial soil deposits in the river flats. Even though the deep alluvial soils have the potential to yield stratified subsurface deposits, the active erosion and aggradation caused by channelled or overbank stream flow is likely to have potentially eroded away any archaeological deposits. In addition, the Goulburn Soil Landscape displays little evidence of soil forming processes apart from the accumulation of organic matter at the soil surface (Hird 1991).

The survey revealed that the study area had been subject to significant ground disturbance due to the construction of buildings and outbuildings associated with the Goulburn Gasworks. The study area has been occupied for nearly 140 years and the construction of buildings and associated infrastructure would have displace surface cultural material and may have also affected deeper buried archaeological deposits. Furthermore, the foreshore area demonstrates disturbance associated with the construction and use of Alfred Street and the pathway adjacent to the Malwaree River.

A review of previous archaeological studies, surveys, test excavations and regional predictive modelling indicates that all landforms within the Goulburn region were utilised to some degree by Aboriginal people in the past, with the majority of sites being located on the alluvial flats associated with the Wollondilly and

Mulwaree Rivers and Gundary Creek (Fuller 1989). A predictive model has also been developed to broadly predict the type and character of Aboriginal cultural sites likely to exist(ed) throughout the study area and where they are more likely to be located. The model is based primarily on Lance and Koettig (1986) and Fuller's (1989) prediction models as well as the landscape context and ethnohistory of the region. This model has been tested multiple times with the majority of results from these studies conforming to the model. Using Fuller's (1989) model, the study area is located with three zones: Zone 1 (major watercourses), Zone 2a (lower slopes adjacent to major watercourses), and Zone 4 (built up areas). Both Zone 1 and 2a have high sensitivity and moderate to high significance; however, the built up nature of the study area places it more definitively within Zone 4 which has medium sensitivity and low significance. Therefore, the high disturbance present and nature of the soil landscape has resulted in the entire study area being assessed as low.



Legend

- Study area
- Survey Tracks

Figure 6: Survey Effort

0 10 20 30 40 50

Metres

Scale: 1:1,000 @ A3

Coordinate System: GDA 1994 NSW Lambert

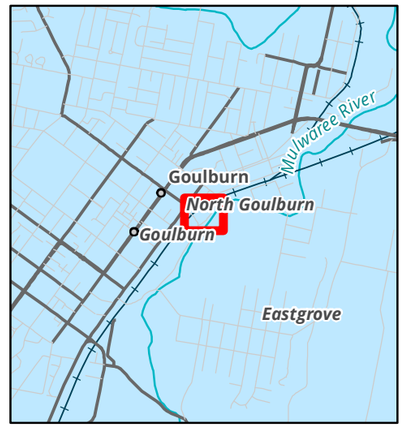
N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27213
Date: 05 April 2018,
Checked by: CLA, Drawn by: LW, Last edited by: lwilson
Location:P:\27200s\27213\Mapping
27213_F6_SurveyEffort

Acknowledgements: Basemap © Land and Property Information 2016



Legend

Study area

Archeological potential

Low

Figure 7: Survey Results

0 10 20 30 40 50

Metres
Scale: 1:1,000 @ A3
Coordinate System: GDA 1994 NSW Lambert

N

Biosis Pty Ltd

Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27213
Date: 05 April 2018,
Checked by: CLA, Drawn by: LW, Last edited by: lwilson
Location:P:\27200s\27213\Mapping
27213_F5_SurveyResults

5 Conclusions and recommendations

5.1 Conclusions

This assessment has identified that the entire study area has low archaeological potential. This assessment was made based on background research that identified that the entire study area had been subjected to substantial industrial development and use, which has significantly disturbed the area. The area adjacent to the foreshore also demonstrated disturbance from the construction and use of Alfred Street and the shared pathway. These practices would have removed or disturbed the top soil, which indicates that the potential for cultural material and potential archaeological deposits to remain is low.

The overall effectiveness of the survey for examining the ground for Aboriginal sites was considered to be low due to both low GSV, predominantly due to vegetation cover, and the low amount of exposures. No new sites were discovered during the archaeological survey. There is low likelihood for potential archaeological deposits to be present within the study area due to the landforms and soil types; therefore, no further archaeological assessment is required.

5.2 Recommendations

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
  - Ethos of the Australia ICOMOS Burra Charter (2013)
  - The code

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

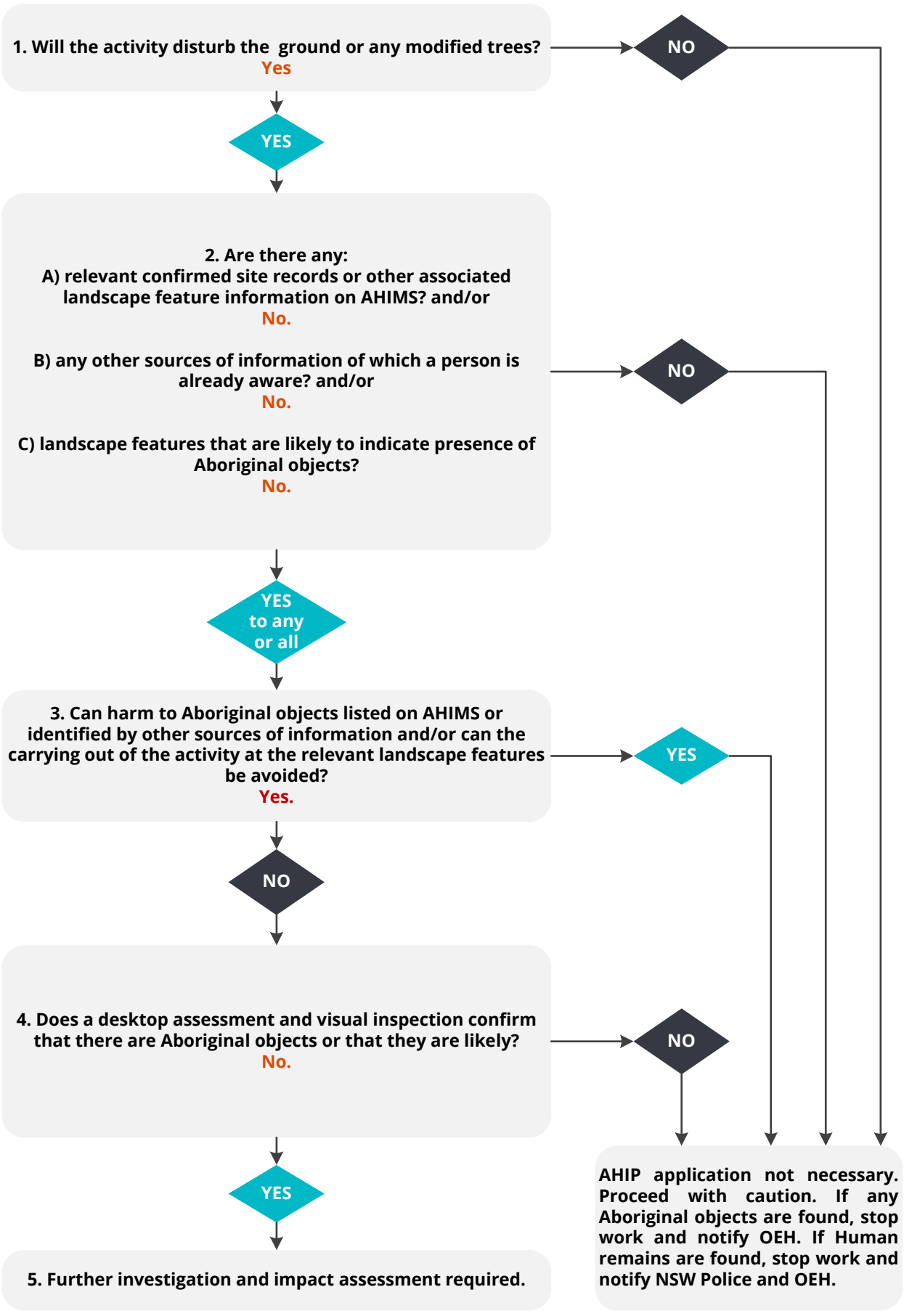
Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NSW National Parks and Wildlife Act 1974. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Office of Environment and Heritage (OEH). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object the archaeologist will provide further recommendations. These may include notifying the OEH and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and OEH's Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by OEH.


1. Will the activity disturb the ground or any modified trees?
Yes
NO
YES
2. Are there any:
A) relevant confirmed site records or other associated landscape feature information on AHIMS? and/or
No.
B) any other sources of information of which a person is already aware? and/or
No.
C) landscape features that are likely to indicate presence of Aboriginal objects?
No.
NO
YES to any or all
3. Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?
Yes.
YES
NO
4. Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?
No.
NO
YES
5. Further investigation and impact assessment required.
AHIP application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify OEH. If Human remains are found, stop work and notify NSW Police and OEH.

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Appendices

Appendix 1 AHIMS search results

This Appendix is not to be made public.

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 27213

Client Service ID : 333220

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
51-6-0692	WR-OS-8	GDA	55	751187	6152768	Open site	Valid	Artefact : 3		102280
	Contact	**Recorders**	South East Archaeology,Mr.Leigh Bate					**Permits**		
51-6-0041	GC05	AGD	55	750900	6150750	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0042	GC06	AGD	55	750250	6148680	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0100	Wollondilly Graves	AGD	55	749400	6149000	Open site	Valid	Burial : -	Burial/s	
	Contact	**Recorders**	Ms.Adrienne Howe-Piening					**Permits**		
51-6-0056	GC20	AGD	55	750000	6149400	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0043	GC07	AGD	55	751050	6150220	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0044	GC08	AGD	55	751050	6150120	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0061	GSP 1	AGD	55	751150	6152700	Open site	Valid	Artefact : -	Open Camp Site	1845,1975
	Contact	**Recorders**	Rex Silcox					**Permits**		
51-6-0062	Goulburn 2	AGD	55	750250	6149300	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	**Recorders**	Doctor.Susan Mcintyre-Tamwoy					**Permits**		
51-6-0063	Goulburn 3	AGD	55	751000	6150000	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Doctor.Susan Mcintyre-Tamwoy					**Permits**		
51-6-0051	GC15	AGD	55	747270	6152930	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0053	GC17	AGD	55	747261	6152492	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0054	GC18	AGD	55	749950	6149350	Open site	Valid	Artefact : -	Open Camp Site	1578
	Contact	**Recorders**	Ms.N Fuller					**Permits**		
51-6-0123	Tall Timbers 1	AGD	55	749650	6149200	Open site	Valid	Artefact : 100		98991
	Contact	**Recorders**	Mr.Doug Williams					**Permits**	2027,3952	
51-6-0318	Paton J	AGD	55	747220	6152264	Open site	Valid	Artefact : 3		
	Contact T Russell	**Recorders**	Mr.Justin Boney					**Permits**	3831	
51-6-0234	Pineleigh Isf2	AGD	55	751151	6150920	Open site	Valid	Artefact : 1		99404
	Contact T Russell	**Recorders**	Heritage Concepts					**Permits**		
51-6-0235	Pineleigh Ocs1 & PAD	GDA	55	751409	6150980	Open site	Valid	Artefact : 4		

Report generated by AHIMS Web Service on 13/03/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 747290 - 751548, Northings : 6148651 - 6153158 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 51

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 27213

Client Service ID : 333220

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact T Russell	**Recorders**	Heritage Concepts					**Permits**		
51-6-0236	Pineleigh Ocs3	GDA	55	751229	6150897	Open site	Valid	Artefact : 4		
	Contact T Russell	**Recorders**	Heritage Concepts					**Permits**		
51-6-0237	Pineleigh ISF 1	GDA	55	751341	6150969	Open site	Valid	Artefact : 1		
	Contact T Russell	**Recorders**	Heritage Concepts					**Permits**		
51-6-0650	WR-OS-1 (Pole 31)	AGD	55	750790	6151740	Open site	Valid	Artefact : 11		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0651	AS-OS-1 (Pole 20)	AGD	55	750810	6150730	Open site	Valid	Artefact : 17		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0652	WR-OS-2 (Pole 33)	AGD	55	750970	6151970	Open site	Valid	Artefact : 7		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0653	WR-OS-3 (Pole 36)	AGD	55	751070	6152410	Open site	Valid	Artefact : 3		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0654	WR-OS-4 (Pole 37)	GDA	55	751060	6152560	Open site	Valid	Artefact : 5		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0655	WR-OS-5 (Pole 38)	AGD	55	751060	6152720	Open site	Valid	Artefact : 7		101434
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0656	WR-OS-6 (Pole 39)	AGD	55	751070	6152870	Open site	Valid	Artefact : 2		101434
	Contact	**Recorders**	Mr.Peter Kuskie,South East Archaeology,Mills Archaeological & Heritage Services P					**Permits**	3222	
51-6-0658	RH-OS-1 (Goulburn)	AGD	55	750571	6149373	Open site	Valid	Artefact : 4		
	Contact	**Recorders**	Mills Archaeological & Heritage Services Pty Ltd					**Permits**	3222	
51-6-0724	Leeson ST1	GDA	55	749519	6149423	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Canberra					**Permits**		
51-6-0768	CSPAD3	GDA	55	747336	6152624	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	Ms.Lyn O'Brien					**Permits**	3831	
51-6-0107	Snow Gum Ridge 1	AGD	55	747357	6152394	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mr.Tim Hill					**Permits**		
51-6-0108	Snow Gum Ridge 2	AGD	55	747419	6152425	Open site	Valid	Artefact : 30		
	Contact	**Recorders**	Mr.Tim Hill,Mr.Dean Freeman					**Permits**		
51-6-0671	AS-OS-1 (same as 51-6-0651)	GDA	55	750810	6150730	Open site	Valid	Artefact : 17		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0390	Memorial Road South	AGD	55	749788	6148685	Open site	Valid	Artefact : 15		
	Contact T Russell	**Recorders**	Rod Wellington					**Permits**		

Report generated by AHIMS Web Service on 13/03/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 747290 - 751548, Northings : 6148651 - 6153158 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 51

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 27213

Client Service ID : 333220

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
51-6-0413	Pineleigh OCS 2	AGD	55	751312	6150874	Open site	Valid	Artefact : 2		
	Contact T Russell	**Recorders**	Heritage Concepts					**Permits**		
51-6-0674	PL-OS-10	GDA	55	750600	6149410	Open site	Valid	Artefact : 7		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0675	PL-OS-11	GDA	55	750690	6149540	Open site	Valid	Artefact : 2		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0676	PL-OS-19	GDA	55	751000	6150690	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0677	PL-IF-18	GDA	55	750970	6150530	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0678	RH-IF-1	GDA	55	750040	6149050	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0679	LS-OS-1	GDA	55	750820	6149880	Open site	Valid	Artefact : 7		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0680	MD-OS-1 and PAD	AGD	55	749840	6148650	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : -		102657
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0673	PL-OS-14	GDA	55	751000	6150690	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Robynne Mills					**Permits**		
51-6-0791	Lot 1 DP789099/IF3	GDA	55	750237	6150360	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0792	Lot 1 DP789099/IF4	GDA	55	750202	6150511	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0793	Lot 1 DP789099/IF1	GDA	55	750251	6150536	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0794	Lot 1 DP789099/3	GDA	55	750326	6150489	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0795	Lot 1 DP789099/IF2	GDA	55	750306	6150526	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0796	Lot 17 DP789099/IF2	GDA	55	750262	6150503	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0797	Lot 1 DP789099/2	GDA	55	750288	6150500	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					**Permits**		
51-6-0798	Lot 1 DP789099/1	GDA	55	750146	6150408	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 13/03/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 747290 - 751548, Northings : 6148651 - 6153158 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 51

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 27213

Client Service ID : 333220

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					Permits		
51-6-0801	Lot 17 DP789099/IF1	GDA	55	750232	6150535	Open site	Valid	Artefact : -		
	Contact	Recorders	Biosis Pty Ltd - Sydney,Ms.Rebecca Morris					Permits		

Report generated by AHIMS Web Service on 13/03/2018 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 747290 - 751548, Northings : 6148651 - 6153158 with a Buffer of 0 meters. Additional Info : Due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 51

G1. INTRODUCTION

Jemena wishes to undertake the removal of structures and one building in order to reduce the requirements of off-site disposal and facilitate the remediation works

G2. STRUCTURES TO BE REMOVED

The primary structures to be removed include the following:

- Four (4) steel shed structures;
- Gas infrastructure compound (decommissioned); and
- One (1) brick storage building (c. 1964)

Figure G2–1: Location of Structures to be Demolished

G3. IMAGES OF STRUCTURES

Figure G3–1: Open Sheds

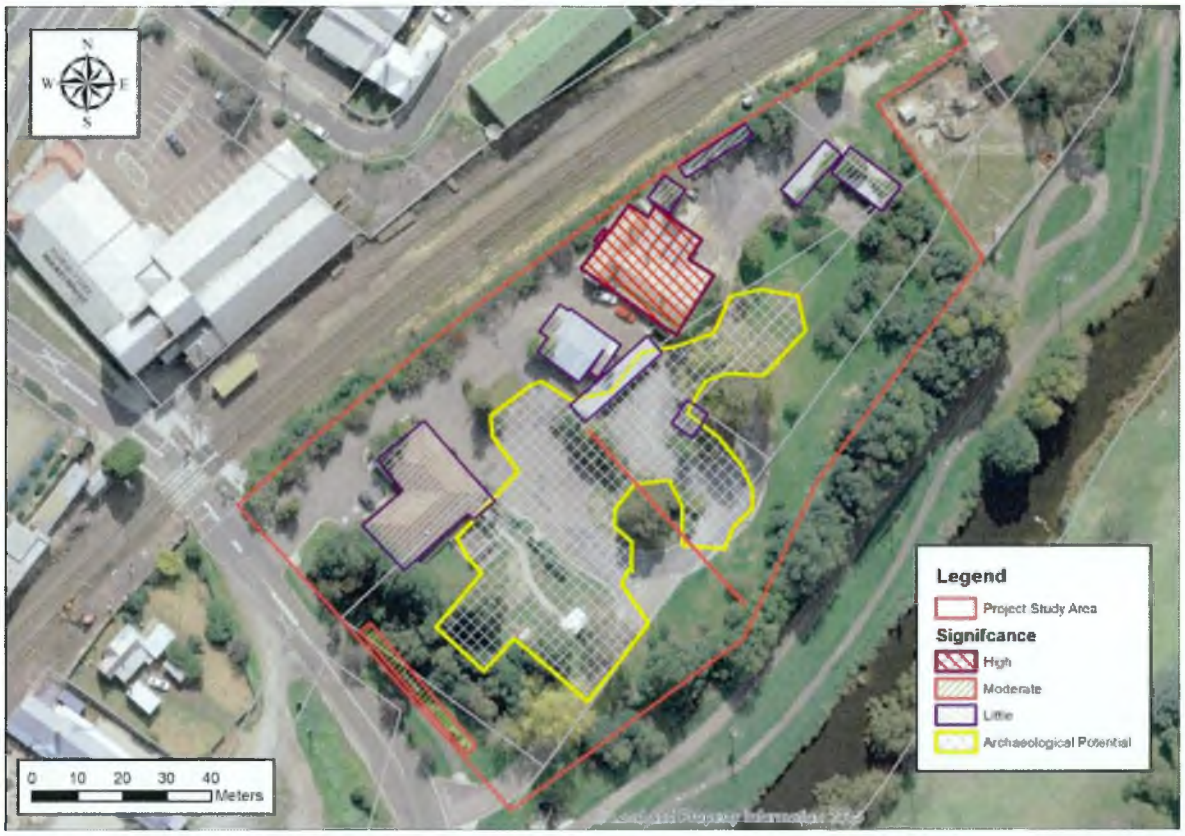
Figure G3–2: Open Sheds

Figure G3–3: Brick Storage Building

Figure G3–4: Redundant Gas Infrastructure

G4. HERITAGE

In accordance with the heritage impact assessment study provided within the SEE **Appendix H**, thee building and all shed structures fall under low significance. The building identified as having high significance will be protected during the remediation and demolition in accordance with the heritage impact assessment provided within the SEE.



G5. DEMOLITION

All demolition works will be undertaken in accordance with all applicable guidelines and legislation.

