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Marulan South Limestone Mine | SSD 7009

Historic Heritage Management Plan

Prepared for Boral Cement Limited | 7th November 2023

Marulan South Limestone Mine

SSD 7009 | HISTORIC HERITAGE MANAGEMENT PLAN

Prepared for Boral Cement Limited
22 September 2022

PR163

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1 INTRODUCTION

1.1 Background

Boral Cement Limited (Boral) owns and operates the Marulan South Limestone Mine (the mine), an open cut mine located in Marulan South, New South Wales (NSW). Limestone mining north of Bungonia Gorge began around 1830, with major developments emerging in the 1920s to supply limestone for cement manufacturing and steel making.

The limestone mine was opened in 1929 to supply limestone for cement, manufacturing and steel making. By 1953 two main pits (northern mine pit and southern mine pit) were well established and by the early 1970s the facets of the business included limestone for cement, steel making, agriculture, glass making, lime manufacturing, quicklime and hydrated lime.

The mine produces up to 3.38 million tonnes (Mt) of limestone based products per year for the cement, steel, agricultural, construction and commercial markets.

Due to changes in the *NSW Mining Act 1992* (Mining Act) and the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), a State significant development (SSD) consent under the EP&A Act was required to move mining operations beyond the area covered by the mining operations plan (MOP).

Two approvals are required for the mine:

- a consent for the Project (SSD 7009) under Part 4, Division 4.7 of the EP&A Act; and
- controlled action approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for impacts on listed threatened species and communities (sections 18 and 18A of the Act).

An environmental impact statement (EIS) was prepared to accompany the application for SSD 7009 and addresses the requirements of State agencies under the EP&A Act and the Commonwealth Department of Agriculture, Water and the Environment. A response to submissions (RTS) report was subsequently prepared to consider and respond to agency and public submissions and provide clarification of project components where relevant.

Development consent (the consent) was granted by the Department of Planning, Industry and Environment (DPIE) on 19 August 2021, to continue mining limestone at a rate of up to 4 million tonnes per annum (Mtpa) for a period of up to 30 years (the Project).

To satisfy Condition of Consent (CoC) D5(i), the EIS, RTS, development consent and other publicly available information related to the assessment and determination of SSD 7009 can be accessed on DPIE's Major Projects Planning Portal (https://www.planningportal.nsw.gov.au/major-projects/project/9691).

The consent requires the preparation and implementation of a number of management plans, strategies, protocols and procedures detailing environmental commitments, controls and performance objectives at the mine throughout its operational life. An Historic Heritage Management Plan (HHMP) is required in accordance with CoC B63.

This plan incorporates the relevant management measures presented in the EIS, RTS and conditions of consent relating to historic heritage.

The HHMP has been prepared by Pamela Kottaras, who has been endorsed by DPIE as a suitable expert in the field and with the assistance of Kerryn Armstrong. The HHMP will continue to remain a dynamic document which will be updated as required over the life of mining operations until 31 August 2051.

1.2 Overview of operations

1.2.1 Site description

The Project site is in Marulan South, 10 km south-east of Marulan village and 35 km east of Goulburn (Figure 1.1

Figure 1.1 Regional setting

Figure 1.2 Project site in the local context

). It is in the Goulburn Mulwaree Local Government Area (LGA).

The mine is separated from the Bungonia National Park (NP) and State Conservation Area to the south by Bungonia Creek and is separated from the Shoalhaven River and Morton NP to the east by Barbers Creek.

The Project site (Figure 1.2) and surrounds are characterised by rolling hills of pasture interspersed with forest to the west, contrasting with the heavily wooded, deep gorges that begin abruptly to the east of the mine, forming part of the Great Escarpment and catchment of the Shoalhaven River.

Access is via Marulan South Road, which connects the mine and Boral's Peppertree Quarry with the Hume Highway approximately 9 km to the north-west. Boral's private rail line connects the mine and Peppertree Quarry with the Main Southern Railway approximately 6 km to the north.

The Project site covers historical and proposed future areas of disturbance and comprises two geographically separate areas:

- the existing mine including the proposed 30-year mine footprint and associated infrastructure; and
- the proposed Marulan Creek Dam to be on Marulan Creek, within Boral landholdings approximately 2.5 km north of the mine entrance.

The Project site covers an area of 846.4 ha. The existing pre-SSD disturbance footprint is 341.5 ha with 256.5 ha of new disturbance associated with the proposed 30-year mine plan.

Most of the Project site is zoned RU1 - Primary Production under the Goulburn Mulwaree Local Environmental Plan (LEP) 2009. Mining and extractive industries are permissible in this zone with consent. The remaining area is zoned E3 - Environmental Management. Mining and extractive industries are prohibited in this zone. However, as agriculture is permitted in the E3 zone with consent, mining is also permitted in this zone under the Mining Sate Environmental Planning Policy with consent.

1.2.2 Overview of existing mining

The mine is sited on a high-grade limestone resource. Subject to market demand the mine has typically produced up to 3.38 Mt of limestone and up to 200,000 t of shale per annum.

The mine currently produces a range of limestone products for internal and external customers in the Southern Highlands/Tablelands, the Illawarra and Metropolitan Sydney markets for use primarily in cement and lime manufacture, steel making, agriculture and other commercial uses. Products produced at the mine are despatched by road and rail, with the majority despatched by rail.

Historically limestone mining was focused on the approximately 200-300 m wide Eastern Limestone and was split between a north pit and a south pit. A limestone wall (referred to by the mine as the 'centre ridge') rising almost to the original land surface, divided the two pits. The north and south pits were joined in 2016/2017 by mining the centre ridge to form a single continuous pit, approximately 2 kilometres (km) in length. However, the north pit/south pit nomenclature remains important as current mining operation locations continue to be reported with respect to one or other of the old pits.

Limestone and shale are extracted using open-cut hard rock drill and blast techniques. Limestone is loaded using front end loaders and hauled either to stockpiles or the processing plant using haul trucks. Oversized material is stockpiled and reduced in size using a hydraulic hammer attached to an excavator.

Limestone processing facilities including primary and secondary crushing, screening, conveying and stockpiling plant and equipment are in the northern end of the north pit. Kiln stone grade limestone is also processed on site through the existing lime plant comprising kiln stone stockpiles, rotary lime kiln, hydration plant and associated auxiliary conveying, processing, storage, despatch plant and equipment. Overburden from stripping operations is emplaced in the Western Overburden Emplacement (WOE), west of the open cut pits.

1.2.3 Overview of approved project

Consent was granted for a 30-year mine plan accessing approximately 120 Mt of limestone down to a depth of 335 m. The mine footprint focuses on an expansion of the pit westwards to mine the Middle Limestone and to mine deeper into the Eastern Limestone. As the Middle Limestone lies approximately 70-150 m west of the Eastern Limestone, the 30-year mine plan avoids mining, where practical, the interburden between these two limestone units thereby creating a smaller second, north-south oriented west pit with a ridge remaining between. The north pit will also be expanded southwards, encompassing part of the south pit and leaving the remainder for overburden emplacement and a visual barrier.

Limestone will be extracted at up to 4 Mtpa for 30 years until 31 August 2051. Clay shale will also continue to be extracted at up to 200,000 tonnes per annum (tpa). The limestone will be processed to create limestone and lime products including limestone aggregates and sand, hydrated lime and quick lime.

Existing infrastructure is being retained along with the following changes:

- relocation of a section of high voltage power line to accommodate a proposed overburden emplacement;
- realignment of a section of Marulan South Road, to accommodate a proposed overburden emplacement;
- relocation of the processing infrastructure and the stockpile and reclaim area at the northern end of the north pit to allow the northward expansion of the pit;
- development of a shared Road Sales Stockpile Area including a weighbridge and wheel wash to service both the mine and Peppertree Quarry; and
- construction of a 118 megalitre (ML) in-stream water supply dam on Marulan Creek.

Boral will transport up to 600,000 tpa of limestone and hard rock products along Marulan South Road to the Hume Highway, as well as 120,000 tpa of limestone products to the agricultural lime manufacturing facility.

The Project provides continued direct employment for 118 people on the mine site and 73 offsite. It will operate 24-hours per day, 7 days per week. Blasting will continue to be restricted to daylight hours on weekdays, excluding public holidays.

1.3 Environmental management framework

The mine operates in accordance with the Boral integrated Health Safety, Environment and Quality Management System (HSEQ MS) which establishes a strategic platform for regulatory compliance and continual improvement in environmental management. This framework is documented in GRP-HSEQ-1-01 Management System Framework and Operational Control. The Boral HSEQ MS is aligned with the international standard ISO-14001.

1.3.1 Environmental Management System

CoC D1 requires the preparation of an Environmental Management Strategy (EMS) for the mine. The EMS provides the mine's strategic framework for environmental management under which the HHMP operates.

1.4 Purpose and objectives

The HHMP describes how Boral will manage and control the historical heritage values when operating the mine.

This HHMP applies to all activities undertaken by the mine including extraction (drilling and blasting), loading and haulage of materials, stockpiling, processing (crushing, screening and conveying) and operation of the lime plant.

Specific objectives of the HHMP are to address CoCs by providing guidance on:

- management procedures for historic heritage values within, and adjacent to, the Project site during pre-construction and construction phases (Section 3);
- protocols and procedures for new cultural finds and human remains (Section 3.11 and 0;
- protocols for undertaking activities in areas that have not been previously assessed (Section 3.14);
- other administrative requirements, including post-project management of historical finds and recovered material, ongoing compliance, regular review and update of the HHMP to ensure its functionality is maintained through the Project (Section 4); and
- include a strategy for the care, control and storage of heritage relics salvaged from the site.

The HHMP is prepared for a mixed audience of consent authorities, environmental regulators and site personnel, the latter of which are responsible for implementing this plan as part of day-to-day operations.

1.5 Responsibility for implementation

The Site Manager carries ultimate responsibility for the implementation of this HHMP and providing the necessary resources as required.

The site Environmental Coordinator is responsible for implementing heritage management, inductions, carrying out and/or coordinating the monitoring and reporting requirements of this plan and ensuring the HHMP is kept up to date.

Operations personnel (Technical Manager and Mine Production Manager) are responsible for adjusting mine operations as appropriate to minimise impacts on site and neighbouring properties.

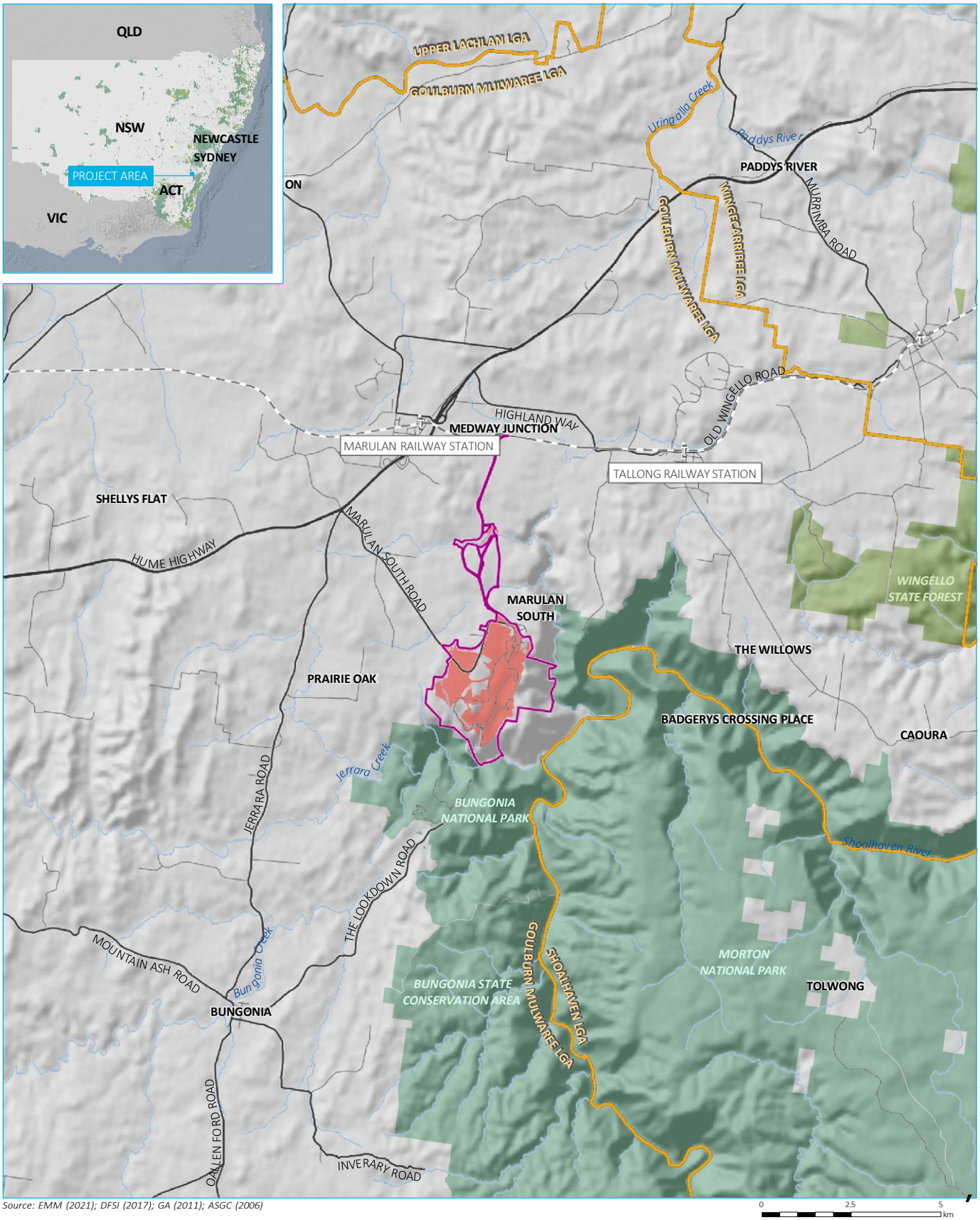
Other site personnel are responsible for reporting incidents to the shift Supervisor.

1.6 Document structure

The structure of the HHMP is outlined in Table 1.1.

Table 1.1 Structure of the HHMP

Section	Content
1	Provides an overview of the project and objectives of the plan.
2	Outlines statutory requirements associated with the development consent, environmental protection license (EPL) and consultation undertaken by the specialist to development the plan.
3	Provides management procedures for historic heritage values within, and adjacent to, the Project site during pre-construction, construction and operational phases. Provides protocols and procedures for new finds, including unanticipated finds and human remains. Provides protocols for undertaking activities in areas that have not been previously assessed.
4	Provides obligations to create training and heritage inductions. Provides the method to measure performance and statutory reporting requirements. Provides a management protocol for complaints and incidents.
5	References
Appendix A	The archaeological research design provides a guiding methodology for any excavation works.
Appendix B	The historical heritage assessment completed in 2018 which includes all identified sites and significance.



Source: EMM (2021); DFSI (2017); GA (2011); ASGC (2006)

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GDA 1994 MGA Zone 56

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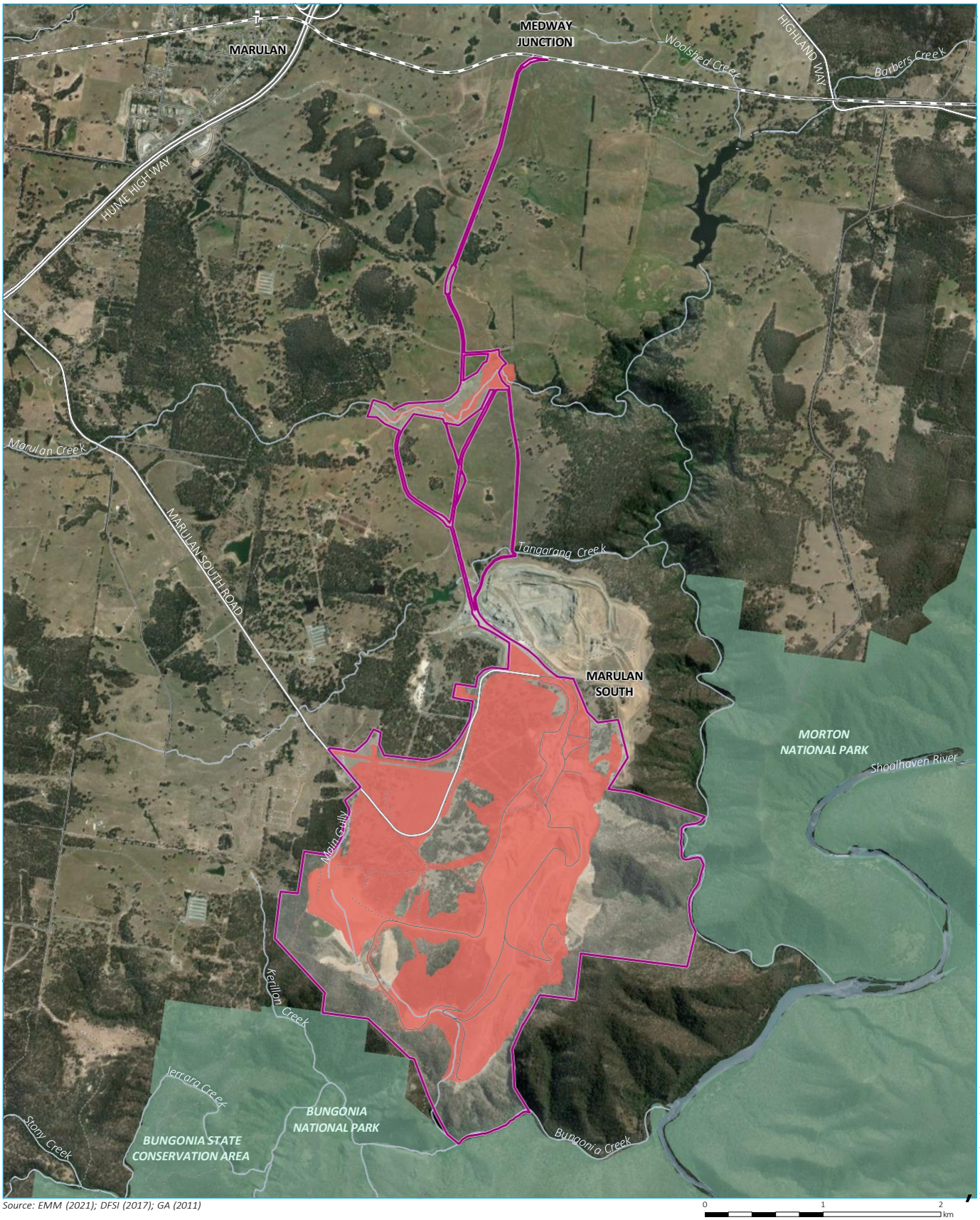
KEY

- Project area
- Disturbance footprint
- Train station
- Rail line
- Major road
- Minor road
- Named watercourse
- Named waterbody
- Local government area
- NPWS reserve
- State forest

Regional setting

Marulan South Limestone Mine
Historic heritage management plan
Figure 1.1

EMM creating opportunities



Source: EMM (2021); DFSI (2017); GA (2011)

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KEY

- Project area
- Disturbance footprint
- Train station
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve

Project area in the local context

Marulan South Limestone Mine
Historic heritage management plan
Figure 1.2

EMM creating opportunities

2 STATUTORY REQUIREMENTS

2.1 Development consent

This HHMP has been prepared in accordance with the development consent. Table 2.1 presents the consent conditions relevant to the HHMP and identifies where each condition has been addressed in this plan.

Table 2.1 Management plan requirements

Condition No.		Condition requirement	Section reference
Historic Heritage Management Plan			
B63		The Applicant must prepare a Historic Heritage Management Plan for the development, in respect of all non-Aboriginal cultural heritage items, to the satisfaction of the Planning Secretary. This plan must:	This document
	(a)	be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary	Section 1.1
	(b)	be prepared in consultation with Council and in accordance with the relevant Heritage NSW guidelines	Section 2.2
	(c)	describe how the historic heritage values of the site would be recorded and preserved;	Section 3.1 Section 3.2 Section 3.3
	(d)	identify all heritage items in the vicinity of the site and include a statement of significance for each item	Appendix B
	(e)	describe the measures to be implemented on the site or within the offset areas to	Section 3
	(e)(i)	ensure all workers on the site receive suitable heritage training/inductions prior to carrying out any activities which may cause impacts to historic heritage, and that suitable records are kept of these inductions	Section 4.3
	(e)(ii)	protect heritage items located outside the approved disturbance area from impacts of the development, beyond those predicted in the document/s listed in condition A2(c).	Section 3.7
	(e)(iii)	undertake photographic/archival recording of any items of heritage significance predicted to be impacted by the development, prior to disturbance	Section 3
	(e)(iv)	manage any new heritage items discovered during the life of the development	Section 3.5
	(f)	include a strategy for the care, control and storage of heritage relics salvaged from the site	Appendix A
Management Plan Requirements			
D5		Management plans required under this consent must be prepared in accordance with relevant guidelines, and	

		include:	
	(a)	Summary of relevant background or baseline data;	Appendix A
	(b)	Details of:	
	(b)(i)	The relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2.3
	(b)(ii)	Any relevant limits or performance measures and criteria; and	Section 4.2.1
	(b)(iii)	The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 4.2.1
	(c)	Any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Section 3
	(d)	A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 3
	(e)	A program to monitor and report on the:	
	(e)(i)	Impacts and environmental performance of the development; and	Section 4
	(e)(ii)	Effectiveness of the management measures set out pursuant to condition D4(c);	Section 4
	(f)	A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 3.12
	(g)	A program to investigate and implement ways to improve the environmental performance of the development over time;	Section 4.4.1
	(h)	A protocol for managing and reporting any:	
	(h)(i)	Complaint; or	Section 4.2.2
	(h)ii)	Failure to comply with other statutory requirements;	Section 4.2.4
	(i)	Public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	N/A
	(j)	A protocol for periodic review of the plan.	Section 4.4.2

2.2 Consultation

CoC B63 requires this plan be prepared in consultation with Goulburn Mulwaree Council. This plan was submitted to council for review and comment on 29 March 2022. Boral has since contacted Council multiple times, via phone and email, however Council has not provided comments. Refer to Appendix C.

3 HISTORICAL HERITAGE MANAGEMENT

3.1 Heritage management objectives

The overriding objective in managing heritage significance is avoidance of impacts. Avoidance removes the need for mitigation or amelioration and is in keeping with the philosophy of the Australia International Council on Monuments and Sites (ICOMOS) *Burra Charter 2013* (Burra Charter) (ICOMOS Australia 2013).

In all cases where significant heritage values may be affected by a project, the precautionary approach can be implemented by excising the construction disturbance footprint where it intersects with heritage items or with areas that have been identified as having potential to contain relics. This was the approach adopted by Boral as part of the refinement process for the project; however as the historical sites are located around the Project site, it is not possible to avoid them all.

The HHMP is designed to guide the management of heritage within the approved disturbance footprint. This includes the management of heritage values with varying levels of predicted impacts as well as unanticipated heritage values, such as relics, that may arise. Additionally, the HHMP sets out actions to avoid inadvertent impacts and provide guidance on what actions are required in the event of an unanticipated find.

3.2 Obligation to avoid harm

All employees, contractors, sub-contractors and visitors to the Project site have an obligation to avoid harming historic heritage (Figure 3.1 Historical Heritage sites

) unless engaged in an historical heritage management activity described in this plan. This is discussed further in Section 4.3.1, historic heritage inductions.

3.3 Management of known sites – general

There have been several management measures drafted in the following sections to ensure that the appropriate protection is afforded to each historic heritage item. Historic heritage management over the life of the project will primarily take the form of either protective measures to avoid sites, or the creation of records for sites that will be impacted.

There are 13 sites within the project boundary (Figure 3.1 Historical Heritage sites

Project impacts to historical heritage are anticipated to occur at eight known sites that will be either wholly or partially physically disturbed. The items, level of disturbance, and management measures are presented in Table 3.1 and are described in more detail in Section 3.4. In addition to this, there are two sites abutting the Project site to the south: Bungonia National Park (LEP I027) and MS10 (Mt Frome Mine – unlisted). One site is situated to the north-east: Glenrock Homestead and Outbuildings (LEP I314). These three sites are outside of the Project boundary and will not be physically impacted by construction or operation of the Project.

Boral will not disturb any historic heritage item (approved for disturbance by the development consent), until this HHMP is approved by the Planning Secretary. A historic heritage item, will only be disturbed after the HHMP is approved by the Planning Secretary, and the historic heritage mitigation measures outlined in this plan, that are specific to that heritage item, have been undertaken.

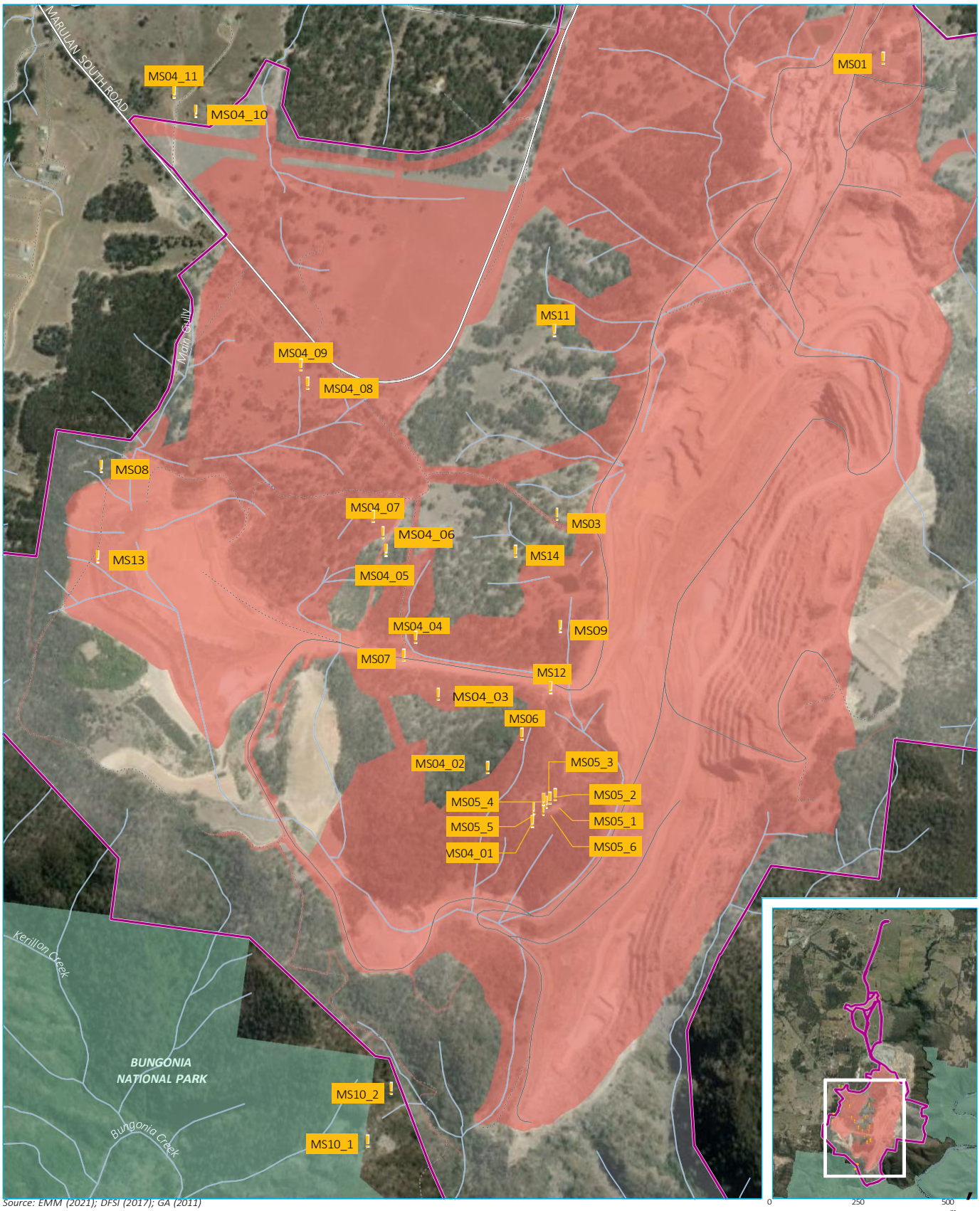
3.4 Management of known sites – specific

This section details the management and mitigation measures for the 13 historic heritage items identified within the project boundary.

Table 3.1 Management of known sites

Site ID	Site name	Impact level/type	Management / mitigation
	Entire Project site	Partial	• Full archival 3D drone recording of development footprint and immediate surrounds prior to impacts. The development footprint and its surrounds are part of a larger significant cultural landscape, which will be partially physically impacted. Views will also be affected.
MS01	Marulan South village	No impact	• Passive protection to avoid accidental impacts • Include in general landscape digital photographic archival record • Archaeological recording through topographic survey
MS03	Hut/camp site	Total impact	• Active protection until excavated (Section 3.6) • Photographic archival recording (Section 3.9) • Archaeological recording through topographic survey • Archaeological excavation (sample area)
MS04	Aerial ropeway	Partial (majority) impact of elements	• Photographic archival recording (Section 3.9) • Archaeological recording through topographic survey • Move metal buckets from former aerial ropeway for safekeeping. Place buckets in locations that will not be impacted to remain in situ
MS05	Lime kiln group	Total impact	• Active protection until excavated (Section 3.6) • Photographic archival recording of entire group (Section 3.9) • Archaeological recording through topographic survey • Archaeological excavation of one of each type (two types of kilns exist on the site)
MS06	Explosives hut	Total impact	• Photographic archival recording (detail not required) (Section 3.9) • Archaeological recording through topographic survey
MS07	Old alignment of Marulan South Rd (now closed)	Total impact	• Include in final spatial mapping of sites; data to be extracted from cadastre • Photographic archival record of a representative sample
MS08	The Feltham house	No impact	• Active protection through fence and signpost (Section 3.6) • Photographic archival recording (Section 3.9)

			• Archaeological recording through topographic survey • Record any artefacts and structures that occur in the area of impact
MS09	Camp (Armitt family)	Total impact	• Photographic archival recording (Section 3.9) • Archaeological recording through topographic survey
MS10	Mt Frome mine and rail	No impact	• These items are outside the Project site • Include in general landscape digital photographic archival record
MS11	Ramp of earth and timber	No impact	• Active protection through fence and signpost (Section 3.6) • Photographic archival recording (Section 3.9) • Archaeological recording through topographic survey
MS12	Lime-kiln Road	Total impact	• Include in final spatial mapping of sites • Photographic archival record of a representative sample (Section 3.9)
MS13	Mt Frome Road	Partial impact	• Photographic archival recording of a representative sample of the section of road to be removed (Section 3.9) • Include in spatial mapping of sites; data can be extracted from cadastre
MS14	House site – chimney remaining; planted trees, possibly quince; track.	No impact	• Erect a fence and signpost • Photographic archival recording (Section 3.9) • Archaeological recording through topographic survey • Undertake archaeological excavation if related artefacts and structures extend to the area of impact



Source: EMM (2021); DFSI (2017); GA (2011)

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KEY

- Project area
- Disturbance footprint
- Historic heritage item within and immediately adjacent to the project area
- Major road
- Minor road
- Vehicular track
- Watercourse/drainage line
- NPWS reserve

Project area in the local context

Marulan South Limestone Mine
Historic heritage management plan
Figure 1.2

EMM
creating opportunities

3.5 General management measures

- Historic items that are identified as not being impacted by the historical heritage assessment (HHA) will be protected from harm through either active or passive protection measures.
- Active protection means construction of fencing and controls implemented on access by those undertaking activities within the project boundary.
- Passive protection means no fencing or other active measures will be applied as the sites are at limited risk of inadvertent impacts because they are a suitable distance from the development footprint. These sites are to be included on constraints mapping so that their locations are known.
- Digital archival photographic recording will be performed prior to disturbance of sites identified in Table 3.1.
- Project personnel will be informed of the significance of heritage items as part of site inductions and toolbox talks.
- Topographic survey will be undertaken for the sites identified in Table 3.1.

3.6 Active protection close to development footprint

Four sites will have active protection (MS03, MS05, MS08 and MS11). Measures to actively protect these sites include the installation of demarcation and signposts as dictated below, before construction activities begin. MS03 and MS05 will be impacted, therefore active protection will be implemented for the sites until all mitigation measures have been met. These measures are proposed with the understanding that construction and operation activities will be restricted to identified work areas and access tracks and deviations will not be permitted.

Demarcation and signposts

Heritage items within 20 m of the Project disturbance footprint will be avoided through measures to make them visible. This will require the installation of treated timber poles, or similar, painted with high visibility paint around the visible extent of the sites with an approximate 5 m buffer from the edge of visible site fabric. A suitably qualified archaeologist will demarcate site locations and where the poles should be erected.

A durable sign will be attached to the posts including words to the effect of:

“Environmentally sensitive area; do not disturb; contact the Site Manager for more information”.

The location of historic heritage items that are not to be impacted by the Project have been identified in Section 3.4 above and will be included in induction and training procedures.

3.7 Passive protection away from project activities

Passive management will apply to two historic items (MS01 and MS06) that have been identified for protection inside the project boundary but over 50 m from the development footprint. While no fencing, signage or active land management measures are proposed for these sites, their locations will be noted on inductions for persons working on, or visiting, the Project site.

Passive management will also apply to three historic items outside the Project boundary including MS10, Bungonia National Park (LEP I027) and Glenrock Homestead and Outbuildings (LEP I314). As they are outside the Project boundary, active protection is neither required, nor possible.

Items requiring passive management will be clearly identified during project induction and toolbox talks as no-go areas.

3.8 Topographic survey

The relevant sites and surrounding landscape will be surveyed and mapped prior to disturbance of historic heritage items. The survey will include the creation of detailed plan drawings and the digital recording of elevations and landscape features for the creation of topographic maps.

A complete 3D drone survey will be undertaken of the Project site and surrounding views and kept in the digital files as a reference. The drone survey should capture the site as is, before works approved under the development consent begin.

Maps and plans will be stored in digital form by Boral and provided to researchers including students and historians as required, notwithstanding confidentiality issues.

The topographic survey will form part of the archival record.

3.9 Digital archival photographic recording

A digital archival photographic record will be prepared prior to any changes to the landscape and heritage items in the Project site. Photographic archival recording is important in recording change, for posterity and future research, and in keeping a record of the place's state before that change.

The digital photographic record will be prepared in accordance with the Heritage Manual guidelines, *Photographic Recording Of Heritage Items Using Film or Digital Capture* (Heritage Office 2006) and *How to prepare archival records of heritage items* (NSW Heritage Office 1998).

Photographic archival recording will be undertaken by a project archaeologist and will include:

- representative features of the MS04 including the engine room. That is, at least one pulley tower, an example of the cable, one set of tower plinths and one of each type of carrier. The report must also include the survey plan of the entire aerial ropeway;
- all sites identified for impact, including MS06, MS07, MS09, MS12 and MS13;
- the landscape of the Feltham's house MS08 (including the house ruins);
- Marulan South Village MS01; and
- the camp landscapes (MS09 and MS11) that will be impacted by the Project.

Photographs will be taken from ground level and using drone photography to capture discrete sites with more detail than current aerial photography allows.

3.10 Archaeological excavation

An archaeological research design (ARD) is located in Appendix A. This document should be used to guide the management of MS03 and MS05 along with the digital archival photographic recording. All archaeological excavation photographic records should be completed in accordance with the *Photographic Recording Of Heritage Items Using Film or Digital Capture*. this includes MS03, MS05, MS08, MS09, MS11 and MS14.

3.11 Unanticipated finds protocol

3.11.1 Discovery of new historical items

Field survey and desktop analysis for the HHA and statement of heritage impact (SoHI) was thorough but in some circumstances, where early historical data such as maps and plans were not available, a reliable characterisation of the archaeological landscape cannot be made,

especially in this early historical landscape. Therefore, it is possible that archaeological sites exist that were not recorded.

In the event of discovery of new historical sites within the project boundary, the following will apply:

- work will immediately, but temporarily, cease and a minimum of 10 m around the site will be secured with temporary fencing/ flagging to protect the find;
- the find will be immediately reported to the work supervisor who will immediately advise the site Environmental Coordinator or other nominated senior staff member;
- an archaeologist will be contacted to assess the find, where relevant, and determine if it is clearly a relic or has moderate to high potential to be a relic (this may require additional research). If possible, identification would be completed over email using photographs and if necessary, the archaeologist will attend the site;
- if the find is determined to be a relic, a 146 notification (of the NSW *Heritage Act 1977*) is to be forwarded to the Heritage Council who will be consulted on the appropriate management measures;
- if the find is assessed as a significant work (that is, government infrastructure such as early roadway), an assessment of significance will be completed, and the item will be recorded;
- if the find is assessed and is not a relic, work inside the area that was made a no-go area can re-commence; and
- any new sites will be added to the HHMP site inventory within six (6) weeks.

3.12 Management of new historical items

This section sets out the measures that will be employed for newly identified historic items. Appropriate management measures agreed to with the Heritage Council could range from do nothing to archaeological excavation.

Where archaeological excavation is required, it must be completed by a qualified archaeologist(s). The management measures in the following sections will ensure that the appropriate protection is afforded to each item.

3.12.1 Newly identified sites within 20 m of approved disturbance areas

Avoidable sites that are within 20 m of approved disturbance areas of the development footprint will be managed through active protection measures identified in this plan (Section 3.6).

Sites that cannot be avoided will trigger the stop work procedure described in Table 3.2.

3.12.2 Newly identified sites that are not at risk of impact

Sites considered not to be at risk (ie those that are over 20 m from approved disturbance areas of the development footprint) will be avoided through passive protection (Section 3.7).

Table 3.2 Management of newly identified items

Site type	If the site can be avoided	If avoidance is not feasible
Potential relics Archaeological sites that may be of local or State significance. Sub-surface structures (bonded bricks, timber or stones in formation) and soil deposits with artefacts concentrations.	• Apply active or passive protection measures (Section 3.6 or 3.7).	• Assess significance to develop a suitable management strategy. • Boral to contact the project heritage specialists and provide detailed and contextual photographs and intended treatment (eg, total or part demolition, avoidance). • The project heritage specialists will provide advice via email, or may determine that a site visit and additional research are required to assess the item. • If the find is determined to be a relic, the NSW Heritage Council will require notification under s146 of the Heritage Act prior to disturbance of the item. • If the find is a relic, management would be in accordance with the NSW Heritage Council guidelines *Archaeological Assessments* 1996 and *Assessing Heritage Significance 2015* and the ICOMOS *Burra Charter 2013*. • The salvage program will require a report on the methods and outcomes of the removal. • If the find is a work of significance, advice from the project heritage specialist will be sought.
Moveable heritage items	• Apply active protection measures (Section 3.6).	• Moveable heritage includes items such as mining, camp-related or farming infrastructure. Immovable items, such as walls and fences, or archaeological artefacts/ sites are not included in the definition of moveable heritage. • If moveable heritage items will be impacted through construction and/or operation activities, the following measures will be employed: – the project archaeologist will be contacted and informed of the item and the need to move it; – archival recording of the item will be undertaken prior to removal to capture context; and – the item will be protected by re-locating it to another area of the property, not impacted by works, in consultation with the landholder.
Built heritage	• Apply active or passive protection measures (Section 3.6 or 3.7).	• Assess significance to develop a suitable management strategy. • Boral to contact the project heritage specialists and provide detailed and contextual photographs and intended treatment (eg, total or part demolition). • The project heritage specialists will provide advice via email or may require a site visit and additional research to assess the find. • If the find is assessed to be of local or State significance, management would be in accordance with the ICOMOS *Burra Charter 2013*. • The salvage program will require a report on the methods and outcomes of the removal.

3.13 Discovery of human remains

In the event that known or suspected human remains, including skeletal remains, are encountered during the activity, the procedure presented in Table 3.3 will be followed.

Table 3.3 Procedure for the discovery of potential historic human remains

Stage	Actions
1. Stop work and secure site	• The immediate vicinity will be secured to protect the find and the find will be immediately reported to the Environmental Coordinator who will immediately advise the Site Manager or other nominated senior staff member. • A 10 m no-go zone will be established around the immediate area of the site. • Contact the project heritage specialist for advice – provide images and location information via email.
2. Establish the origin of the remains	• This will occur after discussion with the project heritage specialist. • If the bones are identified as human or suspected of being human, follow step 3 below.
3. Notification to authorities and stakeholders	• The Site Manager or other nominated senior staff member will notify: – Marulan Police (**02 4841 1516**) as soon as practicable and within two days of notifying DPIE – the police will notify the State Coroner; – if the human remains are less than 100 years old, they will be dealt with under the *NSW Coroners Act 2009* (Coroners Act); – determine if the bones are ancestral Aboriginal remains or a historical burial; and if so, manage as step 4 below.
4. Determination of the find and further notification	• If it is determined that the skeletal remains are historic in origin (and not of Aboriginal origin), engage project heritage specialist to assist and/or facilitate management of the remains with Boral, which will include contacting Heritage NSW. • If it is determined that the skeletal remains are Aboriginal ancestral remains, follow the process in the AHMP.
	• If the skeletal material is not human, and not part of an archaeological deposit, resume work. Ensure determination of non-human material is provided by relevant experts (eg Police or DPIE archaeologist) before resuming work.
	• If the remains are historical in nature the NSW Heritage Council will be consulted to determine requirements in accordance with the Heritage Act, relevant guidelines and other relevant acts. Further actions are likely to require adherence with the following NSW Heritage Council guidelines: – *Conservation Management Documents: Guidelines on Conservation Management Plans and other Management Documents.* – *Skeletal Remains; Guidelines for Management of Human Skeletal Remains*.
	• If the remains are non-Aboriginal and non-historical human remains, Boral will continue to liaise with police. Works will not proceed until written approval is granted from relevant authorities.
5. Initial planning and reporting if it is determined that the remains are historic remains.	• Historic remains certificate to be submitted to the Police/Coroner to address the Coroners Act. • Exhumation of human bones will require consultation and permits under legislation other than the Heritage Act. • Engage an archaeologist to record the site and undertake significance and impact assessment of the burial site. Site recordings must involve drawings and photography. Additional technical studies and samples may be taken such as those for dating and biological information (eg age, sex and health of deceased).

	• In consultation with the archaeologist, establish an investigation area and any additional protocols to be adhered to during further investigation. The investigation will aim to establish whether other burials are in the immediate area or likely to occur nearby. Suitable methods could include controlled and monitored hand or machine excavation and/or non-invasive techniques such as geophysical techniques.
6. Engagement with construction and operation manager to determine whether disturbance of the burial site(s) can be avoided.	• If the historical human remains cannot be avoided: • consult with project archaeologist to facilitate recovery and reburial protocols and actions - recovery methods must include: – consultation with Heritage NSW and any other agency that is required. – exhumation in a controlled archaeological method and placed into a secure, temperate controlled storage location until a final reburial site can be identified; – access to the secure storage location containing any human remains will be managed and facilitated by Boral; – the project archaeologist will determine if further studies, media releases or other investigations are appropriate for the finds; and – where required, Boral will help facilitate any culturally appropriate reburial or ceremonial methods; • prepare report for Heritage NSW on the outcome of relevant investigation, recovery, and reburial outcomes. • update HHMP. • Record the burial site on the Marulan South Limestone Mine Continued Operations historical heritage database. • Works will not recommence until written approval is received from relevant authorities.
	• If the historical human remains can be avoided: – develop appropriate management and mitigation measures in consultation with archaeologists; – prepare report for DPIE; – update HHMP; and – works will not recommence until written advice is provided from the project archaeologist that the remains are suitably protected and away from project impacts.

3.14 Any proposed activity proposed outside of the Project site

Ground disturbance proposed outside of the approved development footprint, or outside other existing approved areas under SSD-7009, cannot occur without appropriate approvals including historical heritage assessment and other relevant legislative and internal approvals.

If the proposed activity requires additional environmental assessment, such as a modification to the existing development consent, an HHA may be required in accordance with relevant assessment requirements (as specified by DPIE).

4 COMPLIANCE, TRAINING, REVIEW, AND IMPROVEMENT

4.1 Key points

- This section provides information to ensure the HHMP is complied with during the Project; training requirements and processes and procedures to manage complaints and non-conformances.
- Criteria and timing for revisiting and updating the HHMP is provided in this section.

4.2 Compliance and auditing

4.2.1 Measuring performance

Actions undertaken under the plan will be reported as part of required Independent Environmental Audits (CoC D13) to DPIE. Compliance with the plan will be measured by standard environmental auditing procedures undertaken at regular intervals. The audit may include an assessment of compliance with development consent conditions and may include auditing the following measures:

Audits will include an assessment of compliance with relevant conditions of consent and will include auditing the following measures:

- protection of all nominated sites;
- inductions are taking place and include appropriate material; and
- the Marulan South Limestone Mine Continued Operations historic heritage database is updated and maintained as required by this plan.

Boral may engage a heritage consultant to assist with reporting compliance as part of an Independent Environmental Audit. Any incidents and non-compliance notifications will follow requirements set out in sections 4.2.3 and 4.2.4 and the EMS (refer to Section 1.3).

4.2.2 Complaints

The community complaints protocol as set out in the EMS for the Project will apply to the works associated with this HHMP. Complaints will be recorded in the Boral online HSEQ system and managed through the HSEQ Sequence system.

Any complaints will be considered in improvements of the HHMP.

4.2.3 Incident reporting

In accordance with CoC D9 Boral will immediately notify DPIE and any other relevant agencies after it becomes aware of an incident resulting in unauthorised historic heritage impacts. The notification will be in writing through DPIE's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.

The development consent defines an 'incident' as:

"An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance".

Material harm is defined as:

"*harm to the environment that:*

involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or

results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)

This definition excludes "harm" that is authorised under either this consent or any other statutory approval"

4.2.4 Non-compliance reporting

The development consent defines a 'non-compliance' as:

"An occurrence, set of circumstances or development that is a breach of this consent".

In accordance with CoC D10 Boral will, within seven days of becoming aware of an historic heritage non-compliance, notify DPIE of the non-compliance. The notification will be in writing through DPIE's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

The Site Manager (or delegate) is responsible for reporting to DPIE any occurrence or set of circumstances that that has breached any conditions of consent relating to historic heritage.

Note that a non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

Investigation into a non-compliance will include:

- a clear description of the non-compliance, and its actual/potential harm to historic materials;
- all personnel involved in the non-compliance, their organisation and contact details;
- any corrective actions undertaken to address the non-compliance; and
- next steps, including the need for additional heritage activities and/or requirements to contact DPIE/Heritage NSW to advise them of the non-compliance.

Any non-compliance will be considered in improvement of the HHMP as outlined in Section 4.4.

4.3 Historic heritage induction requirements

4.3.1 Site inductions

All employees, contractors, sub-contractors involved in ground-disturbing activities will undergo an historical heritage induction. Historical heritage inductions will be conducted either by the site Environmental Coordinator, lead contractor (once appropriately trained to present the induction), or their subcontractor (once appropriately trained to present the induction). In addition, visitors to the Project site and general contractors not involved in ground-disturbing activities will be made aware of their obligation to avoid harm to historic heritage through an historic heritage component of the general site induction. Records of these inductions will be kept by Boral/its contractors.

The following points will be conveyed through site induction material:

- historical sites have been identified across the Project site and beyond;
- historical sites are protected by law; the development consent includes conditions allowing impacts to certain historical sites in accordance with this plan and the protection of others that will be avoided;
- historical sites include built sites (such as houses, kilns and ropeways), as well as archaeological sites (relics) and views;
- historical sites can be hard to recognise; therefore, reference must be made to the historical heritage figures in this plan so that they are clearly identified;
- prior to disturbing a historical heritage site, specific management measures outlined in Section 3 must be applied; and
- there are unanticipated finds procedures which involve stopping work if historic items/sites or skeletal material are identified.

4.4 Review and improvement and data management

4.4.1 Continual improvement

Continual improvement of this HHMP will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. The continual improvement process will be designed to:

- identify areas of opportunity for improvement of environmental management which leads to improved environmental performance;
- determine the root cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address non-conformances and deficiencies;
- verify the effectiveness of the corrective and preventative actions; and
- document any changes in procedures resulting from process improvement.

4.4.2 Annual review

By the end of July each year after the commencement of development, or other timeframe agreed by the Planning Secretary, Boral will prepare a report for submission to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary.

This report will be prepared and submitted in accordance with CoC D11. Historic heritage will be measured and reported against conditions B63 – B65.

4.4.3 HHMP review and update

The HHMP is to be reviewed in accordance with CoC D5 (j). The HHMP will be revisited and updated in accordance with CoC D7 if necessary, in the following circumstances:

- where modification to the Project occurs that may affect impacts to historic heritage, ie where approved changes to the Project change or remove previously planned impacts on historic heritage where mitigation was proposed in the HHMP but is no longer required;
- where complaints and/or non-conformances have been identified that require changes to ensure suitable management of historic heritage in future stages of the Project;
- the discovery of human skeletal remains and/or burials;
- where new historic sites are discovered, they must be added to the inventory in this HHMP within six (6) weeks of the find;
- where mitigation was proposed in this plan but is no longer required; and/or

- where other conditions or situations arise that require the updating of this plan.

Each year following the annual review outlined in Section 4.4.2 and every three years after the independent environmental audit detailed in CoC D13, Boral will review this plan and update it if necessary, with findings of the annual review and independent environmental audit, to promote continuous improvement.

In accordance with CoC D8, if changes are required to this plan, it will be resubmitted to the Planning Secretary for approval within six weeks of the review. The most recent version of this plan as approved by the Planning Secretary is to be implemented.

Boral will continue to apply the approved HHMP until the approval of the revised HHMP.

4.4.4 Marulan South Limestone Mine Continued Operations Heritage Database

The Marulan South Limestone Mine Continued Operations historic heritage database will be created and maintained by Boral. The database will be a 'live' document of historical heritage resources within the project boundary that will be continuously updated to reflect new finds and their management status.

The database will include:

- a record of current location, significance of all historical sites in the project boundary or in the vicinity that may be affected; and
- management measures still to be completed, measures underway and measures completed.

The database will comprise datasets available in both MS Excel format and Geographical Information System (GIS) format. GIS data will be made available for mapping purposes to assist in the identification and management of all heritage sites and areas during the life of the project. The database will be 'version controlled' to ensure that all relevant parties involved in heritage management are working with the most up-to-date datasets.

Boral will be responsible for ensuring that all relevant employees, contractors and subcontractors are provided with up-to-date datasets.

The database will be updated within six (6) weeks in the following circumstances:

- discovery of human remains;
- discovery of new relics, works or built heritage items;
- changes or incidents to existing sites;
- changes to the management status of heritage sites and areas; and/or
- the completion of heritage activities such as survey, excavation, and protective measures.

Note that any newly identified historical archaeological sites of local or State significance must be notified to the NSW Heritage Council under s146 of the Heritage Act.

5 REFERENCES

Australia International Council on Monuments and Sites (ICOMOS), 2013, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, Australia ICOMOS Inc.*

Heritage Office, Department of Planning NSW, 2009, *Assessing Significance for Historical Archaeological Sites and 'Relics'*, NSW Heritage Branch.

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- 2006, Historical Archaeology Code of Practice, NSW Heritage Branch.
- 2004, Investigating Heritage Significance, NSW Heritage Branch.
- 1998 How to Prepare Archival Records of Heritage Items, NSW Heritage Branch.
- 1996, Archaeological Assessments Guidelines, NSW Heritage Branch.

EMM Consulting, 2018 '*Marulan South Limestone Mine Continued Operations Project: Historical heritage assessment and statement of heritage impact*', prepared for Boral Cement Limited.

APPENDIX A

Archaeological Research Design

Marulan South Limestone Mine | SSD 7009

Archaeological Research Design

Prepared for Boral Cement Limited
December 2021

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Marulan South Limestone Mine | SSD 7009

Archaeological Research Design

Report Number

J210454 2

Client

Boral Cement Limited

Date

16 December 2021

Version

v1 Draft

Prepared by

Kerryn Armstrong
Senior Archaeologist
17 September 2021

Approved by

Pamela Kottaras
National Technical Lead - Historic Heritage
17 September 2021

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Appendices

Tables

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1 Introduction

1.1 Overview

EMM Consulting Pty Ltd (EMM) has been engaged by Boral Cement Limited (Boral) to complete the archaeological research design (ARD) for sites MS03 (the camp site) and MS05 (the lime kilns) at the Marulan South Limestone Mine (the Project site). The proposed expansion of the mining operations may impact on these sites or other unexpected finds. This report forms Appendix A of the historical heritage management plan (HHMP) for the Project; reference should be made to the HHMP before activities on the site begin.

1.2 Background

1.2.1 Purpose of this document

This ARD has been prepared to meet recommendations by EMM in the prepared statement of heritage impact (SoHI) (EMM Consulting Pty Ltd, 2018). It has been prepared to guide the management of archaeological resources in the construction impact zones identified in Figure 1.1. It forms an appendix of the historic heritage management plan (HHMP) prepared by EMM (2021).

1.2.2 Location

The Marulan Limestone Mine is in Marulan South, 10 km south-east of Marulan village and 35 km east of Goulburn in the Goulburn Mulwaree Local Government Area (LGA). The mine is separated from the Bungonia National Park (NP) and State Conservation Area to the south by Bungonia Creek and from the Shoalhaven River and Morton NP to the east by Barbers Creek.

The Project site and surrounds are characterised by rolling hills of pasture interspersed with forest to the west, contrasting with the heavily wooded, deep gorges that begin abruptly to the east of the mine, forming part of the Great Escarpment and catchment of the Shoalhaven River.

Access is via Marulan South Road, which connects the mine and Boral's Peppertree Quarry with the Hume Highway approximately 9 km to the north-west. Boral's private rail line connects the mine and Peppertree Quarry with the Main Southern Railway approximately 6 km to the north.

The Project site includes historical and proposed future areas of disturbance and comprises two geographically separate areas:

- the existing mine including the proposed 30-year mine footprint and associated infrastructure; and
- the proposed Marulan Creek dam to be on Marulan Creek, within Boral landholdings, approximately 2.5 km north of the mine entrance.

The Project site covers an area of 846.4 ha. The existing pre State Significant Development (SSD) disturbance footprint is 341.5 ha with 256.5 ha of new disturbance associated with the proposed 30-year mine plan.

Most of the Project site is zoned RU1 - Primary Production under the *Goulburn Mulwaree Local Environmental Plan* (LEP) 2009. Mining and extractive industries are permissible in this zone with consent. The remaining area is zoned E3 - Environmental Management. Mining and extractive industries are prohibited in this zone. However, as

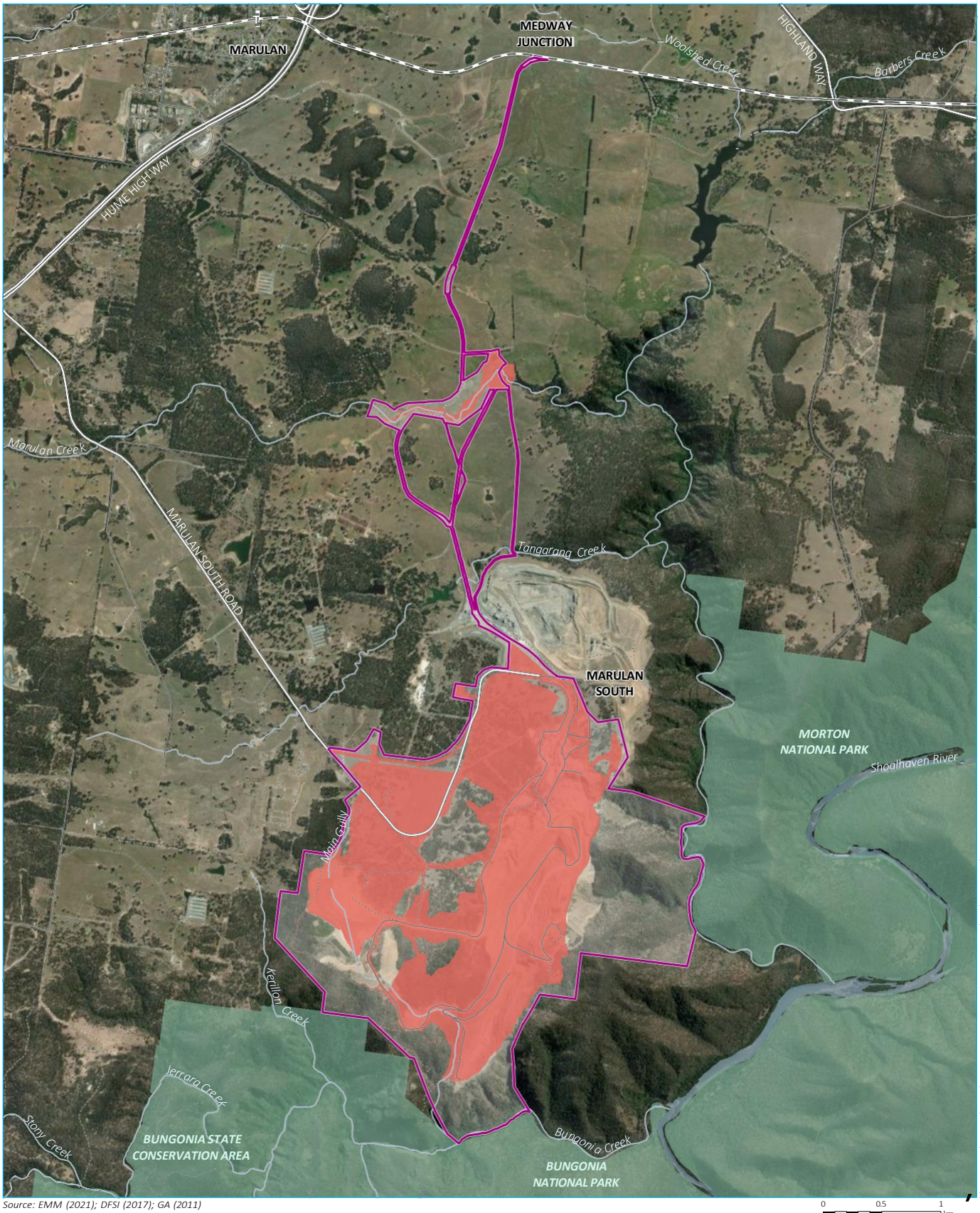
agriculture is permitted in the E3 zone with consent, mining is also permitted in this zone under the Mining State Environmental Planning Policy with consent.

1.2.3 Report limitations

This report has been prepared to detail the process of excavation for the camp site (M03) and the lime kiln group (M05). In addition to this, the report will indicate the preferred method for other possible excavations throughout the project area, but this will not include an exhaustive list. Should an unexpected find require excavation, a suitable excavation method based on the methods below should be designed for the site.

1.2.4 Authorship

The report was prepared by Kerryn Armstrong (EMM Senior Archaeologist) and reviewed by National Technical Lead for Historic Heritage, Pamela Kottaras (EMM Associate Archaeologist).



Source: EMM (2021); DFSI (2017); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

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KEY

- Project area
- Disturbance footprint
- Train station
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- NPWS reserve

Marulan South Limestone Mine disturbance footprint

Marulan South Limestone Mine
Archaeological research design
Figure 1.1

EMM
creating opportunities

2 Archaeological potential and significance

2.1 Archaeological potential

2.1.1 The project area

The project area has been mined since 1826 for marble, limestone, granite and arsenic. The potential for extractive industries, particularly in the 1800's, drew miners to the area where they created communities. Within the project area both industrial and residential activities were undertaken, both of which have left remnants. The two sites described below (MS03 and MS05) are indicative to the type of sites found within Marulan South and of which more may be identified during works.

Archaeological features that may occur as unidentified finds include:

- indications of camp sites;
- footings of huts/houses;
- mining infrastructure;
- railway lines;
- wells/cisterns;
- stables/cart and dray equipment; and
- isolated artefacts.

2.1.2 The camp (MS03)

MS03 is inside the project area boundary (Figure 1.1) on Portion 17, which was owned by James Hogg. The landform is a gentle slope that overlooks the mine. Land modification suggests something more than a temporary camp site. This area was described by local knowledge holders as possibly containing a hut and a road. The presence of larger stone blocks may be evidence of a building or road border.

The road is visible in the landscape as a graded track lined with stones.

Fire pits, adjacent to the road, contain broken glass, ceramic, porcelain, bricks and tin. The interpretation of this area is undecided as it may have formerly contained a hut, which is evidence of something more substantial than an area to camp. It also contains strong evidence of being a camp site and therefore may be a workers' accommodation area. This location may also be where timber was cut to fire kilns. Archaeological investigation may yield information that will determine the nature of the site.

MS03 is an archaeological site and has research potential.

Archaeological evidence that may occur at MS03 includes:

- indicative camp/hut lay out;

- floorplans for tents and/or hut;
- drainage trenches;
- material culture relating to daily living;
- evidence of sawmills and brick kilns; and
- community areas.

2.1.3 The lime kilns (MS05)

MS05 consists of a complex of structures, roads and associated landscape modification in the south of the project site (Figure 2.1). It includes two areas of lime kilns (Plate 2.1) approximately 100 m apart on a hill slope.

Kiln Area A (refer to HHA) consisted of kiln towers of local stone, brick and mortar, and wooden and iron beams, all with evidence of firing and burning. A road, areas of slag slipping down the road embankment, landscape modification for water management, and areas of glass, ceramic and metal were identified around the kilns. The road is the terminus of Lime-kiln Road, which underwent a name-change to Marulan South Road and was redirected approximately 1.3 km to its north.

The kilns were constructed of stone and built into the banks or side of steep hills. Only portions of the rear stone wall, which was built against the hill, and the side buttresses remain. It is this group of kilns that are those most likely built by Hogg. The kilns in Area A are in poor condition but the ramps that connected the road to the kiln survive. The area is overgrown with thick woody weeds that will have to be removed for clear access.

Kiln Area B (refer to HHA) consists of two kilns located on a hill slope approximately 100 m east from Kiln Area A, adjacent to a track. The remains of the kilns consisted of bricks, earthworks, wooden beams and stones with evidence of firing and burning. Glass, ceramic and metal has been dumped in the area around the kilns. Based on the historical research in Section 2 of the historical heritage assessment (EMM Consulting 2020) (Appendix B of the HHMP) the kilns at Kiln Area B are D or round type kilns.

Archaeological evidence that may survive includes:

- bricks/mortar;
- stone arrangements/foundations;
- iron;
- wooden beams/structures;
- evidence of the complex layout;
- mining infrastructure (such as tools);
- evidence of transport to and from the kilns; and
- remnants of use.

Plate 2.1 Example of the lime kilns

2.2 Heritage significance

2.2.1 The significance framework

In NSW, historical value is ascribed to buildings, places, archaeological sites and landscapes modified in the Australian historical period for purposes other than traditional Aboriginal use. The assessment of heritage significance is based on the Burra Charter (Australia ICOMOS 2013) and further expanded upon in *Assessing Heritage Significance* (NSW Heritage Manual Heritage Office 2001). This guideline lists seven criteria to identify and assess heritage values that apply when considering if an item is of State or local heritage significance. These criteria are set out in Table 2.1. The result of the assessments of significance may determine that an individual heritage element does not meet the threshold for local or State significance as an individual item, but that it does contribute to the significance of the cultural landscape. The below heritage significance has been drawn from the prepared SoHI (EMM Consulting Pty Ltd, 2018).

Table 2.1 NSW heritage assessment criteria

Criterion	Explanation
a)	An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).
b)	An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).
c)	An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).
d)	An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).
e)	An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).
f)	An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).
g)	An item is important in demonstrating the principal characteristics of a class of NSW's (or the local area's) cultural or natural places or environments (Representativeness).

Source: *Assessing heritage significance* (NSW Heritage Office 2001, p.9).

2.2.2 The camp (MS03)

MS03 House site (Figure 2.1) is of local significance for its historical significance that also embodies rare surviving elements of domestic structures in close proximity to an industrial area. This site also possesses research value for its potential to answer questions that no other source can about life on the fringes of an industrial site and its relationship to the surrounding cultural landscape.

Table 2.2 Assessment of significance

Criterion	Assessment
a) Historical	The ruins of a probable house site, possibly comprised of a temporary structure but with substantial landscape modifications. The site comprises a road levelled out of the existing ground and tin and ceramic artefacts. Its position overlooking what would have historically been a mined area suggests that this was a miner's house site or camp. Local knowledge states that this site was the place of a hut and a road, and the presence of large blocks may be evidence of such a building. MS03 demonstrates the settlement pattern associated with working at the limestone mines. MS03 is of *local* historical significance
b) Associative	MS03 House site is on the boundary of James Hogg and George Feltham's land (Portion 144 and 156 respectively). The site is situated on the north side of a long drive, which may be the delineation between Hogg's (north) and Feltham's (south) land. As the house site has been recorded on the north side, it has been taken here to be on Hogg's land. The residents of this site are not known and are likely to have been mine workers. MS03 does not fulfil criterion B.
c) Aesthetic	The site of MS03 is characterised by the creation of a road and areas of dumped early to mid-nineteenth century rubbish. It has the appearance of being a residential site with landscape

Table 2.2 Assessment of significance

Criterion	Assessment
	modifications, but nothing was noted that would indicate it has evidence of creative or technical achievement embodied in the site. MS03 does not fulfil criterion C.
d) Social	MS03 House site is not associated with a particular group of people or community. MS03 House site does not fulfil criterion D.
e) Research	MS03 House site has been identified as a camp, suggesting that it was an area used by various individuals at different times. The identification of MS03 is currently fluid and is subject to change based on the outcomes of archaeological excavation and research assisted by the material to shed light on the function of this site. This site and the other 'house' and 'camp' sites identified in this report are significant as a group for their potential to demonstrate the use of the landscape in the early to mid-twentieth century days of mining at Marulan South. This period and class of habitation site is not represented comprehensively in existing research and literature and has the potential to shed light on individual miners who may have been working their own mines, or who found temporary employment and established themselves in the region for short-term stays. The information that may be inherent in the archaeological resources may shed light on a certain group of the working class including itinerant workers and entrepreneurs trying to build a business in the growing colony. MS03 House site is of *local* research significance.
f) Rarity	MS03 House site is one of at least five similar sites (house or camp) in the immediate area, which suggest that there may be other such sites that were not discovered during field survey or interviews with Boral employees. Considering that little is known about MS03 or other similar sites, rarity is not a value that can be definitively established but knowledge about fringe camps, itinerant workers and individual mine owners living on the edge of mine pits is rare. MS03 House site is of *local* significance for its rarity value.
g) Representativeness	Information to support significance under this criterion would be gathered through archaeological excavation.

2.2.3 The lime kilns (MS05)

The lime kiln group (Figure 2.1) at Marulan South consists of five kilns and associated landscape modifications. The group is of local historical and research significance for its ability to contribute information about the development of a local industry and the mine of Marulan South. Despite its poor condition the lime kiln group is rare in the local area and has the potential to provide information on the construction and operation of lime kilns in the Southern Tablelands.

Table 2.3 Assessment of significance

Criterion	Assessment
a) Historical	The lime kilns are a significant development of the lime quarrying industry at South Marulan signalling the importance of the mines by ensuring that processing could occur on site when climatic conditions were an obstacle to their transportation to the kilns at Old Marulan. The group is also significant as one of the earlier in the area, and may be the earliest as no other kilns have been discovered. They demonstrate the development of lime quarrying from small-scale operations to larger enterprises when James Hogg established his business here. The lime kilns are significant as one of the elements of limestone mining infrastructure established across the colony by James Hogg and demonstrate the growing nature of industry. MS05 and its component kilns are of *local* historical significance.
b) Associative	The group of lime kilns in the south-west of the Project site were established by James Hogg, one of the earliest limestone operators in the area. James Hogg not only established the most successful limestone mine of its time, he was an individual of note who owned and funded limestone extraction in the region. Hogg also owned limestone kilns in Parramatta in which he burned limestone from his mines in Mudgee, Rockhampton, Melbourne and Geelong. Hogg has been described as putting 'Marulan and its lime on the map'. MS05 is of *local* associative significance.
c) Aesthetic	The lime kiln group is indicative of the early stages of mining in the Marulan area. James Hogg established the kilns in the 1870s which his sons continued on with at least until early 1900s. The lime kilns were repaired and maintained over time while still retaining their core technical characteristics. This group of items shows evidence of two types of kiln but they are in a poor state of repair. The lime kiln group may have the ability to demonstrate technical achievement in the local area. MS05 is of *local* aesthetic significance.
d) Social	The lime kilns are an important indicator of the significance of the place and the solutions needed to exploit the resource. However, the item is not associated with a particular group or community. MS05 Lime kiln group does not fulfil criterion D.
e) Research	MS05 Lime kiln group has the potential to answer a number of questions directly related to their purpose, ownership, construction and relationship of the kilns to the surrounding landscape. Two types of kiln were recorded during fieldwork but their condition is poor and a definitive assessment of their type has not been possible. Archaeological excavation of the kilns and their curtilage is likely to contribute to knowledge on the points raised above. Photographic archival recording and measured drawings will also provide additional information on the kilns and their setting, how they related to each other and the surrounding industrial landscape. Additional physical research is likely to yield information about the grading of the elements belonging to the group and the surrounding industrial landscape. The lime kiln group is of *local* research significance.
f) Rarity	The lime kiln group is a vestige of the historical period of limestone mining in the region. It is likely that there were more kilns associated with the mine in the immediate area but only

Table 2.3 Assessment of significance

Criterion	Assessment
	those reported in this document were found during field survey. These kilns are most likely to be those that are reported in the various media as belonging to James Hogg and are therefore the earliest recorded in the Marulan South area. If there were more kilns closer to the earlier mines, they will have been removed, thus making Hogg's kilns rare in the local area. MS05 Lime kiln group is of *local* significance for its rarity value.
g) Representativeness	The lime kiln group is in poor condition and is missing many of its representative elements. More complete examples exist in other areas of NSW including at Piper's Creek in Kumbatine National Park, the Moses Morley burning kiln at 501 Cooma Rd, Googong, NSW and the Kingsdale Line Kilns in the Southern Tablelands. As individual items, the lime kilns do not meet the threshold for demonstrating a principal characteristic of lime kilns but as a group, set into the edge of a drop, the lime kiln group represent a historic lime processing area, specifically from an archaeological perspective. MS05 Lime kiln group is of *local* representative significance.

Figure 2.1 Marulan South Limestone Mine disturbance footprint and historical sites

3 Proposed works and potential impacts

3.1 The camp (MS03)

The camp is located within the proposed 30-year mine pit and will therefore incur total impact during the proposed works. The development will result in the removal of the camp and surrounding area.

3.2 The lime kilns (MS05)

The lime kiln group is located within the proposed 30-year mine pit disturbance footprint. The development will result in the removal of all the identified lime kilns and their curtilage, which includes Lime-Kiln Road, the rock-face into which they are built and the associated ramps.

3.3 Unexpected significant finds

The disturbance footprint (Figure 1.1) will encompass much of the Project site. Although the survey effort conducted for the SoHI (EMM Consulting Pty Ltd, 2018) aimed at a high level of coverage, it is possible that unidentified resources or sites maybe discovered during construction.

If unexpected archaeological finds are assessed as reaching the threshold for being relics, that is archaeological resources of local or State significance, their removal will be managed using a research design, adapted from this document.

4 Archaeological methods

4.1 Background

An archaeological research design is a theoretical framework to support archaeological field investigations with the aim of extracting information that is relevant to the development and function of the site. The research design is based on the outcomes of the archival and documentary research and the existing environment and seeks to develop questions that will contribute to current knowledge about a place, a theme or perhaps individuals that documentary sources cannot contribute to. These questions should be compatible with the nature of the predicted archaeological resource and realistic in terms of the sites ability to produce answers.

4.2 Research questions

When excavating a historical site, it is essential to remember the site is being destroyed. Therefore, it is crucial that the research design is undertaken in a way that adds to the body of scientific knowledge by attempting to answer relevant research questions. Specific questions are essential for items such as the camps and lime kilns; however, excavation undertaken within the project footprint will be attempting to answer some overarching questions such as those below. Note that not all questions need to be answered if they are irrelevant and other questions can be posed:

1. How was everyday life lived within the mining community of Marulan South?
2. What is the topographical layout and operational relationship of the site/community, and mines?
3. What does the topographical layout demonstrate about the use of space by the new arrivals and later settlers and industry?
4. Do the sites indicate a single occupancy period or multiple occupancy periods (reuse or phases)?

4.2.1 Research questions for the camp (MS03)

1. Is this site related to the mine?
2. Oral evidence indicates a hut was located in the vicinity. Is there archaeological evidence to support this?
3. What is the layout and operational relationship of the site?
4. What is the time period associated with the site, and how long does it appear to be used for?
5. Does the site appear to have multiple uses? Were they transient or permanent?
6. Has the landscape been altered for the camp, if so, how?
7. Do the resources present indicate use by workers only, or does it indicate occupation by a family unit?
8. Are different phases of use evident?

4.2.2 Research questions for the lime kilns (MS05)

1. When do the kilns date too?

a) What sort of mortar was used within the lime kilns?

b) What material are the bricks, how (and where) were they made?

2. When were the kilns last in use?

3. How much lime did the kilns produce and were they an efficient means for the time period they were used?

4. Are there any visible repairs to the kiln, and if so, how were they repaired? Why were modifications required?

5. Research indicates these were unique kilns for the region, were they well built?

6. Is there indication that anything other than limestone was produced in the kiln?

7. What is the stratigraphic construction of the kiln?

8. What is the layout and operational relationship of the site and how does this relate to the topography?

4.3 Test excavation methods

4.3.1 General excavation methods

Although each excavation should be tailored to the item/site in question, standard best practice excavation methods should be employed across the project area. Sections 4.3.2 and 4.3.3 indicate the additional methods needed for those sites, while still employing the general excavation methods as follows:

- the area should be recorded visually using a 3D drone and photogrammetry for a digital record pre-excavation;
- a site datum would be established or an existing one will be used;
- a standard context recording system will be implemented whereby a context number will be applied to each element of each feature, cut and deposit; the feature number, assigned to each feature, will be related to the context number assigned on site;
- excavation should be undertaken by hand where possible with suitable fill (excavated material) to be sieved and examined for artefacts;
- archaeological features, deposits and cuts will be photographed (RAW format with photo board and scale), planned to scale and sections drawn prior to, and, depending on the remains, after removal by hand. Diagnostic and representative artefacts will be collected by context for later analysis; and
- features will be recorded by a qualified surveyor and the resulting plan will be tied into the appropriate datum (on advice from the surveyor). This will include recording reduced levels to establish the varying depths of phases across the site.

4.3.2 The camp (MS03)

As the layout of the site is largely unknown, it is recommended that the area be subject to survey before excavation in order to increase accuracy when excavating.

- record the site to endeavour to target the excavation over the most promising areas; and

- target the excavation based on visual assessment and the information derived from the survey results.

4.3.3 The lime kilns (MS05)

As the lime kilns are found both above and below ground a mixture of techniques will be used during excavation. This is to ensure that the maximum amount of information can be inferred during the course of the works.

- the area should be recorded visually using a 3D drone and photogrammetry for a digital record pre-excavation;
- careful removal of vegetation from the area is necessary to ensure that no artefacts are being stripped away at the same time or that the stability of the fabric and deposit is not compromised. Document the 'before', 'during' and 'after' photographs with a scale;
- once the features are exposed record what is visible via photographs, digital surveying and sketch;
- dismantle the kiln carefully, recording the construction of the feature in a reverse engineering manner; and
- once the kiln has been deconstructed down to ground level, prepare the site for general excavation.

4.4 Recording methods

i Site recording

The activity will be recorded on context sheets. Information that will be recorded will include:

- date; location; recorder;
- nature of the deposit – ie stratigraphically;
- description of the deposit – ie colour, texture, moisture levels, etc;
- description of the feature and how it was constructed;
- a topographic survey completed by a surveyor;
- drawing of the feature in plan and profile; and
- archival photographs using a digital single lens reflex (DSLR) camera.

ii Photography

As the MS03 and MS05 will be archivally recorded as per condition of consent for SSD 7009, photography will be undertaken in accordance with the NSW Heritage Council "Heritage Information Series" *Photographic recording of heritage items using film or digital capture* (NSW Heritage Office, 2006). As per best practice a scale will be used during the photographs as often as possible, occasional context photographs will not include a scale, however all archival photographs will.

4.5 Artefact management

Artefacts collected during the excavations will be managed in the following manner:

- artefacts recovered from the site will be managed by a dedicated artefact manager after retrieval from the site;
- large or redundant materials will have samples collected (eg bricks). Hazardous material will be recorded but will not be collected;
- all artefacts that are retained will be catalogued by using a system that identifies and allows easy retrieval of the item;
- unprovenanced artefacts and other material assessed as being of low significance or limited research potential will be discarded upon delivery of the final report and deaccessioned from the artefact catalogue;
- all retained artefacts, regardless of the level of significance, will be stored in a secure location along with the catalogue at the conclusion of works;
- all care will be taken to preserve artefacts as per best practice (for example, no washing bone);
- an archaeologist will produce a summary report, tables and photographs on the results of the artefact analysis. This information will be incorporated into the final Excavation Report for the project;
- recommendations will be made by the archaeologist if;
    - an artefact specialist is required to produce reports on specialised artefacts; and
    - important artefacts to be the subject of materials conservation that may include the gluing of pottery or the conservation of important metal or leather artefacts.
- once post-excavation analysis and reporting has been completed, Boral will be responsible for the management, curation and ongoing care of the collection, including items that require special care (ie material prone to deterioration);
- if the artefact collection is to be incorporated into an interpretive public display, artefacts may require material conservation; and
- where artefacts are to be deaccessioned, Boral should consider donating to historical societies for their display and research.

4.6 Reporting

A detailed excavation report will be compiled that includes the following information as minimum:

- historical summary of the site;
- archaeological excavation methods;
- recording methods;
- test excavation results;
- artefact report; and
- response to research questions.

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APPENDIX B

Historical Heritage Assessment

Marulan South Limestone Mine Continued Operations Project

Historic heritage assessment and statement of heritage impact

Boral Cement Limited | 9 August 2018

Marulan South Limestone Mine Continued Operations Project

Historic heritage assessment and statement of heritage impact

Prepared for Boral Cement Limited | 9 August 2018

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Marulan South Limestone Mine Continued Operations Project

Final

Report J14107RP1 | Prepared for Boral Cement Limited | 9 August 2018

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Executive Summary

EMM Consulting Pty Limited (EMM) was commissioned by Boral Cement Limited (Boral) to prepare a historic heritage impact assessment to accompany the development application for the Marulan South Limestone Mine Continued Operations Project (the Project).

Boral proposes to continue mining limestone from the mine at a rate of up to 4 million tonnes per annum (mtpa) for a period of up to 30 years. A 30 year mine plan is proposed, which will access 120 million tonnes of limestone down to a depth of 335 m AHD. In addition to mining approximately 5 million tonnes of shale, the extraction of the limestone requires the removal of approximately 108 million tonnes of overburden over the 30 year period. This material will be emplaced within existing and proposed overburden emplacement areas.

Limestone will continue to be mined using drilling and blasting methods. Shale will continue to be mined by excavator/front end loader. Limestone, shale and overburden will be transported to the primary crusher, stockpile areas and overburden emplacements respectively, using the load and haul fleet of trucks.

Products produced at the mine will continue to be despatched by road and rail, with the majority despatched by rail.

The assessment identified eleven items, through field survey, of historic heritage significance in the Project site. The items are:

- MS01 Marulan South Village;
- MS03 Hut/camp;
- MS04 Aerial ropeway;
- MS05 Lime kiln group;
- MS07 Old alignment of Marulan South Road;
- MS08 the Feltham's house;
- MS09 the Armitt camp;
- MS11 ramp of earth and timber (possible camp site);
- MS12 Lime-kiln Road;
- MS13 Frome Hill Road;
- MS14 House site

Glenrock Homestead and Outbuildings (I314), which is a heritage item on the *Goulburn Mulwaree Local Environmental Plan 2009* is located approximately 240 m to the north of the Project site in the area where Marulan Creek Dam is proposed and 2.4 km north of the mine. A section of Bungonia National Park is also listed on the *Goulburn Mulwaree Local Environmental Plan 2009* but is recorded as the "Bungonia State Recreation Area" (I027). One unlisted site with heritage value was discovered during survey outside the Project site:

- MS10 Mt Frome mine and tramway

The historical development of the local area is a combination of mining and grazing. Limestone was sought at Marulan South as early as the 1860s and the location has provided an important contribution to the construction industry initially in the colony and now to the Southern Highlands/Tablelands, the Illawarra and Metropolitan Sydney markets. The Project site encompasses evidence of the early mining activities in the form of remnant lime kilns and early roads, camps and houses for mine workers and later technological developments in the form of the remnants of an aerial ropeway.

The geology of the region that has made the place so valuable occurs in a landscape of high relief, thus visibility from outside mine-owned (Boral) land is low except from the Bungonia Lookdown within the Bungonia National Park to the south of Bungonia gorge. Significant historical landscapes occur within the Project site but these are of a small scale and measures to record them have been developed. Wider significant historical landscapes do not exist within visual distance to the mine although the surrounding land is predominantly pastoral.

The impacts presented in this report were assessed and alternatives were discussed at length. The location, orientation and depth of the limestone dictates the location, depth and extent of the pit required to mine this resource and also the volume of overburden and the area required for the emplacement of overburden. The area required for the continuation of mining for the next 30 years precludes the retention of those heritage items identified for removal. The location that is proposed for the mine pit, infrastructure and overburden emplacements has been carefully considered to balance impacts on all relevant environmental values. The 30 year mine plan has been designed to most efficiently extract the limestone resource and minimise the amount of overburden material, while not mining the southern rim of the pit and limiting the height of the overburden emplacements to reduce long term visual impacts. The proposed 30 year mine plan is considered by the mine planners to be optimal.

Site and landscape-specific management measures are summarised in Table 1.1 below and in Table 7.1, Section 7 of this report. They have been developed to record information about the industrial/residential landscape inside the Project site associated with historic mining activities, before various historic heritage items are removed to accommodate the continued operations at the mine. It is anticipated that the data to be recorded will be useful for future research related to spatial and comparative analysis and will provide an understanding of the material culture created by nineteenth and early twentieth century miners. This is how the Project aims to create opportunities for research and learning on the themes identified in this report.

In the first instance, avoidance of impacts to areas of historic heritage significance is the preferred option. Where avoidance is not possible, the following measures apply:

i Undertake photographic archival recording of all sites to be removed

ii Archaeological recording of all identified items in the Project site which includes:

- all identified items, including those that will not be impacted, will be recorded with the use of topographic survey or their cadastral boundaries (refer to Table 1.1 below) so their relative location, elements and orientation can be mapped;
- archaeological excavation of representative structures of the lime kiln group (M05) prior to its removal; and
- archaeological excavation of a sample of camp site MS03.

iii Fence and signpost sites that will not be removed by the Project

iv Preparation of a historic heritage management plan addressing

- unexpected finds; and
- human skeletal material

Table E1 Site impact assessment and management summary

Site ID	Site description	Location	Significance	Impact level	Management
MS01	Marulan South village	North-east of the limestone processing and limestone production plant.	Local	No impact	Photographic archival recording Archaeological recording through topographic survey
MS02	Deleted				
MS03	Hut/camp site	Centre of proposed 30 year mine pit; directly west of existing mine	Local	Total impact	Photographic archival recording Archaeological recording through topographic survey Archaeological excavation (sample area)
MS04	Aerial ropeway	Southern area of 30 year mine pit to the north west of the Western Overburden Emplacement (and outside of Project site)	Local	Partial (majority) impact of elements	Photographic archival recording Archaeological recording through topographic survey Move metal buckets from former aerial ropeway for safekeeping. Buckets in locations that will not be impacted to remain in situ
MS05	Lime kiln group	Southern end of 30 year mine pit	Local	Total impact	Photographic archival recording of entire group Archaeological recording through topographic survey Archaeological excavation of at least one of each type (two types of kiln exist on the site)
MS06	Explosives hut	Southern end of 30 year mine pit	None	Total impact	Photographic archival recording (detail not required) Archaeological recording through topographic survey
MS07	Old alignment of Marulan South Rd (now closed)	Northern edge of the main Western Overburden Emplacement haul road, immediately south of the proposed Central Dam		Total impact	Include in final spatial mapping of sites; data to be extracted from cadastre Photographic archival record of a representative sample
MS08	The Feltham house	Western side of the mine and immediately west of the Western Overburden Emplacement	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey Record any artefacts and structures that occur in the area of impact
MS09	Camp (Armitt family)	Western side of the existing mine pit and north of the lime kiln group	Local	Total impact	Photographic archival recording Archaeological recording through topographic survey
MS10	Mt Frome mine and rail	South of the mine (outside)	Local	No impact	None – these items are outside of the Project site

Table E1 Site impact assessment and management summary

Site ID	Site description	Location	Significance	Impact level	Management
MS11	Ramp of earth and timber	Immediately south of the Northern Overburden Emplacement, west of the 30 year mine pit and east of the Western Overburden Emplacement	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey
MS12	Lime-kiln Road	Southern end of 30 year mine pit	Local	Total impact	Archival recording Archaeological recording through topographic survey
MS13	Mt Frome Road	Crosses into Project site on western side of the Western Overburden Emplacement	Local	Partial impact	Photographic archival recording of a representative sample of the section of road to be removed. Include in spatial mapping of sites; data can be extracted from cadastre.
MS14	House site – chimney remaining; planted trees, possibly quince; track.	Centre of proposed mine plan; directly west of 30 year mine pit	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey Undertake archaeologically excavation if artefacts and structures occur in the area of impact

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1 Introduction

1.1 Overview

Boral Cement Limited (Boral) owns and operates the Marulan South Limestone Mine (the mine). It is a long standing open cut mine that has produced up to 3.38 million tonnes of limestone based products per year for the cement, steel, agricultural, construction and commercial markets.

The mine is a strategically important asset for Boral, as it supplies the main ingredient for the manufacture of cement at Boral's Berrima Cement Works. This is also a strategically important operation for Sydney based consumers of these products as this represents around 60% of the cement sold in NSW and feeds into more than 30% of concrete sold in Sydney.

The mine operates under Consolidated Mining Lease No. 16 (CML 16), Mining Lease No. 1716, Environment Protection Licence (EPL) 944 and a combination of development consents issued by Goulburn Mulwaree Council and continuing use rights.

Due to changes between the *Mining Act 1992* and the *Environmental Planning & Assessment Act 1979* (EP&A Act), when mining moves beyond the area covered by the current Mining Operations Plan, a development consent under the EP&A Act will need to be in place.

An Environmental Impact Statement has been prepared by Element Environment Pty Ltd on behalf of Boral for submission to the Department of Planning and Environment to satisfy the provisions of Part 4 of the EP&A Act. Boral is seeking approval for continued operations at the site through a development application for a State Significant Development including a 30 year mine plan, associated overburden emplacement areas and a mine water supply dam (hereafter referred to as 'the Project').

EMM Consulting Pty Limited Pty Limited (EMM) was commissioned by Boral Cement Limited (Boral) to prepare a historical heritage impact assessment to accompany the development application for the Marulan South Limestone Mine Continued Operations Project (the Project).

1.2 Site description

1.2.1 Site location

The mine is in Marulan South, 10 km southeast of Marulan village and 35 km east of Goulburn, within the Goulburn Mulwaree Local Government Area in the Southern Tablelands of NSW (Figure 1.1). Access is via Marulan South Road, which connects the mine and Boral's Peppertree Hard Rock Quarry (Peppertree Quarry) with the Hume Highway approximately 9 km to the northwest. Boral's private rail line connects the mine and Peppertree Quarry with the Main Southern Railway approximately 6 km to the north (Figure 1.2).

1.2.2 Land use and ownership

CML 16 (which encompasses ML 1716) covers an area of 616.5 hectares (ha), which includes land owned by Boral (approximately 475 ha), Crown Land (adjoining to the south and east) and five privately owned titles (refer to EIS Figure 1.3). There is also Boral owned land surrounding the mine that does not fall within CML 16.

Land use surrounding the mine is a mixture of extractive industry, grazing, rural residential, commercial/industrial and conservation.

The mine is separated from the Bungonia State Conservation Area and Bungonia National Park to the south by Bungonia Creek and is separated from the Shoalhaven River and Morton National Park to the east by Barbers Creek.

Peppertree Quarry, owned by Boral Resources (NSW) Pty Limited, borders the mine to the north. The site of the former village of Marulan South is between the mine and Peppertree Quarry on land owned by Boral. The village was established principally to service the mine but has been uninhabited since the late 1990's. The majority of the village's infrastructure has been removed and only a village hall and former bowling club remains. The bowling club has been converted into administration offices for the mine and the hall is used by the mine services team.

A small number of rural landholdings surround the Boral properties to the north and west, including an agricultural lime manufacturing facility, fireworks storage facility, turkey farm and rural residential (a number of these properties are actively grazed). The main access for these properties is via Marulan South Road. Rural residential properties are also located to the northeast of the mine along Long Point Road. These properties are separated from the mine by the deep Barbers Creek gorge. Sensitive receivers are shown in EIS Figure 1.3.

1.2.3 Zoning

The majority of the site is zoned RU1 - Primary Production zone under the Goulburn Mulwaree Local Environmental Plan (LEP) 2009. Mining and extractive industries are permissible in this zone with consent.

The remaining area is zoned E3 - Environmental Management. Under this zone mining and extractive industries are prohibited development, although historically mining has occurred within these areas under "existing use rights" as mining and processing operations commenced well before the commencement of the Mulwaree Planning Scheme Ordinance (PSO) on 15 May 1970. Notwithstanding that both mining and extractive industries are prohibited in the E3 zone these activities are permissible pursuant to *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*. In accordance with Clause 7(1)(b)(i) of this SEPP mining can be carried out with consent in any zone which has agriculture as a permissible land use (with or without consent). Agriculture is permitted with consent in the E3 - Environmental Management zone under the Goulburn Mulwaree LEP 2009. Similarly, Clause 7(3)(a) of this SEPP makes it clear that extractive industries can be carried out with consent in any zone which has agriculture as a permissible land use (with or without consent). Therefore, both mining and extractive industries are land uses which can be carried out provided development consent is granted.

Boral operates the mine pursuant to Section 109 of the EP&A Act and the continuance of an existing use and its expansion is possible provided the necessary approvals are in place. Therefore, there are no environmental planning issues that would prohibit approval of expanded operations at the mine.

Importantly, the Project aims to improve the stability of existing overburden emplacements and improve rehabilitation outcomes over the entire site.

1.2.4 Topography and hydrology

The Southern Highlands, similar to the Blue Mountains to the north-west, are predominantly comprised of a level plateau with the occasional high intrusive volcanic remnant mountains, such as Mount Jellore, Mount Gibraltar and Mount Gingenbullen. On the seaward side they decline into a steep escarpment that is heavily divided by the headwaters of the Shoalhaven River.

The Project site and surrounds is characterised by the rolling hills of pasture and grazing lands interspersed with woodland to the west, contrasting with the heavily wooded, deep gorges that begin abruptly to the east of the mine, forming part of the Great Escarpment and catchment of the Shoalhaven River. As such, local relief of Marulan South ranges from around 130 m Australian Height Datum (AHD) to over 630 m AHD.

The Project site is drained by a number of minor ephemeral drainage lines into Barbers Creek to the east and Bungonia Creek to the south. These creeks are tributaries of the Shoalhaven River, which is 1.5 km from the mine (at its closest point) and flows eastwards into Lake Yarrunga, approximately 20 km downstream and enters the Pacific Ocean approximately 15 km east of Nowra (approximately 100 km downstream).

1.2.5 Geology

The Marulan South limestone deposit lies within the Lachlan Geosynclinal Province. During the Palaeozoic Era (500 to 300 million years ago) thick sedimentary formations were laid down in the region. The formations included sediments, volcanic lavas and ash, and limestone reefs.

A reef complex formed the Bungonia Limestone Group, which was later folded and faulted by crustal collisions and then subsequently levelled by substantial erosion. About 65 million years ago the area was again uplifted giving way to a rejuvenated river system leading to the landscape of today.

The Bungonia Limestone formations at Marulan South consist of a number of generally parallel and north-south striking beds dipping to the west. The Bungonia Limestone includes:

- Eastern Limestone, which is the oldest, easternmost and thickest unit; and
- Mt Frome Limestone, which is the younger unit that lies to the west of the Eastern Limestone and is made up of three sub-parallel sub-units including the Upper Limestone (furthest west), Middle Limestone and Lower Limestone (furthest east).

Separating the limestone units are fine grained sediments including shales, mudstones, siltstones and minor fine sandstones.

The total horizontal width of the Bungonia Limestone is approximately 670 m east-west. The true depth of the Bungonia Limestone is not known as the termination of the limestone is not visible either in the mine or at the bottom of the Bungonia gorge to the south. To date even the deepest drill holes (approximately 300 m) in the mine have ended in limestone.

The Eastern Limestone has the highest grade and was therefore selected for the commencement of mining. The Eastern Limestone is still the focus of current mining operations, however mining of Mt Frome Middle Limestone commenced in approximately 2016.

The Bungonia Limestone Group is bound to the east by the older Tallong shale beds and in the west by the Tangarang Volcanics (younger shales, volcanic and associated sedimentary rocks). A north-south and various east-west dolerite dykes penetrate the limestone from beneath and the limestone bed is cut off in the north by the Glenrock Granodiorite intrusion, which is extracted by Peppertree Quarry.

1.2.6 Climate

The mine is in Australia's cool temperate climatic region, which is characterised by mild to warm summers and cold winters, with common frost and occasional snow fall.

Long term climatic data was obtained from the Bureau of Meteorology (BoM) automatic weather station at Goulburn Airport, approximately 25 km west-southwest of the mine.

The BoM weather station shows that January is the hottest month with a mean maximum temperature of 27.9 degrees Celsius (^{0}C) and July is the coldest month with a mean minimum temperature of 0.3ºC.

Average annual rainfall is 551.9 mm. Rainfall peaks during the summer and the month of June. June is the wettest month with an average rainfall of 60.9 mm over 7.0 days and April is the driest month with an average rainfall of 25.6 mm over 4.0 days.

Relative humidity levels exhibit variability and seasonal flux across the year. Mean 9am relative humidity levels range from 65% in October and December to 88% in June. Mean 3pm relative humidity levels vary from 39% in December to 63% in June. Wind direction is predominantly from the west in winter and from the east in summer.

Wind speeds have a generally similar spread between the 9am and 3pm conditions. The mean 9am wind speeds range from 12.2 km/h in March to 19.8km/h in September. The mean 3pm wind speeds vary from 19.8km/h in April to 26.5km/h in August.

1.3 Existing operations

The mine is sited on a high grade limestone resource. Subject to market demand the mine has typically produced 3 to 3.38 million tonnes of limestone and 120,000 to 200,000 tonnes of shale per annum.

The mine currently produces a range of limestone products for internal and external customers in the Southern Highlands/Tablelands, the Illawarra and Metropolitan Sydney markets for use primarily in cement and lime manufacture, steel making, agriculture and other commercial uses. Products produced at the mine are despatched by road and rail, with the majority despatched by rail.

Historically limestone mining was focused on the approximately 200-300 m wide Eastern Limestone and was split between a North Pit and a South Pit. A limestone wall (referred to by the mine as the 'centre ridge') rising almost to the original land surface, divided the two pits. The North and South Pits were recently joined in 2016/2017 by mining the centre ridge to form a single contiguous pit, approximately 2 km in length. However, the North Pit/South Pit nomenclature remains important as current mining operation locations continue to be reported with respect to one or other of the old pits.

Limestone and shale are extracted using open-cut hard rock drill and blast techniques. Material is loaded using front end loaders and hauled either to stockpiles or the processing plant using haul trucks. Oversized material is stockpiled and reduced in size using a hydraulic hammer attached to an excavator.

Limestone processing facilities including primary and secondary crushing, screening, conveying and stockpiling plant and equipment are in the northern end of the North Pit. Kiln stone grade limestone is also processed on site through the existing lime plant comprising kiln stone stockpiles, rotary lime kiln, hydration plant and associated auxiliary conveying, processing, storage, despatch plant and equipment. Overburden from stripping operations is emplaced in the Western Overburden Emplacement, west of the open cut pits.

The current operations are 24 hour, 7 days per week with personnel employed on a series of 8, 10 and 12 hour shifts to cover the different operational aspects of the mine. Blasting is restricted to daylight hours and on weekdays, excluding public holidays.

1.4 The proposed Project

1.4.1 Mining operations

Boral proposes to continue mining limestone from the mine at a rate of up to 4 million tonnes per annum (mtpa) for a period of up to 30 years. This represents an increase in extraction rate from historic levels (peak of 3.38 mtpa) due to forecast increased demand from the construction industry. Shale will continue to be extracted at a rate of up to 200,000 tonnes per annum (tpa).

The proposed 30 year mine plan accesses approximately 120 million tonnes of limestone down to a depth of 335 m AHD. The mine footprint focuses on an expansion of the North Pit westwards to mine the Middle Limestone and to mine deeper into the Eastern Limestone. As the Middle Limestone lies approximately 70 m to 15 m west of the Eastern Limestone, the 30 year mine plan avoids mining where practical the interburden between these two limestone units thereby creating a smaller second, north-south oriented West Pit with a ridge remaining between. The North Pit will also be expanded southwards, encompassing part of the South Pit, leaving the remainder of the South Pit for overburden emplacement and a visual barrier (Figure 1.3).

In addition to mining approximately 5 million tonnes of shale, the extraction of the limestone requires the removal of approximately 108 million tonnes of overburden over the 30 year period. This material will be emplaced within existing and proposed overburden emplacement areas (Figure 1.4).

Limestone will continue to be mined using drilling and blasting methods. Shale will continue to be mined by excavator/front end loader. Limestone, shale and overburden will be transported to the primary crusher, stockpile areas and overburden emplacements respectively, using the load and haul fleet of trucks.

Products produced at the mine will continue to be despatched by road and rail, with the majority despatched by rail.

The limestone sand plant produces a crushed and air classified limestone sand for use in concrete. The mine currently produces 500,000 tpa for Peppertree Quarry and propose to increase production of manufactured sand to approximately 1 million tpa.

Boral's adjoining Peppertree Quarry currently has approval to emplace some of its overburden in the South Pit mine void. As the South Pit is required for the emplacement of over 30 million tonnes of overburden from the mine after the removal of accessible limestone, Boral proposes to emplace up to 15 million tonnes of overburden from Peppertree Quarry within the Northern Overburden Emplacement (Figure 1.3).

1.4.2 Associated infrastructure

i Processing

The existing facilities for processing limestone will continue to be utilised to produce a series of graded and blended limestone products that are despatched from site for use primarily in cement manufacture, steel making, commercial and agricultural applications.

Limestone processing facilities (Figure 1.3) include primary and secondary crushing, screening, conveying and stockpiling plant and equipment located north-west of the North Pit and extending to the tertiary crushing, screening, bin storage and despatch (rail and road) systems that form part of the main processing facilities.

Kiln stone grade limestone will also continue to be processed on site through the existing lime plant comprising kiln stone stockpiles, rotary lime kiln, hydration plant and associated auxiliary conveying, processing, storage, despatch plant and equipment.

Processing infrastructure and the reclaim and stockpile area at the northern end of the North Pit will be relocated during the life of the 30 year pit to enable full development of the mine plan. The timing and location of this is presented in the EIS.

Shale and white clay will not be processed and will be stockpiled directly from the pit, ready for dispatch by road to the Berrima and Maldon cement operations.

ii Water supply

Water supply for the Project, including dust suppression, processing activities and some non-potable amenities will be from existing and new on-site dams and a proposed new water supply dam on Marulan Creek (Figure 1.4). This dam would be located on Boral owned land north of Peppertree Quarry and utilises Boral's adjoining Tallong water pipeline to transfer water to the mine. This dam would require the purchase of water entitlements.

Mine water demand will also be supplemented by Tallong Weir via the Tallong water pipeline.

iii Rail

No changes are proposed to the existing rail infrastructure. A 1.2 km long passing line was constructed at Medway Junction during construction of the Peppertree Quarry, which will also be used by the mine to enhance access to the Main Southern Railway.

iv Road

Road access from the mine to the Hume Highway is via Marulan South Road. The proposed Western Overburden Emplacement extends northwards over Marulan South Road. Boral propose to realign a section of Marulan South Road, to accommodate the northern portion of the proposed Western Overburden Emplacement (Figure 1.3).

All public roads within the former village of Marulan South as well as the section of Marulan South Road between Boral's operations and the entrance to the agricultural lime manufacturing facility will be de-proclaimed.

v Power

Power supply to the mine is via a high voltage power line that commences at a sub-station on the southern side of Marulan South Road, immediately west of the Project boundary. A section of this power line will be relocated to accommodate the proposed Northern Overburden Emplacement (Figure 1.3).

1.4.3 Transport

The majority of limestone products will continue to be transported to customers by rail for cement, steel, commercial and agricultural uses. Boral seeks no limitation on the volume of products transported by rail.

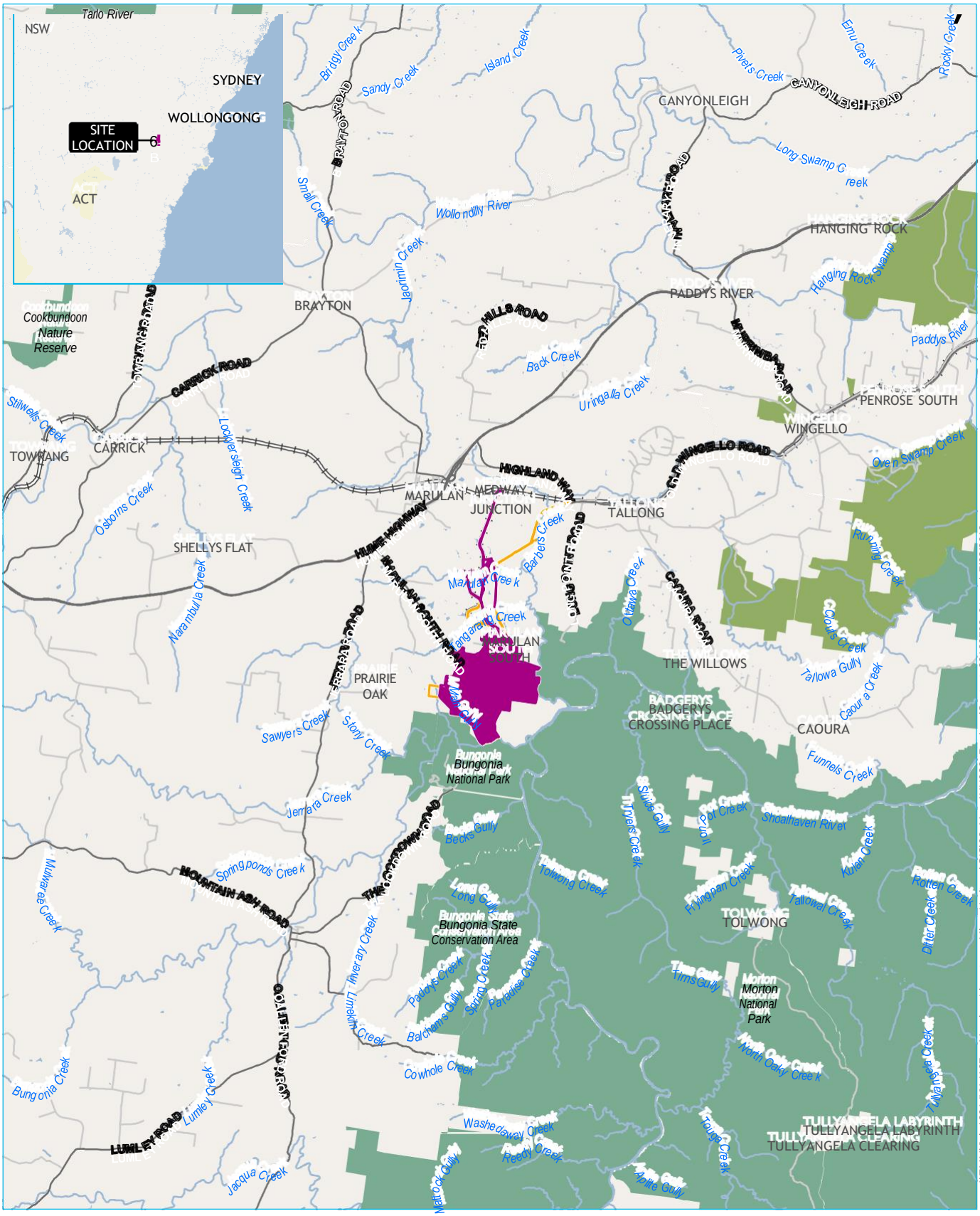
Manufactured sand will continue to be transported by truck along a dedicated internal road, across Marulan South Road and into Peppertree Quarry for blending and dispatch by rail.

Agricultural lime, quick lime and fine limestone products will continue to be transported by powder tanker, bulk bags on trucks or open tipper trucks along Marulan South Road.

Shale, limestone aggregates, sand and tertiary crushed products will be transported by predominantly truck and dog along Marulan South Road.

The adjoining Peppertree Quarry is currently approved to transport all products by rail. Boral will seek to transport approximately 150,000 tpa of Peppertree Quarry's products from the mine to customers via Marulan South Road. This could be achieved by back loading to a new shared road sales product stockpile area by the trucks carrying the limestone sand to Peppertree Quarry. A new shared road sales product stockpile area is proposed on the northern side of Marulan South Road, immediately west of the mine and Peppertree Quarry entrances (Figure 1.3). This shared finished product stockpile area, includes a weighbridge and wheel wash and will service both the mine and Peppertree Quarry.

In total, Boral is seeking to transport up to 600,000 tpa of limestone and hard rock products along Marulan South Road to the Hume Highway, as well as 120,000 tpa of limestone products to the agricultural lime manufacturing facility.



Source: EMM (2018); DFSI (2017); LPI (2015); GA (2015); LPMA (2011)

0 3 6 km

GDA 1994 MGA Zone 56

KEY

- Project area
- CML 16
- Main road
- Local road
- Rail line
- Watercourse
- Waterbody
- NPWS reserve
- State forest

Project site in the regional context

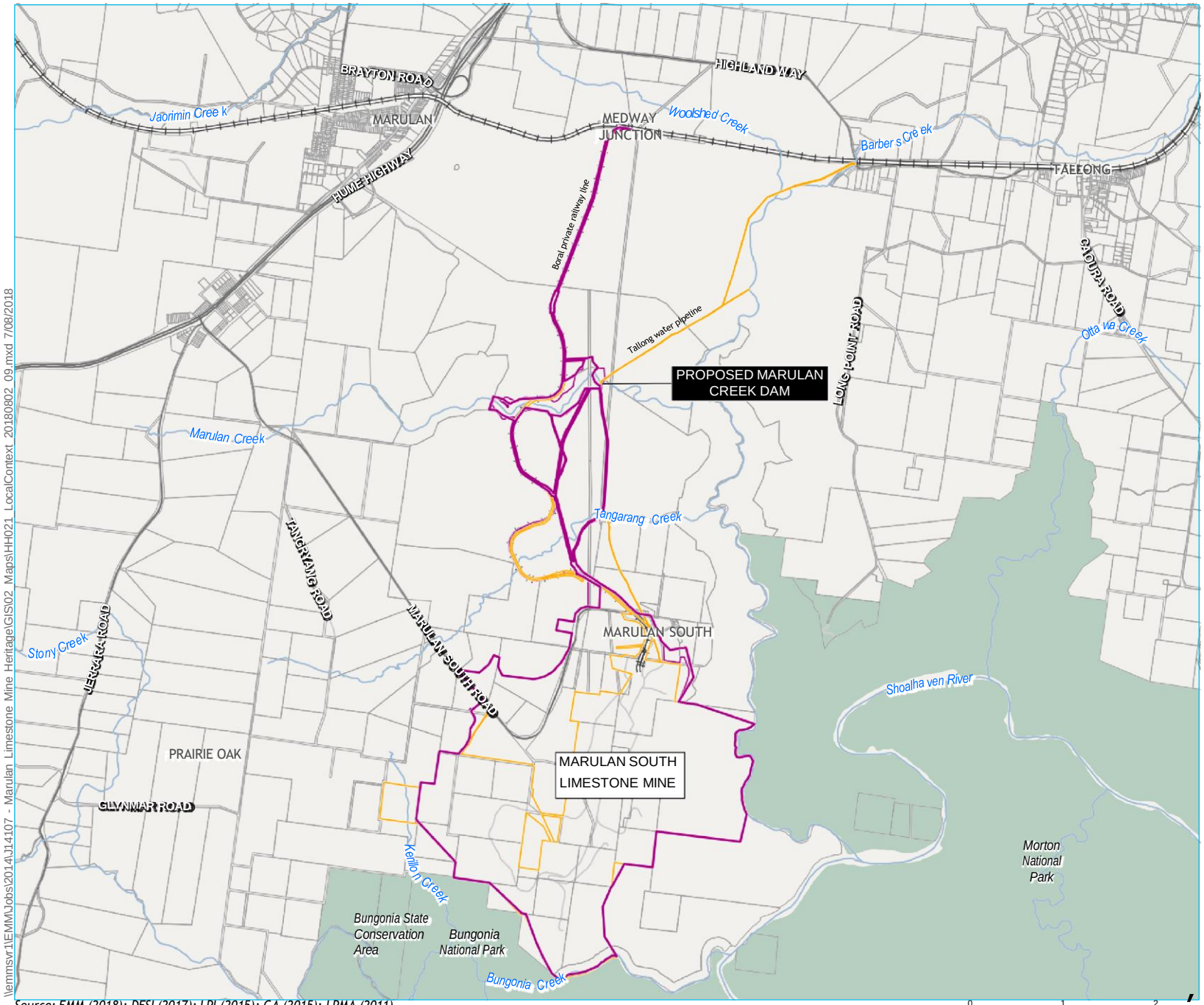
Marulan South Continued Operations Project

Historical heritage assessment and SoHI

Figure 1.1

\\emmsvr1\EMM\Jobs\2014\J14107 - Marulan Limestone Mine HeritageGIS\02_Maps\HH020_RegionalContext_20180703_04.mxd 7/08/2018

EMM



\\emmsvr1\EMM\Jobs\2014\J14107 - Marulan Limestone Mine Heritage\GIS\02 Maps\HH021 LocalContext 20180802 09.mxd 7/08/2018

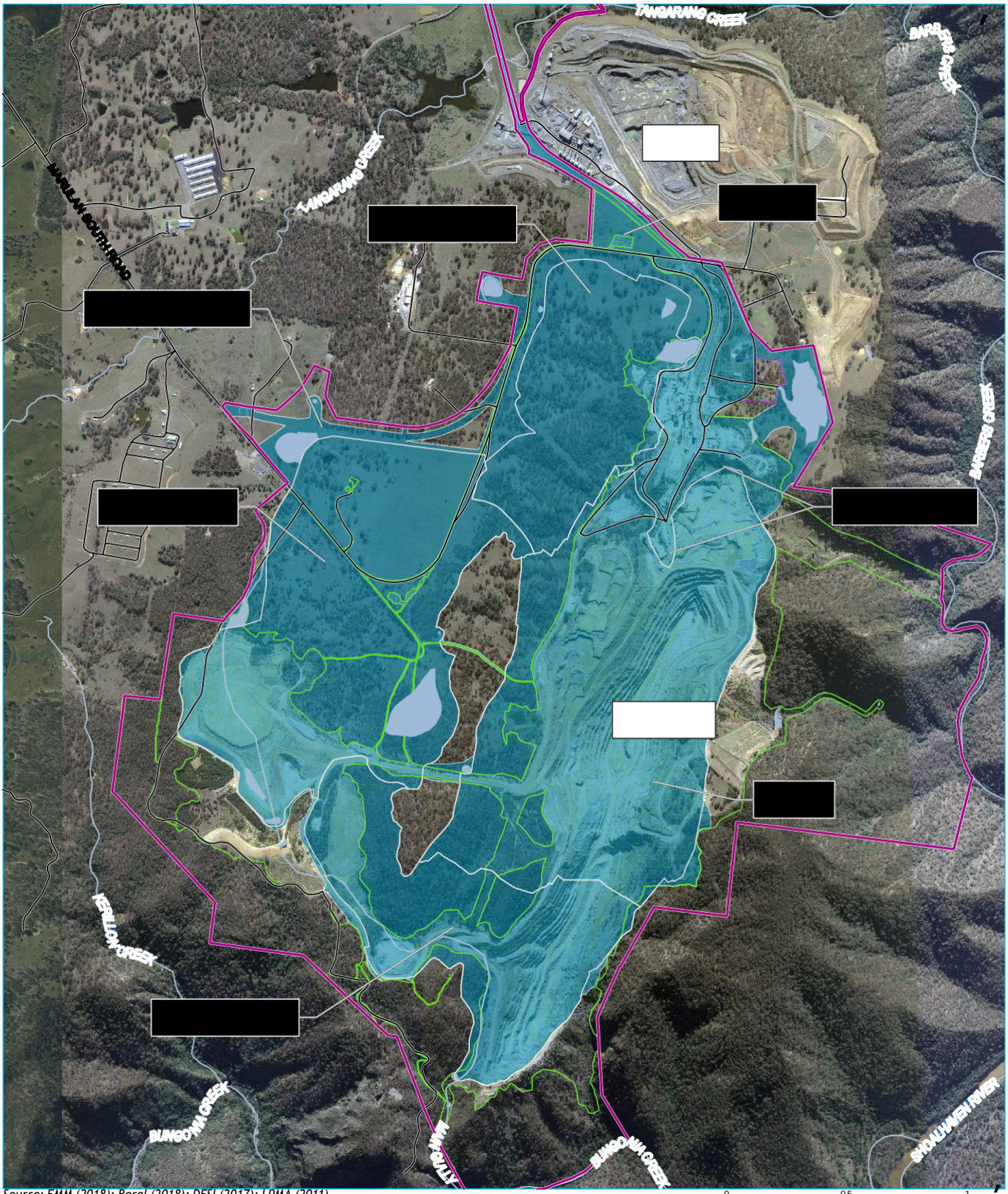
Source: EMM (2018); DFSI (2017); LPI (2015); GA (2015); LPMA (2011)

Project site in the local context

Marulan South Continued Operations Project
Historical heritage assessment and SoHI

Figure 1.2

EMM



Source: EMM (2018); Boral (2018); DFSI (2017); LPMA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

KEY

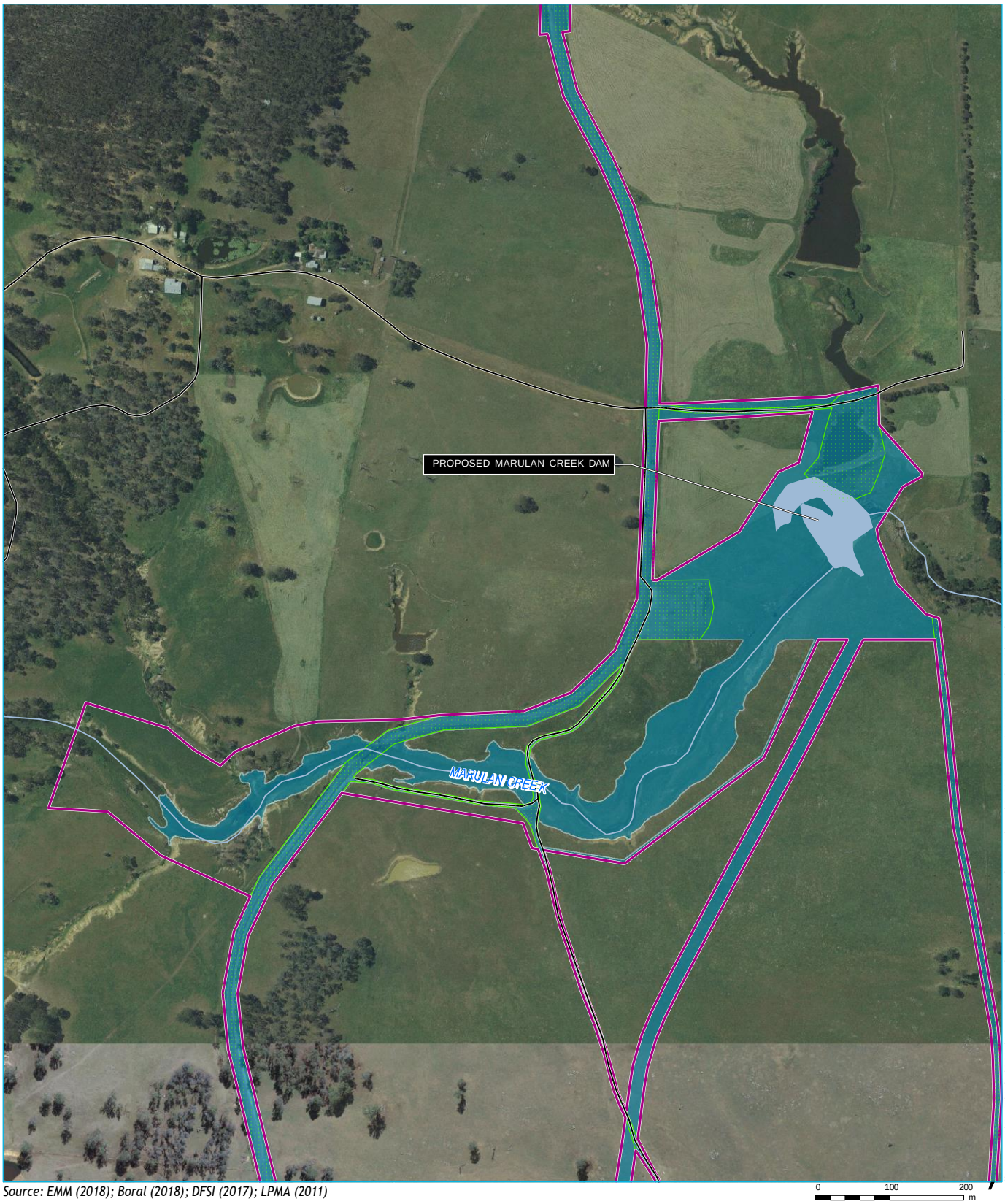
- Road/access track
- Watercourse
- Project boundary
- Overburden emplacement and 30 year mine pit design boundary
- Project (SSD) disturbance footprint
- Proposed dam location
- Historical disturbance footprint (pre - SSD)
- Additional historic area of disturbance (pre -SSD)

\\emmsvr1\EMMJobs\2014\J114107 - Marulan Limestone Mine HeritageGIS\02_MapsIHH026_ProjectDisturbanceFootprint_20180807_06.mxd 7/08/2018

Project disturbance footprint mining operations

Marulan South Continued Operations Project
Historical heritage assessment and SoHI
Figure 1.3

EMM



Source: EMM (2018); Boral (2018); DFSI (2017); LPMA (2011)

0 100 200 m
GDA 1994 MGA Zone 56

KEY

- Road/access track
- Watercourse
- Project boundary
- Proposed Marulan Creek Dam
- Historical disturbance footprint (pre -SSD)
- Project (SSD) disturbance footprint

Project disturbance footprint
proposed Marulan Creek Dam

Marulan South Continued Operations Project
Historical heritage assessment and SoHI
Figure 1.4

EMM

\\emmsvr1\EMM\Jobs\2014\J14107 - Marulan Limestone Mine Heritage\GIS\02_Maps\HH033_ProjectDisturbanceFootprintDam_20180803_01.mxd 7/08/2018

1.5 Legislative framework

Boral will be seeking approval as a State Significant Development (SSD) under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal will be assessed for a project-based approval from the Department of Planning and Environment (DP&E). The individual issues that were identified in the early stages of the process will be investigated and the relevant departments will be consulted; however approval under the *Heritage Act 1977* (Heritage Act) is not required to permit impacts to heritage items.

In NSW, heritage is generally managed through statutory instruments that require approval for changes to be made. These instruments include schedules or registers of items that have been assessed and deemed to reach a threshold of significance values high enough to include them on the instrument itself.

Heritage items require a high level of consideration where a project is assessed as an SSD, so while individual approvals are not part of the overall process, a detailed level of assessment is required for the project's approval. Relevant heritage registers are provided in Section 1.6.2.

1.6 Objectives of this assessment

This report has been prepared to fulfil the Secretary's environmental assessment requirements (SEARs) for historic heritage under Part 4 Division 4 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The SEARS and EMM's responsive approach are presented in Table 1.1.

Table 1.1 SEARS

Item	Requirement	Response
DP&E	**A Historic heritage assessment (including archaeology) which must:**	
	• Include a statement of heritage impact (including significance assessment) for any State significant or locally significant historic heritage items; and	Section 6 of this report presents the statement of heritage impact for all heritage items, including newly recorded sites, which will potentially be affected by the project.
	• Outline any proposed mitigation and management measures (including an evaluation of the effectiveness and reliability of the measures), having regard to the Heritage Branch of NSW's requirements.	Section 7 of this report details the mitigation measures for items of heritage significance identified in this report.
	In addition, the EIS must include:	
	• A list of any approvals that must be obtained before the development may commence;	This project is seeking approval as an SSD under Part 4, Division 4.1 of the EP&A Act. Approvals under the Heritage Act are not required; however, should archaeological excavation be required for this project or post-approval works, any works that may impact relics or potential relics must be accompanied by the appropriate documentary investigation and undertaken by a qualified consultant. Management of relics and potential relics will be guided by the proposed heritage management plan (recommendation 1 of this report).

Table 1.1 SEARS

Item	Requirement	Response
	• An assessment of the likely impacts of the development on the environment, focussing on the specific issues identified below, including:	Chapter 6 of this report is the assessment of impacts and includes the statement of heritage impact.
	a) a description of the existing environment likely to be affected by the development, using sufficient baseline data;	Chapter 1 describes the existing environment.
	b) an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant laws, environmental planning instruments, guidelines, policies, plans and industry codes of practice;	Chapter 6
	c) a description of the measures that would be implemented to mitigate and/or offset the potential impacts of the development, and an assessment of: – whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented; – the likely effectiveness of these measures; and – whether contingency plans would be necessary to manage any residual risks;	Chapter 7details the management strategy, including the measures to mitigate the anticipated impacts of the project on identified heritage. The management strategy was formulated based on an assessment of the heritage significance of the area against project requirements.
	d) a description of the measures that would be implemented to monitor and report on the environmental performance of the development if it is approved.	Chapter 7

Table 1.1 SEARS

Item	Requirement	Response
Stakeholder consultation	During the preparation of the EIS, you must consult with relevant local, State and Commonwealth Government authorities, service providers, community groups and affected landowners. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.	Refer to the EIS for government consultation. Consultation was completed with local residents and former local residents to obtain information about the area as it was remembered by those individuals. The results are included in the report and informants acknowledged.
NSW Heritage Council		
Heritage	The Applicant must undertake a detailed archaeological assessment which includes a consideration of Aboriginal and non-Aboriginal heritage. The proposed mine pit expansion, overburden emplacement and haul road construction has a high potential to impact on Aboriginal sites. The detailed archaeological assessment should consider the proposed below ground impacts on any potential archaeology and in addition, consider what archaeological works have already been undertaken on this site which may provide information to aid in this assessment. The assessment should include overlay maps and assessments of significance for the potential archaeological resource utilising appropriate Heritage Council Guidelines such as 'Assessing the Significance of Archaeological Sites and Relics'. It is [*sic*] should also contain mitigation strategies to manage this potential archaeological resource which may include redesign to avoid significant archaeology or archaeological testing or salvage during project works.	This report documents the investigation of archaeological and built heritage significance. The significance of each site has been assessed and project impacts have been considered to arrive at site-specific management measures. This report addresses the heritage requirements identified by the NSW Heritage Council. Maps and overlays are included throughout the report to locate heritage items in and around the Project site. Relics associated with the lime burning enterprise will be removed by the project. Measures to record these sites prior to their removal are presented in Chapter 7 of this report.

Table 1.1 SEARS

Item	Requirement	Response
Visual	The Applicant should submit a Heritage Impact Assessment (HIA) as part of the EIS. The HIA should address the potential heritage impacts of the proposal to the Marulan Village and other state significant heritage items in the vicinity of the site, including views and settings to and from these heritage items. Identification of' potential impacts should include potential cumulative impacts from surrounding projects as the mine expansion proposal consists of a large scope of works in dislocated areas of Marulan. The HIA should include measures to manage, mitigate, monitor and offset potential adverse impacts. The applicant should also assess if the proposed works will have an impact on any archaeology protected under the Heritage Act 1977.	Significant views and vistas are addressed in Chapter 6.
Relics provision	The relics provisions in the Heritage Act 1977 require an excavation permit to be obtained from the Heritage Council of NSW, or an exception to be endorsed by the Heritage Council of NSW, prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed. Where possible, refer to archaeological zoning plans or archaeological management plans held by Local Councils. If any unexpected archaeological relics are discovered during the course of work, excavation should cease. An excavation permit, or an exception notification endorsement, should be obtained.	Archaeological sites containing relics were identified in the Project site. They have been assessed for significance (Section 5) and impacts (Section 6) and management measures have been developed (Section 7).
Make use of the following documents:		
	The *Burra Charter (The Australian ICOMOS charter for places of cultural significance)* (ICOMOS 2013).	Refer to section 1.7.1
	Heritage Manual (Heritage Office 1996 and updates)	Refer to section 1.7.1
	Statements of Heritage Impact Guidelines (Heritage Office 2006)	Refer to section 1.7.1
	Assessing Significance Historical Archaeological Sites and 'Relics'	Refer to section 1.7.1

1.7 Assessment method

1.7.1 Guidelines

This assessment is conducted using the principles of *The Charter for Places of Cultural Significance* (also known as the *Burra Charter,* Australian ICOMOS 2013) and the NSW *Heritage Manual* (Heritage Office 2006) to satisfy the SEARs for a historic heritage assessment.

The *Burra Charter* (Australian ICOMOS 2013) defines the concept of cultural significance as 'aesthetic, historic, scientific, social or spiritual value for past, present or future generations' (*Burra Charter* 2013 Article 1.2). It identifies that conservation of an item of cultural significance should be guided by the item's level of significance.

The Heritage Division of the Office of Environment and Heritage (OEH) provides guidelines for the assessment of heritage significance and the listing of heritage items in Council local environmental plans (LEPs) or on the State Heritage Register, known as the *Heritage Manual* (Heritage Office 1996 and updates). The components of the *Heritage Manual* are informed by the values and definitions in the *Burra Charter*. OEH provides other best practice guides which have informed this report including:

- *Statements of Heritage Impact Guidelines* (Heritage Office 2006);
- *Investigating Heritage Significance* (Heritage Office 2004); and
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch Department of Planning 2009).

1.7.2 Heritage registers

Research has been undertaken through the review of statutory and non-statutory registers. All registers were searched online and included:

Statutory:

- The National Heritage Register (NHL) made under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- The Commonwealth Heritage Register (CHL) made under the EPBC Act.
- The State Heritage Register (SHR) made under Part 3A of the Heritage Act. Items on the SHR undergo a rigorous assessment process and must reach a high significance threshold to be included. Inclusion on the SHR is directed by the Minister of the agency that administers the Heritage Act.
- The Heritage and Conservation Register (s170 register) made under Section 170 of the Heritage Act and is also referred to as the section 170 (s170) register. It is a register of heritage items that are owned or managed by state government authorities. Items on the s170 register may also be listed on other registers.

- Schedule 5 of the *Goulburn Mulwaree Local Environmental Plan 2009* (LEP) Division 4 of the EP&A Act includes provision for the making of local environmental plans (LEPs) by the Minister. LEPs are prepared to a standard template, which includes environmental heritage in Schedule 5 (heritage schedule). Where an item is included in the heritage schedule, development applications must include an assessment of impacts to the item. Where a project is being assessed as a SSD, approval by the relevant council does not form part of the overall approval; however, the items require assessment and management if they are affected by the proposal.

- The State Heritage Inventory (SHI), which is a central collection of statutory heritage listings in NSW and, which was cross-checked with the Schedule 5 and s170 registers.

Non-statutory:

- National Trust of Australia, NSW (NT); and

- Register of the National Estate (RNE).

1.7.3 Relics provision Heritage Act 1979

Archaeological sites are protected by Section 139 of the Heritage Act if they are assessed to be relics, that is, of local or State significance. A formal listing is not required to ensure that protection and impacts can only be undertaken with approval, either under the Heritage Act or through a SSD approval.

1.7.4 Primary research

Primary research included investigating archives that may hold original material such as plans, written documents and photographs, including:

- newspaper articles, accessed through *Trove* online;

- photographs, accessed through *Trove* online and in secondary publications;

- Ancestry.com;

- online registry of Births Deaths and Marriages;

- interviews with people who lived in the local area – Barry Armitt, Pamela Cooper and Rosemary Turner;

- land titles information; and

- maps, plans, sketches.

1.7.5 Secondary research

Secondary sources including local histories and publications of research societies were also reviewed to understand the history of the local area and provide further detail on mining techniques possibly used in the historic mine workings.

1.7.6 Facilities

The following facilities were visited to obtain research material on the study area:

- Berrima District Historical & Family History Society Inc;
- Land and Property Information (LPI);
- National Library of Australia *Trove* Online;
- State Library (Mitchell Wing); and
- Wingecarribee Local Studies Library.

1.8 Report structure

The report is structured as follows:

- section 1 provides an introduction to the assessment and an outline of the legislative framework;
- section 2 includes a historical background;
- section 3 describes the historical survey methodology and results;
- section 4 is the comparative analysis for the industrial sites;
- section 5 is the assessment of significance;
- section 6 details the impact assessments for the items; and
- section 7 provides conclusions and recommendations for retaining significance followed by mitigation measures where change is unavoidable.

1.9 Authorship

This report was written by Rebecca Newell (EMM archaeologist) with additions in 2018 by Kerryn Armstrong and Pamela Kottaras. It was reviewed by Ryan Desic (EMM Senior Archaeologist. External review was provided by Neville Hattingh (Element Environment), Les Longhurst and Rod Wallace (Boral).

1.10 Acknowledgments

We would like to thank Barry Armitt, Pamela Cooper, Rosemary Turner, Maureen Eddy and Philip Leighton Daly for their time and invaluable information about the local area and Marulan South. An additional thank you to Grant Thompson of Boral, who escorted the team around the site and passed on his 20 years of knowledge about the mine.

1.11 Review of previous investigations

Historic heritage investigations have included two publications used in the historical background (Eddy 1985 and Leighton-Daly 2010) as well as many publications on aspects of mining and domestic life in the Southern Tablelands. Investigations specific to the study area, completed as part of a review of environmental factors for the mine operations were also reviewed.

RPS Harper Somers O'Sullivan (RPS HSO 2009) completed an investigation of Aboriginal and European heritage to support a Mine Operations Plan. They identified the remains of a historic structure and associated artefacts within one of their study units. It comprised a hut probably built in the nineteenth century and occupied until the early twentieth century. It was noted that kiln bricks were scattered around the historical structure. Research into the hut identified it as belonging to George Feltham, a mine worker, who built the structure on land he leased. While the construction date is unknown historical research has indicated that George and his wife lived in the house until 1908. The assessment did not consider the hut to be of heritage significance and no archaeological significance or research potential was identified (RPS HSO 2009, p.40). As the historical structure was located in an area of impact it was recommended that an application for an exception to the requirement for an excavation permit under Section 139(4) of the Heritage Act be completed prior to impacts to the structure. The structure was revisited during the historic heritage survey for this assessment.

ERM completed an environmental assessment as part of the proposal to establish and operate Peppertree Quarry, located adjacent to Marulan South Limestone Mine. A historic heritage assessment completed for the Peppertree Quarry Project did not identify any historic heritage sites or areas of potential historical archaeological deposit.

1.12 Register searches

All registers noted in Section 1.7.2 were reviewed for items located in the Project site. No registered historical heritage items have been previously recorded in the Project site.

In the wider study area the 'Bungonia State Recreation Area' has been identified immediately south of the Project site. It is an item of local heritage significance listed on the Goulburn Mulwaree LEP (Item No. I027). It is considered to be significant for its natural and cultural associations. The Bungonia State Recreation Area refers to what is now the Bungonia State Conservation Area and Bungonia National Park.

The site of Old Marulan Town (usually referred to as 'Old Marulan'), an item listed on the SHR (Item number 00127) is located approximately 9 km from the Project site. Old Marulan is a State significant archaeological site for its ability to illustrate, through its archaeological resource, details of an early colonial service town, predominantly from 1835–67.

The Glenrock Homestead and outbuildings is listed as an item of local heritage significance on the Goulburn Mulwaree LEP (Item No I314). It is considered to be significant for its aesthetic and historical values and for its association with George Barber and his wife Elizabeth Hume (sister to Hamilton Hume). The property boundary retains its historical extent but the identified heritage curtilage has been greatly reduced and is approximately 2.4 km from the closest area of impact at Marulan Creek (Figure 1.5).

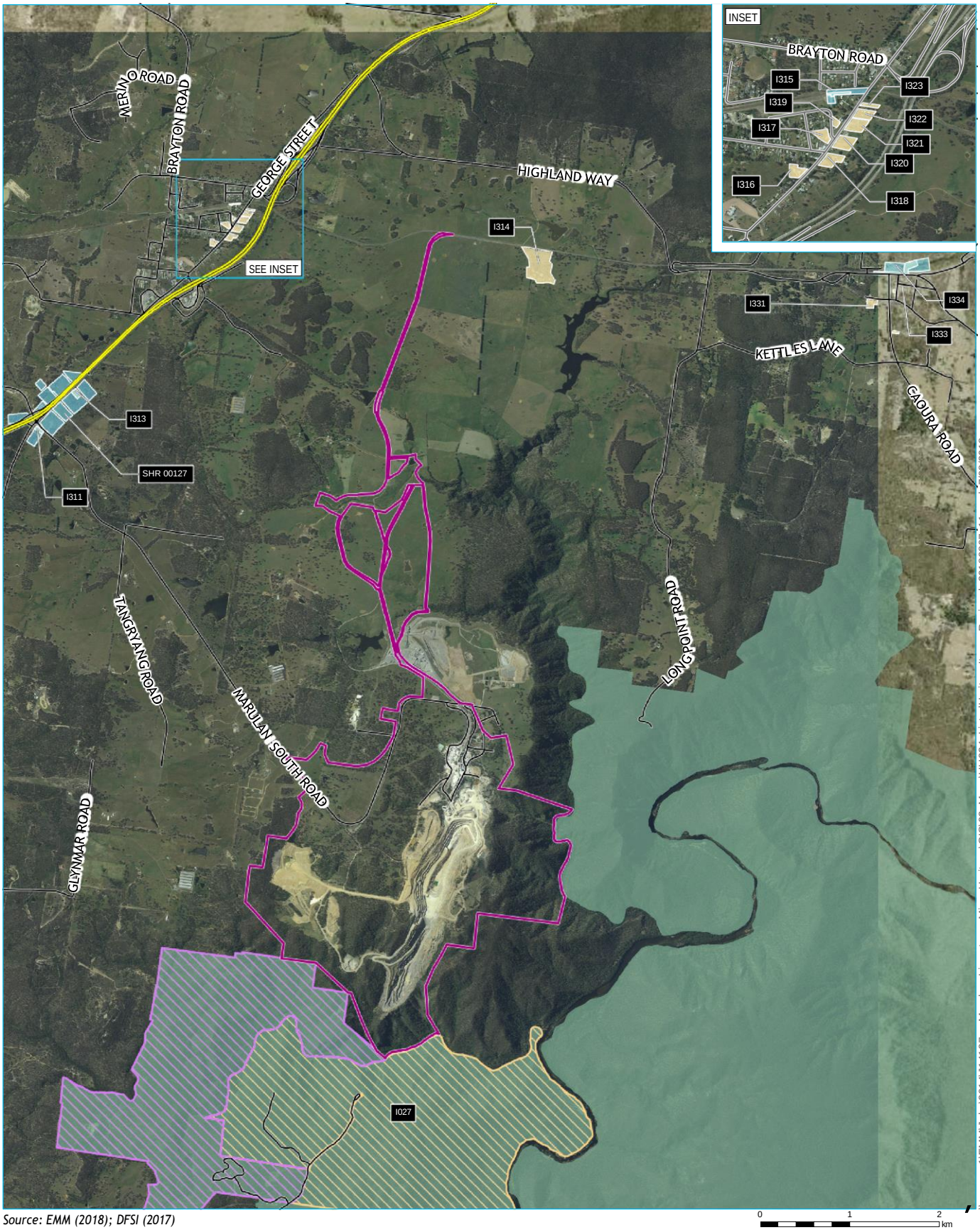
A summary table of heritage items listed on statutory registers is provided in Table 1.2. The locations of listed heritage items in vicinity of the Project site are shown on Figure 1.5. These items are within 6 to 6.5 km of the Project site.

Table 1.2 Listed heritage item in the vicinity of the Project site

Item	Listing	Listing ID	Significance
Bungonia National Park	LEP	I027	Local
Old Marulan Town	SHR	00127	State
Marulan Township Conservation Area	LEP	N/A but shown on Map	

Table 1.2 Listed heritage item in the vicinity of the Project site

Item	Listing	Listing ID	Significance
		HER 003D	
Old Marulan Anglican Cemetery	LEP	I311	Local
St Patrick's Catholic Cemetery	LEP	I313	Local
Marulan Railway Station and yard	SHR	01188	State
Marulan Railway Station and yard	LEP	I315	State
All Saints Church of England	LEP	I316	Local
Terminus Hotel	LEP	I317	Local
Badlock's Shed Store (c1870), Marulan Public School	LEP	I318	Local
Postmaster's residence, Post Office "Mooroowoolen"	LEP	I319	Local
Dwelling "Waverley"	LEP	I323	Local
Dwelling "Cora-Lyn", St Stephen's Uniting Church	LEP	I322	Local
Shop Group, "Wattle Glen", "Coronation Stores", Morgan's General Store, "the Boarding House"	LEP	I321	Local
"Royal Hotel", "Aunty Mary's" shop	LEP	I320	Local
Tallong Railway Station, Water Supply	SHR	01259	State
Tallong Railway Station, Water Supply	LEP	I334	State
Glenrock Homestead and Outbuildings	LEP	I314	Local
War Memorial Hall	LEP	I333	Local
Dwelling, Federation, Tallong Public School	LEP	I331	Local



\\emmsvr1\EMM\Jobs\2014\J14107 - Marulan Limestone Mine Heritage\GIS\02_Maps\HH024_ListedHeritageItems_Regional_20180807_11.mxd 7/08/2018

Source: EMM (2018); DFSI (2017)

KEY

- Major road
- Road
- Project boundary
- Morton National Park
- Bungonia conservation area
- Bungonia National Park
- Heritage sites
- State Heritage Register
- LEP item

Listed heritage items in the vicinity of the project area

Marulan South Continued Operations Project
Historical heritage assessment and SoHI
Figure 1.5

EMM

2 Historical background

2.1 Historic themes

The Australian and NSW heritage systems employ a series of historic themes to guide the understanding of history and historical investigation in Australia. Historic themes are used to identify context for understanding how a place has developed by identifying the factors that shaped its significance. The state and national themes are complementary to enable the historian to present a unified understanding of how an area fits into NSW and Australian history. The historic themes are also an important guide when assessing an item's heritage significance. They provide information on how an item may be historically significant at the local, state or national level. Finally, historic themes help develop interpretation and management strategies for items of heritage significance.

A full list of these themes can be found on the Heritage Division of OEH website (http://www.environment.nsw.gov.au/heritage/index.htm). Historic themes in the study area were identified based on the historical background (as described below) and the results of the historical survey (see Section 3). The Australian and NSW historic themes relevant to the study area that have been used in this report are listed in Table 2.1.

Table 2.1 Historic themes

NSW historic themes	Australian historic themes
2. Peopling Australia	Aboriginal cultures and interactions with other cultures
3. Developing local, regional and national economies	Agriculture
	Industry
	Mining
	Transport
4. Building settlements, towns and cities	Towns, suburbs and villages
	Land tenure
	Accommodation
5. Working	Labour
8. Developing Australia's cultural life	Domestic life

2.2 The pre-European past

Information about the socio-cultural structure of Aboriginal society prior to European contact largely comes from ethno-historic accounts made by Europeans. These accounts and observations were made after massive social disruption due to disease and displacement. As a result, this information is often contentious, particularly in relation to language area boundaries. The information presented in this report is based on previous studies and the traditional non-Aboriginal data but remains open to reinterpretation.

The study area is located on the boundary of the areas of four Aboriginal groups (based on Tindale 1974):

- the Ngunawal whose territory extended to the south-west from Queanbeyan to Yass and east to beyond Goulburn;
- the Gandangara whose territory extended to the north-west at Goulburn and Berrima, down the Hawkesbury River to Camden;

- the Wodiwodi whose territory extends to the north-east north of the Shoalhaven River to Wollongong; and
- the Wandandian whose territory extends to the south-east from Ulladulla to the Shoalhaven River and Nowra.

Further information can be found in the Aboriginal cultural heritage assessment, included in the EIS for the Project.

2.3 History of the study area

2.3.1 Exploration

European explorers first visited the Southern Tablelands as early as 1798 when Henry Hacking and John Wilson were sent to the area by Governor Hunter (Chisholm 2006, Jervis 1946). His reason for exploring the area was to dispel the myth that convicts would be able to walk to China (Higginbotham 2009, p.21). He ascended Mt Towrang and viewed the Goulburn Plains before returning home. The area was described as containing 'fine open forest' (Jervis 1946, p.108) and "pleasing to the eye, having a beautiful park-like appearance" (Atkinson 1979 p.6), suggesting land management practices by Aboriginal people before the British influx to the region.

The Southern Tablelands were also explored by James Meehan in 1818 (Firth 1983). In August 1820 Joseph Wild travelled south of the Cookbundoon Range and found what is now called Lake George. The County of Argyle was first surveyed in 1824 by Harper on the orders of the Surveyor General but the majority of the work was completed by Robert Hoddle (Jervis 1946, p.115).

2.3.2 Pastoralism and agriculture

Alongside explorers, astute settlers also expanded their interests into the County of Argyle (Plate 2.1). Prior to the 1820s the Southern Tablelands were unavailable for settlement, although a number of prominent pastoralists occupied the land regardless. These included John Oxley and John Moore who both ran large herds of cattle beyond the regular limits of settlement in 1820 (Higginbotham 2009, p.26).

In 1820 the area was opened as permits to cross the 'Cowpastures' (now Camden) were issued. Settlers raced to establish themselves on the most prominent and profitable land with the result that land grants were issued. Despite this, many areas of illegal exploitation of Crown land to run sheep and cattle continued (Higginbotham 2009, p.27).

One of the earliest landholders in the County of Argyle was James Atkinson of Oldbury who settled in Sutton Forest, approximately 40 km toward Sydney. Atkinson received a permit in 1822 to occupy an area of land on the right bank of the Wollondilly River as a grazing farm and built a large, stately home he called Oldbury, which still stands. His brother John followed soon after and established his homestead, Mereworth, across the Great South Road (Hume Highway) from James.

William Bradbury was issued a 'ticket of occupation' at the river Jarara in the Bungonia area in the early 1820s (Rosen 2017, p.26; Jarvis 1946, p.113) and David Reid and Robert Futter were also early landowners in Bungonia (Rosen 2017, p.26).

One of the largest pastoral holdings in the area was the Glenrock Estate on Highland Way. George Barber (b.c1795, d.1844) took up a land grant in the Marulan district in 1826 and built the homestead some time in the mid-1830s or early 1840s (Osborne 2002, p.60-61; SHI DB 2934038). Barber was the stepson of Dr Charles Throsby (Osborne Sept/Oct 2002, p.60) and the husband of Isabella Hume (m.1815), sister to Hamilton. George Barber increased his holdings to approximately 1800 acres although Glenrock appears to have stayed the same size. Sources confirming the extent of Glenrock have not been found but an 1857 survey plan (Plate 2.2) suggests the boundary, which has since been reduced. The assumed original extent of Glenrock (but not Barber's total holdings) is shown in Plate 2.3)

Barber died by drowning in a flooded creek, probably after falling from his horse. On Tuesday 23 July 1844, the *Australian* ran a paragraph under "Country news" after Barber had been missing for three weeks after leaving 'Dunn's public house' for home. His body was found eleven weeks later in the Wollondilly River by Charles Lockyer (SMH 9 September 1844, p.2); the inquest determined that death was caused by accidental drowning as the post mortem found 'not the slightest mark of violence' on his person and the articles he had purchased the day he went missing, still in his pocket. Isabella died in 1855 at Glenrock (Ancestry.com). The property was sold to John Morris is 1862 (SMH 4 Nov 1862, p.8).

The lot boundary of the Glenrock Estate abuts the Peppertree Quarry landholdings but the identified heritage curtilage is a contracted area 2.4 km north of the mine and approximately 240 m from the Marulan Creek Dam site (Figure 1.5).

Opinions on the fertility of the country for agriculture varied; E.S Hall considered it to be barren in 1829 while Lieutenant Breton considered it admirable in 1830 (Jervis 1946, p.116). James Atkinson who settled in Sutton Forest, approximately 40 km towards Sydney on the Hume Highway, described the County of Argyle as being open forest of white and blue gum on a granite soil with large blocks of granite, of a coarse texture, and grey colour (Atkinson, 1979 p.5-6). Atkinson describes most of the land as poor for cultivation but well suited for grazing. In areas where whinstone[1] predominated, the land was considered suitable for grazing and cultivation (Atkinson 1979, p.5-6).

Stock and cattle stations were established in the 1820s throughout the Goulburn Plains and the wool industry dominated the area during the 1800s (Firth 1983). Pastoralists set up stations run by the convict labour force. The wealthiest pastoralists ran their stations from Sydney or the Cumberland Plain sending sons or overseers to run the day to day operations (Higginbotham 2009, p.27).

Expansion of the wool industry continued until the end of convict transportation and the resulting withdrawal of cheap convict labour. Along with the drought that started in 1839, affecting wool and wheat prices and its continued economic reliance on England, NSW experienced a depression that was to usher in hardship for the citizens of the new British colony. The 1841 Depression caused a collapse in the price of wool, with the expected domino effect on the rest of the economy. By 1845 the depression was officially over and life gradually went back to normal.

However, a recovery in the industry was nearly derailed by the discovery of gold in 1851. It once again reduced the labour pool as prospectors raced to the goldfields. The gold rush petered out by the 1860s allowing a return to pastoral occupations and a resulting economic growth period to the 1890s (Higginbotham 2009, p.27). The area directly around Marulan South has remained grazing land until the present day.

[1] Whinstone is defined as a "popular term for any dark, fine-grained igneous rock" in Kearey (2001, p. 293).

Plate 2.1 Map of the County of Argyle in 1843 with the approximate area of the Project site shown in red (National Library of Australia 2015)

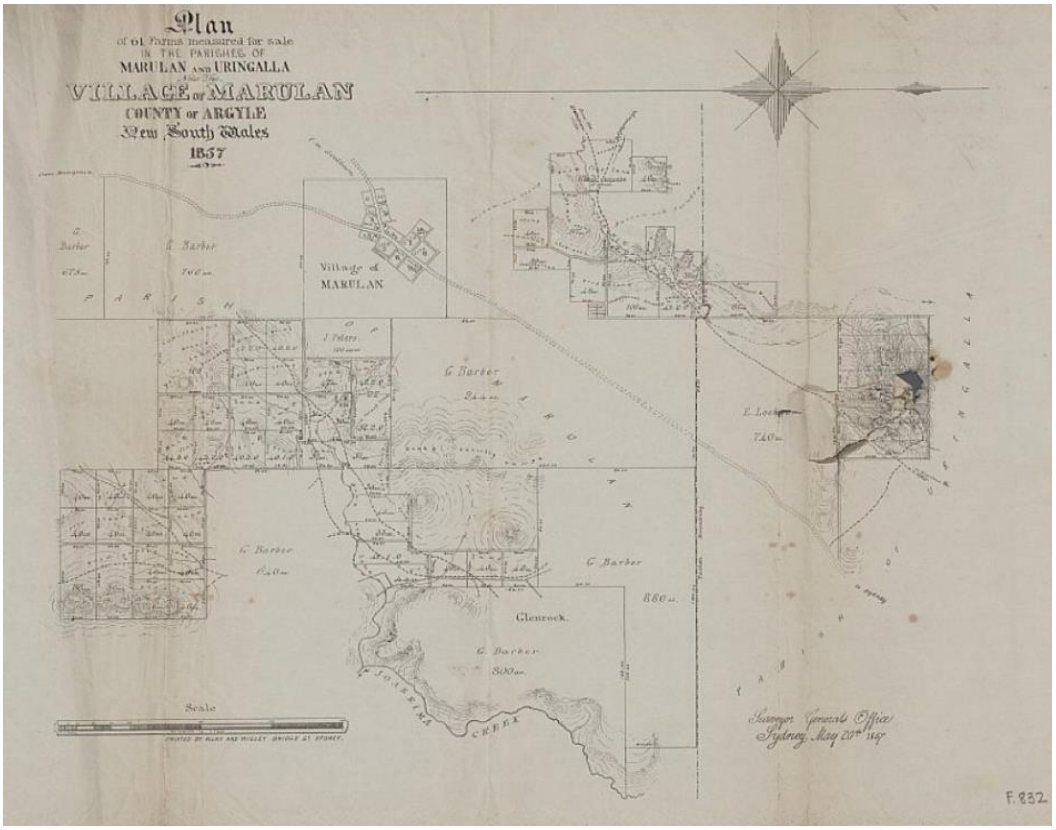


Plate 2.2 **Plan of the village of Marulan 1857 (top left), which also shows the extent of Glenrock Estate and Barber's other holdings (National Library of Australia (2015b). North is pointing right**

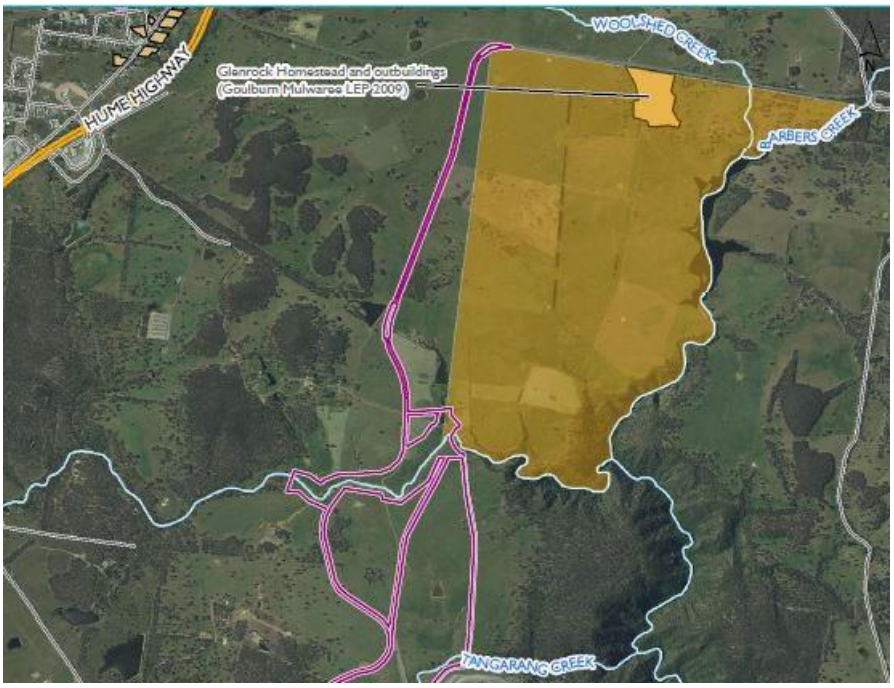


Plate 2.3 **The estimated extent of historical Glenrock Station and the listed curtilage.**

2.3.3 Towns

i Major towns in the region

Pastoral settlement necessitated that homesteads and the communities living there were self-sufficient because of the large distances between homesteads and centres of produce such as Goulburn and Sydney. This self-sufficiency also affected the establishment of towns, which was slower in areas where large pastoral stations were equipped with all they required. The settlement of towns is also based on the placement of infrastructure, with Goulburn and Old Marulan both established based on the location of the South or Argyle Road.

A town plan for Goulburn was approved in 1829 based on the lobbying of the local Bench of Magistrates who wanted a permanent meeting place and a commercial and government centre to be created (Higginbotham 2009, p.80). This town included a courthouse and lockup, barracks, veteran's huts and an inn. Sir Richard Bourke chose the area of the second town of Goulburn in 1832. He decided that the old location was flood prone. The growth of Goulburn mirrored that of the wider colony with periods of expansion before the Depression in the 1840s, followed by a sustained period of growth from the 1860s to the end of the nineteenth century. The railway to Goulburn was built in 1869.

Marulan was established first in 1834 but moved approximately 2 km away in 1868 when the Great South Railway Line was constructed. Initially the new Marulan was name 'Mooroowoolin' but reverted to Marulan with the old town taking on the moniker of Old Marulan. Other towns (or villages) established in the area included Tallong (1869), Wingello (1871) and Bungonia (1836). By 1882 Marulan sustained two hotels, three stores, a butcher, two blacksmiths, two wheelwrights, two bootmakers, a saddler, a bank, a public school, three places of worship and a population of approximately 200 (*Goulburn Evening Penny Post* 1882, p.4). It is clear that Marulan was one of the large towns between the Southern Highlands and Goulburn. Rumours also abounded that in 1903 a tiger roamed the surrounds (*Barrier Miner* 1903, p.3). The animal was, in fact, a leopard, brought to Australia by a young officer from South Africa. The beast escaped its owner and 'chased peaceable citizens' of Marulan (1903 'The Marulan Tiger', *Hawkesbury Herald*, 20 March, p. 12).

ii Marulan South

The most recent mining operations at Marulan South Limestone Mine led to the rise of the village of Marulan South. Before the village was established, families moved into the area and established camps and rudimentary houses so they could be close to the mines that they worked. A references to an earlier incarnation of 'Marulan South' dating to around the 1860s is made in Leighton-Daly (2010, p.33 and 145) but there is no evidence that a town or village as such existed. Plans, newspaper articles and photographs were reviewed to determine if in fact an early town existed and that the story of Old Marulan to Marulan was repeated to the south-east; nothing was found to suggest a town or a village although references to at least two schools have been found. It is far more likely that 'Marulan South' referred to the mining area and the scattering of dwellings in the area, many of which are likely to have been destroyed as the mine grew.

The earliest permanent resident of the now empty village at Marulan South was Les Cooper who arrived in 1929 to build his home. He obtained a pre-existing service store built for the railway workers at Marulan and began operating a local store and post office for the mine workers (P Cooper *pers. comm.*). The store was well known to contain almost anything that could be required for work and at home and Les Cooper was also the local banker and postman. Approximately 30 houses, a school and recreational facilities were built for workers who lived at Marulan South (Plate 2.4 to Plate 2.6). The houses were constructed for the companies running the mine and were lived in by many miners' families.

Before Les Cooper moved to Marulan South to open shop he worked near Freddy's Hill (location unidentified), which was at the junction of the skip line from Weenga and burnt lime at the Weenga Kilns. The location of the Weenga Quarry has not been established through research and references are rare except as text in newspapers and in the history prepared by Leighton-Daly. However, based on the drawings sketched according to Alma Armitt's memory, it is likely that it was in the current mine area (Leighton-Daly, p.161).

Marulan South became a community hub for the miners and their families and a well known place in the local district. In 1998 the decision was made to close the village rather than complete additional repairs and upgrades. Residents' houses were transported to Marulan as part of the closure and a large wake was held to farewell the town (P Cooper, R Turner and M Eddy pers comm).

EMM has been able to complete oral history interviews with former residents and workers of Marulan South and they have provided a picture of a close knit and self-sustaining community. The mine operators also contributed to the community atmosphere of the town, helping to provide recreational facilities and funding for functions.

Plate 2.4 A typical house in Marulan South circa 1960 (Boral Resources 2015).

Plate 2.5 Single men's quarters (Boral Cement 2015).

Plate 2.6 **A section of an aerial photograph from 1972 showing the town of Marulan South and the mine (Boral Resources 2015).**

2.3.4 Transport and communications

The most well known of the roads created from Sydney to the Southern Tablelands was Mitchell's Great South Road, which progressively opened from 1820 to 1843. In addition to this road there was the South or Argyle Road (1818 to 1833) and Macquarie's Government Road (1822 to 1839) (Higginbotham 2009, p.55). Smaller road systems also crisscrossed the area.

Formalised road construction was led by surveyors like General Thomas Mitchell and the majority of the work was completed by convict road gangs. The gangs would be sent out from their stockades to a distant portion of the road to work either retuning home in the evening or sleeping in mobile huts. Two stockades were known in the Southern Tablelands; Towrang and Wingello from which convicts would have constructed the Great South Road (Higginbotham 2009, p.56).

The Marulan South Road started off as the Lime-kiln Road which ended at Mr James A Hogg's (a son of the first James Hogg in the area) lime kilns. Some minor adjustments to this road have been made, the most substantial being the left turn (north) to Marulan South approximately 5.6 km from the Hume Highway. The earlier alignment of the road continued its trajectory south-east and took a slight left (south) where it travelled for another 500 m before veering east and then south again to the lime kilns (Figure 3.1).

In 1952 the road was in disrepair and was the subject of discussion. James Hogg complained to the Mulwaree Shire Council that the Lime-kiln Road (the original name for Marulan South Road) was being allowed to 'drift into ruin'. Hogg described the matter as 'one of "national importance" as it was a "great feeder road serving the steel and cement industry of this nation... the whole six miles needs urgent attention"' (Goulburn Evening Post 4 April 1952, p.1).

It is likely that the lime kilns mentioned above are those identified during field survey for this report. A haul road has been constructed over part of the Lime-kiln Road close to the lime kilns but the southernmost extent of this road is probably the small road leading north from those kilns. Other small roads can be seen in historical and current aerial photography and very likely relate to ad-hoc roads created by the smaller historic mining operations.

During 1888 James Hogg took out two advertisements in the *Goulburn Herald* (18 February 1888, p.5) searching for railway sleepers and a contractor for railway earth works. One year later the Hogg bros. were auctioning off their bullocks and horses as their tramway was complete (*Goulburn Evening Penny Post* 9 February 1889, p.5). The tramway followed the path of the current railway until approximately the first 2.5 km from the mines; it diverges north-west toward Marulan station. This was later replaced by the Medway junction line.

The rail line from Marulan South is privately owned by Boral to service Marulan South Limestone Mine and Peppertree Quarry. Tenders for construction were advertised in 1926 (*Robertson Mail* 2 November 1926, p.3) and the line was operational in 1928 (NSW Rail Net – Medway Junction [online]).

2.3.5 Education

A number of small schools dotted the Southern Tablelands, possibly due to the lack of reliable transportation for children to travel long distances to school (Eddy 1985, p.56). Two schools existed at Marulan. The first was opened in 1860 and remains open till this day. The second was opened in 1871 and closed shortly after in 1877 (NSW Department of Education 2015). The location of both schools is approximately 8 km west of the Project site.

The schools at Marulan moved based on the location of the township; the original school was moved twice to remain close to the town when it was relocated. Many of the schools in the area struggled with inadequate facilities, including lack of classrooms, desks and equipment for the varying numbers of students attending. The school at Marulan had an enrolment for 75 children but only desks for 45 (Eddy 1985, p.57).

A school was built at Marulan South in 1934 and existed in various guises until 1995. It began as a provisional school and was located in the Workers Mess Hut until a proper school building was constructed in 1937. From 1938–1940 Marulan South was a half time school with the remainder of classes held at a school at Brayton. Marulan South became a full time school in 1940 but also struggled with an inability to obtain the necessary equipment with the Parents and Citizens Association requesting desks and an assistant for the teacher (Eddy 1985, p.68). The high regard in which the teachers at Marulan South were held is evidenced in the inclusion of tributes to many in the Goulburn Post (*Goulburn Evening Post* 1936, p.1).

Another, earlier school listed as Argyle (Lime-kilns) public school was known to the area, situated approximately 4.5 km south-east from Old Marulan. The building of Argyle public school (not to be confused with East Argyle public school) began in 1884 (*Goulburn Evening Post* 1884, p.7). The exact position of this school is unknown but may be in one of two places:

- James Hogg owned land along South Marulan road (Lot 17) which is marked as "Argyle PS" site (Dep of Lands, 1953) (outlined in red in Plate 2.7); or

- Portion 193, on which the ruins of a building survive was owned by George Feltham, who sold it to FH Gall in 1910. This building has been variably called George and Elizabeth Feltham's house (Leighton-Daly 2010, p.144) as well as the Argyle school (pers. comm. Philip Leighton-Daly 13/03/2018) (outlined in blue in Plate 2.7).

A report from the *Goulburn Evening Penny Post* (Thursday 12 September 1895, p.4) reporting on the loss of property due to bushfires states the *"...old school house on the Lime-kiln road has also succumbed to the fires. I understand that two workmen used it as a camping house, and that at the time of the fire it contained their bedding and also a saddle and bridle.*" This notice in the paper suggests that the old school house was not the place that the Feltham's lived in for a time and it must have been somewhere on the main road to Marulan South.

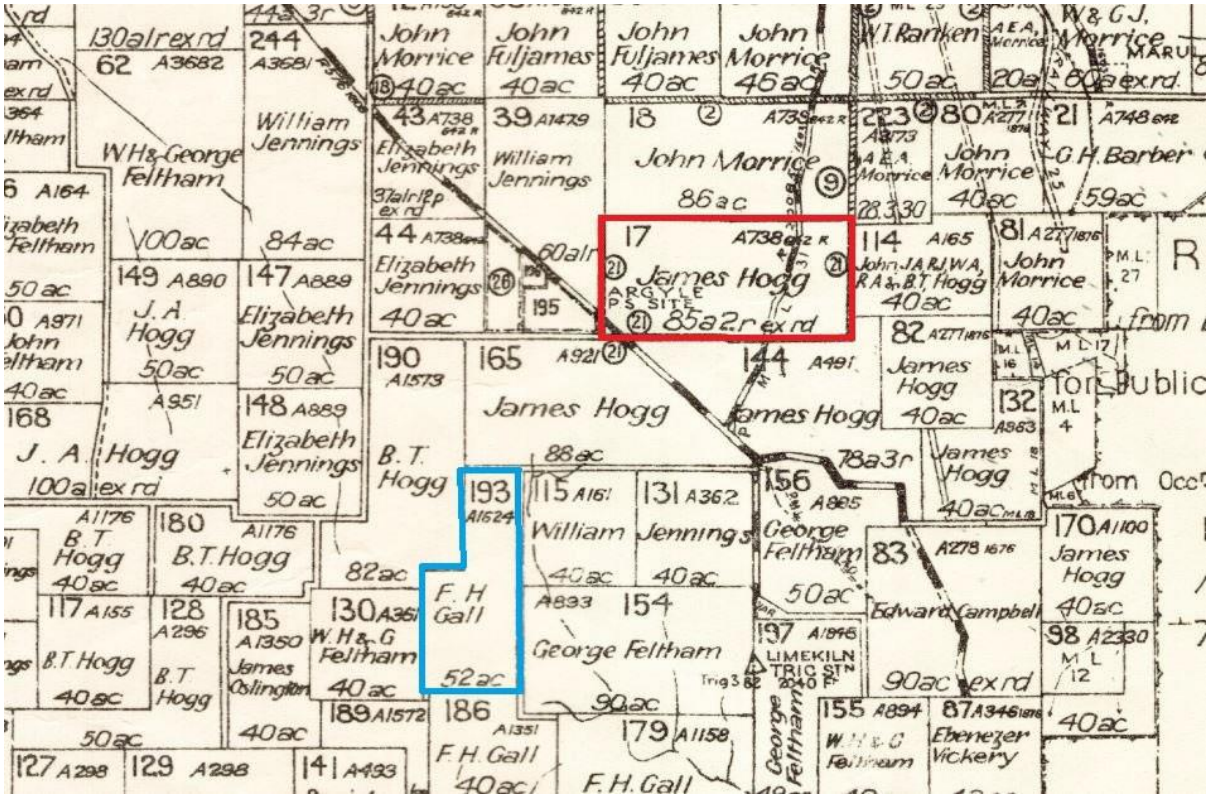


Plate 2.7 **1953 Department of lands map showing James Hogg Lot 17 with note "Argyle P.S Site" (red) and FH Gall's allotment (blue).**

2.3.6 Recreation

Marulan South was a centre of recreation for the community. It had one of the main bowling clubs in the district. It served the dual purpose of licensed facility and bowling green and was also a community hub regularly hosting functions for the town. This building survives as a Boral office facility today.

Tennis was also a popular pastime in the district. Many of the local tennis clubs looked forward to playing on the Marulan South courts which were believed to be some of the best in the district. Tennis was played at least twice a week, three times in the summer (P Cooper *pers comm*).

In the 1950s and 1960s Southern Portland Cement assisted in the creation of a local oval, community hall and tennis courts to further increase the facilities present for recreation. The community hall held a number of debutant balls and mock debutant balls, as well as touring entertainers.

2.3.7 Mining

i Region

The Southern Tablelands has a long and extensive history of extractive industries for a variety of products. Very fine limestone was noted at Barramaragoa and "Murroowallin"[2] by James Atkinson (Atkinson 1979, p.22). Exploration for minerals occurred in 1844 with Clarke and Throsby noting the deposits of quartz and limestone in the area (Jervis 1946, p.381). In 1833 there were two quarries recorded; a limestone quarry on Captain Rossi's land and a marble quarry near Stucky's Farm. Slate was quarried from Slateville Quarry in Chatsbury, 25 km in a straight line from Marulan, and provided roofing slate for public buildings in Sydney until the Second World War. Good quality sandstone was quarried at Marulan and used for colonial houses and gravestones in the area. The sandstone quarry was located on the western side of Mount Otway north of Marulan (Eddy 1985, p.86). Lockersleigh hosted a silver mine on a remote ridge (Higginbotham 2009, p.141). In 1849 the local Marulan South newspaper provided details of the discovery of good quality iron ore at a property belonging to Major Lockyer. However, no further information on the mining of this ore has been obtained and it is possible that the search for gold was more alluring than iron ore (Eddy 1985, p.87).

The gold in the local area was first ignored in favour of the diggings at Bathurst and Ballarat. Gold diggings in the area were located at Braidwood and along the Shoalhaven River and were worked after the 1860s. In 1881 it was reported that gold had been discovered in Wingello Creek. The discovery caused commotion and traffic jams with a number of miners coming into the area to pan for gold. Nuggets the size of peas were found (*Goulburn Evening Post* 1881, p.4).

ii Mining at Marulan South

Mining at Marulan South has been focused on the limestone deposits. By March 1826 it was clear that the deposits of limestone in the Marulan South area were recognised and it was recommended that these areas were not included in settlers grants (Leighton-Daly 2010, p.145).

The area of Marulan South was bought by Mr Fuljames who purchased the land for its limestone deposits in the early nineteenth century. James Hogg then purchased a number of lots in the 1860s. The limestone quarries were quick to gain attention and by 1869 a notice in *The Armidale Express* and *New England General Advertiser* (4 September 1869) talks of the three parties who are working in the limestone quarries near Marulan. The area continued to allow new leases and new mines including a nearby lease for arsenic on Hogg's property. The area was then held under adjoining leases by Weenga Lime Limited, Hoskins Iron and Steel Limited and Southern Portland Cement prior to 1928 when the area was consolidated and worked by Southern Portland Cement (Eddy 1985, p.87). A section of the mine area was worked for agricultural limestone and as a raw material for cement manufacturer at Maldon. The full amalgamation of the mine occurred when it was obtained by Blue Circle Southern Cement. Boral acquired Blue Circle Southern Cement in 1987 and in 2004 leases were consolidated under a mine lease (CML) for Boral-CML 16 (Plate 2.8; EIS Figure 1.3).

The Marulan South Limestone Mine operations were closely linked with the cement works at Berrima, both through its product and the connections of the company which ran both enterprises. For managers, a move to Berrima was seen as a step-up in the company and meant that it was unlikely that they would return to Marulan South. Also located close to Marulan South was a small granite quarry overlooking Barbers Creek (Leighton-Daly 2010, p.146).

[2] Also spelled "Mooroowoolen", previous name for "Marulan" (Geographical Names Board 2015).

The mining method employed at Marulan South has changed significantly over the many years mining has occurred in the area. When mining limestone at Marulan was first undertaken by James Hogg in the 1860s it was completed by hand with picks and shovels and hand–loaded into horse drawn wagons (Leighton-Daly 2010, p.188).

James Hogg was born in 1819 (Ancestry.com 2018); little is known about his parents but we do know that he shared his father's name. James married Mary Straker in 1843 and the couple had eight children. After Hogg died in 1886 the lime business was carried on by his sons (*Goulburn Evening Penny Post* 7 September 1886, p.4). By 1931 there was both Hogg Bros., lime merchants (*Sydney Morning Herald* 5 December 1931, p.17) and the Weenga Lime Company (*Goulburn Evening Penny Post* 11 May 1922, p.3). Weenga lime was still hiring in 1949 (*Goulburn Evening Post* 22 February 1949, p.4); however, by 1951 Weenga Lime Co was hiring in conjunction with Commonwealth Portland Cement Co Ltd. (*Goulburn Evening Post* 4 April 1951, p.4).

In 1898 the mining activity in the Marulan area was steadily increasing, particularly the Carrington Iron mines though issues with railway lines meant not all the product reached its destination (*Goulburn Evening Penny Post* 1898, p.2). By the early 1900s, the rock was carted from the pits by approximately 25 horses, while mining was completed with steam shovels (Leighton-Daly 2010, p.178) (refer to plates 2.9 to 2.13 for historical photographs).

A dispute, being heard at the Goulburn Mining Warden's court, was ongoing in September 1938 with the Metropolitan Products Ltd applying for access to build a dam, aerial ropeway and pipeline on Portion 135 and S3. The Commonwealth Portland Cement Company was the objecting party and in an effort to avoid creating deep divisions between the two companies, the mining warder WF Britz adjourned the application to October 10 (*Goulburn Evening Penny Post Thursday* 20 September 1938, p.1). Timber was cleared in preparation for the installation of an aerial ropeway sometime before October 1936 (*Goulburn Evening Penny Post Thursday* 25 February 1937, p.1).

Although disputes over access continue into 1939, the aerial ropeway was operating to the west of the mine. Problems with a bend in the alignment resulting in the rope breaking on a regular basis and holding the works up (*Goulburn Evening Penny Post* 29 November, 1939, p.1). Nonetheless, the technology to remove limestone was improving at a rapid rate.

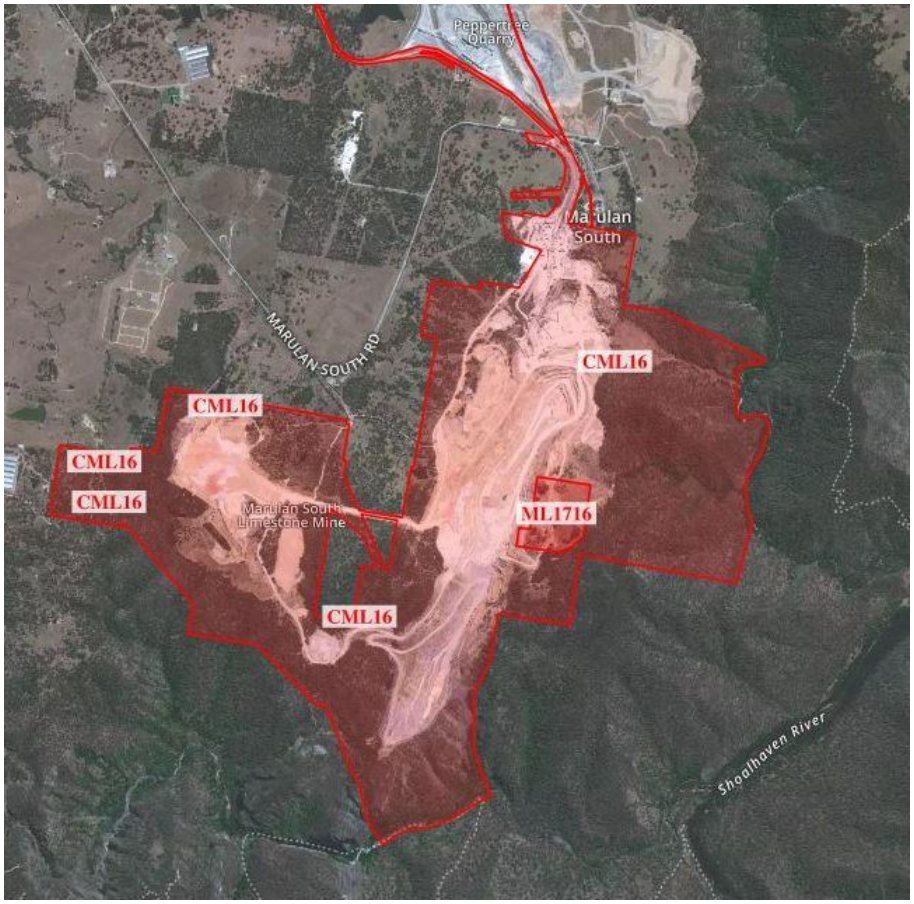


Plate 2.8 **CML16 held by Boral (Source: NSW Planning & Environment MinView: Current mineral leases 2018)**

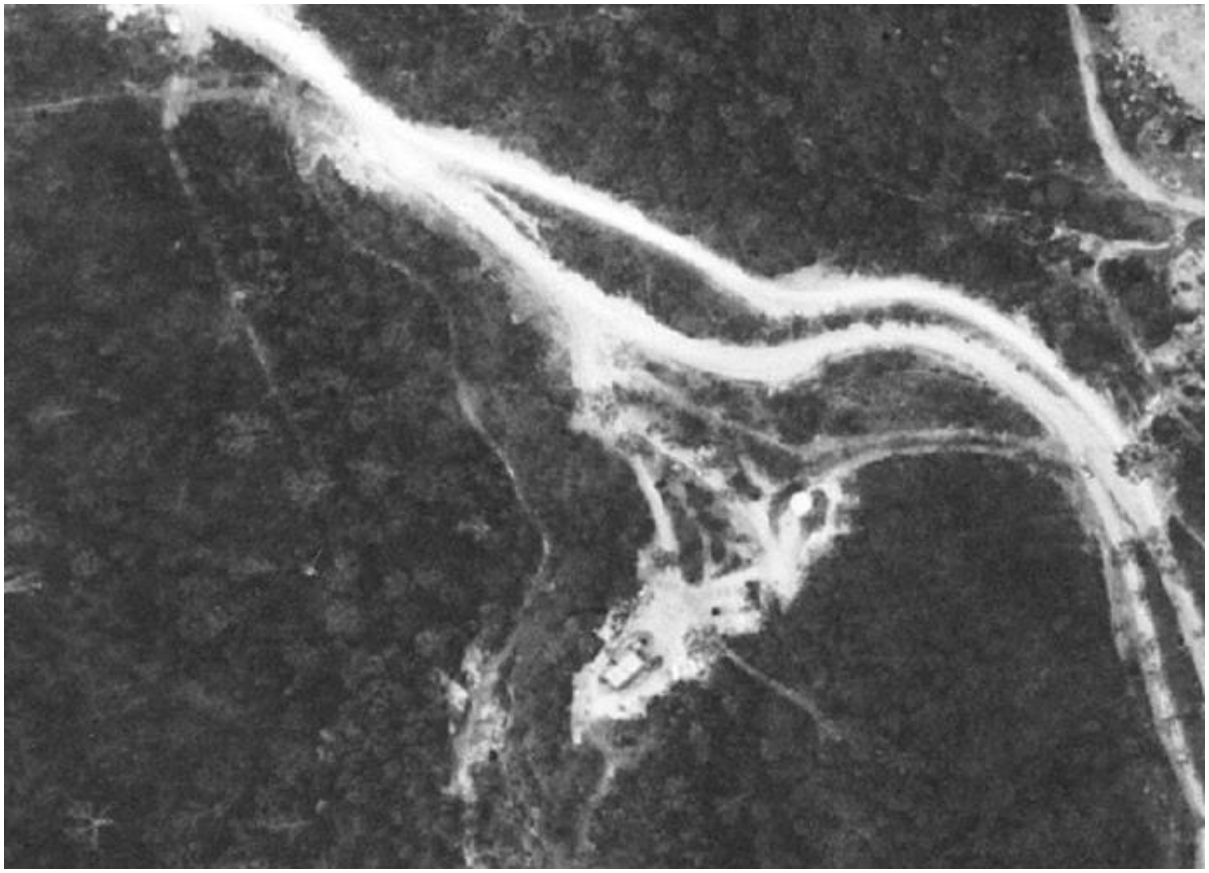


Plate 2.9 **1972 aerial photograph of the Lime-kiln group area (1) and Lime-kiln Road (2). Source: Dept of Lands 1972_11_31_Marulan31.**

Plate 2.10 **An early photograph of the Marulan South Limestone Mine including a conveyor (Boral Cement Limited 2015).**

Plate 2.11 **Marulan South Limestone Mine showing drays ready to transport limestone from the pit (courtesy of Boral Cement Limited)**

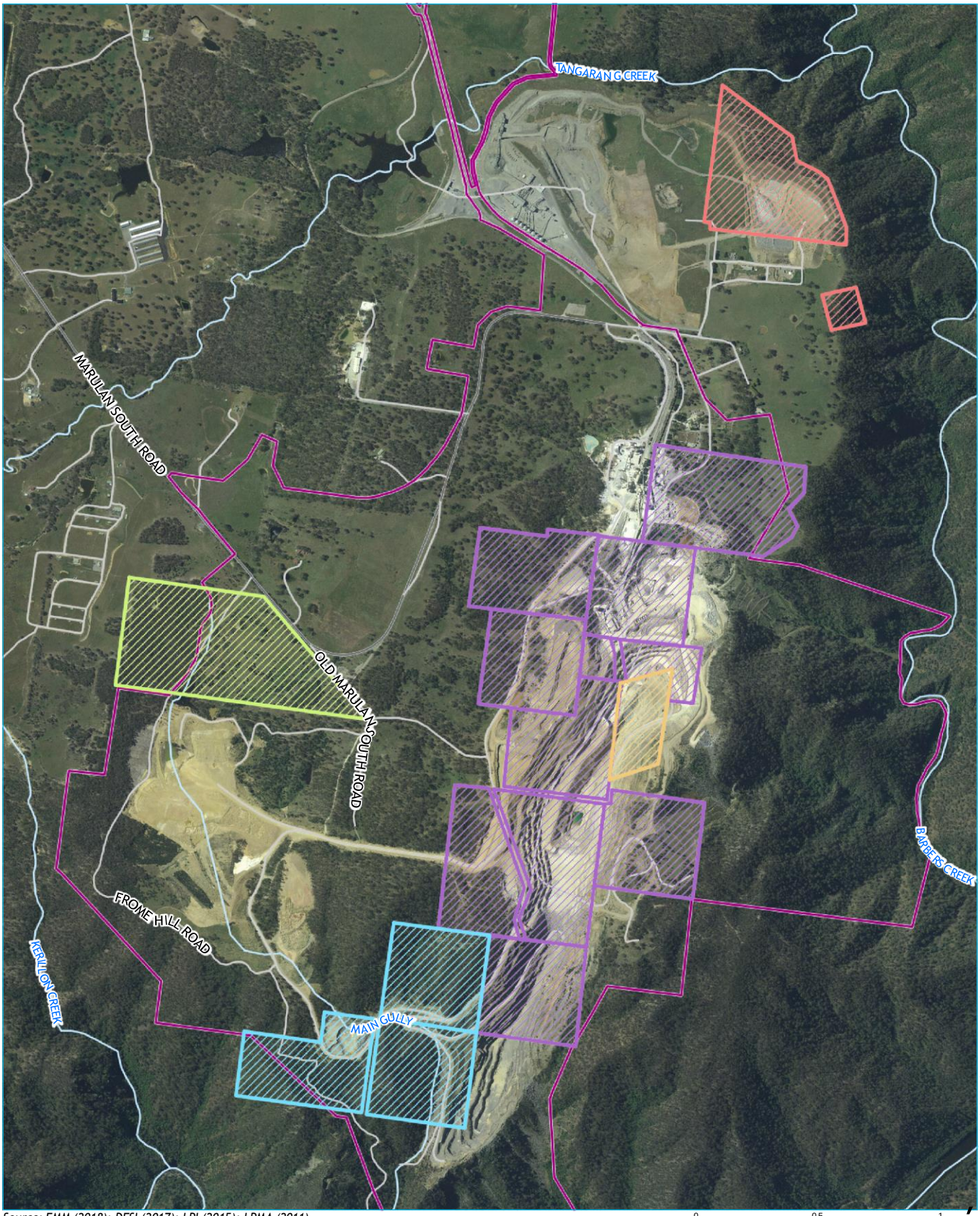
Plate 2.12 **Overview of the Marulan South Limestone Mine early twentieth century (Boral Cement Limited 2015).**

Plate 2.13 **Limestone outcrops at Marulan South Limestone Mine face in 1929. Note the tram bucket in front of the face (Boral Cement Limited 2015).**

Plate 2.14 **An example of the steam shovel and lorries used in the mine in the 1930s (Boral Cement Limited 2015).**

The decades of the mid-twentieth century saw varied demand for the limestone mined from Marulan South. Work was stopped at the mine for a month in 1927 as demand slowed (*Goulburn Evening Penny Post* 1934, p.1) and again in 1934 (*Goulburn Evening Penny Post* 1927, p.2), during the Great Depression.

The limestone mine at Marulan South is now owned by Boral Cement Pty Ltd and what started as a number of individual enterprises on a small scale was amalgamated into one large enterprise.



Source: EMM (2018); DFSI (2017); LPI (2015); LPMA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

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KEY

Mining lease type

- Marble
- Marble and limestone
- Limestone
- Granite
- Arsenic

- Project boundary
- Main road
- Local road
- Watercourse

Original mining leases prior to 1953

Marulan South Limestone Mine
Continued Operations Project
Historic heritage assessment and SoHI
Figure 2.1

EMM

3 Field survey

3.1 Method

The survey was planned using the information gathered in the background research for this report including the historical summary, the location of listed heritage items and local knowledge. Desktop assessment to prepare for the fieldwork included a review of historical aerial photographs of the area, a review of historical information related to the study area and a review of the LEPs. Information from the NSW Government Land and Property information Service and the State Library supplemented the desktop analysis. These investigations provided the basis for the on site historical investigations by identifying areas of historical potential requiring field survey.

Field survey targeted areas predicted to hold tangible evidence of the historical development of the Project site, therefore total coverage was not planned or achieved. The team was escorted to a number of areas where long-term Boral staff have identified 'ruins' and 'rubbish dumps'. Travel to the areas of interest was by car, but site inspection was completed on foot.

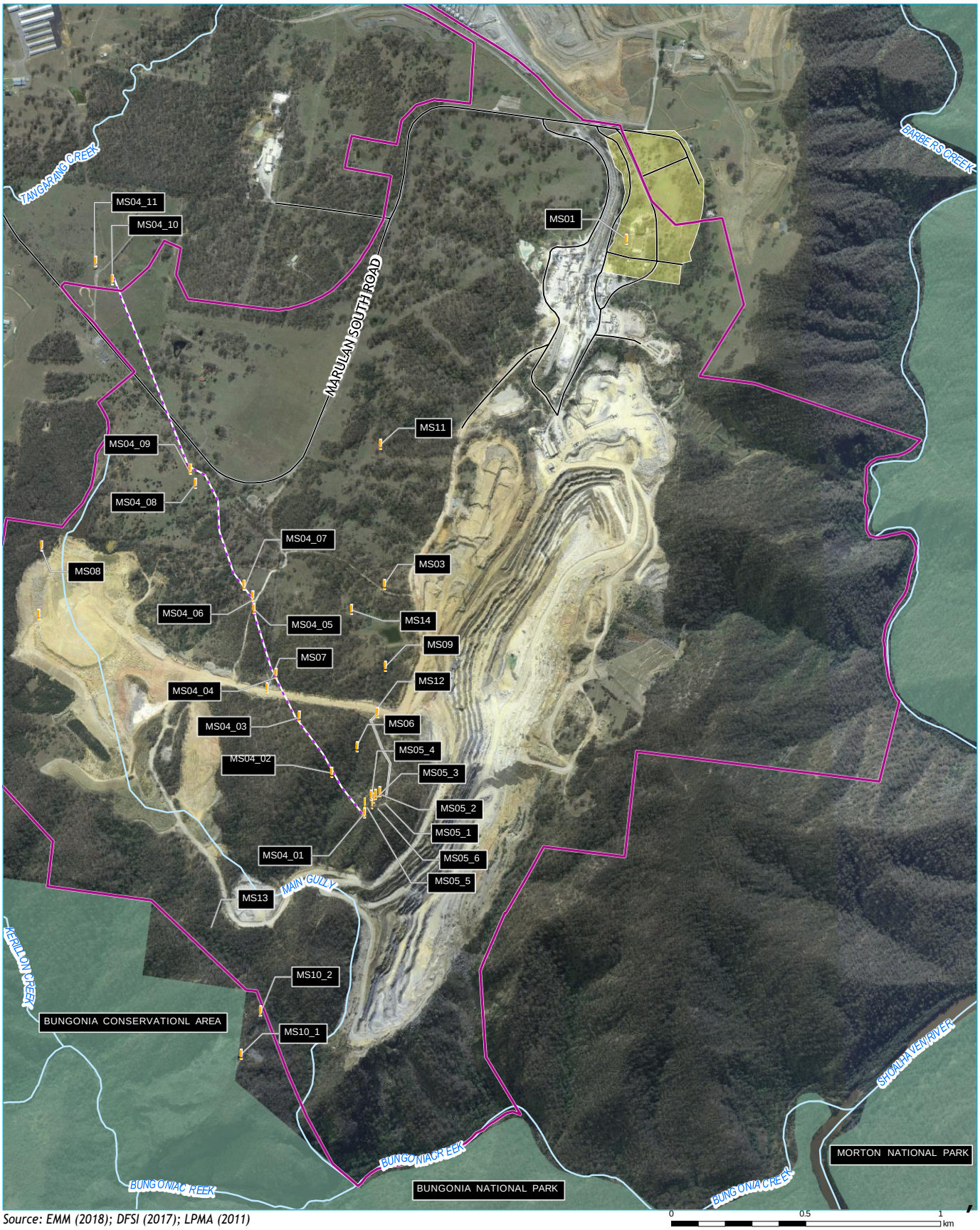
Items and places were recorded through digital photography, GPS coordinates and written descriptions.

The purpose of the field survey was to:

- identify potential relics or known relics in the Project site;
- ascertain the existence of structures over or in close proximity to the Project site; and
- identify significant cultural landscapes within the Project site.

Five categories have been described in this report, which were defined using a combination of field observations, oral history and local knowledge. Roads have been identified through aerial photography and field survey. The following terms have been used in this report to describe the results of the field survey:

- Village is the site of the former village of Marulan South. Presently a small number of buildings survive, as do roads and street plantings.
- Houses are former residential dwellings with evidence of substantial construction such as stone walls, mortar, chimney bases and/or considerable landscape modifications.
- Camps are areas that demonstrate habitation, possibly even short-term, with some evidence of landscape modifications.
- Industrial areas are those that are clearly the remnants of industrial processes, such as kilns and the aerial ropeway.
- Roads were identified through current and historical mapping, aerial photography and field survey. It is possible that not all roads have been identified.



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Source: EMM (2018); DFSI (2017); LPMA (2011)

KEY

- Historic heritage item within and immediately adjacent to the project site
- Approximate pathway of aerial ropeway
- Project boundary
- Watercourse
- Road
- Marulan South village
- National park

Survey results

Marulan South Continued Operations Project
Historical heritage assessment and SoHI
Figure 3.1

EMM

3.2 Results overview

A field survey was conducted on 1 April 2015 by Rebecca Newell, Ryan Desic (EMM) and Grant Thompson (Boral) to assess items identified during the desktop analysis. Archaeological potential was also considered during the survey. Additionally, historic heritage items were identified and recorded during the Aboriginal heritage survey conducted on 13–17 April 2015.

A second trip to view the kiln area (MS05) and two of the house sites (MS03 and MS08) was undertaken by Rebecca Newell, Pamela Chauvel (EMM), Pamela Kottaras (EMM) and Grant Thompson (Boral) on 26 June 2015.

The following sections provide details of the items of local heritage significance identified during the heritage survey. Refer to Figure 3.1 for all survey results.

3.3 Industrial areas

3.3.1 MS05 Lime kiln group

MS05 is inside the Project boundary and consists of a complex of structures, roads and associated landscape modification in the south of the Project site. It included two areas of lime kilns approximately 100 m apart on a hill slope.

Kiln Area A (Plate 3.1 to Plate 3.3) consisted of kiln towers of local stone, brick and mortar, and wooden and iron beams all with evidence of firing and burning. A road, areas of slag slipping down the road embankment, landscape modification for water management and areas of glass, ceramic and metal were identified around the kilns. The road is the terminus of Lime-kiln Road, which underwent a name-change to Marulan South Road and was redirected to the north approximately 1.3 km to its north. They were constructed of stone and built into the banks or side of steep hills. At the examples in Marulan South, only portions of the rear stone wall which was built against the hill and the side buttresses remain. It is this group of kilns that are those most likely built by Hogg.

The kilns in Area A are in poor condition but the ramps that connected the road to the kiln survive. The area is overgrown with thick woody weeds which will have to be removed for clear access.

Kiln Area B (Plates 3.4 to 3.6) consists of two kilns located on a hill slope approximately 100 m east from Kiln Area A, adjacent to a track. The remains of the kilns consisted of bricks, earthworks, wooden beams and stones with evidence of firing and burning. Glass, ceramic and metal has been dumped in the area around the kilns. Based on the historical research in Section 2 the kilns at Kiln Area B are D or round type kilns.

Analysis suggests that this area was mined by James Hogg, although it is in George Feltham's lot (refer Section 2).

Plate 3.1 Kiln Area A showing one remnant kiln and associated iron beams (DSCN2491).

Plate 3.2 Kiln Area A showing remnants of a kiln including bricks, iron and timber beams (DSCN2498).

Plate 3.3 Kiln Area A showing slag slipping down slope and slope towards the creek (DSCN2492).

Plate 3.4 Kiln Area B showing landscape modification and metal elements (IMG_8996).

Plate 3.5 Kiln Area B showing an example of burnt bricks that form part of lime kilns (IMG_9004).

Plate 3.6 Kiln Area B. Shovel associated with lime kiln area (IMG_9000).

3.3.2 MS04 Aerial ropeway

MS04 is inside the Project boundary and consists of a number of elements of the aerial ropeway system originally used to transport the lime from the base of the mine up the large hills to the processing and transport areas have been identified. The surviving elements consisted of the following items:

- the control room (MS04_11) a large brick and corrugated iron structure with sliding doors, opening at the top for the ropes and pulleys, and a water tank (Plates 3.11 to 3.13);
- concrete plinths (MS04_1, MS04_3, MS04_5, MS04_6, MS04_7, MS04_8, MS04_9 and MS04_10) in groups of two or four for the pulley towers;
- two pulley towers including plinths, constructed of steel and concrete approximately 20 m high and able to hold two cables to send carriers up and down; one tower is complete (MS04_2) (Plate 3.9) and the other has collapsed (MS04_4);
- metal carriers (buckets/bins for carrying the resource) (Plate 3.10); and
- steel rope (cable) (Plate 3.10).

These items are located in a line from the west of the Project site, and travel in a north-westerly direction upslope to the control room (M04_11) located on the north-western edge of the Project site. Two complete pulley towers remain (one of which has collapsed) with many more plinths located in a line from the easternmost plinth in the area of the lime kilns. Those that were accessible are shown in Plates 3.7 to 3.8. Figure 3.1 shows the location of identified components of the aerial ropeway and the original path the aerial ropeway would have used to transport product through the area. Discarded elements of the ropeway suggest that the Bale carriers were used with overhead grips (refer to 'Figs' 11 and 12 in Plate 4.4).

Plate 3.7 Example of groups of concrete plinths (IMG_8990).

Plate 3.8 **Example of an upturned concrete plinth showing both above and below ground sections (IMG_8992).**

Plate 3.9 **Tower 1 (MS04_2) is an example of a complete pulley tower. This tower is directly opposite the lime kiln group (refer to Figures 3.1 and 5.1 and is the only surviving complete and standing tower (IMG_9030).**

Plate 3.10 Example of cables and the upper element of a Carrier (IMG_8988); (refer also to figure 2.11).

Plate 3.11 Front of the control room (MS04_11), facing west, showing the corrugated iron rolling doors which would have opened to let out heat (at the base) and for the rope to rotate (top) (20151006_144642).

Plate 3.12 Rear of the control room showing corrugated iron engine housing, doors, bricked in openings and a water tank (20151006_145129).

Plate 3.13 Interior of control room showing wooden beams for piles and roof, concrete foundations and dirt floor (20151006_144957).

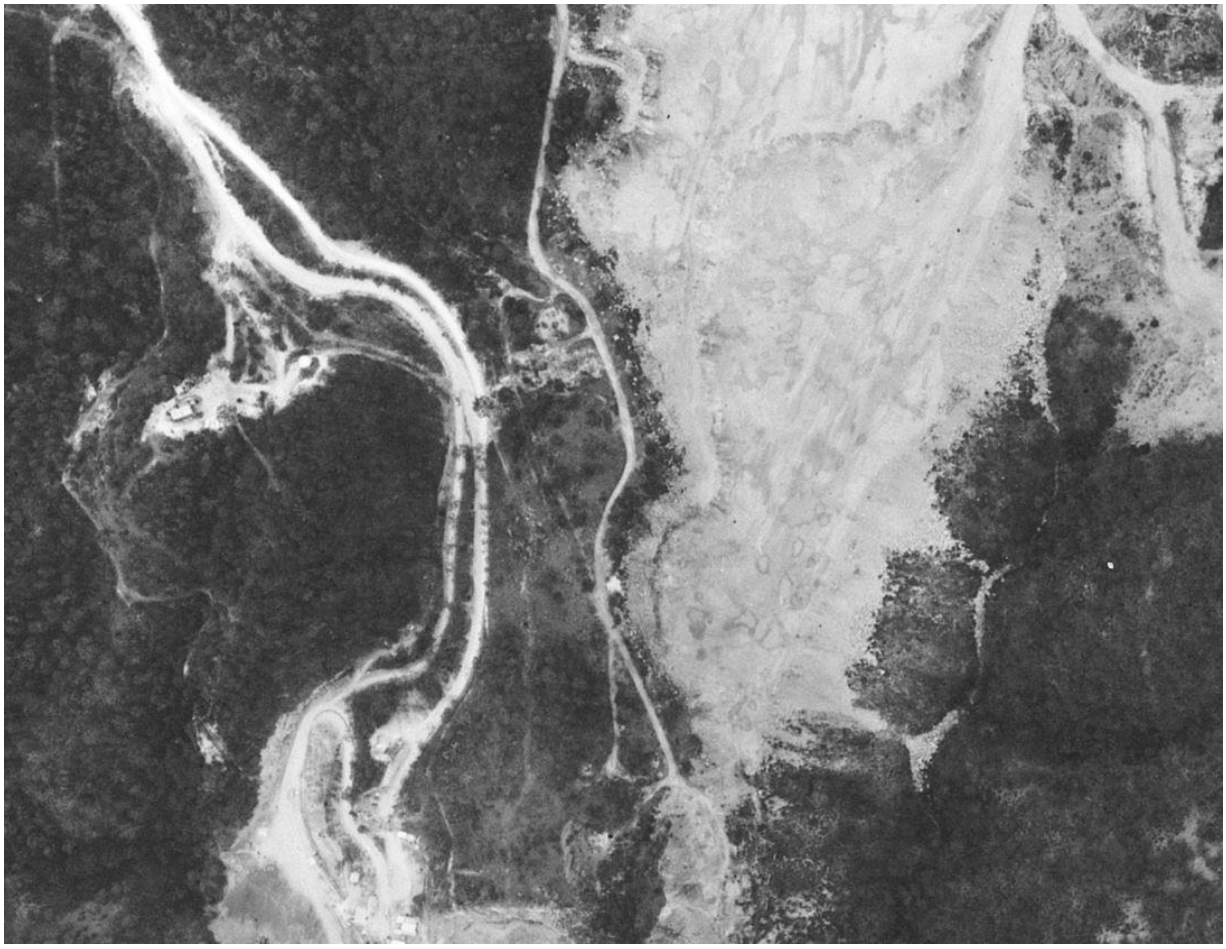


Plate 3.14 **MS04_1 in an aerial photograph from 1972; the easternmost plinth is marked with a red dot (Image reference: 1972_11_31_Marulan31)**

3.3.3 MS10 Mt Frome mining area

Note that the Mt Frome mining area is south of the Project site boundary but has been included here as one of the mine elements (tram rail) is adjacent to the Project site boundary.

An area of early mine workings was identified on Mt Frome including tracks from a short rail line (Plates 3.15 to 3.16 and Plate 2.13), which was used to haul offcuts for disposal downslope.

Plate 3.15 **Mt Frome showing the early mining area. The yellow colour in the rock is the result of blasting and excavation activities (IMG_9053).**

Plate 3.16 **Mt Frome mining area showing the rail track used to transport product down the mountain (IMG_9058).**

3.4 Residential

3.4.1 MS01 Marulan South

The former village of Marulan South was established as a result of limestone mining but was moved to make way for the expanding mine operations and because maintenance was not considered to be cost-effective. The village closed down in 1998 with a number of the buildings being moved to Marulan. What remains are components of the former village, which includes some buildings such as the former community hall, bowling club, bowling green, streets, and street plantings. A small building displaying what appears to be wattle and daub construction was recorded at the southern end of the former village. Plates 3.17 to 3.20 provide some examples of the remains of the village.

Plate 3.17 MS01 view south along Hume Street, South Marulan (IMG_8932).

Plate 3.18 MS01 remnant road, footpath and empty lots at Marulan South (IMG_8943).

Plate 3.19 MS02 dilapidated building at the southern end of the former town (IMG_8949).

Plate 3.20 MS02 detail of the dilapidated building (above) showing possible wattle and daub construction (IMG_8951).

3.4.2 MS03 camp/hut site

MS03 is inside the Project boundary on Portion 17, which was owned by James Hogg. The landform is a gentle slope which overlooks the mine and the site demonstrating evidence of land modification suggesting something more than a temporary camp site (Plates 3.21 to 3.23). This area was described by local knowledge holders as possibly containing a hut and a road. The presence of larger stone blocks may be evidence of a building or road border.

The road is visible in the landscape as it is defined by stones that act as a low retaining wall (Plate 3.23) and were created by excavation through the existing rocky terrain rather than being defined simply by lining with stones.

Fire pits, adjacent to the road, contain broken glass, ceramic, porcelain, bricks and tin. The interpretation of this area is undecided as it may have formerly contained a hut, which is evidence of something more substantial than an area to camp. It also contains strong evidence of being a camp site and therefore may be a workers' accommodation area. This location may also be where timber was cut to fire kilns.

MS03 is an archaeological site and has research potential.

Plate 3.21 **MS03 example of landscape modification at MS03 overlooking the current mining area (IMG_8972). View east.**

Plate 3.22 MS03 example of metal fragments at MS03 (IMG_8976). View east.

Plate 3.23 MS03 detail of the road. Close inspection indicates that the road has been constructed by excavation/grading (IMG_8975). View east.

3.4.3 MS08 house site

The elements of a structure identified by RPS HSO in 2009 were revisited during the survey. It was in similar condition to when it was recorded by RPS HSO, with some additional trees growing in and around it (Plate 3.24).

This item is on the western side of the Project site and immediately adjacent to the disturbance footprint. The historical research completed on this structure identified it as a house belonging to George Feltham who built the structure on his land. While the construction date is unknown historical research has indicated that George and his wife lived in the house until 1908, after which they relocated to the Marulan courthouse (Leighton-Daly 2010, p.144). The land was purchased by FH Gall in 1910. The courthouse was on the eastern side of the Marulan South Road, near the intersection with the Hume Highway and opposite a derelict cottage that once belonged to Harold Feltham, the son of George and Elizabeth and who was born at 'Limekiln'.

Plate 3.24 MS08 facing south-west (IMG_9034).

A variety of land holdings are recorded on parish maps with the name 'George Feltham' from 1917 to 1953 as Feltham was a well-known name in the region. The ruins have been identified as being the former home of George and Elizabeth Feltham and their children (Leighton-Daly 2010, p.143).

George (Laurence) Feltham was born on 17 July 1852 (d.1932), to parents Ann Read (d.1865) and William Feltham (d.1888). He married Elizabeth Neal (d.1948) on 10 September 1888. It appears that he also lived in Sydney for a brief period, as two of his children's births were recorded as being 'Sydney' or suburbs in Sydney, but the more likely explanation is that Elizabeth travelled to Sydney to give birth to some of her children. In total, Elizabeth gave birth to 10 children. George died in 1932 in Goulburn aged 79 years old (*Goulburn Evening Penny Post* 28 March 1932, p.2). Another son was born at 'Limekiln' near Marulan – Harold George Victor Feltham in 1891, who built the house near the Anglican cemetery on Marulan South Road close to the highway. The mention of 'Limekiln' as Harold's place of birth must be an indication of the name of the area that MS08 is in.

Another George Feltham was born in 1875 to John and Elizabeth Feltham, with John being the brother of the aforementioned George Feltham. He married Martha Theresa Halls in Goulburn 1899 and together they had 5 children; Doris May (b.1899), George Leo (b.1900), John Horace (1902), Neville (1904) and Marrietta Caroline (1905). George's listed occupation in 1903 is 'butcher' (Ancestry.com). He passed away in Marulan 1949 at age 74. An important fact to note is his son George Leo Feltham's place of birth is also listed a 'Limekiln' near Marulan. This George Feltham also appears to have different landholdings in the area, shared with his older and sole brother William H Feltham (WH Feltham b. 1973).

George and Elizabeth owned a number of allotments in the Marulan South area as did their relatives. The Felthams were a well-known family in Marulan South and George was a respected member of the community:

> The late Mr Feltham, for the greater part of his life, had lived in Marulan where he was well-known and esteemed. His kindly disposition gained for him many friends. He followed the occupation of grazier for many years, retiring some time ago.
>
> *Goulburn Evening Penny Post* 28 March 1932, p.2

The site of MS08 displays some disturbance through erosion and dereliction from time. While erosion has occurred in some locations, evidence of deposit was noted on site. The site was assessed in a previous study as lacking archaeological potential and suggested that a greater understanding of the occupation of the Marulan district would be gained through documentary sources relating to mining (RPS HSO 2009, p.33). Documentary sources were sought for this study that provide information about the area but it is argued here that the landscape features that survive at the site warrant further research despite the lack of substantial soil deposits across the site. An archaeological analysis of MS08 may provide an understanding into how the site was used and therefore a clearer picture of the Feltham family and what changes they made to make a home with a mine on one side and the Australian bush on the other.

MS08 is a potential archaeological site and has research potential.

Plate 3.25 MS08 The land around George and Elizabeth Feltham's house at the mine (IMG_9042). View north.

Plate 3.26 MS08 view into the interior. The current mine is visible to the left (IMG_9036). View south.

3.4.4 MS14 house site

Substantial evidence of a structure (Plates 3.27 to 3.31), probably a house with chimney was identified west of the 30 year mine pit. The site consisted of a flat area of ground overlooking a dam and an ephemeral creek line. The area contained evidence of extensive landscape modification in the form of rock structures, road or track edges, fences and exotic trees (possibly quince).

An accumulation of glass, ceramics and metal was also noted on the ground. Areas that had the appearance of a road or track with stone edging also exist at MS14.

Modifications to the landscape in this area are extensive and warrant further field and documentary investigation. An analysis of the spatial layout of MS14 and other archaeological investigation may shed light on the function of the ruins and perhaps the inhabitants. Detailed field and documentary research would also add to the knowledge about this and other sites like it in the Marulan and South Marulan district.

MS14 is an archaeological site and has research potential.

Plate 3.27 **Area of MS14 showing landscape modification, possible wall, fence or water diversion (DSCN1243). View west.**

Plate 3.28 MS14 a view of the element considered to be part of a chimney with the dam and mine in the background (DSCN1250). View east.

Plate 3.29 MS14, with one of the two exotic trees, chimney remnant in the mid-ground and operational mine in the background (DSCN1254). View east.

Plate 3.30 MS14 showing close up of possible retaining wall and dump of glass and ceramic (DSM1261). View south.

Plate 3.31 MS14 close-up of what appears to be a chimney (DSCN1248). View south-west.

3.4.5 MS09 camp site

MS09 is located to the west of the existing mine pit and north of the lime kiln group. It is inside the Project site but will not be impacted by the Project. It is understood that this is the abode lived in by the Armitt family (Barry Armitt *pers. comm.*), which was more akin to a tent than a solid structure. Barry Armitt and his sister, along with their parents who worked in the mine, lived in a basic hut near the mine during the early twentieth century. Remains of the hut included landscape modifications in the form of fences and tree cuttings, sandstone and brick fragments and small walls made of trees (Plates 3.32 to 3.33).

The camp site is in proximity to the other camp sites MS14 and MS03, approximately 260 m and 370 m respectively.

MS09 has research value focused on the development of the landscape and the spatial organisation of accommodation be it substantial structures or camps. An investigation of surface material, combined with oral history (if possible) would add to the body of information about the development of the site and may be able to answer questions related to life on the fringes of the mine before large-scale mechanisation.

Plate 3.32 **MS09, facing east showing sandstone fragments and some tree modification in the left of frame (20151006_151424).**

Plate 3.33 **MS09 facing south-east showing the area cleared for the tent, also used for tethering horses and donkeys (20151006_152158).**

3.4.6 MS11 Camp site

MS11 was identified as a camp because of the remnant features on the site including bricks, fence posts and a rubbish dump with tin cans, stoneware and other ceramic sherds (Plates 3.34 to 3.36). This area also contained what appears to be a ramp, the purpose of which can only be guessed at this stage of the assessment (Plates 3.37).

The ramp's presence supports that this area is a camp, or at least temporary/intermittent accommodation and possibly not even overnight. The fence posts suggest stock.

The Boral escort indicated that MS11 is known as a camp; the presence of a structure that may be a loading ramp suggest that this location may have been a temporary work camp.

Plate 3.34 MS11 with fence posts (DSCN1057). View south-east.

Plate 3.35 MS11 fence post indicating defined boundaries (DSCN1063). View north-west.

Plate 3.36 **MS11 dumped rubbish (DSCN1053).**

Plate 3.37 **MS11 loading ramp (DSCN1067). View north-west.**

3.5 Roads

3.5.1 MS07 Old Marulan South Road

Marulan South Road was originally known as the Lime-kiln Road, which extended from the Hume Highway at Old Marulan to Marulan South. From the Hume Highway, the road travelled in a south-easterly direction for 6 km at which point it turned south for approximately 500 m before turning east again for another 400 m (now a stretch of road that is a mine haul road). At this point the road turns south again and enters the area of the lime kilns (MS05). This last stretch of road is Lime-kiln Road (MS12).

The Old Marulan South Road is labelled as such on current mapping and is the stretch of road, now closed, that travels south for approximately 500 m before it reaches the haul road. Today Marulan South Road has been realigned to turn north on its way to the former village, which is now the Boral Marulan South offices.

This road was not surveyed, and it is blocked to traffic at both ends. It is a section of sealed road with bushland on either side.

Plate 3.38 **The closed section of the former Marulan South Road, now called Old Marulan South Road (IMG_9031). View north.**

3.5.2 MS12 Lime-kiln Road

Lime-kiln Road is the short stretch of road leading from what is now a recently created haul road (over the original Marulan South Road) to the lime kilns. It has been labelled Lime-kiln Road for the purposes of this report to differentiate it from other sections of Old Marulan Road in addition to the fact that it appears to retain its historical form.

The Lime-kiln Road is likely to date to the 1870s when the kilns were erected.

Plate 3.39 A stretch of Lime-kiln Road close to the kilns in Kiln Area A (DSCN2495). View north

3.5.3 MS13 Frome Hill road

Frome Hill Road was identified as a potential early road through the mining area that departed Marulan South Road approximately 400 m before it turns to the north and tracks south toward Mt Frome. Frome Hill Road passes in front of the ruin of the Felthams' house (MS08) and past the Armitt camp (MS09) where it continues to Mt Frome.

Frome Hill Road is likely to be one of many tracks through the area that provided access to individual mines.

3.6 Historic views and vistas

The Marulan South area is characterised by hills and ridges of varying heights and the majority of the area has been cleared and used for agriculture. The topography is such that it is shielded by rises in most places and is best seen up close, accessible mostly from Boral-owned land. Historic views and vistas that are significant to the area were not identified in the immediate external vicinity of the mine, and those impacts associated with the Project will generally not be visible from anywhere outside of the Boral-owned land. The most relevant and significant landscapes are present on a small scale within the Project site and impacts to these will be managed through recording various data.

In the wider area, the Bungonia Lookdown in the Bungonia National Park to the south of the Project site looks over a landscape considered to be a historic vista with natural values. It displays the unique geology of the area including the gorges bound by the Bungonia and Jerrara Creeks. The Bungonia Gorge is a slot canyon with vertical walls 275 m high in its base (NSW National Parks and Wildlife Service 1998). The current mine area is visible from Bungonia Lookdown (Plate 3.40) and to a lesser extent, from Morton National Park to the east of the mine. A detailed assessment of the visual impacts has been prepared by RLA 2018.

The mine is visible from a small number of public spaces with the largest visual impact being from Bungonia Lookdown where impacts are already visible. The rehabilitation plan will see large-scale tree planting to screen the mine in this area. A view from Bungonia Lookdown to the operating mine is shown in Plate 3.40. Rehabilitation as part of the 30 year mine plan is shown in Plate 3.41.

Plate 3.40 **The view from Bungonia Lookdown to the existing limestone mine (Source: RLA 2018 and Cambium). View north.**

Plate 3.41 **Photomontage of the view to the mine pit from the Bungonia Lookdown 5 years after the end of the proposed 30 years of continued mining operations. (Source: RLA 2018 and Cambium).**

3.7 Historic mining landscapes

The majority of the early mine landscape has been removed by the continuation of mine activities and very few elements of this landscape remain. Those that do survive are of value as they have changed insorfar as the encroachment of the bush rather through active impacts. The intact mining landscape identified through research and field survey is close to the southern end of the Project site and contains lime kilns that are associated with James Hogg's activities (c1870s) and the aerial ropeway, which has been dated to the late 1930s.

The kilns are at what was once the western fringe of the current mining area and to the north of the Mt Frome mine. The kilns are set into a low cliff and were accessed by Lime-kiln Road (MS12). The kilns are also set in a steep gully traversed by an unnamed creek flowing from north to south, and on the other side of this gully, the aerial ropeway extends to the north-west. The surviving elements of the aerial ropeway, being one complete iron lattice tower on concrete plinths, a fallen tower and a number of bare concrete plinths are testament to changing mining technology and the importance of the Marulan South Mine and all its previous incarnations. Smaller elements of the aerial ropeway are scattered across the gully. This landscape is only visible from within the Project site but its existence, along with the residential sites, is a legacy of the historic mine operations in the area.

Details of the elements that combine to create the historic mining landscape are presented in earlier sections as individual elements.

3.8 Local interviews

In addition to the field survey, interviews with local knowledge holders were conducted to understand the local area in more detail. The interviews provided information about Marulan South but did not provide additional information of items of possible heritage significance in the Project site. Talking to local residents also helped establish items of social significance in the area.

The interviews centred on the town of Marulan South from which some of the participants originated. Marulan South was of considerable social significance to the local community and was a hub for the families who worked in the Marulan South Limestone Mine. The local store which also operated as the bank and post office was well known in the local area as a place where almost anything could be purchased.

The majority of the buildings in Marulan South were removed as part of the closure of the town in the late 1990s. The buildings which remain include the former bowling club building and the community hall and have been reused by the mine. Evidence of the town is still visible with an oval and tennis court and a plaque where the school was located. The interviewees spoke of the connections made at the town and the generally positive interactions between the local people and the mining companies that operated the mine. For the generations who lived at Marulan South the town represented a time of great joy with the bonds made in the working and community life of the town continuing beyond the removal of the buildings and the closure of the town.

3.9 Summary

A number of heritage items and potential relics were recorded in the Project site during this investigation. All identified heritage items were recorded at the southern extent of the Project site, while the northern extent, comprising the Marulan Creek Dam was devoid of historical items. The heritage items and potential relics recorded during the investigation for this report include:

- MS01 - The Marulan South village area including the remains of the bowling club, a small structure and town hall as well as landscape modifications indicating the original town layout.
- MS04 - Elements of the aerial ropeway system operating in the Project site, including concrete plinths in groups of four or two used for holding up the pulley towers, two pulley towers (Tower 1 and Tower 2), metal buckets and steel cables.
- MS05 - A lime kiln group of five kilns in two areas was identified in the south of the Project site. Kiln Area A consisted of three D-type kilns and associated bricks, earthworks, wooden beams and stones with evidence of firing and burning. Kiln Area B consisted of two D-type or round type kilns and associated bricks, burning and stones. The lime kiln group also contained ephemeral road structures and areas where glass, ceramic and metal had been dumped. In addition to the kilns is a road that accessed them and a concrete slab that was used as the base for a shed at a later date.
- MS07 – Old Marulan South Road, which is an earlier but now disused alignment of Marulan South Road. The section continued to the lime kilns and has been called ‘Lime-kiln Road’ in this report.
- MS12 - Lime-Kiln Road, which is the terminus of the old road that started on the Hume Highway and ended at Hogg’s lime kilns.
- MS13 – Frome Hill Road, which is the road that departs the Marulan South Road and generally skirts the current mining area, terminating at the Mt Frome Mine.

- Two house sites:
    - MS08, a structure identified in previous assessments as a house probably built and occupied in the late nineteenth and early twentieth centuries by George and Elizabeth Feltham. The structure is rectangular and built of local stone and mortar. The roof is missing and walls are in varying states of repair; and
    - MS14, an accumulation of local stone with what appears to be a chimney in the centre. The area contained evidence of landscape modification in the form of rock structures, fences and exotic trees. A dump of glass, ceramics and metal was also evident. The remains of a chimney were also identified and the area has the potential to contain relics.
- Three 'camps', which may have been used as permanent dwellings for a time:
    - MS03, an area containing old huts but with little evidence of substantial structures that can be described as a dwelling. This site displays a high degree of landscape modification including roadways and dry-stone walls;
    - MS09, described as Barry Armitt's house where he and his family lived in the early twentieth century; and
    - MS11 consisting of in situ fence-posts, bricks, and artefact scatters including stoneware, whiteware and glass. This site is associated with a timber ramp made of logs, earth and old rubber matting. Corrugated iron is also tangled up in this feature.

Heritage items close to, but outside, the Project site includes:

- MS10 - Elements of the mining area at Mt Frome including a rail track and evidence of early blasting;
- a large portion of the alignment of Frome Hill Road (MS13);
- Bungonia National Park; and
- Glenrock Homestead and outbuildings (Item 314 on the Goulburn Mulwaree LEP 2009).

4 Comparative analysis

4.1 Introduction

The comparative analysis focuses on the industrial nature of the Project site and results of the field survey. It has been compiled to place the significance of the kilns and the aerial ropeway into its historical context.

4.2 Lime burning

There is evidence of limestone burning and working at Marulan South from the mid-nineteenth century. Low-density rural population and an undeveloped road network meant it was uneconomical to transport lime. Therefore lime production tended to be small scale and local (O'Keefe 1994, p.16).

Lime kilns can be categorised as either intermittent, where the kilns are loaded, fired and emptied each time, or continuous (Pearson 1990, p.28). While intermittent kilns are inexpensive to construct, continuous kilns are more efficient in terms of labour and fuel, as the kilns do not cool down after each load. Lime kilns in NSW in the late nineteenth to early twentieth century were predominantly the intermittent type, and the most common of these was the D-kiln (kiln 'B' as shown in Plate 4.1).

The D-kiln was "a cylindrical deep pit cut into a bank of earth and crowned, and sometimes lined with stone or brick" (Carne & Jones 1919, cited in Pearson 1990, p.30). A wall was built across the front to create a D shaped firing chamber. Ash boxes were built below the kiln floor and could be emptied by a door at the front. Above this was an arched fire door into which fire arches of limestone blocks were built. The kiln was then loaded from above with alternating layers of fuel and limestone. The firing process using an intermittent kiln took 48–90 hours. Completion was judged by the amount of shrinkage which could be gauged by inserting a metal rod into the kiln (Pearson 1990, p.30).

Pearson (1990, p.30) provides typical dimensions for D-kilns:

- 4.3–6.7 m long;
- 2.4–4.3 m broad; and
- 3–4.9 m deep.

Examples of kilns are found throughout Australia including the Pipers Creek Lime Kilns in Kumbatine National Park NSW. The Pipers Creek kilns may be similar in construction to those at Marulan South as they are D-type kilns built into a bank with a stone front wall; however it is possible that the Marulan South kilns are shaft kilns or a combination of the two techniques.

Locals describe the Piper's Creek Lime Kilns (Plate 4.2) process as a fire being set in the pit and wood and limestone blocks dropped in from above. Lime fell to the bottom and was scraped out through front openings. The men rotated from one kiln to the next for each task.

Another example of a lime kiln is the Moses Morley burning kiln at 501 Cooma Rd, Googong, NSW near Queanbeyan. It operated from 1876–77 to the early 1900s. It was a stone construction, built into the bank for top loading with a draw hole at the base and stone buttresses at the front of the kiln (McGowan 1996, p.164). It is shown in Plate 4.3.

Closer to Marulan South, the Kingsdale lime kilns and quarries were the second largest lime-producing centre in NSW. By 1925 around 90% of the state's lime production came from only two locations: Portland near Lithgow and Kingsdale. Kingsdale provided limestone of great purity, averaging 97% calcium carbonate. Quarrying of the material was costly however, due to the presence of 'overburden' with pockets and bands of clayey material.

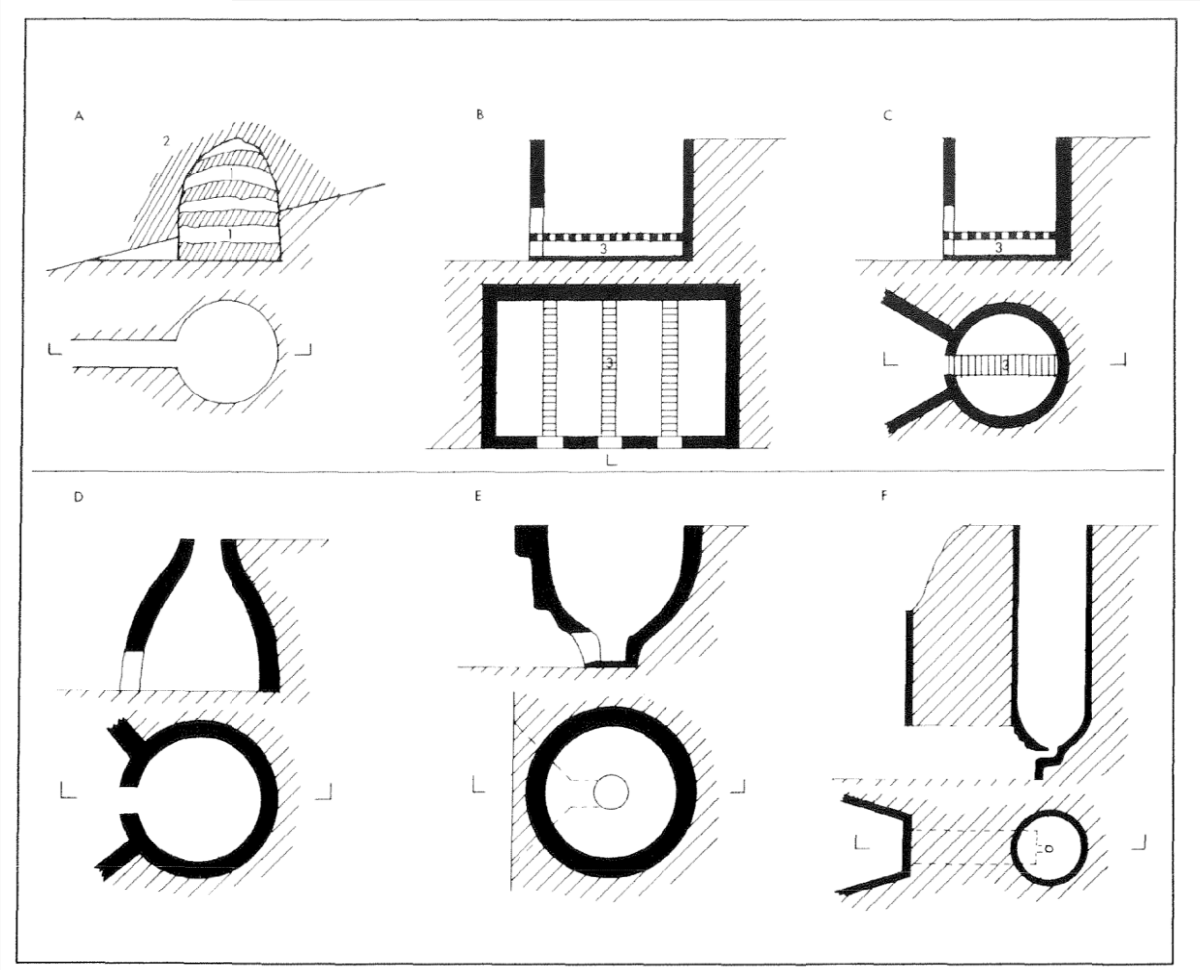


Fig. 1: Schematic outline of various kiln types, showing plan and cross-sectional elevation of each major type (not to scale). A. Pit-burn kiln; B. 'D' kiln; C. Small cylindrical shaft kiln; D. Inverted cone (bottle) kiln; E. Inverted bell kiln; F. Continous feed shaft kiln. 1. Limestone or shell; 2. fuel (wood or coal); 3. ash pit.

Plate 4.1 Types of lime kilns, including the D-kiln (from Pearson 1999, p.29).

Plate 4.2 Pipers Creek lime kilns showing front wall made of stone (OEH 2015).

Moses Morley's 1870s kiln on Stringybark Hill south of Queanbeyan. The massive tree trunk supporting the upper part of the kiln's front wall probably helped to stabilise it during the burning process. The front walls of kilns tended to bulge outward with the intense heat. (Photograph by author).

Plate 4.3 Moses Morley's lime kiln (OEH 2015).

There is conjecture on the establishment and operation of the lime kilns at Marulan South. An article in the *Illustrated Sydney News and New South Wales Agriculturalist and Grazier* (1860, p.11) describes the Marulan marble lime quarries as being situated six or seven miles from the railway station which has "retarded their success from a financial point of view" because of the terrible condition of the roads, especially in winter. However, the article goes on to mention that the new proprietors Dunlop Gall and Co are building kilns and other buildings as well as improving the roads from the

The date of 1860 for the establishment of the lime kilns is contradicted by an article in the *Goulburn Post,* (16 August 2013, p.10), which states that James Clewett and Mr Stuckey opened a marble quarry in the 1830s but that this enterprise was short-lived. James Hogg and a Mr Sieler began lime burning some time after the 1860s and this continued up until 1917. They sold the lime in Sydney through an agent. When Hogg took over the mining at Marulan in the 1860s, his kilns in Old Marulan supplied lime to Sydney. He had 16 teams of 60 men working to extract the product. At Marulan South, Hogg established three large kilns each with a 20 tonne capacity and four furnaces; the kilns identified in the field survey are most likely the kilns described in the article (*Goulburn Herald and Chronicle*, 2 November 1878). The article continues, *in addition to these there are two similar kilns near Mr Hogg's residence, and a circular kiln, the first of the kind introduced into the colony* (*Goulburn Herald and Chronicle*, 2 November 1878, p.3). These lime kilns were located within two miles of the railway station at Marulan and were in operation from at least 1876 to into the 1900s (Eddy 1985, p.87) so it is clear that the circular kiln and the two additional large kilns were situated at Old Marulan.

In 1885 Hogg trialled a traction engine (a self-propelled steam engine) to transport lime from the 'Shoalhaven gullies to the Marulan railway station' (*Goulburn Herald* 18 December 1884, p.4). The trial was successful enough that by August 1886 Hogg had two traction engines in circulation and was planning on removing horses from further haulage (*Goulburn Herald* 31 August 1886, p.2). However they must have held onto their stock a little while as a later advertisement in the *Goulburn Evening Penny Post* (9 February 1889, p.5) includes the Hogg bros. auctioning off all their bullocks and horses due to "*having no further use for them, they having constructed a tramway*'. Traction engines ran on wheels without tracks and the description of the trial is hair raising:

> Although there was no beaten track, and the engine had to climb a steep incline, the journey was accomplished on Monday without any further mishap than a tire coming off one of the waggon-wheels. In coming up the incline a stone eighteen inches high was encountered, and in passing over it the front of the engine became uplifted. This caused a scare among some of the bystanders, who ran away into the bush thinking the engine would fall over, but it passed on without interruption.
>
> *Goulburn Herald* 18 December 1884, p.4

The kilns at Marulan South operated during wet weather when the route to the kilns at Old Marulan was impassable (*Goulburn Post* 1988 p.2). Additional lime kilns in the mine pit remained in use at Marulan South until the 1960s when automatic kilns were introduced and they were removed (Leighton-Daly 2010, p.175).

It is no surprise that industrial accidents occurred as the kilns needed to burn continuously for 48–90 hours in order to produce lime. Continuous burning meant that someone would have needed to maintain the feed of fuel and limestone during the night. The Marulan lime kilns were the location of an unfortunate incident in 1927 when James Martin was found burned to death in the drying fire area of a kiln (*The Canberra Times* 1927, p.11).

4.3 Aerial ropeways and aerial tramways

Another component of the Marulan South mine system was an aerial ropeway to transport the mined material to a central facility for processing. The main advantage of this system is that it could be built to transport material along very rugged terrain and up steep inclines removing the need to haul heavy loads, by beast or automated vehicle, along winding tracks. This system meant that transportation in rugged country was faster and economically more sustainable than transportation along roads. The biggest obstacle was obtaining the funding to build them and the permission to erect them across other people's land.

Aerial ropeways, also called aerial tramways or cableways (Ritchie *et* al, 1997, p.11; Booth 1965, p.1), were generally consistent in design and form with major changes occurring around the 1850s when the stronger wire rope was developed. The first authenticated ropeway was constructed in 1644 for the city of Dantzig by Adam Wybe, from the Netherlands. The ropeway was comprised of hemp rope passed over pulleys on high posts and was used to transport soil from one point to another to strengthen the city's fortification (Booth 1965, p.7). The next substantial development in the ropeway system was in 1860 by Baron von Ducker in Germany in 1860. Von Ducker's first ropeway was a monocable system and by 1870, he had developed the bi-cable system (Booth 1965, p.8).

The monocable ropeway is a single, spliced wire rope, which supports and hauls the carriers. This system is limited as it cannot be detached from the ropeway and was, in the early period of its use, limited to 300 pounds (136 kg).

The bi-cable ropeway is characterised by a stationary wire rope that holds the carriers, while another wire traction rope is used to haul them along the stationary wire.

Another breakthrough was the standard coupling designed in the early 1870s by the Austrian Theobald Obach, which allowed the cars to be disengaged and reattached to the trackway. Until the end of the nineteenth century, aerial ropeways had been powered by humans (sometimes using a windlass or a treadwheel), by animals (horses or mules), by waterwheels and/or by gravity (DeDecker 2015).

Using gravity to move the aerial ropeway was only possible in mountainous areas where the descending carrier delivered the power to haul the ascending carrier. To make the system work, the descending carrier was filled with water or other materials to render it heavier than the ascending carrier and the angle of descent was made steep enough to facilitate the movement of the carriers (DeDecker 2015). The aerial ropeways at Marulan South were likely operated in this way. In 1911 aerial ropeways had a capacity of 15 to 200 tonnes and a possible length of 305 m to 4,600 m.

New power sources appeared at the turn of the century; first steam engines, then electric motors (DeDecker 2015). Engines were housed in brick and corrugated iron sheds with openings for the ropes and space to ventilate the building. Carrier designs are shown in Plate 4.4.

A similar example of an aerial ropeway is at Brogans Creek, formerly owned by Boral Cement. The ropeway was also used for a lime burning works, supplying lime to the Charbon Cement Works. Today the area is agricultural, used for cattle and sheep grazing. Tourism has increased as the improvements to the Hume highway connected the area to Sydney. The area was amalgamated into the Goulburn Mulwaree LGA in 2005 from the Goulburn and Mulwaree Shires previously.

Fig. 9. Carrier, with Webber Patent Compression Grip, showing Patent Automatic Attacher.

Fig. 10. Carrier, with Bleichert Patent Automatic Overhead Grip.

Fig. 11. Bale Carrier, with Overhead Grip.

Fig. 12. Carrier, with Bleichert Patent Automatic Underhung Grip.

Plate 4.4 **Various aerial ropeway carrier designs, Marulan South's aerial ropeway was likely similar to Figure 10 (DeDeker 2015).**

4.4 Archaeological resources

The heritage items discovered during field survey have been classed as archaeological resources and this report assesses them as such.

4.5 Relics in NSW

In New South Wales, relics are protected by the Heritage Act and their removal is permitted by approval from the Heritage Council or delegates. 'Relics' are defined in the Act as:

> any deposit, artefact, object or material evidence that:
>
> a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and
>
> b) is of State or local significance.

Where relics are known to exist, or where there is reasonable cause to suspect that they exist, it is illegal to disturb or excavate that land (s139 Heritage Act) except with an excavation permit.

The project is being assessed as an SSD (as a Major Project) and Division 4, Part 4.41 of the EP&A specifies a number of approvals under other Acts, including the Heritage Act are not required; however, any activities that relate to relics for the Project will be reviewed and assessed by the DPE in accordance to the same guidelines and standards that would be applied outside of the Major Projects framework.

4.6 Research value

All items discovered during the field survey component of this project have research value regardless of the presence of archaeological deposit. One of the most important aspects of the archaeological/mining landscape is the spatial organisation of the sites, internally and relative to each other and the adjacent topography.

5 Significance assessment

5.1 Defining heritage significance

The Heritage Division of OEH assesses heritage significance based on the *Burra Charter* (Australia ICOMOS 2013). It lists seven criteria to identify and assess heritage values that apply when considering if an item is of state or local heritage significance as follows:

a) An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).

b) An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).

c) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).

d) An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).

e) An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance).

f) An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).

g) An item is important in demonstrating the principle characteristics of a class of NSW's (or the local area's), cultural or natural places or environments (Representativeness).

These criteria are then considered in combination to come to an overall level of significance for the site as either State or local significance.

5.2 Community heritage values

During the historic heritage survey, local residents were questioned in informal interviews about their memories of the area. These discussions helped to build an understanding of the places and items within the area which local residents valued. The area of highest community value, the town of Marulan South, has largely been removed and the former residents are now part of the wider Marulan and Goulburn town communities. The two remaining buildings related to the Marulan South town, the bowling club and the community hall are of value to the community and can be considered representative of the town and its importance to its former members.

5.3 Assessment of significance

The assessment of significance for each site recorded during survey is presented in Table 5.1. While Mt Frome is outside the Project site it is included in the assessment of significance because it is directly adjacent to the southern boundary.

The assessment has taken into account the fact that most of the sites recorded within the Project boundary are generally archaeological in nature. Camps, the ruins of a house, stone walls and lime kilns, while represented by above ground fabric, fall into the category of relics as defined by the Heritage Act. The old roads within the Project boundary are works that contribute to knowledge about site processes and development and have been assessed to be significant. The aerial ropeway is the only item that has been treated as a standing structure despite the fact that it is in poor condition.

The assessment of significance presented in Table 5.1 has considered heritage values from an archaeological perspective as it is in the archaeological information that most of the research values lie. The issues of acquiring information from archaeological excavation have been considered in the assessment of significance, particularly under criterion e) but also under the other criteria.

Table 5.1 Assessment of significance

a) *An item is important in the course or pattern of NSW's (or the local area's) cultural or natural history (Historical Significance).*
MS01 Marulan South village and hut (MS02): The surviving elements of the village at Marulan South date to after 1926 when the first resident, Les Cooper moved there from his place of abode closer to Weenga Quarry. From that time, the village became an important aspect of the limestone mine, housing employees and their families and providing a strong sense of community. The village was established because of the limestone mine but as the mine expanded, it was no longer tenable to have a community situated there due to the cost of repairs and upgrades. Residents began moving in 1998 to Marulan, Goulburn and elsewhere and the village was reduced to two buildings, one hut, streets with kerbing and street trees. Marulan South village was an important aspect of the mine's growth and its logical extension. It demonstrates the success of the limestone mine and the company's care towards its employees. The Marulan South village demonstrates an early 20th century village in Southern tablelands of NSW which has come about due to a primary economical industry in the area. Its visual setting and contents both demonstrate the necessity of nearby facilities at the time of its establishment and the subsequent lack of need due to changing times. Marulan South village has *local* historical significance
MS02 – not used
MS03 House site The ruins of a probable house site, possibly comprised of a temporary structure but with substantial landscape modifications. The site comprises a road levelled out of the existing ground and tin and ceramic artefacts. Its position overlooking what would have historically been a mined area suggests that this was a miner's house site or camp. Local knowledge states that this site was the place of a hut and a road and the presence of large blocks may be evidence of such a building. MS03 demonstrates the settlement pattern associated with working at the limestone mines. MS03 is of *local* historical significance
MS04 Aerial ropeway system The aerial ropeway that survives on site is most likely to be a bi-cable because of the date of construction, which was in the late 1930s. Bi-cable became the preferred option as it allowed for greater flexibility to move the resource. The type however has not been confirmed and the ropeway may have been monocable. The ropeway has associated *in situ* elements including one standing iron lattice tower, one collapsed lattice tower and a number of concrete plinths arranged in an alignment out of the gully to Marulan South Road. Other elements that were noted during field survey were lengths of iron rope and metal fragments and ropeway carriers. The ropeway permitted a greater volume of resource to be transported out of the gully than traditional road vehicle method. It was however, short-lived as operations became more mechanised and roads improved. The aerial ropeway is of historical significance for its ability to provide information on the development of mining at Marulan South. It demonstrates the ways in which product was transported around the steep mining area using a common system. It has a connection to the remaining concrete pillars that together reveal the route of the ropeway across the landscape and its important role in connecting the mine to the railway. MS04 is of *local* historical significance.

Table 5.1 Assessment of significance

MS05 Lime kiln group
The lime kilns are a significant development of the lime quarrying industry at South Marulan signalling the importance of the mines by ensuring that processing could occur on site when climatic conditions were an obstacle to their transportation to the kilns at Old Marulan. The group is also significant as one of the earlier in the area, and may be the earliest as no other kilns have been discovered. They demonstrate the development of lime quarrying from small-scale operations to larger enterprises when James Hogg established his business here.
The lime kilns are significant as one of the elements of limestone mining infrastructure established across the colony by James Hogg and demonstrate the growing nature of industry.
MS05 and its component kilns are of *local* historical significance.
MS06 Explosives hut
The explosives hut relates to the later development of the mine. Its date of construction is not known but based on the fabric, it dates to the second half of the twentieth century, probably after 1970 when concrete Besser blocks became more readily available. While the explosives hut was part of the historical development of the limestone mine, it does not have a level of significance that meets the threshold.
MS06 does not fulfil criterion A.
MS07 Old Marulan South Road
Old Marulan South Road, originally known as 'Lime-kiln Road' is significant for its ability to track the development of the limestone quarries. It remains visible in the landscape and is still used but is closed off where it meets the haul road to the south. It is a remnant of the historic landscape amongst large-scale change.
MS07 is of *local* historical significance.
MS08 House site
The ruins of MS08 are the most intact of all the occupation/domestic sites in the Project site. The structure with all four walls, retains the ability to provide insight into the accommodation arrangements for workers at the mine(s). Evidence of group accommodation was not discovered but isolated habitation sites were, indicating the people fended for themselves by either building a stone house or humpy-like structure at the camps, or went back to Old Marulan and Marulan where they had more substantial homes.
MS08 has also been identified as the house of George and Elizabeth Feltham, a well-known family in the region who also owned much property as well.
MS08 is of *local* historical significance.
MS09 Camp site
This site is an old camp on a bend on the Mt Frome Road where Barry Armitt and his family lived while he worked at the Weenga Quarry (now the Marulan South Limestone Mine) and during the Great Depression. The camp demonstrates the ingenuity and tenacity that people displayed during hard economic times.
MS09 is of *local* historical significance.
MS10 Mt Frome Mine group
This item comprises mine workings and a segment of the tram used to haul offcuts down the embankment into the ravine below. It was one of the many limestone mines operating in the area in the early to mid-twentieth century and retains scars that can attest to its history. A tram track associated with the mine, was pulled by horse a short distance to dispose of offcuts. As a component of the history of limestone mining in the region, this item has historical value. It is however, outside of the Project site but directly adjacent to the boundary.
MS10 is of *local* historical significance.
MS11 Camp site
This camp is an example of working life at the mine at the turn of the century. It is likely that this was a place that one or more miners resided while employed at one of the mines. It may demonstrate ingenuity and resilience in difficult economic situations and forms a part of the larger industrial landscape. The existence of the makeshift ramp adds another layer to the story that is embedded in this place.
MS11 is of *local* historical significance.

Table 5.1 Assessment of significance

MS12 Lime-kiln Road

Lime-kiln Road is the earlier former alignment of Marulan South Road that provided access to James Hogg's kilns and was a vital component of resource transportation. It is now a dirt track with lime kiln by-product on the slopes into the gully and is generally in poor condition.

MS12 is of *local* historical significance.

MS13 Frome Hill Road

An alignment of the road from South Marulan Road to the quarry at Mt Frome. The general alignment of the road has significance as the access road to the Mt Frome workings. It demonstrates the development of the area for its industrial purposes.

MS13 is of *local* historical significance.

b) *An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's (or the local area's) cultural or natural history (Associative Significance).*

MS01 Marulan South village

The former village of Marulan South is associated with the employees of the limestone mine since the 1920s but it is not associated with any individual or group of persons that would reach the threshold for associative significance.

MS01 does not fulfil criterion B.

MS02 – not used

MS03 House site

MS03 House site is on the boundary of James Hogg and George Feltham's land (Portion 144 and 156 respectively). The site is situated on the north side of a long drive, which may be the delineation between Hogg's (north) and Feltham's (south) land. As the house site has been recorded on the north side, it has been taken here to be on Hogg's land. The residents of this site are not known and are likely to have been mine workers.

MS03 does not fulfil criterion B.

MS04 Aerial ropeway system

The Aerial ropeway system, was an important but short-lived technological solution, and is associated with the Hogg bros., who were the descendants of James Hogg and who continued the business he started.

MS04 is of *local* associative significance.

MS05 Lime kiln group

The group of lime kilns in the south-west of the Project site were established by James Hogg, one of the earliest limestone operators in the area. James Hogg not only established the most successful limestone mine of its time, he was an individual of note who owned and funded limestone extraction in the region. Hogg also owned limestone kilns in Parramatta in which he burned limestone from his mines in Mudgee, Rockhampton, Melbourne and Geelong. Hogg has been described as putting 'Marulan and its lime on the map'.

MS05 is of *local* associative significance.

MS06 Explosives hut

MS06 does not fulfil criterion B.

MS07 Old Marulan South Road

The Old Marulan South Road serviced Hogg's lime kilns at Marulan South and appears to be the southern terminus of the road from Marulan. This road is associated with the early workings of the limestone mines but is also directly associated with James Hogg, who was instrumental in the early development of the limestone industry at Marulan South.

MS07 is of *local* associative significance.

Table 5.1 Assessment of significance

MS08 House site

This site has been associated with George and Elizabeth Feltham who were late nineteenth century limestone workers. Local knowledge has identified this site as the home of the Felthams but also of the Argyle school although there is no evidence to back up this second assertion. Between them George and Elizabeth Feltham owned a number of allotments in the Marulan and Marulan South area and later their sons also amassed land there.

The Felthams were a well-known and esteemed family in the region, with George being the son of John and Elizabeth Feltham who were early residents in the area.

MS08 is of *local* associative significance.

MS09 Camp

Camp MS09 is the former residence of the Armitt family who lived and worked at the limestone mines in the middle of the twentieth century. The camp was short-lived and the Armitts moved to Marulan South after the village was established.

MS09 does not fulfil criterion B.

MS10 Mt Frome mine group

The research conducted to date has not indicated that the item fulfils criterion B.

MS11 Camp

The research conducted to date has not indicated that the item fulfils criterion B.

MS12 Lime-kiln Road

The research conducted to date has not indicated that the item fulfils criterion B.

MS13 Frome Hill Road

The research conducted to date has not indicated that the item fulfils criterion B.

C) An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) (Aesthetic Significance).

MS01 Marulan South village

What survives of Marulan South Village is standard urban design from the 1920s to the 1990s. Elements of aesthetic characteristics and creative achievement are not demonstrated here.

MS01 does not fulfil criterion C.

MS02 – Not used

MS03 House site

The site of MS03 is characterised by the creation of a road and areas of dumped early to mid-nineteenth century rubbish. It has the appearance of being a residential site with landscape modifications but nothing was noted that would indicate it has evidence of creative or technical achievement embodied in the site.

MS03 does not fulfil criterion C.

MS04 Aerial ropeway system

The evidence shows that the aerial ropeway was the third method of innovation used to transport lime to the railway by the Hogg family. The preceding methods being livestock and traction engine. The type of technology represented by this item had been in used for approximately 70 years by this stage. The aerial ropeway was a creative use of technology for the local area and was a major achievement for the industry at Marulan South.

MS04 is of *local* aesthetic significance.

MS05 Lime kiln group

The lime kiln group is indicative of the early stages of mining in the Marulan area. James Hogg established the kilns in the 1870s which his sons continued on with at least until early 1900s. The lime kilns were repaired and maintained over time while still retaining their core technical characteristics. This group of items shows evidence of two types of kiln but they are in a poor state of repair. The lime kiln group may have the ability to demonstrate technical achievement in the local area.

MS05 is of *local* aesthetic significance.

MS06 Explosives hut

MS06 does not fulfil criterion C.

Table 5.1 Assessment of significance

MS07 Old Marulan South Road

Old Marulan South Road is of standard road construction and a continuation, albeit a now-defunct alignment of the road from Marulan to the mines.

MS07 does not fulfil criterion C.

MS08 House site

This former house of George and Elizabeth Feltham has some technical interest due to its mid-nineteenth century vernacular construction of local materials. The house does not appear to demonstrate technological innovation but it is a visual (aesthetic) indication of settlement pattern around the mines.

MS08 does not fulfil criterion C.

MS09 Camp

MS09 camp does not fulfil criterion C

MS10 Mt Frome mine group

Mt Frome mine includes visual remnants of early industry in Marulan. Where much of the surrounding area was more successfully quarried, Mt Frome has been passed over. Therefore the remnants of tracks for early trams to be pulled plus the quarry scars demonstrates an early industrial landscape. The Mt Frome quarry is outside the Project site but directly adjacent to the boundary.

MS10 is of local a*esthetic* significance.

MS11 Camp

MS11 does not fulfil criterion C.

MS12 Lime-kiln Road

MS12 is a now unused extension of the former Marulan South Road. The road does not demonstrate technological achievement on its own rather it is representative of the larger limestone mining activities in the local area.

MS12 Lime-kiln Road does not fulfil criterion C.

MS13 Mt Frome Road

MS13 is a track that took traffic from the Marulan South Road to the mining area of Mt Frome.

MS13 Mt Frome Road does not fulfil criterion C.

MS14 House site

MS14 is the site of a former dwelling or camp that is identifiable by two exotic trees and surface modification using locally sourced stone. The modifications are horizontally substantial but further research (archaeological) is required to gain a clearer understanding of what the elements at MS14 represent.

MS14 House site does not fulfil criterion C.

d) An item has a strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons (Social Significance).

MS01 South Marulan village and hut (MS02)

South Marulan village itself is a direct result from a need by the mining community for facilities and homes near work. The location of the village was chosen because of its proximity to the mine. The village was moved in the 1990s and residents were interviewed prior to the move. Interviews with local residents indicate strongly that the village was an important place to the people that lived there as it was a small and close-knit community.

MS01 is of *local* significance to the former residents of the village.

MS02 – Not used

MS03 House site

MS03 House site is not associated with a particular group of people or community.

MS03 House site does not fulfil criterion D.

Table 5.1 Assessment of significance

MS04 Aerial ropeway system

The installation of the aerial ropeway was an important achievement for mining operations at Marulan South and would have improved the working lives of the workers for a short time. However, the item is not associated with a particular group or community. While not associated with a specific group or community today, the installation of the aerial ropeway would have made life easier and safer for the workers at the mine and thus has a low level of social significance but does not meet the threshold.

MS04 Aerial ropeway system does not fulfil criterion D.

MS05 Lime kiln group

The lime kilns are an important indicator of the significance of the place and the solutions needed to exploit the resource. However, the item is not associated with a particular group or community.

MS05 Lime kiln group does not fulfil criterion D.

MS06 Explosives hut

MS06 Explosives hut is not associated with a particular group or community.

MS06 Explosives hut does not fulfil criterion D.

MS07 Old Marulan South Road

MS07 Old Marulan South Road is not associated with a particular group or community.

MS07 Old Marulan South Road does not fulfil criterion D.

MS08 House site

MS08 house site was the home of George and Elizabeth Feltham for an unknown period of time. While the Felthams were a well-known family in the area, the house and property were/are not of any community importance.

MS08 House site does not fulfil criterion D.

MS09 Camp site

MS09 was the abode of the Armitt family during the Depression before they moved to Marulan South. It is not associated with a particular group or community.

MS09 Camp site does not fulfil criterion D.

MS10 Mt Frome mine group

The MS10 Mt Frome mine components site is not associated with a particular group or community.

MS10 Mt Frome Mine group does not fulfil criterion D.

MS11 Camp site

MS11 Camp site is not associated with any particular group or community.

MS11 Camp site does not fulfil criterion D.

MS12 Lime-kiln Road

MS12 Camp site is not associated with any particular group or community.

MS12 Camp site does not fulfil criterion D.

MS13 Mt Frome Road

MS13 Camp site is not associated with any particular group or community.

MS13 Camp site does not fulfil criterion D.

e) An item has the potential to yield information that will contribute to an understanding of NSW's (or the local area's) cultural or natural history (Research Significance)

MS01 Marulan South village and hut (MS02)

The village of Marulan South was established in the late 1920s to house workers at the various mines, and their families. Prior to the village being officially created, there is the possibility that earlier buildings existed in the general location. The hut (MS02) is one such building. Field research on Marulan South village has the ability to yield information about the place as a residential space prior to the village being built.

MS01 Marulan South village is of *local* research significance.

MS02 – not used

Table 5.1 Assessment of significance

MS03 House site
MS03 House site has been identified as a camp, suggesting that it was an area used by various individuals at different times. The identification of MS03 is currently fluid and is subject to change based on the outcomes of archaeological excavation and research assisted by the material to shed light on the function of this site. This site and the other 'house' and 'camp' sites identified in this report are significant as a group for their potential to demonstrate the use of the landscape in the early to mid-twentieth century days of mining at Marulan South. This period and class of habitation site is not represented comprehensively in existing research and literature and has the potential to shed light on individual miners who may have been working their own mines, or who found temporary employment and established themselves in the region for short-term stays. The information that may be inherent in the archaeological resources may shed light on a certain group of the working class including itinerant workers and entrepreneurs trying to build a business in the growing colony. MS03 House site is of *local* research significance.
MS04 Aerial ropeway system
The Aerial ropeway system, consisting of remaining concrete plinths, two towers (one collapsed) and scattered carriers and wire rope, was a significant development in the transport of the resource to Marulan for further processing. Ropeway operation is well understood in general but the equipment at Marulan South was not well documented. The Aerial ropeway system has the potential to yield information about the transportation of material from the limestone mine to its nearest destination, particularly on methods use to overcome the steep and difficult landscape. Closer inspection of the bins and other components that are scattered across the alignment will contribute to knowledge about the origins and operations of the aerial ropeway. MS04 Aerial ropeway system is of *local* research significance.
MS05 Lime kiln group
MS05 Lime kiln group has the potential to answer a number of questions directly related to their purpose, ownership, construction and relationship of the kilns to the surrounding landscape. Two types of kiln were recorded during fieldwork but their condition is poor and a definitive assessment of their type has not been possible. Archaeological excavation of the kilns and their curtilage is likely to contribute to knowledge on the points raised above. Photographic archival recording and measured drawings will also provide additional information on the kilns and their setting, how they related to each other and the surrounding industrial landscape. Additional physical research is likely to yield information about the grading of the elements belonging to the group and the surrounding industrial landscape. The lime kiln group is of *local* research significance.
MS06 Explosives hut
The Explosives hut is of interest as part of the industrial landscape in the vicinity of the kilns and the aerial ropeway. It is part of the mine operations and its inclusion in the history and archival recording will contribute to the overall understanding of this specific area and its contribution to the mine, but it is does not meet the threshold for local significance. MS06 Explosives hut does not fulfil criterion E.
MS07 Old Marulan South Road
The Old Marulan South Road is a vestige of the road to Marulan South from the Hume Highway and signals an earlier area of activity that is related to mining and potentially to habitation in the area. The road was re-directed to service the village of Marulan South and the alignment that continued south was abandoned. The abandoned road alignment is of interest for its ability to provide information about the destination prior to its re-direction. As an item in isolation it does not meet the threshold for local significance but as part of a group, the abandoned road alignment provides insight into access to the historic mine area and its phases. MS07 Old Marulan South Road is of *local* research significance when considered as a group with the surrounding historical industrial landscape.

Table 5.1 Assessment of significance

MS08 House site
MS08 house site has the ability to provide information about life in the local area that was directly related to living and working adjacent to a mine. While the site displays levels of erosion, deposit survives within the ruins of the building and to the west.
The house was lived in by George and Elizabeth Feltham and their children until 1908 but the duration of their lives there is not understood. Archaeological research into this house and its curtilage has the potential to shed light on the family's life there, landscape modifications that were made to accommodate their lives, how they lived and information about the construction of the house. Additional questions exist about the place possibly being a school house that have not been answered by documents or oral history and answers related to this will also contribute to the understanding of what life was like when closely connected to the mine.
MS08 House site is of *local* research significance for its ability to yield information about life in an industrial landscape.
MS09 Camp site
MS09 has been identified as the home camp of Barry Armitt and his family. The site was a place of permanent residence for a time so would have been used as a homestead by the family for a period of time until they moved to Marulan South. This site is of interest as it has the potential to yield information about how a family would treat the semi-wild landscape so that life was possible there. Questions that relate to landscape modifications, spatial patterns and material culture would contribute to knowledge about how people lived in this unusual context. While this is a 'camp site' it functioned as more and the material left behind has the potential also to provide information about life during the Depression, adaptation to hardship, isolation and the human relationship to the landscape.
MS09 Camp site is of *local* research significance for its ability to yield information about life on the fringes of town.
MS10 Mt Frome Mine group
MS10 Mt Frome Mine group is of significance to the local area as one of many limestone mines that was operating at the cusp of the nineteenth/twentieth century. It retains elements that have the potential to yield information about early limestone mining that has since been lost with the expansion of the current mine and it provides an insight into what the historical landscape could have looked like prior to the amalgamation of the earlier mines into the larger Marulan South Boral operation. It retains the potential for interpretation as it is a rare and representative example of attempts at blasting and the use of horse drawn rails to transport product down the mountain.
MS10 Mt From Mine group is of *local* research significance.
MS11 Camp site
The camp site MS11 is of interest because very little about this site is known. Locally, it is known as a 'camp' and its association with the ramp-like structure suggests it is a workers' camp. However, little is known about this site other than it has evidence of early twentieth century rubbish. As a camp site that appears to be related to the limestone mine, it has the potential to provide information about working life at the mine in the early twentieth century and may date to an earlier period of prospecting.
Moreover, comparisons between this and other camp or house sites on the edges of the mine(s) may provide a wider picture of life in general and landscape modifications in an unusual setting.
MS11 Camp site is of *local* research significance for its ability to yield information about working life and life on the fringes of town.
MS12 Lime-kiln Road
MS12 Lime-kiln Road is the southernmost extension of the Marulan South Road and terminates at the lime kilns that James Hogg had built. As with the Old Marulan South Road, this item is of significance for its ability to provide information about the destination prior to its re-direction.
Lime-kiln Road is significant as an integral part of the lime kiln operations, for its ability to yield information about the transportation of the limestone resource in the local area and may provide insight into the use of the natural landscape to achieve the desired economic ends. This abandoned road alignment is also a vestige of an earlier version of the current industry and has the ability to demonstrate the evolution of the place.
MS12 Lime-kiln Road is of *local* research significance when considered as a group with the surrounding historical industrial landscape.

Table 5.1 Assessment of significance

MS13 Frome Hill Road

MS13 Frome Hill Road is a significant alignment as it services the Mt Frome industrial area. The road was not fully made and retains its early twentieth century form. Research on the Mt From Road has the potential to yield information about the importance of this road through its construction techniques, where other residences may have been placed and landscape modifications to accommodate larger, industrial vehicles.

This road is part of the larger industrial landscape in the local area and can shed light on the various access routes to the various mines that existed here historically.

MS13 Frome Hill Road is of *local* research significance for its ability to yield information about the development of the area as a mining interest.

f) An item possesses uncommon, rare or endangered aspects of NSW's (or the local area's) cultural or natural history (Rarity).

MS01 Marulan South village and hut (MS02)

Marulan South village was established in the late 1920s to accommodate workers at the various mines that were operating at the time. The village does not meet the criterion for rarity but if earlier buildings such as huts existed on the site prior to the village, these items may be considered rare at a local level.

MS01 does not fulfil criterion F.

MS02 – not used

MS03 House site

MS03 House site is one of at least five similar sites (house or camp) in the immediate area, which suggest that there may be other such sites that were not discovered during field survey or interviews with Boral employees. Considering that little is known about MS03 or other similar sites, rarity is not a value that can be definitively established but knowledge about fringe camps, itinerant workers and individual mine owners living on the edge of mine pits is rare.

MS03 House site is of *local* significance for its rarity value.

MS04 Aerial ropeway system

The Aerial ropeway system consisting of concrete plinths, two iron lattice towers (one collapsed; one intact) and a scattering of associated items are common industrial items but rare in the local area. Aerial ropeways were a common method for transporting material from mining quarries across undulating landscapes in the nineteenth century but there are few remaining examples in NSW. The Bleichert Ropeway at Katoomba is the most notable example but its wooden construction is different to the concrete and iron towers at Marulan South.

MS04 Aerial ropeway system is of *local* significance for its rarity value.

MS05 Lime kiln group

The lime kiln group is a vestige of the historical period of limestone mining in the region. It is likely that there were more kilns associated with the mine in the immediate area but only those reported in this document were found during field survey. These kilns are most likely to be those that are reported in the various media as belonging to James Hogg and are therefore the earliest recorded in the Marulan South area. If there were more kilns closer to the earlier mines, they will have been removed, thus making Hogg's kilns rare in the local area.

MS05 Lime kiln group is of *local* significance for its rarity value.

MS06 Explosives hut

MS06 Explosives hut is of modern, utilitarian construction.

MS06 Explosives hut does not fulfil criterion F.

MS07 Old Marulan South Road

MS07 Old Marulan South Road is a vestige of the original road servicing the Marulan South area and in particular the mines. As a former road, this alignment is not rare.

MS07 Old Marulan South Road does not fulfil criterion F.

Table 5.1 Assessment of significance

MS08 House site

MS08 House site is one of at least five similar sites (house or camp) in the immediate area, which suggest that there may be other such sites that were not discovered during field survey or interviews with Boral employees. Considering that little is known about MS08 or other similar sites, rarity is not a value that can be definitively established but knowledge about fringe camps, itinerant workers and individual mine owners living on the edge of a mine pit is rare.

MS08 House site is of *local* significance for its rarity value.

MS09 Camp site

MS09 Camp site is one of at least five similar sites (house or camp) in the immediate area, which suggest that there may be other such sites that were not discovered during field survey or interviews with Boral employees. Considering that little is known about MS09 or other similar sites, rarity is not a value that can be definitively established but knowledge about fringe camps, itinerant workers and individual mine owners living on the edge of their lease is rare.

MS09 Camp site is of *local* significance for its rarity value.

MS10 Mt Frome Mine group

The Mt Frome Mine group is rare at the local level for its ability to demonstrate small-scale historical mining enterprises as these physical marks have been left in the rock face. Little to no impacts have occurred on this site, except for the removal of some of the infrastructure. Areas with evidence of mining, particularly early blasting and horse drawn rails are rare in the local area.

MS10 Mt From Mine group is of *local* significance for its rarity value.

MS11 Camp site

MS11 Camp site is one of at least five similar sites (house or camp) in the immediate area, which suggest that there may be other such sites that were not discovered during field survey or interviews with Boral employees. Considering that little is known about MS11 or other similar sites, rarity is not a value that can be definitively established but knowledge about fringe camps, itinerant workers and individual mine owners living on the edge of their lease is rare.

MS11 Camp site is of *local* significance for its rarity value.

MS12 Lime Kiln Road

MS12 Lime Kiln Road a vestige of the original road servicing the Marulan South and at its terminus to the lime kilns and the mines. As a former road, this alignment is not rare but it is a part of a larger industrial landscape that is disappearing through the continuation of the operations that created it. Lime Kiln Road is a rare vestige of the historic lime extraction industry in the local area.

MS12 is rare at a *local* level.

MS13 Frome Hill Road

MS13 Mount Frome Road is an early alignment of a road servicing the southern limestone mine of Mt Frome from Marulan South Road. As with all early roads identified in this report, it is not rare in that its type is represented by other unsealed country roads.

MS07 Frome Hill Road does not fulfil criterion F.

g) An item is important in demonstrating the principle characteristics of a class of NSW's (or the local area's), cultural or natural places or environments (Representativeness).

MS01 Marulan South village and hut (MS02)

MS01 Marulan South village does not fulfil criterion G

MS02 – not used

MS03 House site

Information to support significance under this criterion would be gathered through archaeological excavation.

MS04 Aerial ropeway system

The Marulan South aerial ropeway is representative of a concrete and iron aerial ropeway. It has examples of all the relevant components including the pulley tower, buckets, plinths and cables.

MS04 Aerial ropeway system is of *local* representative significance.

Table 5.1 Assessment of significance

MS05 Lime kiln group
The lime kiln group is in poor condition and is missing many of its representative elements. More complete examples exist in other areas of NSW including at Piper's Creek in Kumbatine National Park, the Moses Morley burning kiln at 501 Cooma Rd, Googong, NSW and the Kingsdale Line Kilns in the Southern Tablelands.
As individual items, the lime kilns do not meet the threshold for demonstrating a principal characteristic of lime kilns but as a group, set into the edge of a drop, the lime kiln group represent a historic lime processing area, specifically from an archaeological perspective.
MS05 Lime kiln group is of *local* representative significance.
MS06 Explosives hut
MS06 is a modern example of a concrete-block (Besser) storage hut.
MS06 Explosives hut does not fulfil criterion G.
MS07 Old Marulan South Road
MS07 Old Marulan South Road is a standard road alignment. It represents many such roads and is an improvement of the earlier road to the lime kilns.
MS07 Old Marula South Road does not fulfil criterion G.
MS08 House site
MS08 House site is the former residence of George and Elizabeth Feltham, who lived by the mine for a number of years and raised their family there for a time. The house, constructed of local stone and mortar is a vernacular structure; the surrounding landscape modifications represent attempts to create a home environment in the remote Australian landscape.
MS08 House site is of *local* representative significance.
MS09 Camp site
Little surface evidence survives from the occupation of this site. It may have representative value as an archaeological resource and as a site used to house a family and the modifications made to create a home environment in the remote Australian landscape.
MS09 Camp site may be of *local* representative significance.
MS10 Mt Frome Mine group
Mt Frome is representative of the ways in which mining was conducted in the Marulan area during the nineteenth century.
MS10 Mt Frome Mine group is of *local* representative significance.
MS11 Camp site
The surface evidence that survives at this site does not provide a clear indication of its origins. It may have representative value as an archaeological resource.
MS09 Camp site may be of *local* representative significance.
MS12 Lime Kiln Road
As a vestige of the earlier road network into the mining area, and particularly to the lime kilns, MS12 Lime Kiln Road has representative significance as an early industrial road. It may have elements in its construction, identifiable through archaeological excavation, that identify it clearly as an industrial road.
MS12 Lime Kiln Road is of *local* representative significance.
MS13 Frome Hill Road
As a vestige of the earlier road network into the mining area, and particularly to the lime kilns, MS13 Frome Hill Road has minor representative value as an early industrial road but does not meet the threshold for significance.
MS13 Frome Hill Road does not fulfil criterion G.

5.4 Statements of significance

5.4.1 Overview

The following section presents the statements of significance for each historic item identified during the research and survey phase of the Project.

Evidence that any of the sites recorded within the Project boundary are of State significance was not found. However, the level of *local* significance must be considered in view of the entire landscape and the cumulative significance of the component parts. The archaeological resource is significant as it has the potential to demonstrate changes and adaptations of the pre-colonial ground to a landscape that was industrial and residential in nature. The spatial relationships of the sites, industrial and residential, to each other and the internal arrangements of each has the potential to shed light on the phasing and use of the landscape by the people that worked and lived there. As a result, the level of local significance of each item should be viewed as a cumulative high level of significance for the local area.

5.4.2 MS01 Marulan South (village)

The former village of Marulan South is of local significance for the esteem in which it is held by the former residents. The town of Marulan South represents a time of great joy and strong community bonds continuing beyond the removal of the buildings and the closure of the town. The former village also possesses research potential as it may retain evidence of earlier occupation there that is not visible in the ground or through documentary sources.

5.4.3 MS02

Refer to MS01

5.4.4 MS03 House site

MS03 House site is of local significance for its historical significance that also embodies rare surviving elements of domestic structures in close proximity to an industrial area. This site also possesses research value for its potential to answer questions that no other source can about life on the fringes of an industrial site and its relationship to the surrounding cultural landscape.

5.4.5 MS04 Aerial ropeway

The aerial ropeway at Marulan South is of local heritage significance for its ability to contribute to the historical understanding of mining processes at Marulan South in the nineteenth and twentieth centuries. It provides insight into the workings of the mine as a whole, and how the elements of the mine, lime kiln group, ropeway, roads and railway fitted together. There is research potential in locating the techniques and infrastructure within a global context, specifically the technologies that were adopted from Europe such as the pulley system. It is of social significance as a landmark in the local area, particularly for the employees of the mine. Aerial ropeways were a common method for transporting material from mining operations across undulating landscapes in the nineteenth century but there are few remaining examples in NSW, as such the Marulan South aerial ropeway is a rare, representative example of this type of mining technique.

5.4.6 MS05 Lime kiln group

The lime kiln group at Marulan South consists of five kilns and associated landscape modifications. The group is of local historical and research significance for its ability to contribute information about the development of a local industry and the mine of Marulan South. Despite its poor condition the lime kiln group is rare in the local area and has the potential to provide information on the construction and operation of lime kilns in the Southern Tablelands.

5.4.7 MS06 Explosives hut

This item does not possess heritage significance.

5.4.8 MS07 Old Marulan South Road

The blocked-off alignment of Old Marulan South Road is of local historical significance as a surviving element of the access network into the earlier mines. It has landscape value for its ability to allow interpretation of the earlier road networks associated with the local industry.

5.4.9 MS08 House site

MS08 House site if of local significance for its historical, representative and rarity values. It also has research potential as an archaeological site and as a modified landscape that is a residential component of a larger industrial landscape that surrounds it. Built using vernacular construction techniques and local materials, the site is of local historical significance for its ability to contribute to our understanding of the building techniques and materials used to construct houses in the local area. It is rare in the local area and is a representative example of vernacular buildings with the potential to provide research opportunities on construction methods.

5.4.10 MS09 Camp site

MS09 Camp site is of local significance for its historical values and research potential. It has the ability to provide insights into the arrangement of structures in the immediate area and on a broader scale when compared to other such sites. It also has the potential to reveal aspects of life in a semi-permanent camp. It is also of significance to the Armitt family, who lived at the camp as children, with their parents.

5.4.11 MS10 Mt Frome Mine group

The Mt From mine group is of local heritage significance for its ability to provide information on the early mining operations in the Marulan area. It provides a rare and representative example of attempts at blasting and the use of horse-drawn rails to transport product down the mountain.

5.4.12 MS11 Camp

The ephemeral camps are of local historical significance for their ability to contribute to our understanding of the relationship between workers and the mine and changes made to the natural landscape to make life a possibility in a remote location and at the edge of a mine pit. Their locations may provide information on the ways the landscape was used by workers.

5.4.13 MS12 Lime-Kiln Road

Lime-Kiln Road is of local significance for its historical values and rarity in the local area. Originally part of the original Lime-Kiln Road (now Marulan South Road), it gave access to the lime kilns and an early section of the mine. It is a surviving remnant of one of the earliest roads into Marulan South.

5.4.14 MS13 Frome Hill Road

Frome Hill Road is of local historical significance for its ability to contribute to knowledge about the development of the area and associated mining operations. This road provides access from Marulan South Road and is where one of the camps, MS08, was located and is therefore an early road to the mines. It is rare in the local context and also representative of early attempts to access the limestone resource.

5.4.15 MS14 House site

MS14 house site is a built and archaeological site with local historical significance and research potential as an example of the landscape modifications and building techniques used to create a home environment in the Australian landscape. It is a rare and representative example of vernacular buildings in the area and has the potential to provide research information on construction methods.

5.4.16 Bungonia National Park

The Bungonia National Park is adjacent to the Project site.

The Bungonia National Park is an item of local heritage significance for its ability to represent the geology of the local area and as a large natural landscape. The Lookdown lookout within the National Park highlights these qualities. As a recreational area it also has social significance to the local and wider community.

5.4.17 Glenrock Homestead and Outbuildings

Glenrock Homestead and Outbuildings is in the vicinity of the Project site.

George Barber began purchasing land in the Marulan district from around 1835 including an allotment of 800 acres that he named “Glenrock”. While the size of the original property has shrunk, today the listed component of the property includes the homestead and surrounding outbuildings.

Glenrock Homestead and Outbuildings is a good example of a Georgian style country home, particular the facade which is of aesthetic significance as a good example of Georgian stonework. Glenrock Estate and its early owners are of historical and associative significance for their contribution to the understanding of the history of the area and the connection to George Barber and Isabella Hume. The item is listed on the *Goulburn Mulwaree LEP*.

6 Impact assessment

6.1 Sources of development impact

The following ground disturbance activities have the potential to impact known and unknown historic heritage items in the Project site:

- the construction of Project infrastructure including haul roads, expansion of the pit, and realignment of Marulan South Road;
- the construction of the Marulan Creek Dam wall and associated inundation of Marulan Creek; and
- the covering of areas by overburden emplacements.

Heritage items of historical value were identified in the southern section of the Project site, that is, the location of the limestone mine. No historical heritage items or potential heritage items were identified, either through survey or documentary research, at the proposed Marulan Creek Dam site or within the area connecting the mine and the dam.

All identified historical heritage items and how they are affected are listed below. A summary of heritage items and management measures is presented in Table 7.1.

Items that are within the disturbance footprint are:

- the majority of MS04 Aerial ropeway system;
- MS05 lime kiln group;
- MS07 Old Marulan South Road (now blocked);
- MS03 camp;
- MS09 camp;
- MS13 Frome Hill Road (small section of the alignment);
- MS12 Lime Kiln Road (vestigial terminus of the original road from Marulan).

Sites identified in this report located within the Project boundary but outside the impact footprint are:

- MS01 (Marulan South village);
- two plinths belonging to the aerial ropeway (MS04_10 and MS04_3);
- the modern control room belonging to the aerial ropeway (MS04_11);
- MS08 (former house site);
- MS11 (camp with ramp);
- a large section of the alignment of MS13 (Frome Hill Road); and

- MS14 (former house site).

Items of heritage value, either listed or recently identified that are in the vicinity of the Project boundary will not be physically impacted. These items are:

- Glenrock Homestead (314 on the Goulburn Mulwaree LEP).
- MS10 Mt Frome Mine (unlisted); and
- Bungonia National Park (I027 on the Goulburn Mulwaree LEP as the Bungonia State Recreation Area).

6.1.1 MS01 Marulan South village

i Impact type

The former village will be avoided by new impacts.

ii Have all options for retention and adaptive re-use been explored?

Options for retention or adaptive re-use have not been considered as the location of the resource precludes moving to another location. The area of the former village will remain as the administrative centre of the mine operations. A small dam will be built to the east of the former village footprint. Impacts to this component of the historical landscape can be managed through archival recording using photography and existing documentary information such as interviews with former residents.

iii Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?

Impacts to the former village will be avoided and the area will continue to operate as the mine administrative centre.

iv Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?

Not applicable.

v Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

Qualified heritage consultants have prepared this statement of heritage impact. As noted above, the Project is constrained by the limestone resource in the area and Project elements have aimed to reduce impacts on all environmental values wherever possible. Archival recording will ensure that information is gathered and retained for posterity and will be a legacy of the Project and the lives of the former community. The recommendations will be implemented to record the former village as it is now.

6.1.2 MS05 Lime kiln group

i Impact type

The lime kiln group is located within the proposed 30 year mine pit disturbance footprint. The development will result in the removal of all the identified lime kilns and their curtilage, which includes Lime-Kiln Road, the rock-face into which they are built and the associated ramps.

ii Have all options for retention and adaptive re-use been explored?

The lime kiln group is not in a state for adaptive reuse to be possible unless restoration is an option. The group has had many of its component parts destroyed or removed with the passing of time and not enough remains for reuse. The kilns themselves are outdated technology, which while providing historical information cannot be reintegrated into the current mining system. They are also on private property and not accessible by the public; interpretation is also not a feasible option.

Retention was considered but the location of the group in relation to the limestone resource does not allow for this.

iii Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?

The Project is constrained by the location of the limestone resource in the area. Therefore the location of the mine pit, overburden emplacements, haul roads and other mining infrastructure is guided by the location of the limestone resource. The proposed location and design of the mine pit, infrastructure and overburden emplacements have been carefully considered to reach a balance between impacts on all relevant environmental values while allowing for the economically viable extraction and processing of the limestone resource now and into the future. The proposed 30 year mine pit, which impacts on the lime kiln group, has been designed to provide 30 years of limestone resource, while limiting the disturbance footprint of the pit and avoiding mining the southern rim of the existing pit, to reduce long term visual impacts from the Bungonia Lookdown. The proposed 30 year pit design is considered by Boral to be the optimal design and therefore altering the disturbance footprint associated with this 30 year pit to avoid the lime kiln group is not feasible.

iv Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?

Timing of the removal of the lime kiln group will be based on the mining schedule. While demolition is only likely to take place within Stage 2 of the 30 year continued operations (after the first five years – refer to the EIS prepared by Element Environment 2018), it cannot be prevented and when operations reach their location the group will be removed.

v Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?

It is likely that the area of the lime kiln group has archaeological sensitivity, which has been considered in the assessment of impacts and the management measures. The preferred measure from a heritage perspective is to retain the topography on which the kilns and the surviving alignment of Lime Kiln Road are situated. The option of retention has been investigated but it is not possible because of the location and depths of the resource. As retention is not possible, archival recording in the form of archaeological excavation, photographic recording and topographical recording will be undertaken.

vi Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

Qualified heritage consultants have prepared this statement of heritage impact. As noted above, the Project is constrained by the limestone resource in the area and Project elements have aimed to reduce impacts on all environmental values wherever possible. Due to the impact of the lime kiln group, recommendations for archival recording including all components and archaeological excavation of a representative kiln, prior to the development impacts, are made in Section 7. Archival recording will ensure that information from the lime kiln group is gathered to contribute to the understanding of early mining operations throughout the area. The recommendations will be implemented progressively as impacts are proposed to the area and will form part of the mitigation measures for the Project.

6.1.3 MS04 Aerial ropeway system

i Impact type

The majority of the aerial ropeway system will be impacted by the mine pit and Western Overburden Emplacement. The elements that will not be impacted are not significant in isolation.

ii Have all options for retention and adaptive re-use been explored?

Portions of the aerial ropeway will be retained, including the modern engine room, and a complete concrete plinth. Buckets located outside the mine disturbance area will also be avoided. These elements will remain *in situ* as a reminder of this historical technology in its original setting.

The elements that will be removed include some concrete plinths, some wire rope and the standing and collapsed pulley towers. Options for retention of these items were explored, however due to the location of the current mine and the limestone resource the Project impacts cannot be avoided in these locations. Options for adaptive reuse or removal were explored, however the aerial ropeway elements are large and difficult to move in the steep terrain of the Project site and moving the structure out of its industrial and landscape context would diminish its interpretive value considerably. Additionally, the aerial ropeway cannot be adaptively reused as it is outdated technology and is in poor condition. However, the archival recording of the aerial ropeway will ensure a complete record of the technology will be made to contribute to our understanding of this type of transport system and its place in history.

iii Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?

The Project is constrained by the limestone resource in the area. As noted above, the location of the pit, overburden emplacements, haul roads and other mining infrastructure is guided by the location of the limestone resource. The proposed location and design of the mine pit, infrastructure and overburden emplacements has been carefully considered to reach a balance between impacts on all relevant environmental values, while allowing for the economically viable extraction and processing of the limestone resource now, and into the future. The 30 year mine has been designed to most efficiently extract the limestone resource and minimise the amount of overburden material, while not mining the southern rim of the pit and limiting the height of the overburden emplacements to reduce long term visual impacts. The current design is considered to be optimal and it is preferential not to alter the disturbance footprints associated with the Project to avoid a portion of the aerial ropeway.

iv Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?

Only those portions of the aerial ropeway impacted by the Project will be removed and the removal of those elements of the aerial ropeway will be based on the mining schedule.

The elements of the system that will be retained include the engine room, one concrete plinth and some carriers. Other bins in the field may be able to be retrieved depending on the ruggedness of the surrounding topography.

v Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

Qualified heritage consultants have prepared this statement of heritage impact. As noted above, the Project is constrained by the limestone resource in the area and the 30 year mine plan has aimed to reduce impacts on all environmental values wherever possible. Due to the impacts on portions of the aerial ropeway, a recommendation for archival recording of the aerial ropeway is made in Section 7, with photographs and measured drawing of selected elements and a plan of the ropeway. Archival recording will ensure that information from the aerial ropeway is gathered and retained even though portions of the aerial ropeway will be removed. This will also ensure that as close to a complete record of the current aerial ropeway is obtained before components are removed and will contribute to the understanding of early mining operations throughout the area. The recommendations will be implemented progressively as impacts are proposed to the area and will form part of the mitigation measures for the Project.

6.1.4 MS03 and MS09 Former house and camp sites

i Impact type

Impacts differ across the site with two sites (MS03 and MS09) being fully within the impact footprint. These sites are within the 30 year mine pit. All other former house and camp sites will be partially impacted or avoided completely as described:

- Total impact: MS03, MS09.
- Partial impacts: zero;
- No impacts: MS08, MS11 and MS14 (house and camp sites).

ii How is the impact of the new development on the heritage significance of the item or area to be minimised?

Recommendations have been provided in Section 7 with the aim of minimising impacts to the former house and camp sites by recording the elements of each site and their position in the landscape.

iii How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?

The former house and camp sites that will be retained will be within view of the mine pit and the overburden emplacements. Views to the mining operations are acceptable in the historical context as these sites were lived at and used by those working in the industry. These sites exist here because the mine exists here.

iv Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?

All the house and camp sites have archaeological potential although deposits may not be deep. One of the most important areas of research from an archaeological perspective is that of the spatial arrangement of the habitation sites on an individual and collective scale. The sites that will be destroyed cannot be avoided because of the location of the limestone resource.

v Will the additions visually dominate the heritage item? How has this been minimised?

Additions in this context have been defined as overburden emplacements and views to the mine pit. These changes to the landscape directly around the former house and camp sites are acceptable as the landscape context has always been an industrial, mine-focused one. These sites exist because the mine exists.

vi Will the public and users of the item, still be able to view and appreciate its significance?

The public is currently unable to view any of these sites as they are on Boral land and close to the active mining operations. This situation is unlikely to change.

6.1.5 MS07, MS12 and MS13 Roads

The Old Marulan South Road (MS07), the Lime-Kiln Road (MS12) and the Frome Hill Road (MS13) are all remnants of the historic mining activities that developed into the enterprise it is today. While as a group, with each other as well as with the other historic elements in the landscape, the roads have the ability to demonstrate transport processes and different phases of the mining activities, their research potential and historical significance can be captured through archival recording in photographic format and by mapping their locations.

6.1.6 MS10 Mt Frome

The mining area at Mt Frome will not be impacted by the Project. It is located against the Project boundary which is approximately 200 m from the closest disturbance footprint associated with the Project.

6.1.7 Bungonia National Park

i Impact type

While Bungonia National Park was not re-assessed for significance in this report, it is included here because of its proximity to the Project.

The mine is currently and will remain, visible from the Bungonia Lookdown. Physical impacts to the recreation area and the national park are not anticipated. The mine, including the southern extent of the Project site (the South Pit) has been part of the landscape for over a century. The Project will therefore not result in any new or more significant impacts, closer to this heritage item, than have already occurred during historic mining operations.

ii How is the impact of the new development on the heritage significance of the item or area to be minimised?

As the Project progresses, the existing South Pit will start to be backfilled with overburden. Once the overburden emplacement extends above the current rim of the South Pit, the emplacement with start to screen the remainder of the mine void located to the north. The embankments of the Southern Overburden Emplacement will be progressively revegetated, blending the emplacement into the surrounding bushland and reducing the visual impact of the mine over time. This will minimise the impact of the Project on the Bungonia Recreational Area and Bungonia National Park (refer to RLA 2018 and Plate 3.41)

iii Why is the new development required to be adjacent to a heritage item?

iv How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?

The Bungonia National Park will remain a large protected park with good natural examples of the geology of the area. The mine is currently most visible from one area; the Bungonia Lookdown. The national park will retain its context and the visibility of the mine from the Lookdown lookout will not increase significantly, but is likely to improve over time with the backfilling of the South Pit with overburden and the revegetation of newly formed embankments with locally occurring native vegetation. Visitors will be able to enjoy all currently accessible areas of the Bungonia National Park.

v How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?

The site is visible from the Bungonia National Park, particularly the Lookdown, one of the many lookouts available for visitors. As outlined above, the visibility of the mine from the Lookdown lookout will not increase significantly, but is likely to improve over time with the backfilling of the South Pit with overburden and the revegetation of newly formed embankments with locally occurring native vegetation.

vi Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?

The new development does not represent a dramatic change to the current view from the Lookdown the conservation area or the national park. Views from the Bungonia Lookdown can be considered intrusive to the dramatic bushland setting but they are also a part of historical mining operations. The Project will not represent a significant change to the views. The emplacements have been designed to have a minimal impact on the surrounding environment and will be revegetated, which will gradually reduce visibility to the mine.

vii Will the public, and users of the item, still be able to view and appreciate its significance?

The public will retain full access to the Bungonia National Park and be able to view and appreciate the natural environment throughout. It is understood that interpretive boards are placed at the lookdown that explain the mining operations.

6.1.8 Glenrock Homestead

Glenrock Homestead was not re-assessed for significance as it is a sufficient distance from the Project to be avoided by any new impacts. It is located more than 2 km from substantial Project impacts at the northern extent of the Project site.

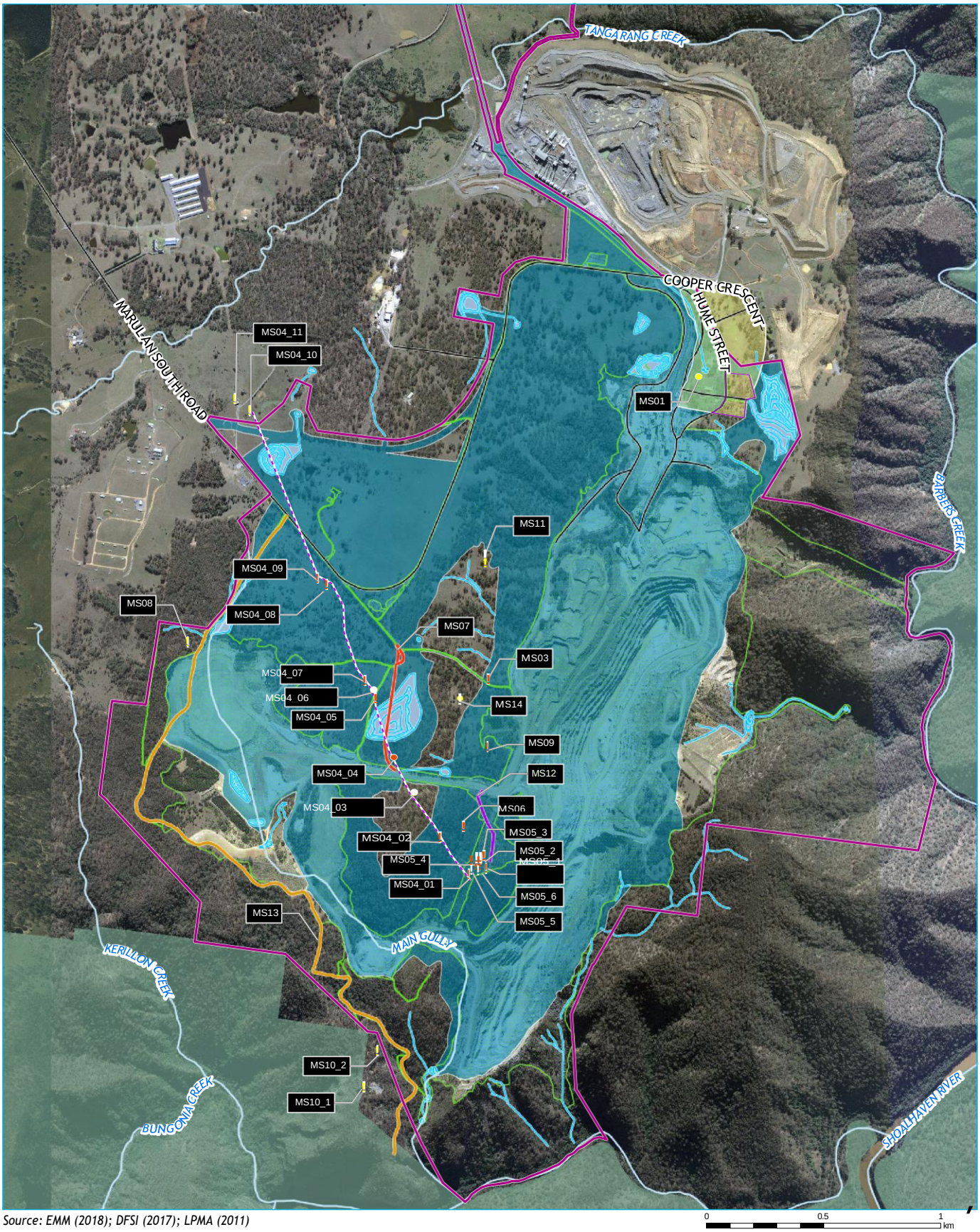
6.1.9 Visual impacts

A visual analysis was undertaken by Richard Lamb and Associates (RLA 2018). RLA assessed the impact to Bungonia National Park at the Lookdown, Morton National Park and the Bungonia State Conservation Area and determined that while there will be some residual impacts these will be mitigated through the management measures outlined in the visual impact assessment report.

6.1.10 Cumulative impacts

The cumulative impacts to the historic industrial landscape are high as almost all items discovered during field survey will be removed by the Project. The current landscape is of a mixed industrial and residential nature and is rare in the local context. It is also situated in such a way as not to be visible to those working away from the immediate vicinity. The loss of this type of landscape is probably common due to its conceptual invisibility when compared to landscapes created by activities such as gold mining and wealthy pastoral pursuits. The humble remnants of working life, labouring on the edge of a mine and where striking it rich was never an option, is not generally visible and therefore not as valued as the 'big' remnants of the past. The significance of this historic landscape and the continuation of the activities that created it, approximately one hundred and fifty years ago, lends an irony to the concept of minimising harm and retaining where possible.

One of the most valuable aspects of the collective sites however, is research potential, the Project will provide an opportunity to record all aspects and therefore a springboard for more research to answer questions posed throughout this report.



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Source: EMM (2018); DFSI (2017); LPMA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 56

KEY

- Approximate pathway of aerial ropeway
- Proposed dam location
- Project boundary

Site impact

- No impact
- Total impact

- Frome Hill Road
- Lime-kiln Road
- Old Marulan South Road
- Road
- Watercourse
- Marulan South village

- Historical disturbance footprint (pre -SSD)
- Project (SSD) disturbance footprint
- Additional historic area of disturbance (pre -SSD)
- Proposed dam location

Project impacts

Marulan South Continued Operations Project
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Figure 6.1

EMM

7 Conclusion and recommendations

7.1 Conclusion

Management measures including site and landscape-specific actions are summarised in the Table 7.1. They have been developed to extract information about the industrial/residential landscape inside the Project site before it is both removed (where it will be removed), and during the window of opportunity presented by the Project application and approval process. It is anticipated that the data to be extracted will be useful for future research related to spatial analysis, comparative analysis and will provide an understanding of the material culture created by nineteenth and early twentieth century miners. This is how the Project aims to create opportunities for research and learning on the themes identified in this report.

This section describes the measures to manage the historical heritage values in the Project site that have the potential to be affected by the Project. The management measures have been developed to respond to the specific requirements of the Project. They are:

- the significance of the sites and their spatial relationship to each other;
- the proposed impacts to the sites;
- the need to mitigate against the loss of information by recording sites before they are destroyed; and
- the need to protect sites that will not be impacted by the Project but remain under the care of Boral.

The historic heritage assessment identified eleven items of historic heritage significance in or within 20 m of the Project site (MS06 is not a heritage item). Those items are:

- MS01: Marulan South village.
  - This item will not be impacted by the Project. A small dam will be built directly to the east.
- MS02: deleted.
- MS03: Hut/camp site. This item is characterised by collapsed structures of locally sourced stone, some of which has been bonded by mortar.
  - This item will be impacted by the Project.
- MS04: Elements of the aerial ropeway system that historically operated on the Project site include concrete plinths in groups of four, used for holding up the pulley towers, two pulley towers, metal buckets and steel cables.
  - The majority of this item will be impacted by the Project; the only element of this aerial ropeway in the Project site that will not be impacted is MS04_3.
- MS05: A lime kiln group of five kilns in two areas was identified in the southern part of the 30 year mine pit. The site consisted of D-type kilns and associated bricks, earthworks, wooden beams and stones with evidence of firing and burning. The lime burning complex includes the Lime-kiln Road (MS12) that was an extension of the Marulan South Road to the kilns and areas where glass, ceramic and metal have been dumped.

- This item will be impacted by the Project.

- MS07: Old Marulan South Road, which is an earlier alignment of the Marulan South Road (formerly the Lime-Kiln Road) connecting Marulan and the Hume Highway to Marulan South.
  - This item will be impacted by the Project.

- MS08: House site. This structure was identified in previous assessments as a house probably built and occupied in the late nineteenth and early twentieth centuries by George and Elizabeth Feltham. The structure is rectangular and built of local stone and mortar. The roof is missing and walls are in varying states of disrepair.
  - This item will not be impacted by the Project.

- MS09: Camp site.
  - This item will be impacted by the Project.

- MS11: Camp site, consisting of landscape modifications with ramp, suggesting either a residential camp or a temporary workers' camp.
  - This item will not be impacted by the Project.

- MS12: Lime-kiln Road, so called in this report because it is a vestige of the original road from Marulan to South Marulan and has been unused for a number of years. This road serviced the kilns (MS05) but went out of use when the kilns were no longer required.
  - This item will be impacted by the Project.

- MS13: Frome Hill Road.
  - This item will be partially impacted to the west where it diverges from the Marulan South Road but a considerable length will be avoided.

- MS14: House site, consisting of the elements of a structure, possibly a house consisting of a flat area of ground overlooking a dam and ephemeral creek line. The area contained evidence of landscape modification in the form of rock structures, fences and exotic trees (possibly quince trees). A dump of glass, ceramics and metal was also evident. The remains of a chimney were also identified and the area has the potential to contain relics.
  - This site will not be impacted by the Project.

One feature that is not a heritage item was identified for archival recording and topographic survey due to its relationship to the mining process and proximity to the Lime-kiln group and Aerial ropeway:

- MS06: Modern explosives hut – no heritage significance.
  - This item will be impacted by the Project.

Management recommendations for historic heritage items located within or in proximity to the Project are contained in Section 7.2 below. MS06 the modern explosives hut is included for mitigation because as it is a part of the current industrial landscape. Table 7.1 presents a summary of impacts and management measures.

7.2 Measures to minimise harm and alternatives

The Project is constrained by the nature of the limestone resource in this area and the angle of the resource in the ground. The removal of large amounts of overburden and interburden is necessary to access the resource, which does not allow a large amount of movement in the location of the mine across the landscape. The impacts identified in this report are therefore necessary for the Project to proceed.

Project elements have been designed to accommodate environmental considerations including historic heritage, Aboriginal heritage, ecology, noise and visual amenity. Each design element has been investigated to ensure it provides an optimal design which balances as many environmental considerations as possible. This has resulted in avoidance of some historic heritage items as well as minimising of impacts to other areas of historic heritage.

The management measures proposed in this report aim to retain as much of the modified landscape as possible so that its research potential and interpretability are not removed. There is no opportunity to alter the mine footprint but the recommendations for retention (Section 7.3.1) have been made in the event that an opportunity presents itself during future detailed mine planning.

The following statements of heritage impact have been prepared using the Heritage Office guidelines *Statements of Heritage Impact: A model* (Heritage Office and Department of Urban Affairs & Planning 1996, revised 2002). It has been prepared using the current disturbance footprint.

7.3 Management of impacts

7.3.1 Avoidance of impacts to areas of significance

The location of the limestone resource precludes the retention of the industrial landscape values associated with historical mining activities as described below. While retention through project modification is the preferred option, this approach is not possible on the Project. This measure to avoid impacts should be applied if the Project impacts change.

A group of items has been identified at the southern end of the site that are worthy of retention for their industrial landscape values (Figure 7.1). This area contains the following items:

- MS04 Aerial ropeway system;
- MS05 Lime kiln group; and
- MS12 Lime Kiln Road (surviving remnant).

Where avoidance and retention is not possible, the following management measures set out in Section 7.3.2 apply.

7.3.2 Apply appropriate management measures

The management measures below have been developed to acquire as much knowledge as possible before the archaeological resources and the historic landscape is impacted by the Project. The outcomes of the management measures will be to provide baseline data for further research, particularly for comparative analyses in future studies.

i Photographic archival recording

Archival recording compiles information about the technical, environmental, historical and aesthetic information from heritage items for future generations.

The standards of the Heritage Council's *How to Prepare Archival Records of Heritage Items* (1998) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006) should be used as the guiding documents. Additional research on the ownership and operation of the aerial ropeway is considered a part of this archival recording.

A photographic archival recording will be created of:

- representative features of the aerial ropeway including the engine room prior to any impacts on the pulley system. That is, at least one pulley tower, an example of the cable, one set of tower plinths and one of each type of carrier. The report must also include the survey plan of the entire aerial ropeway;
- the pre-emplacement landscape of the Feltham's house MS08 (including the house ruins);
- any archaeological excavation prior to and during the excavation process; and
- the camp landscapes that will be impacted by the Project.

ii Archaeological recording of all identified items in the Project site

Archaeological recording of the landscape will be undertaken post-approval including:

- recording of all identified items with the use of topographic survey so their relative location, elements and orientation can be mapped;
- archaeological excavation of representative structures of the lime kiln group (M05) prior to its removal; and
- archaeological excavation of a sample of camp site MS03.

Any archaeological investigation involving excavation will be guided by a research design with relevant questions and other supporting information.

iii Fence and signpost

Heritage items within 20 m of the Project disturbance footprint will be avoided through measures to make them visible. This will require the installation of treated timber poles, or similar, painted with high visibility paint around the visible extent of the sites with an approximate 5 m buffer from the edge of visible site fabric. A suitably qualified archaeologist will demarcate site locations and where the poles should be erected.

A suitably durable sign will be attached to the posts including words to the effect of:

"Environmentally sensitive area; do not disturb; contact the Mine Manager for more information". The location of historic heritage items that are not to be impacted by the Project will be identified in the historic heritage management plan (discussed below) and will be included in induction and training procedures.

iv Moveable heritage

Items of moveable heritage should be retrieved before impact and stored in a suitable location on the Marulan South Limestone Mine site. Only one class of heritage item has been identified for removal being the metal buckets used in the aerial ropeway system.

Other items of moveable heritage were not identified during the historical heritage investigation.

v Historic heritage management plan

A historic heritage management plan will be prepared to provide information on the historic heritage items in the Project site and surrounds and details of their management. The following provisions for an unexpected finds protocol and a protocol for managing the discovery of human remains will be included in the historic heritage management plan:

- Unexpected finds

An unexpected finds protocol will be prepared as part of the historic heritage management plan. This protocol will outline the steps that should be taken in the event that intact and substantial relics or other forms of heritage that were not identified in this phase of investigation are discovered.

Aboriginal heritage material that is unexpectedly discovered during the Project operations will be managed in accordance with the Aboriginal heritage management plan.

- Human skeletal material

In the event that known or suspected human skeletal remains are encountered during mining, the procedure below will be followed. This management measure is to be included in the historic heritage management plan

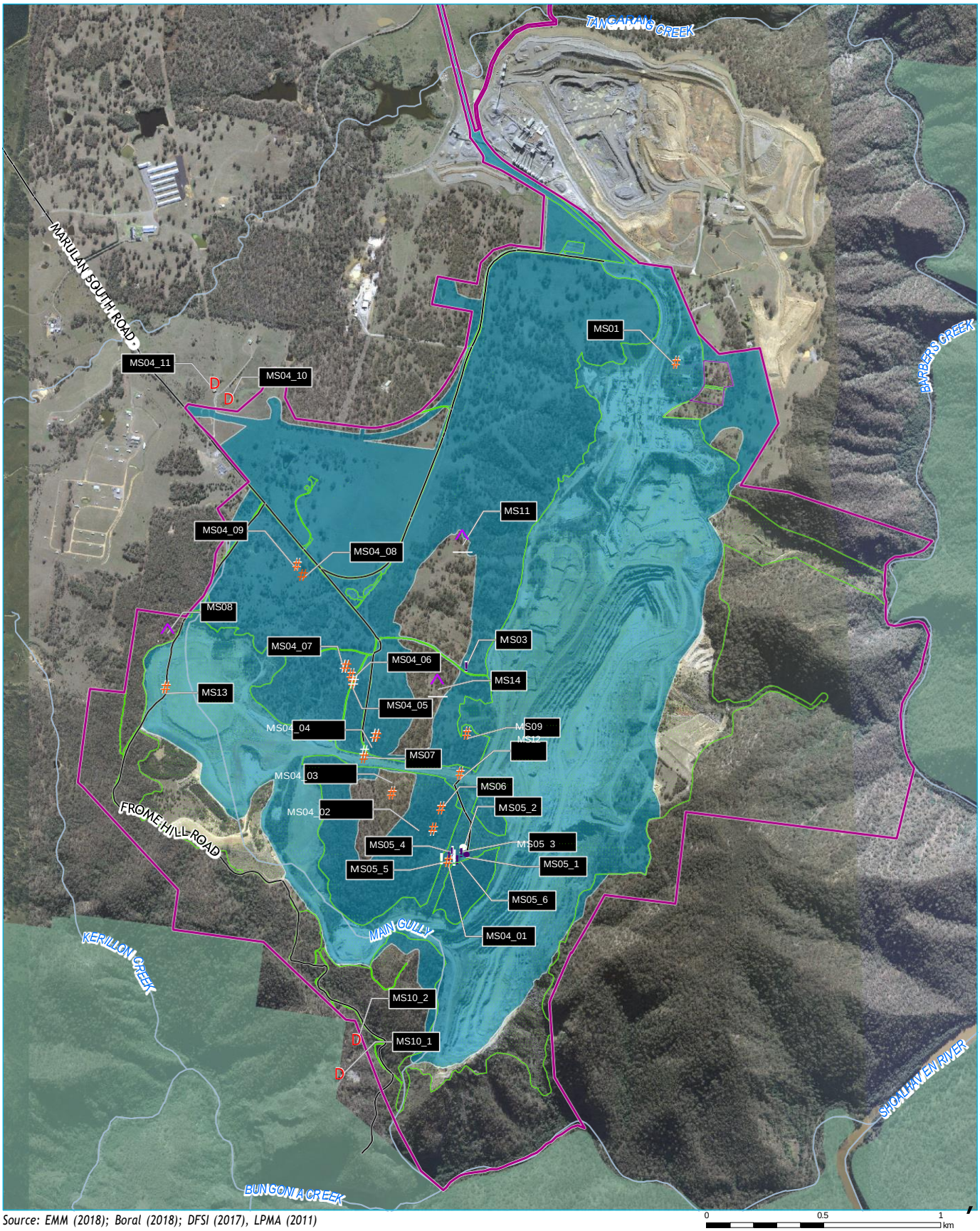
- all work in the immediate vicinity will cease;
- the find will be immediately reported to the work supervisor who will immediately advise the Mine Manager and Environmental Advisor or other nominated senior staff member;
- the Mine Manager, Environmental Advisor or other nominated senior staff member will promptly notify the police and the state coroner (as required for all human remains discoveries);
- the Mine Manager, Environmental Advisor or other nominated senior staff member will contact the OEH for advice on identification of the skeletal material as Aboriginal and management of the material; and
- if the skeletal material is of Aboriginal ancestral remains, the Local Aboriginal Land Council will be contacted and consultative arrangements will be made to discuss ongoing care of the remains.

Table 7.1 Site impact assessment and management summary

Site ID	Site description	Location	Significance	Impact level	Management
MS01	Marulan South village	North-east of the limestone processing and limestone production plant.	Local	No impact	Photographic archival recording Archaeological recording through topographic survey
MS02	Not used				
MS03	Hut/camp site	Centre of proposed 30 year mine pit; directly west of existing mine	Local	Total impact	Photographic archival recording Archaeological recording through topographic survey Archaeological excavation (sample area)
MS04	Aerial ropeway	Southern area of 30 year mine pit to the north west of the Western Overburden Emplacement (and outside of Project site)	Local	Partial (majority) impact of elements	Photographic archival recording Archaeological recording through topographic survey Move metal buckets from former aerial ropeway for safekeeping. Buckets in locations that will not be impacted to remain in situ
MS05	Lime kiln group	Southern end of 30 year mine pit	Local	Total impact	Photographic archival recording of entire group Archaeological recording through topographic survey Archaeological excavation of one of each type (two types of kiln exist on the site)
MS06	Explosives hut	Southern end of 30 year mine pit	None	Total impact	Photographic archival recording (detail not required) Archaeological recording through topographic survey
MS07	Old alignment of Marulan South Rd (now closed)	Northern edge of the main Western Overburden Emplacement haul road, immediately south of the proposed Central Dam		Total impact	Include in final spatial mapping of sites; data to be extracted from cadastre Photographic archival record of a representative sample
MS08	The Feltham house	Western side of the mine and immediately west of the Western Overburden Emplacement	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey Record any artefacts and structures that occur in the area of impact

Table 7.1 Site impact assessment and management summary

Site ID	Site description	Location	Significance	Impact level	Management
MS09	Camp (Armitt family)	Western side of the existing mine pit and north of the lime kiln group	Local	Total impact	Photographic archival recording Archaeological recording through topographic survey
MS10	Mt Frome mine and rail	South of the mine (outside)	Local	No impact	None – these items are outside of the Project site
MS11	Ramp of earth and timber	Immediately south of the Northern Overburden Emplacement, west of the 30 year mine pit and east of the Western Overburden Emplacement	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey
MS12	Lime-kiln Road	Southern end of 30 year mine pit	Local	Total impact	Archival recording Archaeological recording through topographic survey
MS13	Mt Frome Road	Crosses into Project site on western side of the Western Overburden Emplacement	Local	Partial impact	Photographic archival recording of a representative sample of the section of road to be removed. Include in spatial mapping of sites; data can be extracted from cadastre.
MS14	House site – chimney remaining; planted trees, possibly quince; track.	Centre of proposed mine plan; directly west of 30 year mine pit	Local	No impact	Fence and signpost Photographic archival recording Archaeological recording through topographic survey Undertake archaeologically excavation if artefacts and structures occur in the area of impact



Source: EMM (2018); Boral (2018); DFSI (2017), LPMA (2011)

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KEY

- RoadClipped_01pl_LPMA_20150709
- Watercourse
- Bungonia National Park

Site management measures

- # Photographic archival recording; topographic survey
- ^ Photographic archival recording; topographic survey & fence and sign post
- • Photographic archival recording; topographic survey; archaeological excavation sample
- D Not in project site (no management required)

- Project boundary
- Project (SSD) disturbance footprint
- Historical disturbance footprint (pre -SSD)
- Additional historic area of disturbance (pre -SSD)

Historic heritage management measures

Marulan South Continued Operations Project
Historical heritage assessment and SoHI
Figure 7.1

EMM

Abbreviations

Abbreviation	Term
£	Pounds
$	dollars
AHD	Australian Height Datum
AHIMS	Aboriginal heritage information management system
BOM	Bureau of Meteorology
BH	borehole
c	circa
cm	centimetres
DP	Deposited Plan
DP&E	Department of Planning and Environment
EMM	EMM Consulting Pty Limited Pty Limited
EP&A Act	*Environmental Planning and Assessment Act 1979*
km	kilometres
LEP	Local Environmental Plan
LGA	Local Government Area
m	metres
m^2	metres squared
mm	Millimetres
NT	National Trust
NSW	New South Wales
OEH	Office of Environment and Heritage
PAD	Potential archaeological deposit
RMS	Roads and Maritime Services
SHR	State Heritage Register
t	Tonne

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APPENDIX C
Consultation

Pamela Kottaras

From: Les Longhurst <Les.Longhurst@boral.com.au>
Sent: Friday, 15 July 2022 2:09 PM
To: Neville Hattingh
Subject: Fw: Historic heritage Management Plan Marulan South Limestone Mine

Hi Neville,

FYI have just not gotten any response in spite of numerous messages .

Regards,
Les

Les Longhurst
Site Manager - Marulan

Mobile: 0401895032
Office (02) 48203061

From: Les Longhurst <Les.Longhurst@boral.com.au>
Sent: Friday, July 15, 2022 2:08 PM
To: Scott Martin (scott.martin@goulburn.nsw.gov.au) <scott.martin@goulburn.nsw.gov.au>
Subject: Fw: Historic heritage Management Plan Marulan South Limestone Mine

G'day Scott, hope you're well.

In relation to the request for review of our Historic Heritage management plan in late March, I can confirm that we have not received any comments from Council.

In that regard we assume that Council has no comment and will ask DPIE planning to proceed with it's approval of this management plan.

Happy to discuss as necessary.

Regards,
Les

Les Longhurst
Site Manager - Marulan

Mobile: 0401895032
Office (02) 48203061

From: Neville Hattingh <neville@elementenvironment.com.au>
Sent: Tuesday, March 29, 2022 11:43 AM
To: Les Longhurst <Les.Longhurst@boral.com.au>; Scott Martin (scott.martin@goulburn.nsw.gov.au) <scott.martin@goulburn.nsw.gov.au>
Cc: PR163 <PR163@elementenvironment.com.au>
Subject: RE: Historic heritage Management Plan Marulan South Limestone Mine

Hi Scott

Please find link below to the share folder to download the HHMP.

Temp share folder for Council

Please can you confirm that you have successfully downloaded the document.

Many thanks,

Neville.

Neville Hattingh
CEO | Founder

0404 252 265 | neville@elementenvironment.com.au

elementenvironment.com.au | Follow us on LinkedIn

Collaborate | Innovate | Solve

From: Les Longhurst <Les.Longhurst@boral.com.au>
Sent: Tuesday, 29 March 2022 11:15 AM
To: Scott Martin (scott.martin@goulburn.nsw.gov.au) <scott.martin@goulburn.nsw.gov.au>; Neville Hattingh <neville@elementenvironment.com.au>
Subject: Re: Historic heritage Management Plan Marulan South Limestone Mine

Hi Neville,

My earlier email to yourself and Scott bounced back, I suspect because of the file size being 40Mb.

Would you mind emailing Scott with the HHMCP in order for Scott's team to be able to review please?

Thanks,
Les

Les Longhurst
Program and Acting Site Manager - Marulan

Mobile: 0401895032
Office (02) 48203061

From: Les Longhurst
Sent: Tuesday, March 29, 2022 9:53 AM
To: Scott Martin (scott.martin@goulburn.nsw.gov.au) <scott.martin@goulburn.nsw.gov.au>; neville@elementenvironment.com.au (neville@elementenvironment.com.au) <neville@elementenvironment.com.au>
Subject: Historic heritage Management Plan Marulan South Limestone Mine

G'day again Scott, hope you're well.

Further to the Traffic Management Plan that we sent through to council for review, we ask that you also review our Historic Heritage Management Plan as per the requirements of our consent conditions

Please find attached our site Historic Heritage Management plan for review by the appropriate person within Council. I would ask that whoever that person is that they try and get through it at the earliest convenience.

Please feel free to contact myself or Neville (cc'd) in the event you have any questions. I will be away on leave tomorrow for 10 days so if you could sen the response through to Neville for us that would be most appreciated.

Regards,
Les

Les Longhurst
Program and Acting Site Manager - Marulan

Mobile: 0401895032
Office (02) 48203061

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