Hera Resources Pty Limited
ABN: 72 138 992 999

Environmental Assessment

for the

Hera Mine Modification 3
PA 10_0191

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

August 2015

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PA 10_0191

Prepared for:

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LIST OF ACRONYMS

AHD	Australian Height Datum
CCC	Community Consultative Committee
dB(A)	The unit of measurement of sound pressure level heard by the human ear, expressed in "A" scale
DDG	Deposited Dust Gauge
DP	Deposited Plan
DRE	Division of Resources and Energy
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	Environment Protection Authority
ha	hectare
HVAS	High Volume Air Sampler
JORC	Joint Ore Reserves Committee
L/s	Litres per second
lcm	Loose cubic metre
LEP	*Local Environment Plan*
m	metre
m^3	cubic metre
mbgl	Metres below ground level
ML	Mining Lease
ML/d	Megalitres per day
MOP	*Mining Operations Plan*
Mt	million tonnes
OEH	Office of Environment and Heritage
PA	Project Approval
pH	A measure of the degree of acidity or alkalinity of a solution

PM_{10}	Particulate matter <10µm in diameter
ROM	run-of-mine
RWC	R.W. Corkery & Co Pty limited
SEARs	Secretary's Environmental Assessment Requirements
SEPPs	State Environmental Planning Policies
t	tonnes
tpa	tonnes per annum
TSP	Total Suspended Particles
TSR	Travelling Stock Reserve
µm	Micron (1 micron=0.001 millimetre)
V:H	Vertical to horizontal ratio
WAD	Weak Acid Dissociable
WLL	Western Lands Lease

EXECUTIVE SUMMARY

Introduction

This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of Hera Resources Pty Limited (the Proponent) to support an application for a third modification to PA 10_0191 (the Proposed Modification).

The Hera Mine (the Mine) is located approximately 100km southeast of Cobar in western New South Wales and approximately 4km south of the village of Nymagee (**Figure A**).

The application to modify PA 10_0191 is made under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in accordance with the transitional arrangements of the Act associated with the repeal of Part 3A.

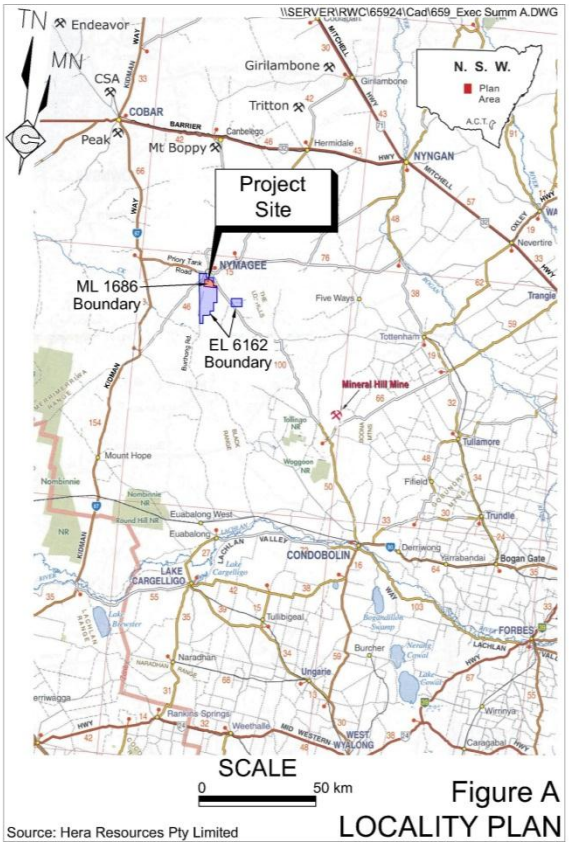

Figure A
LOCALITY PLAN

This summary introduces the Proponent, provides relevant background to the Proposed Modification and presents an overview of the design of the Proposed Modification's, operational safeguards and predicted Project-related impacts on the surrounding environment.

The Proponent

The Proponent, Hera Resources Pty Limited, is a wholly owned subsidiary of Aurelia Metals Limited (Aurelia). Aurelia is an Australian Securities Exchange listed exploration and mining company managed by a highly experienced board with a combined industry experience of more than 170 years.

In addition to operating the Hera Mine, Aurelia is also active in the exploration for copper, gold and tin on a number of tenements within NSW.

Aurelia was known as YTC Resources Limited until June 2014, when it changed its name to Aurelia Metals Limited.

Environmental Performance

The following presents an overview of the environmental performance of the Project from 16 May 2013 to 15 May 2015 (the Review Period). This information has been drawn from the relevant *Annual Environmental Management Report*s.

- Air Quality – Deposited dust is monitored at two locations. Between March 2013 and July 2013, four results at location DDG1 exceeded the relevant criterion of 4/m^2/month as a result of bird droppings entering the dust gauges. A bird deterrent was installed in July

2013 and no exceedances have since been recorded. PM_{10} is monitored by two High Volume Air Samplers (HVAS). During the Review Period, ten results exceeded the relevant 24-hour PM_{10} criterion of 50µg/m^3. The HVAS units were located immediately adjacent to a high traffic roadway and were moved away from dust generated by local vehicle movements and no exceedances have since been recorded.

- Surface Water – Surface water samples are collected on a monthly basis. The Proponent is reviewing the current trigger levels for surface water monitoring as it would appear that ambient water does not comply with the ANZECC-derived trigger values. During the Review Period there were two exceedances of the Weak Acid Dissociable (WAD) cyanide trigger values recorded that resulted in upgrades to the detoxification process that are currently in progress.
- Groundwater – Groundwater samples are collected on a quarterly basis. During the review period there were three exceedances of the relevant groundwater trigger values. These were, however, very similar to the pre-mining baseline groundwater elemental analyses. As per agreements made with the EPA and DPI Water prior to mining commencing, more realistic trigger values were established in consultation with those agencies and no exceedances have since been recorded.
- Contaminated Land Pollution and Hydrocarbon Contamination – During the Review Period eight spills were identified, seven of which involved minor spills of hydrocarbons, grey water or mine water. In each case the spill was rectified and cleaned up immediately. On 27 September 2014, a sump containing cyanide-bearing water was found to be leaking cyanide bearing water. The relevant authorities were notified, the processing plant was shut down for seven days while appropriate rectification was completed, including removal of all contaminated material, to the satisfaction of the regulatory authorities.
- Ecology – A survey of the Project Site and the biodiversity offset area (located within the "Chelsea" property) is undertaken annually. During the Review Period, the Hooded Robin and the Grey-Crowned Babbler (Eastern subspecies) were identified.
- Noise – Noise monitoring is conducted on a monthly basis. During the Review Period one noise exceedance was recorded at a neighbouring property, and a negotiated agreement with the landowner exempting the Proponent from the requirement to comply with noise criteria at that residence was signed.

Proposal Objectives

The Proponent's objectives in modifying PA 10_0191 are as follows.

- To ensure optimal efficiency of the Project and facilitate mining of recently identified mineral resources by increasing the annual rate of production and providing for a greater quantity of ore to be processed over an extended life of the Project.
- To ensure sufficient capacity to store and manage waste rock generated by an enlarged mining inventory at surface.
- To allow sufficient area to stockpile and blend ore material within the ROM Pad.

- To provide additional area for storage of mobile plant and other bulky items.

Overview of the Proposed Modification

The Proposed Modification would include the following components or activities, as shown in **Figure B**.

- An increase in the annual production of the Mine from 355 000t to 505 000t to enable improved mining and processing efficiency.
- An increase in the total amount of ore to be processed from 1.9Mt to 3.2Mt to account for additional ore that has been and is likely to be identified in the vicinity of the current Mine workings.
- An increase of the life of the Mine from 31 December 2020 to 31 December 2022 to account for the additional ore to be mined and processed.
- Expansion of the approved Run-of-Mine (ROM) Pad.
- Construction of an additional non-acid forming waste rock emplacement to the north of the current waste rock emplacement.
- Inclusion of an additional hardstand area for a laydown yard.
- An extension of the existing carpark.
- An update of the existing approval to reflect the as-constructed layout of the Mine.

Consultation

Consultation with the local community involved the following.

- Continued quarterly meetings of the Community Consultative Committee to discuss environmental and operational progress of the Mine with the surrounding community.
- Distribution of the "Hera News" community newsletter to the community of Nymagee and surrounds to provide operational and environmental updates.
- An informal meeting held between the Proponent and the landholder of the land to the north of the Project Site in relation to the Proposed Modification and other activities.

The Proponent and its consultants also regularly consulted with various government agencies and authorities throughout the planning phase of the Proposed Modification.

Environmental Safeguards and Impacts

The following presents an overview of the range of additional residual impacts on the biophysical environment should the Proposed Modification proceed.

- Ecology – an assessment of the proposed areas of disturbance, as well as the approved Biodiversity Offset Area was undertaken following *Framework for Biodiversity Assessment 2014*. That assessment determined that there would be no significant impacts on threatened species, populations or endangered ecological communities. In addition, the assessment determined that with the addition of a further 18ha to the current Biodiversity Offset Strategy, a Tier 1 Biodiversity Offset Outcome may be achieved.
- Groundwater – an assessment of the surrounding aquifer was undertaken based on groundwater extraction and monitoring results since the commencement of mining. That assessment concluded that extraction of

up to 365ML/y of groundwater would be sustainable, provided that additional infrastructure is installed. In addition, the additional extraction would be unlikely to result in groundwater drawdown in excess of the *Water Management Plan*-identified trigger level of 75mbgl. Finally, the Proponent has established that there is sufficient depth in the water trading market to enable it to purchase the required additional water allocation.

- Surface Water – The Proposed Modification would result in the construction or relocation of diversion drains and sediment basins, leading to changes to the Project Site drainage. Given that appropriate sediment and erosion controls would be installed, the Proposed Modification would not result in adverse impacts on the surface water environment within or surrounding the Project Site.
- Noise and Blasting – Revised noise modelling identifies that noise levels as a result of the Proposed Modification would remain below the relevant noise criteria at all times. However, minor increases in noise levels up to 1dB(A) anticipated at one residence during operations under neutral conditions, and an increase of up to 1dB(A) is anticipated at one residence during operations under temperature inversion conditions. A minor increase in sleep disturbance levels of between 1dB(A) and 2dB(A) is anticipated.
- Air Quality and Greenhouse Gas – Monitoring has indicated that 24-hour average PM_{10} concentrations and monthly deposited dust levels are significantly less than the relevant criteria. Given that the Proposed Modification would result, minor changes to the approved disturbance area and activities, the Proposed Modification is not anticipated to result in significant air quality-related impacts.
- Soil and Land Capability – The Proposed Modification would result in the stripping of approximately 21 600m^3 of soil. Given that appropriate soil management and mitigation practices would be followed, it is considered that impacts to soil and land capability would be acceptable.
- Waste Management – The Proposed Modification would result in better separation of potentially acid forming and non-acid forming waste rock, resulting in improved waste management.

The residual impacts associated with Aboriginal and historic heritage, traffic and transportation, visual amenity and bushfire hazards would be negligible.

Project Evaluation and Justification

The Proposed Modification has been evaluated and justified principally through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

Through an assessment of key environmental issues, as well as the consideration of the principles of ecologically sustainable development, the evaluation has found that, with the implementation of the proposed operational controls, safeguards and/or mitigation measures, the residual risk posed by each possible environmental incident or impact has either been reduced from its original level or deemed an acceptable risk

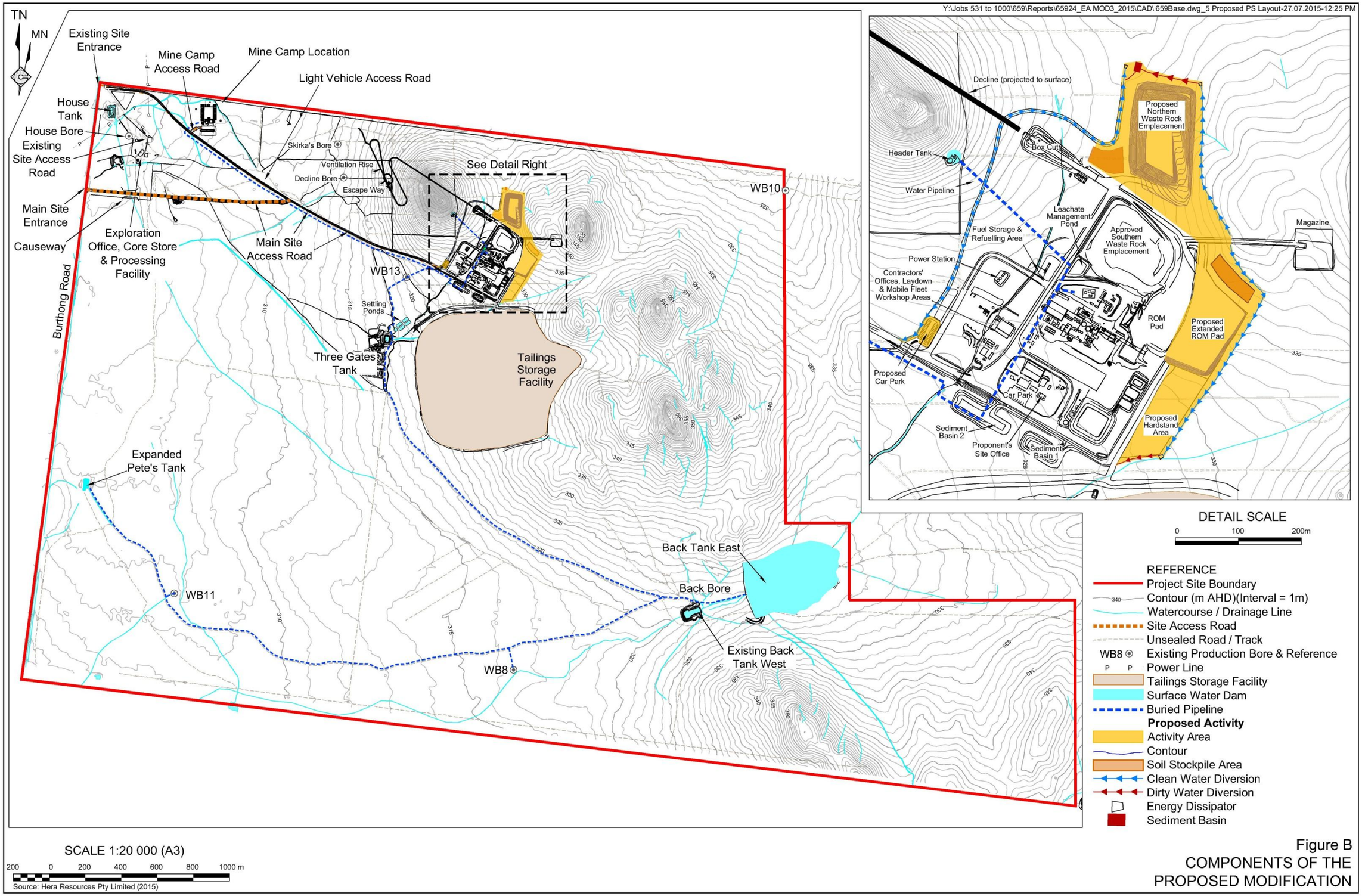

Figure B
COMPONENTS OF THE PROPOSED MODIFICATION

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Further, the design of the Proposed Modification has addressed each of the sustainable development principles, and on balance, it is concluded that the Proposed Modification achieves a sustainable outcome for the local and wider environment.

Conclusion

The Proposed Modification has been, to the extent feasible, designed to address all issues raised by the local community and all levels of government, as well as the principles of ecologically sustainable development. The Proposed Modification provides for the ongoing development of the Mine, resulting in the production, sale and despatch of gold doré and lead and zinc concentrate which would be significant in generating further employment opportunities and maintaining stimulus to the local economies of Nymagee and the Cobar LGA.

In light of the conclusions included throughout this *Environmental Assessment*, it is assessed that the Proposed Modification could be constructed and operated in a manner that would satisfy all relevant statutory goals and criteria, environmental objectives and reasonable community expectations.

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1. INTRODUCTION

1.1 SCOPE

This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited (RWC) to support an application for a third modification to PA 10_0191 (the Proposed Modification) by Hera Resources Pty Limited (the Proponent). The Proposed Modification would increase the rate of production and extend the life of the Hera Mine (the Mine) and would modify the approved infrastructure to increase the efficiency and waste storage capacity of the Mine.

The application to modify PA 10_0191 is under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act), in accordance with the transitional arrangements of that Act associated with the repeal of Part 3A.

Figure 1 presents the location of the Mine, located approximately 100km southeast of Cobar in western New South Wales and approximately 4km south of the village of Nymagee. The Mine is located within Mining Lease (ML) 1686 (**Figure 2**).

The Proposed Modification seeks to modify the following component activities and operations at the Mine.

- Increase the maximum annual production of the Mine from 355 000t to 505 000t to enable improved mining and processing efficiency.
- Increase the amount of ore to be processed from 1.9Mt to 3.2Mt to account for additional ore that has been identified in the vicinity of the current Mine workings.
- Increase the life of the Mine from 31 December 2020 to 31 December 2022 to account for the additional ore to be mined and processed.
- Extend the approved Run-of-Mine (ROM) Pad.
- Inclusion of an additional non-acid forming waste rock emplacement to the north of the current waste rock emplacement.
- Inclusion of an additional hardstand area for a laydown yard.
- Extend the existing carpark.
- Update the existing approval to reflect the as-constructed layout of the Mine.

The information contained within this *Environmental Assessment* relates specifically to those aspects of the Mine to be modified. Aspects of the Mine that would not be modified would continue to be undertaken in accordance with the terms of approval nominated by Condition 2 of Schedule 2 of PA 10_0191, i.e. in accordance with:

- the *Environmental Assessment* prepared by RWC for the Hera Project (RWC, 2011a);
- the *Statement of Commitments* presented in Appendix 5 of PA 10_0191;

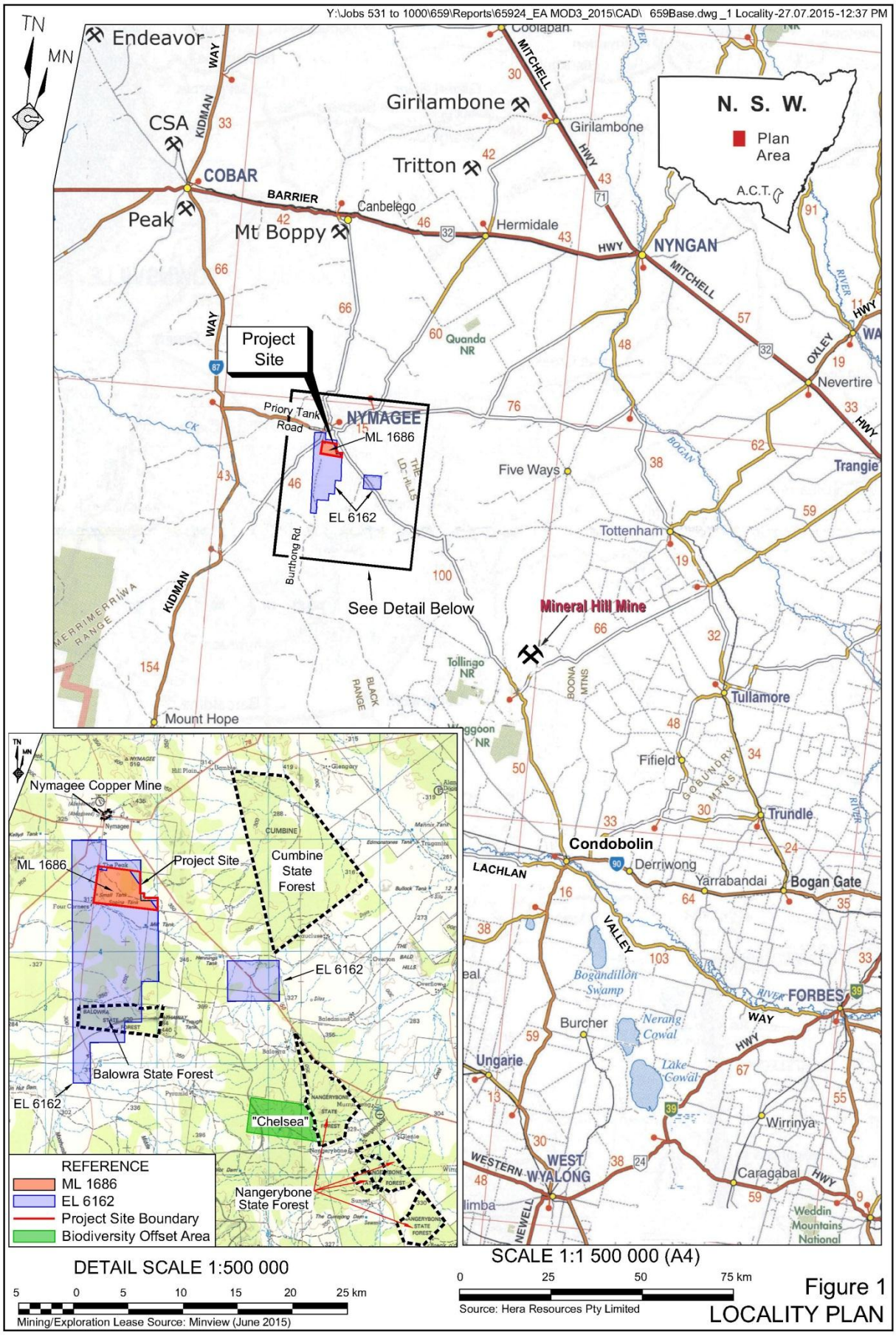
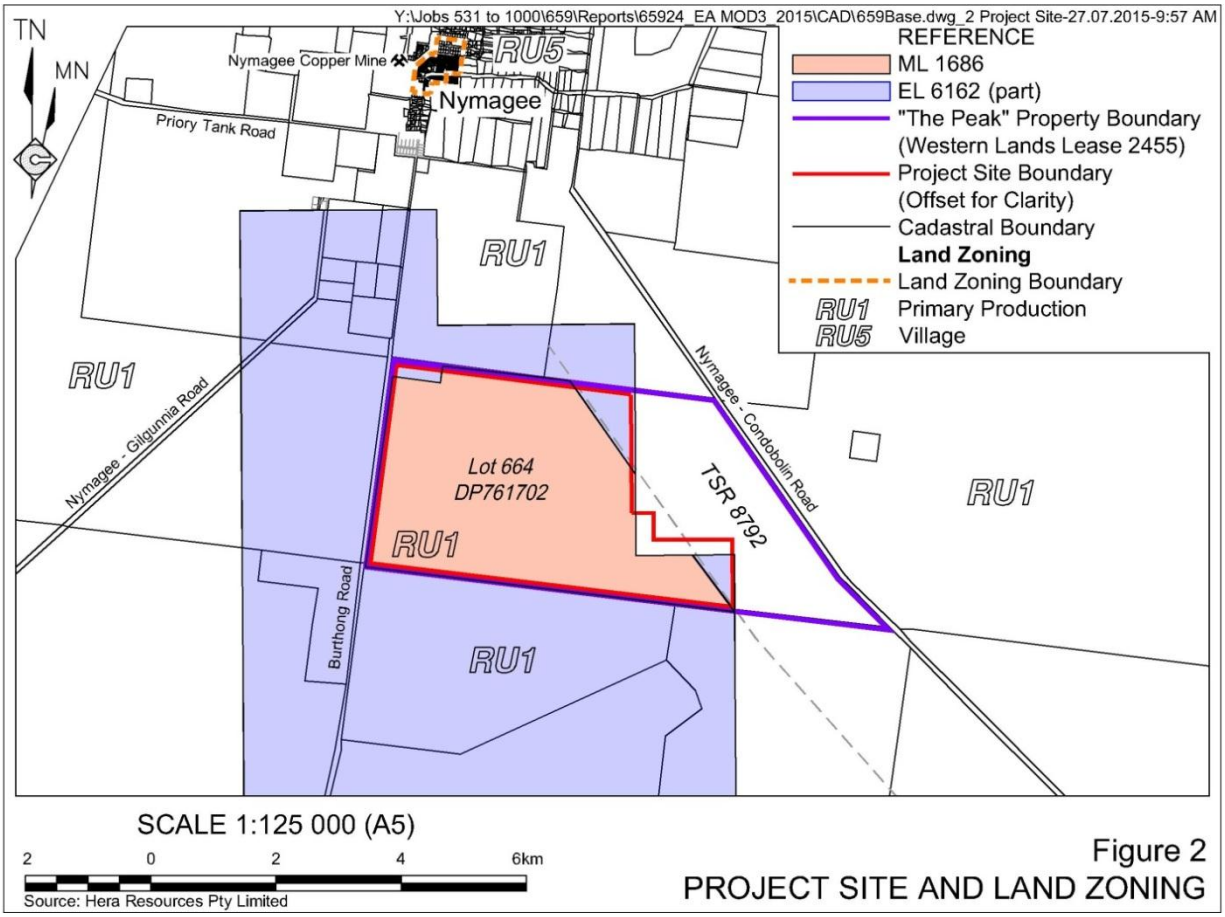


Figure 1
LOCALITY PLAN



- the Conditions of PA 10_0191; and
- Modification 1 and Modification 2, including supporting documentation identified in PA 10_0191.

1.2 THE PROPONENT

The Proponent, Hera Resources Pty Limited is a wholly owned subsidiary of Aurelia Metals Limited (Aurelia). Aurelia is an Australian Securities Exchange listed exploration and mining company based in Orange, NSW. The company is managed by a highly experienced board with a combined industry experience of more than 170 years. The Board is supported by a small, technically-focused management team based in Orange and on-site. In addition to operating the Hera Mine, Aurelia is also active in the exploration for copper, gold and tin on a number of tenements within NSW.

Aurelia was previously known as YTC Resources Limited until June 2014, when it changed its name to Aurelia Metals Limited.

1.3 THE PROJECT SITE

For the purposes of this document, the application area for the Proposed Modification remains unchanged and is referred to as the 'Project Site' (**Figure 2**). The Project Site is located wholly within "The Peak" property (Lot 664, DP761702). That property is held by the Proponent under Western Lands Lease No. WLL2455, granted under the *Western Lands Act 1901* and managed by the Crown Lands Division of the NSW Department of Primary Industries.

The eastern section of WLL2455 is the subject of Travelling Stock Reserve TSR8792.

The Project Site is classified Zone RU1 – Primary Production under the *Cobar Local Environment Plan (LEP) 2012* (**Figure 2**). Mining is permissible with consent within that zone.

1.4 BACKGROUND TO THE PROPOSED MODIFICATION

1.4.1 Introduction

The following sub-sections provide background information to the Proposed Modification in relation to the existing mineral authorities, revised resources and reserve calculations and the approved activities occurring at the Mine that are proposed to be modified.

1.4.2 Existing Approvals, Licences and Tenements

Table 1 identifies the approvals, licences and authorities currently in place for the Hera Mine, the issuing/responsible authority, date of issue and duration.

Table 1
Existing Approvals, Licences and Authorities

Issuing Authority	Type	Date of Issue	Expiry	Comments
Department of Planning & Environment	Major Project Application (PA) 10_0191	31 July 2012		
Department of Trade & Investment, Regional Infrastructure & Services - Division of Resources & Energy	Mining Lease (ML) 1686	16 May 2013	16 May 2034	For copper, gold, lead, silver and zinc.
	Exploration Licence (EL) 6162	26 November 2003	25 November 2018	Group 1 Minerals. Renewed 3 April 2014.
Environment Protection Authority	Environment Protection Licence No. 20179	18 March 2013	Anniversary date: 18 March Review Date: 18 March 2018	
Department of Primary Industries – NSW Office of Water	Water Access Licence (WAL) 28773	1 August 2012	-	Permits extraction of up to 240ML per year.
	WAL 30298	16 September 2013	-	Permits extraction of up to 3 ML per year.

1.4.3 Identified Resources and Reserves

A Joint Ore Reserves Committee (JORC) compliant mineral resource estimate was completed by the Proponent in June 2010 and updated in July 2011 (**Table 2**).

The Proponent has since conducted further exploration and identified additional resources. An updated JORC-compliant mineral resource estimate was completed by the Proponent in July 2015 and is presented in **Table 2.**

Table 2
Mineral Resource Estimates for the Hera Deposit

Category	Tonnes	Au g/t	Ag g/t	Pb %	Zn %	Cu %
July 2011 Resource Statement						
Indicated	2 113 000	4.2	17.0	2.8	3.9	0.2
Inferred	330 000	3.5	14	2.3	3.3	0.1
TOTAL	**2 444 000**	**4.1**	**16.4**	**2.8**	**3.8**	**0.2**
July 2015 Resource Statement						
Measured	658 000	5.14	15.59	2.96	3.40	0.24
Indicated	958 000	3.37	17.97	3.02	4.51	0.15
Inferred	890 000	2.37	73.91	4.85	6.02	0.10
TOTAL	2 506 000	3.48	37.21	3.65	4.76	0.15
Source: Hera Resources Pty Limited						

1.5 APPROVED ACTIVITIES

The approved Mine is fully described in RWC (2011) and YTC (2013 and 2014). In summary, the approved activities include the following (**Figure 3**).

- Extraction of waste rock and metalliferous ore using underground open stope mining methods and underground load and haul operations.
- Backfilling of underground stope voids created during underground mining using potential acid-forming waste rock to minimise sulphide oxidation.
- Use of surface infrastructure required for the underground mine, including a box cut, portal and decline, magazines, fuel store, ventilation rises and power and water store.
- Use of a processing plant, including a run-of-mine (ROM) pad, waste rock emplacement, crushing, grinding and screening operations, gravity separation and flotation circuits to process up to 355 000 tonnes per annum (tpa) of ore to produce gold and silver doré (unrefined bars) and a zinc/lead concentrate.
- Use of a tailings storage facility, including cyanide detoxification of tailings prior to discharge to the Tailings Storage Facility.
- Use of facilities, including the following:
  - the Proponent's Site Office and car park;

  - a Contractors Office, Laydown area and workshop;
  - a Reagent Store, plant workshop, ablutions facilities, crib room, hardstand and laydown areas;
  - a concentrate storage shed; and
  - an explosives magazine.
- Use of a water management system, including two sediment basins, two tanks, a water catchment dam and an associated water diversion system to enable the harvesting and supply of water for environmental flows.
- Use of a Light Vehicle Access Road and a Main Site Access Road and intersection to allow site access from Burthong Road.
- Transportation of up to 50 000tpa of zinc/lead concentrate from the Mine to Hermidale via public roads, including Hermidale Road.

In addition, development consent 2012/LD-00004 for the construction and use of a mine camp, including accommodation facilities, ablution facilities, a water treatment facility, communal facilities and a communal car park was granted by Cobar Shire Council on 14 March 2012.

1.6 ENVIRONMENTAL PERFORMANCE

1.6.1 Introduction

This subsection provides an overview of the environmental performance of the Hera Mine from 16 May 2013 to 15 May 2015 (the Review Period).

Information presented in this subsection has been drawn from the following Annual Environmental Management Reports.

- Hera Mine Annual Environmental Management Mining Lease 1686 for the Period 16 May 2013 to 31 December 2013 (YTC, 2013b).
- Hera Mine Annual Environmental Management Mining Lease 1686 for the Period 1 January 2014 to 15 May 2014 (Aurelia Metals, 2014).
- Hera Mine Annual Environmental Management Mining Lease 1686 for the Period 16 May 2014 to 15 May 2015 (Aurelia Metals, 2015).

1.6.2 Reportable Incidents

1.6.2.1 Introduction

During the review period, five reportable incidents occurred at the Hera Mine, namely one discharge of contaminated water and four elevated Weak Acid Dissociable (WAD) cyanide results. The following subsections provide an overview of these reportable incidents.

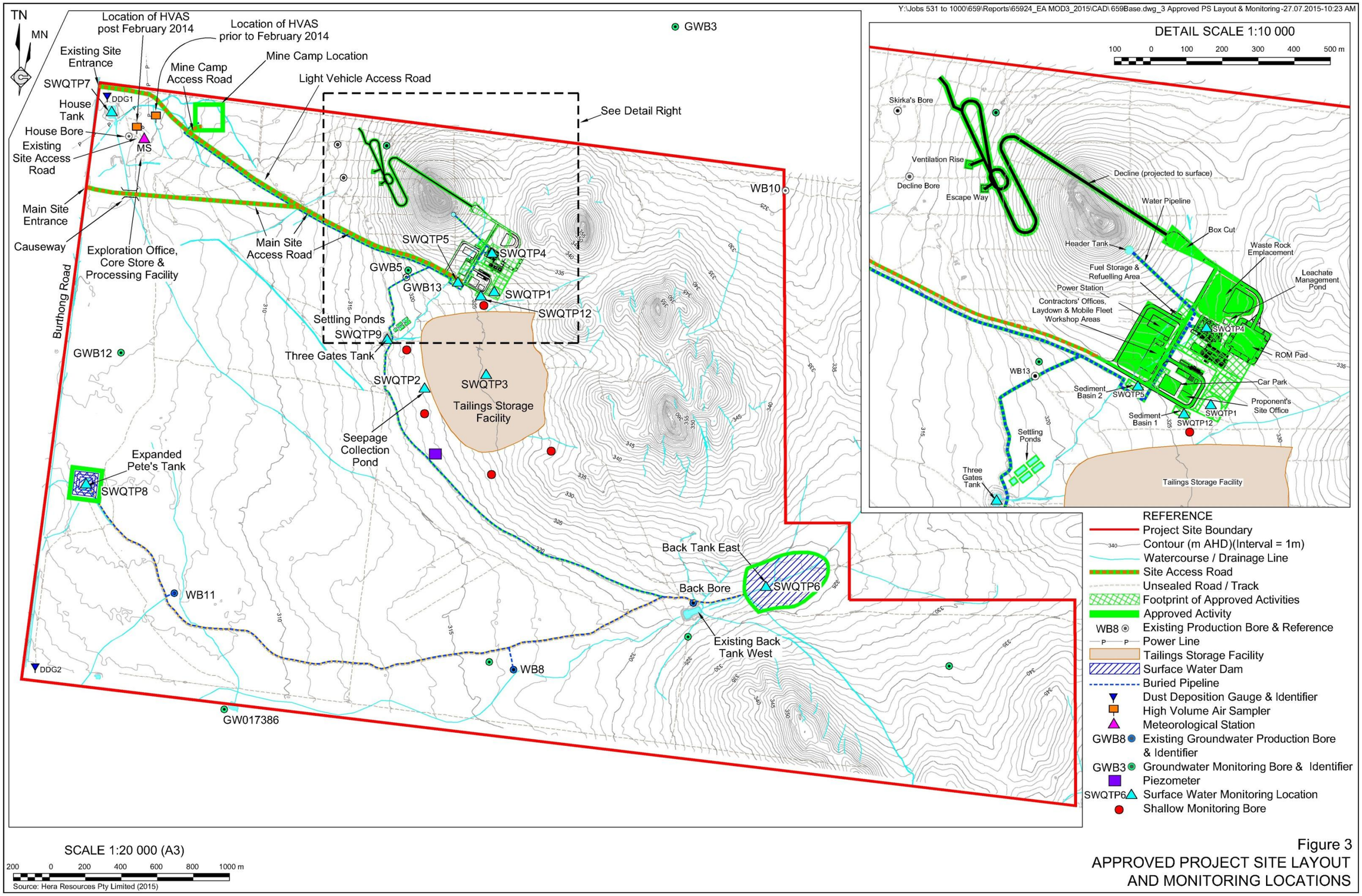


Figure 3
APPROVED PROJECT SITE LAYOUT AND MONITORING LOCATIONS

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1.6.2.2 Discharge of Contaminated Water

In September 2013, a sump was found to be leaking cyanide bearing water. The EPA, DRE, DPE and the Mines Inspector were notified once the incident was identified. Following the incident, the processing plant was shut down for seven days to allow for investigations, containment, rectification and remediation works. The sump was relined with concrete, and all cracks and leaks were repaired. The sump is now regularly inspected.

1.6.2.3 Elevated WAD Cyanide Concentration

Four elevated Weak Acid Dissociable (WAD) cyanide results were recorded within the process water plant on 4 and 6 April 2015 and 21 and 22 June 2015. These exceedances were reported to the EPA. The elevated WAD cyanide concentrations were determined to be a result of a failure of the cyanide detoxification process. As a result of these exceedances, upgrades to the detoxification process are currently in progress to ensure that discharge to the process water dam cannot occur unless the decontamination circuit is active.

1.6.3 Air Pollution

Deposited dust is currently monitored at two locations at the Mine (**Figure 3**), with samples collected and analysed every 30 days. During the Review Period, four results at location DDG1 exceeded the 4/m^2/month criterion. On analysis it was determined that each was the result of bird activity. A bird deterrent was installed in July 2013 and no exceedances have been recorded at this site since

Two High Volume Air Samplers (HVAS) were installed in the vicinity of the former homestead in July 2013. The units were in close proximity to an unsealed vehicular access and parking area and were subsequently moved to a more suitable location of 24 February 2014. Ten exceedances of the 24-hour PM_{10} criterion of 50µg/m^3 were recorded during the review period. **Table 3** presents an overview of each exceedance. In summary, each of the exceedances was recorded prior to moving the HVAS units and while in each case the wind was blowing from a direction other than the east-southeast (where the Mine's surface facilities are located). As a result, it was determined that the units were receiving dust generated by local vehicle movements. Moving the HVAs units reduced that contribution and eliminated the regular exceedances' that were being experienced prior to February 2014.

No dust-related complaints were received during the Review Period.

1.6.4 Erosion and Sediment Control

Erosion and sediment control activities are undertaken in accordance with the commitments made in the *Hera Mine Water Management Plan* and *Mining Operations Plan* (MOP). There have been no erosion and sediment incidents during the Review Period.

Table 3
Overview of PM_{10} Exceedances

Date	Average 24-hour PM_{10} Concentration ($\mu g/m^3$)	Dust Source Project Related?	Explanation
24/9/2013	59	No	Dust storm affected the Project Site and surrounds.
24/10/2013	80	No	Wind from south-southwest, dust from offsite.
5/11/2013	55	No	Wind from north-northeast, dust from offsite.
23/11/2013	85	No	Wind from south-southwest, dust from offsite.
10/1/2014	93	No	Wind not blowing from surface facilities area, dust from offsite.
22/1/2014	62	No	
3/2/2014	58	No	
9/2/2014	139	No	
15/2/2014	54	No	
21/2/2014	56	No	
HVAS relocated on 24 February 2014			
Nil exceedances			
Source: Hera Resources Pty Limited			

1.6.5 Surface Water Management

Water management is undertaken in accordance with the *Hera Water Management Plan*, which complied with triggers based on the *ANZECC (2000) Guidelines – Freshwater Aquatic System*. The surface water quality monitoring results and exceedances are presented in YTC (2013b), Aurelia Metals (2014) and Aurelia Metals (2015).

During the Review Period there were two elevated Weak Acid Dissociable (WAD) cyanide results recorded on 4 and 6 April 2015 and 21 and 22 June 2015 within the process water plant as a result of a failure of the cyanide detoxification process. These are discussed in more detail in Section 1.6.2.3. As a result of the April exceedances, upgrades to the detoxification process are currently in progress.

Surface water samples are collected at a range of locations within the Project Site on monthly basis and on rare occasions when sufficient rain results in surface flows in creeks. The Proponent is currently reviewing the trigger levels included in the *Water Management Plan* as it would appear that ambient water does not comply with the ANZECC-derived trigger values.

1.6.6 Groundwater

Ground water samples are collected on a quarterly basis from a range of locations within the Project Site (**Figure 3**). During the Review Period there were three exceedances of the initial trigger values based on drinking water guidelines and identified in the *Water Management Plan*. In light of the fact that the ambient groundwater quality exceeded the identified trigger values, the Proponent, in consultation with the EPA and DPI Water, proposed more suitable trigger values based on the prevailing ambient groundwater quality. There have been no exceedances of the proposed trigger values since that date.

Standing water levels in eleven bores within and surrounding the Project Site are monitored monthly, with standing water levels typically between 50m and 70below ground level (mbgl). See also Section 4.3 for further discussion of groundwater monitoring results.

Finally, as indicated in Section 1.4.2, the Proponent has water licences that permit extraction of up to 243ML of groundwater per financial year. The Proponent has extracted 191ML in the 2014/2015 financial year, the year with the greatest rate of groundwater extraction to date.

1.6.7 Contaminated Land Pollution and Hydrocarbon Contamination

During the Review Period eight spills were identified, seven of which involved minor spills of hydrocarbons, grey water or mine water. In each case the spill was rectified and cleaned up immediately.

On 27 September 2014, a sump containing cyanide-bearing water was found to be leaking. This incident is described in more detail in Section 1.6.2.2.

1.6.8 Threatened Flora and Fauna

An annual ecology survey of the Project Site and the biodiversity offset area (located within the "Chelsea" property) is undertaken in spring / summer each year. During the Review Period, two threatened species were identified by these surveys as follows. Both of these species were identified during the ecological surveys undertaken for the application for Project Approval.

- Hooded Robin.
- Grey-crowned Babbler (eastern – subspecies).

1.6.9 Weeds

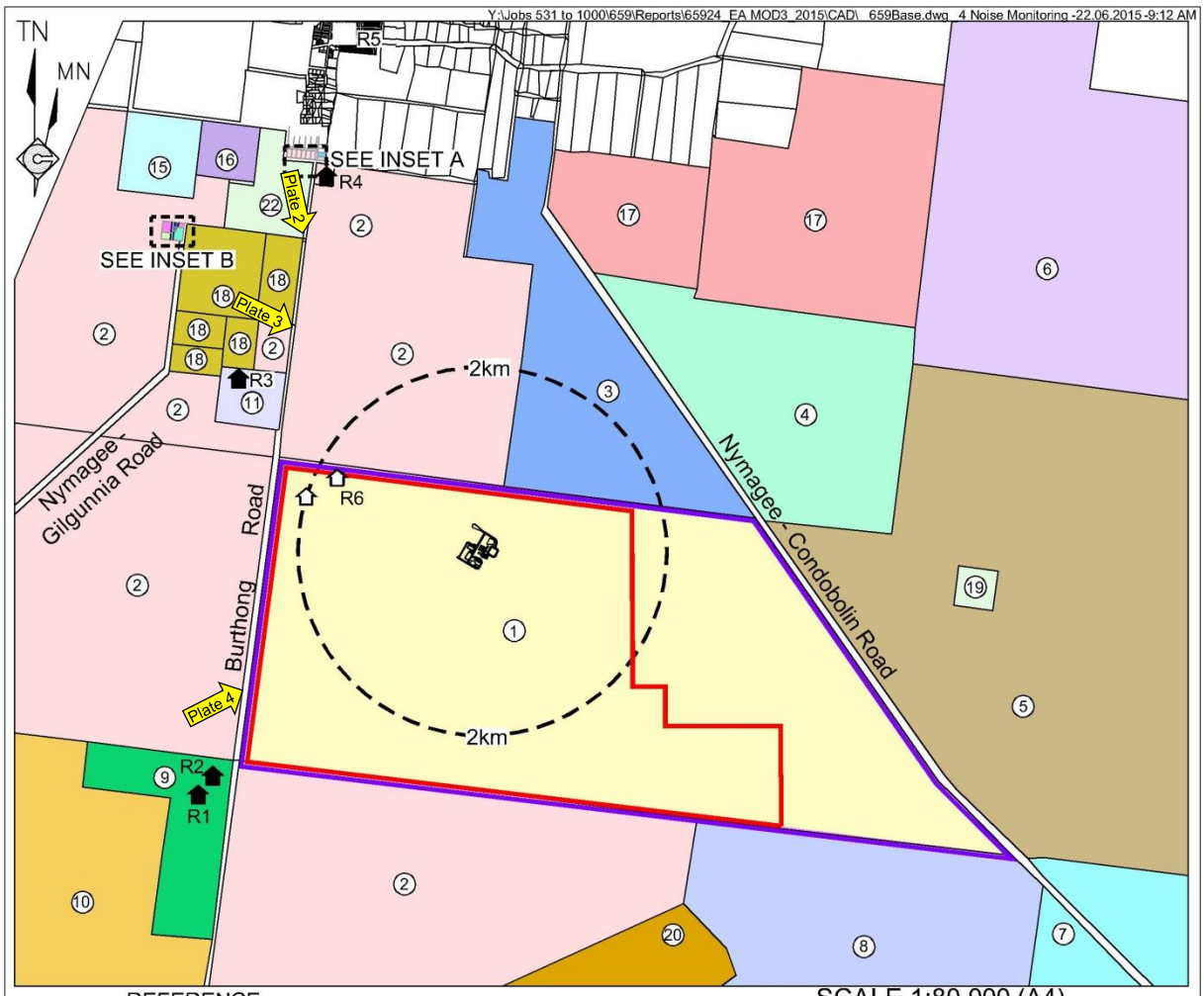
In accordance with the *Biodiversity Management Plan*, noxious weeds are sprayed during September and November. No noxious weeds other than those reported in the *Biodiversity Management Plan*, namely thistle, Bathurst Burr and Galvanised Burr, were observed during the Review Period.

1.6.10 Blasting

Blast activities at the Mine are managed in accordance with the *Blast Management Plan*. During the Review Period no exceedances of the blast criteria were recorded.

1.6.11 Operational Noise

Noise monitoring is conducted at the Mine and at the three closest residential properties (**Figure 4**) on a monthly basis.



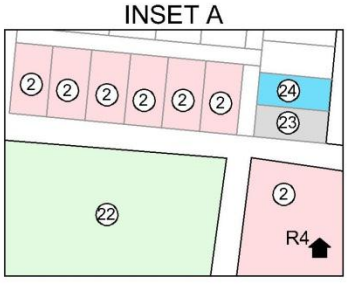
REFERENCE

- "The Peak" Property Boundary
- Project Site Boundary
- Cadastral Boundary
- (1) Landowner Reference
- Residence (Project-related)
- Residence (Non Project-related)

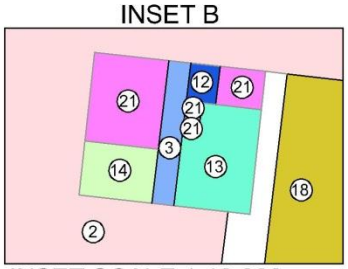
SCALE 1:80 000 (A4)

1 0 1 2 3 4km

INSET A



INSET B



INSET SCALE 1:10 000

100 0 100 200m

Ref.	Landowner
1	Perpetual Lease (YTC Resources Limited)
2	Perpetual Lease (JB Dunne)
3	State of NSW
4	Perpetual Lease (CW Dillon)
5	Perpetual Lease (CA & EA Halloran)
6	Perpetual Lease (JB Cutting)
7	Perpetual Lease (PG & MN Harley)
8	Perpetual Lease (Harley Balowra Pty Limited)
9	Perpetual Lease (EJ Harland)
10	Perpetual Lease (KJ Burcher)
11	BWT & GH Hay
12	G Hurst, G Woolnough, W Clarke, W Kelynack & G Lane
13	F Jolly, HWG Innes, TJ Glynn, JC Daw, H Harris
14	Trustees of Roman Catholic Church for Diocese of Wilcania-Forbes
15	Timbarra Estates Pty Limited
16	Preliminary Syndicate Limited
17	Perpetual Lease (WB Kilkeary)
18	JB Dunne
19	JB Cutting
20	Reference Not Held
21	Crown Land
22	Reference Not Held
23	Reference Not Held
24	Reference Not Held

Note: Residence R5 has been selected, for the purposes of the Air Quality Assessment, to be representative of the village of Nymagee

Landowner Source: Department of Lands Title Search July 2010

Figure 4
NOISE MONITORING LOCATIONS

During the Review Period one noise exceedance was recorded at a neighbouring property, namely Residence R3, in December 2013. An agreement was reached with the owner of that property and a noise agreement stating that the property would be exempt from the noise limits set in PA 10_0191 was signed.

1.6.12 Aboriginal and Historic Heritage

No Aboriginal or historic heritage items have been identified within the Project Site. Aboriginal heritage at the Mine continues to be managed in accordance with the *Aboriginal Cultural Heritage Management Plan.*

1.6.13 Bushfire

No bushfires occurred at the Mine during the Review Period.

1.6.14 Mine Subsidence

No mine subsidence occurred at the Mine during the Review Period.

1.6.15 Community Relations

Section 3.2.1 describes consultation undertaken with the community in relation to MOD3.

One complaint was received on 23 April 2013 in relation to drilling noise. The Proponent relocated the drill rig and installed additional noise barriers in response to the complaint.

A second complaint was received on 20 March 2015. Details in relation to the complaint remain confidential, however, the complaint has been provided with the requested information and the Proponent continues to liaise with the complainant and the EPA.

Two earlier complaints were received in 2012 in relation to blasting of the box cut and transportation operations. Both were resolved at the time and no further complaints in relation to those issues have been received.

1.7 FORMAT OF THE REPORT

This *Environmental Assessment* has been structured to address the general requirements and key issues nominated by the Secretary's Environmental Assessment Requirements (SEARs) and includes the following sections.

This *Environmental Assessment – Modification 3* has been compiled in a single volume with five sections of text as follows.

Section 1: Introduces the Proposed Modification, the Proponent, the Project Site and provides relevant background information.

Section 2: Describes the Proponent's objectives and the Proposed Modification in sufficient detail to enable the application for modification to be fully understood.

Section 3: Provides a description of the process used to identify and prioritise the key issues for assessment, including stakeholder consultation and a review of relevant planning instruments.

Section 4: Describes the anticipated impacts associated with the Proposed Modification.

Section 5: Evaluates the Proposed Modification in terms of biophysical, economic and social consideration, and the goals and guidelines of Ecologically Sustainable Development and provides a conclusion to the document.

References: Lists the various source documents referred to for information and data used during the preparation of the *Environmental Assessment*.

Appendices: Present the following additional information.

- Appendix 1 – SEARs and Requirements of Consulted Government Agencies.
- Appendix 2 – Framework for Biodiversity Assessment:
- Biodiversity Report (OzArk, 2015).
- Appendix 3 – Supplementary Assessment of Groundwater Availability (Aquade, 2015).
- Appendix 4 – Erosion and Sediment Control Plans (SEEC, 2015).
- Appendix 5 – Noise and Vibration Assessment (Spectrum, 2015).

1.8 MANAGEMENT OF INVESTIGATION

This document has been prepared by Mr Mitchell Bland (BSc (Hons), MEcon Geol, LLB (Hons)), Principal Environmental Consultant with R.W. Corkery & Co Pty. Limited with the assistance of Ms Lauren Clear (B.SC., MEnv), Environmental Consultant with the same company.

Professional representatives of the Proponent assisted with the preparation of this document including, but not limited to:

- Mr Dean Fredericksen (MSc(Hons)), consultant and former Chief Operations Officer; and
- Mr Jonathon Thompson (BSc(Hons)), Environmental Officer.

In addition, specialist advice in relation to the Proposed Modification has been provided by:

- Mr Neil Pennington (BSc, B.Math (Hons)), Spectrum Acoustics (noise and vibration).
- Mr Mark Passfield (BSc (Hons), CPESC), SEEC (surface water).
- Mr Phil Cameron (BSc, Ass Dip App Sci.), OzArk Environment and Heritage Management (ecology).

2. DESCRIPTION OF THE PROPOSED MODIFICATION

2.1 INTRODUCTION

2.1.1 Objectives of the Modification

The Proponent's objectives in developing the Project are identified in Section 2.1.1 of RWC (2011). The Applicant objectives in modifying PA 10_0191 are to:

- ensure optimal efficiency of the Project and facilitate mining of recently identified mineral resources by increasing the annual rate of production and providing for a greater quantity of ore to be processed over an extended life of the Project;
- ensure sufficient capacity to store and manage waste rock generated by an enlarged mining inventory at surface;
- allow sufficient area to stockpile and blend ore material within the ROM Pad; and
- provide additional area for storage of mobile plant and other bulky items.

2.1.2 Overview of the Proposed Modification

The Proposed Modification includes the following activities (**Figure 5**).

- Increase in the annual production of the Mine from 355 000t to 505 000t to account for improved mining and processing efficiency.
- Increase of the amount of ore to be processed from 1.9Mt to 3.2Mt to account for additional ore that has been identified in the vicinity of the current Mine workings.
- Increase of the life of the Mine from 31 December 2020 to 31 December 2022 to account for the additional ore to be mined and processed.
- Expand the approved Run-of-Mine (ROM) Pad.
- Construct an additional non-acid forming waste rock emplacement to the north of the current waste rock emplacement.
- Inclusion of an additional hardstand area for a laydown yard.
- An extension of the existing carpark.
- An update of the existing approval to reflect the as-constructed layout of the Mine.

2.2 PROPOSED INCREASED PRODUCTION, WATER REQUIREMENTS AND PROJECT LIFE

As mineral exploration and mining progresses, more detailed information regarding the geological setting and mineralisation is obtained. As a result, a more detailed estimate of the Hera resource and reserve has been made and the mining plan has been optimised.

Table 2 presents an overview of the resources and reserves estimates prepared for the Mine.

In summary, the Proponent has increased the identified resources and reserves from 2.4Mt identified in 2011 to approximately 2.5Mt in 2015. In addition, the Proponent anticipates that additional ore will be identified during the life of the Mine. As a result, the Proponent proposes to increase the maximum amount of ore to be extracted over the life of the Project from the approved 2.4Mt to a proposed 3.2Mt. This would allow for the extraction of the identified resource, as well as any additional resources that may be identified as the Mine is developed.

As a result of the identified increase in Mineral Resources and Ore Reserves and the need to create efficiencies in the operation of the processing plant, the Proponent proposes to increase the annual rate of production from the approved 355 000t to 505 000t.

The proposed increase in production would require additional water for processing-related operations. The Proponent estimates that at the time of finalisation of this document, that annual water consumption was 191ML during the 2014/2015 financial year. In order to facilitate the proposed increase in maximum annual production rate, the Proponent anticipates that between 270ML and 300ML of water would be required per year. This additional water would primarily be sourced from groundwater, with further analysis of the sustainability and licencing impacts of this increase presented in Section 4.3.4. Notwithstanding this, the Proponent notes that it is currently implementing the following water efficiency measures within the processing plant and that the anticipated additional water requirements may be an overestimate.

- Improved recycling of water from the underground mine to reduce the amount of new or makeup water required. This will principally be achieved through installation of equipment to reduce the suspended sediment concentration of that water.
- Infrastructure to allow surface water to be incorporated into the processing water circuit rather than permitting that water to evaporate.
- Increased tailings density on discharge to the Tailings Storage Facility, thereby reducing the volume of water pumped to the facility.

The additional resources and expected discoveries to be made in the immediate vicinity of the existing and planned workings would also require a further 24 months to extract. As a result, the Proponent proposes to increase the currently approved life of the Project from 31 December 2020 to 31 December 2022.

The Tailings Storage Facility as designed and approved has sufficient additional capacity to contain the tailings generated and no modification of the approved facility is required.

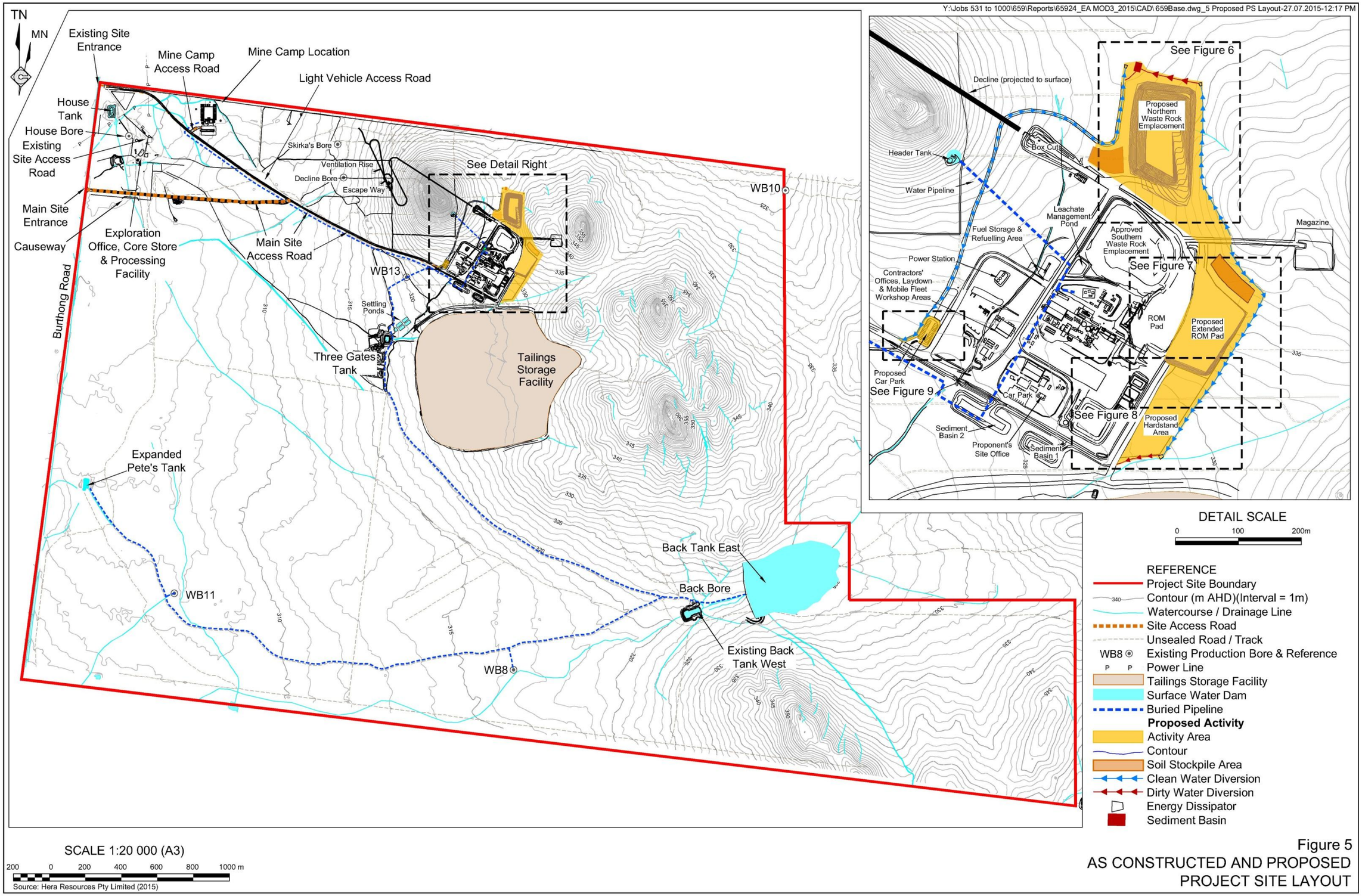


Figure 5
AS CONSTRUCTED AND PROPOSED PROJECT SITE LAYOUT

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2.3 PROPOSED NORTHERN WASTE ROCK EMPLACEMENT

2.3.1 Introduction

Section 2.7 of RWC (2011) identified that ore would be extracted using underground open stope mining methods and underground load and haul operations, with waste rock from the Mine being stored in a single waste rock emplacement (Southern Waste Rock Emplacement) (**Figure 5)**.

The Mine currently generates two classes of waste rock, namely potentially acid forming waste rock and non-acid forming waste rock. The Southern Waste Rock Emplacement currently stores both acid forming and non-acid forming waste rock.

The proposed Northern Waste Rock Emplacement would store only non-acid forming waste rock, while the approved Southern Waste Rock Emplacement would store only potentially acid forming waste rock. This would permit more efficient management of each class of waste rock and would increase storage capacity for the mining operations.

This subsection provides an overview of the waste rock balance and a justification for the need for a second waste rock emplacement, as well as the proposed design characteristics and procedures to be implemented during site preparation and operation of the emplacement.

2.3.2 Waste Rock Balance and Need for the Emplacement

The expansion of the Mineral Resource and Ore Reserve will require additional underground development resulting in more waste rock generated than originally proposed. **Table 4** presents an overview of the original and revised waste rock budget. In summary, the revised mine plan would result in approximately 217 000 loose cubic metres (lcm) of additional waste rock being bought to the surface compared to the mine plan at the time of finalisation of RWC (2011).

Table 4
Revised Waste Rock Balance

Description	Estimated Volume[1] (lcm)[2]
a) Total waste rock to be bought to surface – original mine plan	288 500
b) Waste rock currently on surface (30 June 2015)	170 000
c) Remaining waste rock to be bought to surface – revised mine plan	245 000
d) Total waste rock to be bought to surface – revised mine plan (namely b + c)	415 000
e) Differential original vs revised mine plan (namely d - a)	127 000
Note 1: Estimated volume = volume to be bought to surface. Excludes waste rock directly placed into completed stopes, but includes potentially acid forming waste rock that would be bought to surface for storage prior to subsequent placement back underground	
Note 2: lcm = loose cubic metres	
Source: Hera Resources Pty Limited	

The Proponent notes that it anticipates that the approved Southern Waste Rock Emplacement and voids being created underground include sufficient remaining capacity to cater for the anticipated volume of potentially acid forming waste rock to be bought to surface. However, additional storage for approximately 127 000lcm of non-acid forming waste rock will be required. Approximately 35 000lcm of that material would be required to construct the ROM Pad, with the remaining material to be placed into the Northern Waste Rock Emplacement. In addition, the Proponent anticipates that more waste rock will be generated than current mine plans indicate as more ore is identified or more underground development occurs than is currently envisaged.

Finally, the Proponent notes that its original commitment that all potentially acid forming waste rock, with the exception of that used for surface infrastructure or rehabilitation, would be returned to the underground workings remains in place.

2.3.3 Design Characteristics

Figure 6 presents the layout of the proposed Northern Waste Rock Emplacement. In summary, the proposed Northern Waste Rock Emplacement would have the following design characteristics.

- Maximum elevation ..... approximately 350m AHD.
- Footprint..... approximately 3.5ha.
- Capacity ..... approximately 350 000t or 175 000lcm.
- Number of benches ..... one.
- Bench height .....up to 12m.

The Proponent notes that the proposed Northern Waste Rock Emplacement would have additional capacity to cater for additional waste rock that may be identified throughout the life of the Mine. Alternatively, in the event that the anticipated ratio of non-acid forming to potentially acid forming waste rock is greater than anticipated, then storage for the additional non-acid forming waste rock would be available.

2.3.4 Site Preparation

Site preparation activities would be as described in Section 2.3 of RWC (2011). In summary, the limit of proposed disturbance would initially be marked on the ground to ensure that the ground disturbing activities are restricted to the nominated area. This would be followed by installation of the relevant surface water controls, including the following (see Section 4.4).

- Clean water diversions upslope of the proposed emplacement.
- Dirty water diversions down slope of the proposed emplacement.

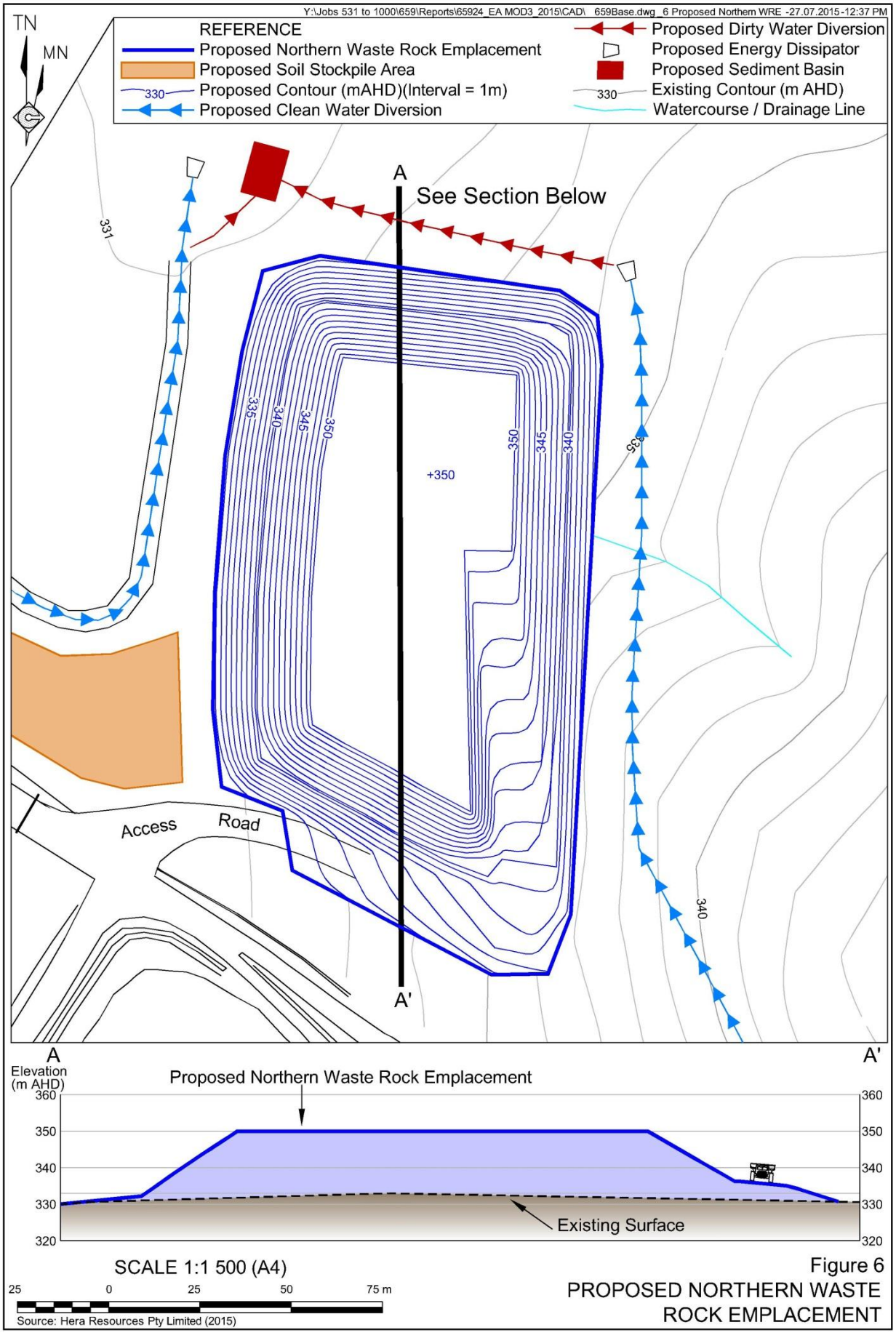


Figure 6
PROPOSED NORTHERN WASTE ROCK EMPLACEMENT

- A sediment basin to collect and temporarily store potentially sediment-laden water to permit settling of the suspended sediment prior to discharge. The sediment basin would include a stabilised spillway/discharge location to permit discharge of surface water in the case of a rainfall event that exceeds the design capacity of the basin.

Following completion, the Proponent would commence vegetation removal and soil stripping operation in accordance with the procedures identified in Section 2.3 of RWC (2011). In summary, those procedures would be as follows.

- Undertake a pre-clearing fauna inspection to ensure that any roosting or nesting fauna are identified and relocated.
- Harvest available seed from vegetation to be cleared, wherever practicable.
- Remove larger vegetation using a bulldozer with its blade positioned just above the surface so as not to disturb the groundcover and topsoil.
- Remove ground cover vegetation with the topsoil.
- Store cleared vegetation for use during rehabilitation activities.
- Strip topsoil material approximately 30cm below surface and subsoil to approximately 70cm below the based of the topsoil, where practicable.
- Ensure that topsoil and subsoil stockpiles have a maximum height of 2m and 3m, respectively.
- Establish a vegetative cover on all soil stockpiles to be retained for more than three months.
- Ensure that appropriate surface water controls are implemented to prevent erosion of soil stockpiles.

2.3.5 Operation of the Waste Rock Emplacement

As described in Section 2.7.2 of RWC (2011), waste rock within the alteration envelope surrounding the ore lenses may be potentially acid forming, while waste rock located further from the ore lenses is likely to be non-acid forming.

Management of potentially acid forming waste rock within the Project Site is described in the Mine's *Waste Management Plan*.

Prior to being extracted, waste rock would be classified as either non-acid forming or potentially acid forming. Where the mining schedule permits, the Proponent would continue to preferentially place acid forming material into completed stopes, removing the requirement to bring that material to surface. Remaining potentially acid forming and all non-acid forming waste rock would be transported from the underground mine by underground haul trucks to the approved Southern Waste Rock Emplacement (potentially acid forming waste rock) or the proposed Northern Waste Rock Emplacement (non-acid forming waste rock).

During construction of the Southern Waste Rock Emplacement, the entire footprint of the emplacement was stripped of topsoil to establish a suitable foundation for the emplacement, containment bunds were constructed and the lined leachate management pond was established in the lowest section of the emplacement area (**Plate 1**). The leachate management pond collects all surface water and leachate from the Southern Waste Rock Emplacement. Surface water monitoring within that pond on nine occasions since March 2014 has returned pH values between 7.23 and 9.01, indicating that acidic leachate has not been generated within the Southern Waste Rock Emplacement.

Plate 1
Southern Waste Rock Emplacement Leachate Management Pond

Source: Hera Resources Pty Limited (Ref: 141214_SamplePoint-WQTP4141214 (PAFLeachatePond).JPG)

The Proponent would convert the Southern Waste Rock Emplacement from a mixed non-acid forming and potentially acid forming emplacement to a potentially acid forming Waste Rock Emplacement. All waste rock within this emplacement would be treated as potentially acid forming and managed, principally through reclamation and transportation back underground, in accordance with the procedures identified in Sections 2.7.3 and 2.7.4 of RWC (2011) and the *Waste Management Plan*.

The Northern Waste Rock Emplacement would only be used to store non-acid forming waste rock. As a result, management of leachate, other than for suspended sediment, would not be required. Material within the Northern Waste Rock Emplacement would preferentially be retained for use at the surface, including for construction of mine infrastructure and for rehabilitation operations.

2.4 PROPOSED EXTENDED ROM PAD

2.4.1 Introduction

Section 2.5.2 of RWC (2011) identified that a ROM Pad would be constructed (**Figure 3**). The adjustments to the mining schedule and production rate described in Section 2.2 would result in additional ore being transported to surface. The proposed extended ROM Pad would provide additional area for storage and blending of ore.

2.4.2 Design Characteristics

Figure 4 presents the location of the proposed extended ROM Pad, while **Figure 7** presents the indicative layout and design. In summary, the proposed extended ROM Pad would have the following design characteristics. Existing design characteristics are presented in parenthesis.

- Footprint..... approximately 1.6ha.
- Storage capacity.....approximately 30 000lcm.
- Non-acid forming waste rock required for construction..... .....approximately 35 000lcm.

2.4.3 Site Preparation

Site preparation activities would be as described in Section 2.3 of RWC (2011). In summary, the limit of proposed disturbance would initially be marked on the ground to ensure that the ground disturbing activities are restricted to the nominated area. This would be followed by installation of the relevant surface water controls in conjunction with those for the proposed hardstand area, including the following (see Section 4.4).

- Relocation of clean water diversions to the east of the enlarged ROM Pad.
- Relocation of dirty water diversions to the east of the enlarged ROM Pad.

Following completion, the Proponent would commence vegetation removal and soil stripping operation in accordance with the procedures identified in Section 2.3.4.

2.4.4 Operation

As described in Section 2.5.2 of RWC (2011), ore would be transported from the underground mine by underground haul trucks and stockpiled on the proposed extended ROM Pad according to the material's characteristics. The ore would be blended and fed into the primary jaw crusher located on the existing ROM Pad using a front-end loader. Once crushed, the ore is stored temporarily in a Crushed Ore Stockpile where it is reclaimed via vibrating feeders onto the plant feed conveyor which transports the ore to the grinding circuit.

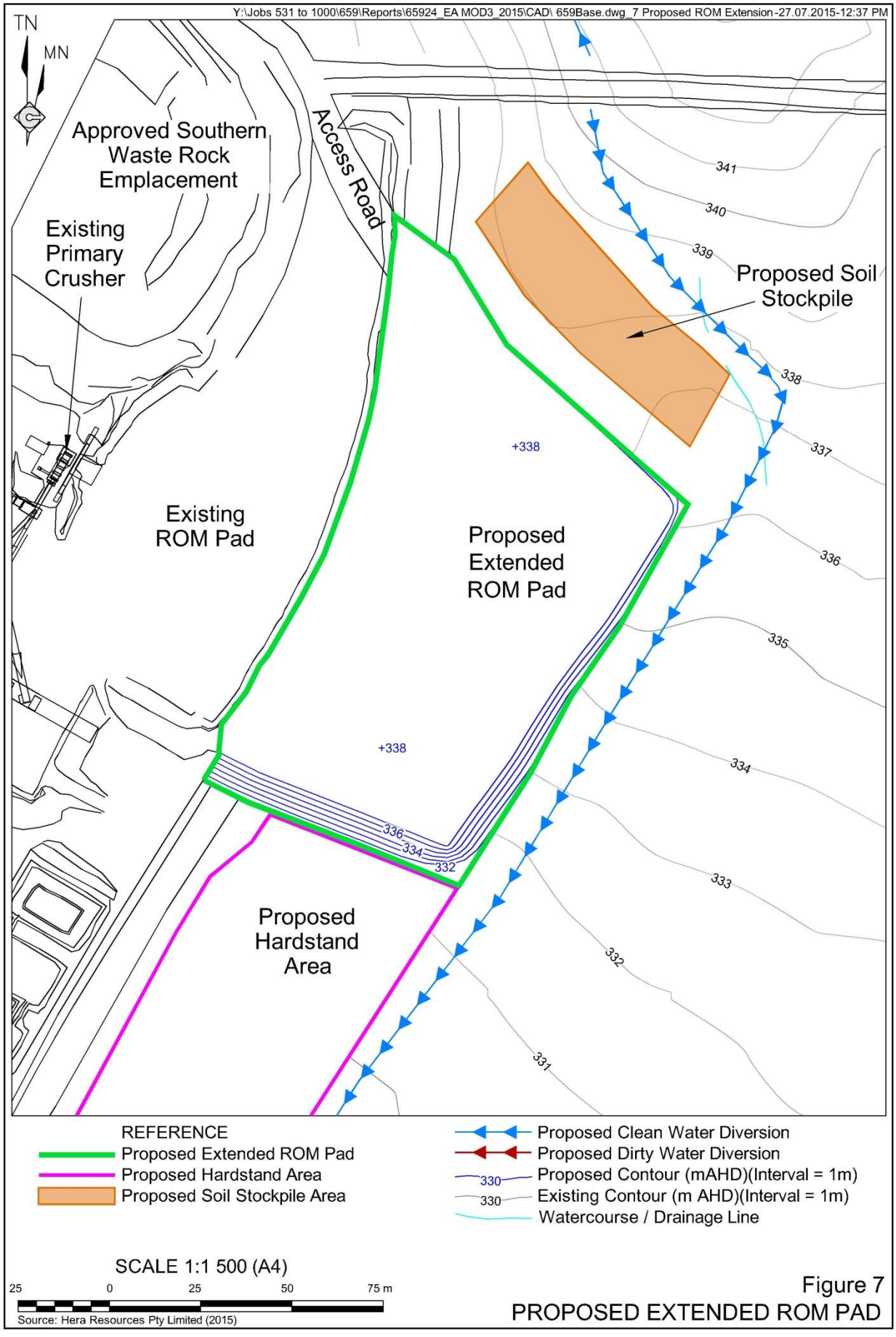


Figure 7
PROPOSED EXTENDED ROM PAD

2.5 PROPOSED HARDSTAND AREA

2.5.1 Introduction

Section 2.11.2 of RWC (2011) identified that a laydown area would be constructed. This laydown area would be used for the storage of mobile equipment when not in use. The approved laydown area is shown in **Figure 3**.

The Proponent has identified that the approved laydown area is not of sufficient size to store the equipment required to operate the approved processing facility. The proposed Hardstand Area would be used as an additional laydown area for the storage of mobile and other bulky equipment and operational spares when not in use.

2.5.2 Characteristics

Figure 5 presents the location of the proposed Hardstand Area, while **Figure 8** presents the indicative layout and design. The proposed Hardstand Area would be composed of sheeted non-acid forming material and would have a footprint of approximately 1.4ha.

2.5.3 Site Preparation

Site preparation activities would be as described in Section 2.4.3.

2.5.4 Operation

The hardstand area would be used to store mobile plant and other bulky items. That equipment is currently stored in and around the approved processing plant, creating a range of inefficiencies and issues associated with over crowding of operational areas. All equipment to be stored within the proposed hardstand area would be non-polluting and no chemicals or hydrocarbons would be stored within that area unless appropriately bunded.

2.6 PROPOSED EXPANDED CAR PARK

2.6.1 Introduction

Section 2.11.2 of RWC (2011) identified that an unsealed car park would be constructed adjacent to the site office. The approved car park has a capacity of approximately 12 cars (**Figure 3**).

The Mine currently employs approximately 100 full time equivalent personnel, most of whom reside in the Mine Camp during rostered work periods. While the Proponent provides transport from the Mine Camp to the various work locations, a number of resident, as well as non-resident employees, contractors and visitors use the car park to park private vehicles. It is the Proponent's experience that the approved carpark is regularly filled to capacity. The Proposed expanded car park would allow for parking for an additional 12 vehicles.

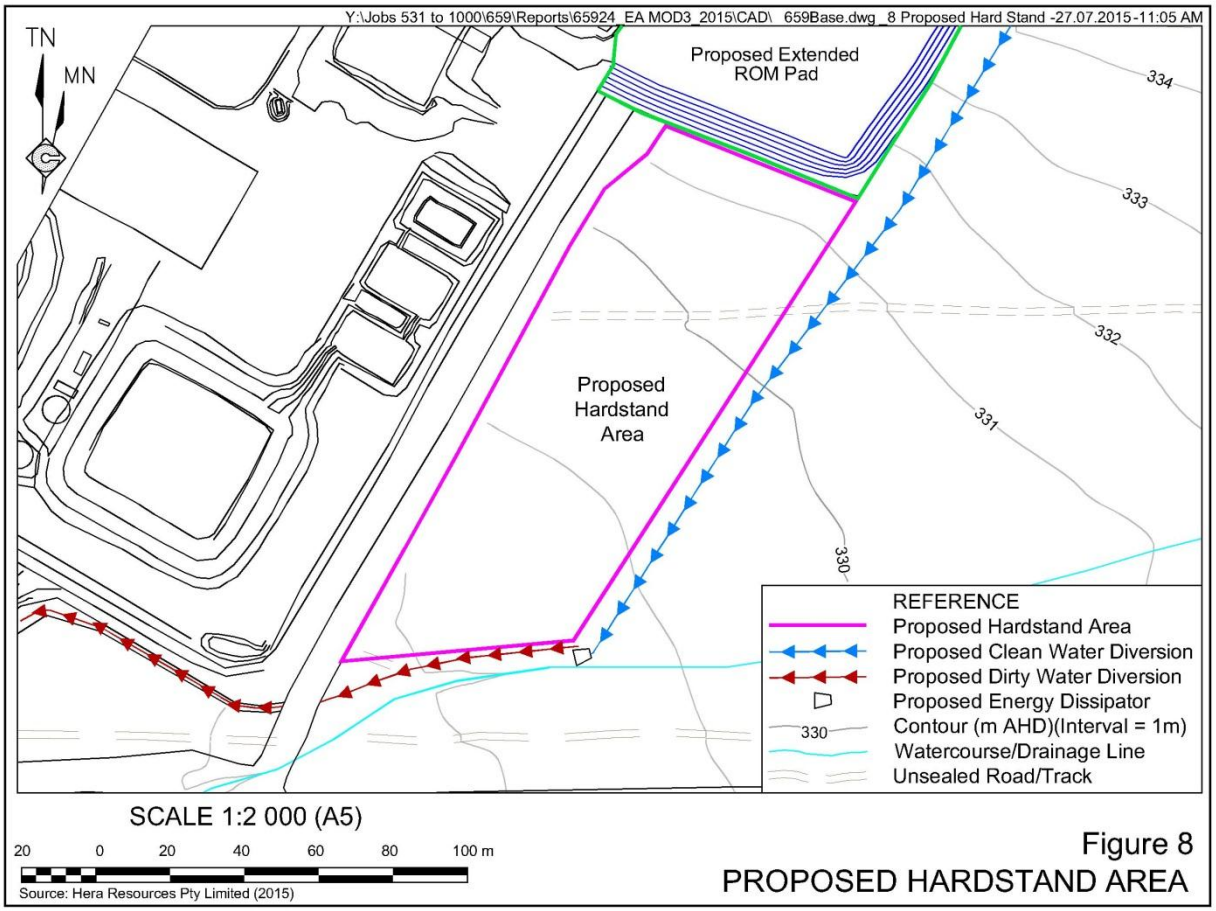


Figure 8
PROPOSED HARDSTAND AREA

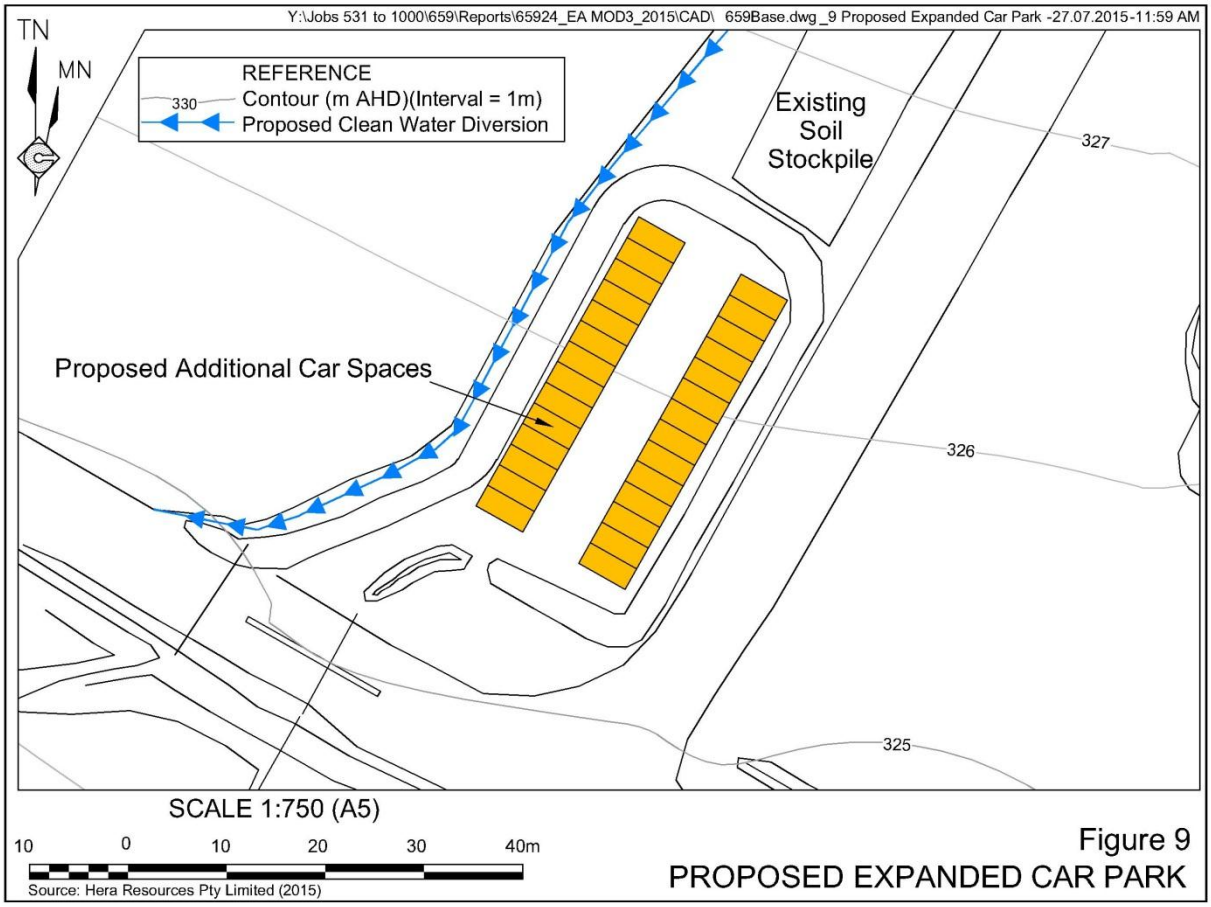


Figure 9
PROPOSED EXPANDED CAR PARK

2.6.2 Design Characteristics

Figure 4 presents the location of the proposed expanded car park, while **Figure 9** presents the indicative layout and design of the expanded carpark. In summary, the proposed expanded car park would be sheeted with non-acid forming waste rock and would have the following design characteristics consistent with the requirements of Australia Standard AS28901 – Off Street Parking.

- Additional footprint ..... approximately 0.1ha.
- Additional Capacity ..... approximately 14 cars.
- Individual parking bay dimensions ..... minimum 2.4m by 5.4m.
- Access aisle width ..... minimum 6.5m.

2.6.3 Site Preparation

Site preparation activities would be as described in Section 2.3.4.

2.6.4 Operation

The Proposed expanded car park would permit parking of an additional 12 cars. All cars would be parked perpendicular to the access aisle and with the rear of the car to the curb. Drivers and others would access the active section of the Project Site via the existing personnel gate and walkways.

2.7 HOURS OF OPERATION

No change to the approved hours of operation are proposed.

2.8 EMPLOYMENT, ECONOMIC CONTRIBUTIONS AND CAPITAL COST

The Mine currently employs approximately:

- 47 full-time employees of the Proponent;
- 55 full-time contract personnel undertaking underground mining, concentrate haulage, plant maintenance and support; and
- varying numbers of short-term contract personnel engaged to assist with specific projects.

In addition, a range of non-site based personnel service the Mine, including transport operators, local and regional engineering and maintenance firms and other suppliers.

As a drive-in/drive-out operation, the majority of the Proponent's employees do not necessarily reside in the vicinity of the Project Site. **Table 5** presents an overview of the residential locations of those employees. In summary, 55% of employees reside in central NSW, with a further 28% resident of the remainder of NSW or the ACT.

Table 5
Residential Location of Employees[1]

Region	Number
Central NSW[2]	26
Remainder of NSW, including the ACT	13
Interstate	
• VIC	5
• SA	1
• WA	2
Total Aurelia Employees	**47**
Note 1: excludes contractors	
Note 2: Central NSW includes postcodes 2671 to 2877, including the towns of Bathurst, Dubbo, Orange, Cowra, Parkes, Lithgow, Oberon, Mudgee, Forbes, Canowindra, Cudal, Molong, Grenfell, West Wyalong, Condobolin, Eugowra	
Source: Hera Resources Pty Limited	

The Proponent anticipates that the Proposed Modification would result in employment of an additional approximately 25 full-time personnel for a period of approximately 6 months to complete a range of upgrades to the processing plant. It is noted that, with the exception of brief periods, that the processing plant would continue to operate as approved during this period.

Following completion of the proposed upgrades, the Proponent anticipates that the Proposed Modification would result in employment of the following additional personnel for the life of the Mine. Figures in parenthesis would be total personnel required to operate the modified Mine.

- Approximately 12 additional full-time employees (59 employees).
- Approximately 5 additional contractors (60 contractors).

Table 6 presents approximate annual economic contributions for the Mine and forecast contributions for the Mine, as modified. In summary, the Proposed Modification would result in an additional $2 million per year in wages and salaries and $5 million per year in goods and services and a further $1 million in royalties would be payable each year.

However, the Proponent notes that the most significant economic impact of the Proposed Modification is that it would enable greater utilisation of existing mineral resources within the Project Site. In particular, the Proposed Modification would permit more cost effective mining and processing that would permit processing of material that would otherwise not have been able to be economically processed.

Finally, the proposed modifications to the processing plant to achieve the proposed efficiencies in throughput would have a capital cost of approximately $20 million. All other proposed activities would be undertaken as an operational cost.

Table 6
Approximate Annual Economic Contributions

Contribution	2013/2014 Contributions	Anticipated Modified Contributions
Wages, Salaries etc.		
• Employees	$7 million	$8 million
• Contractors	$6 million	$7 million
• Total	$13 million	$15 million
Goods and Services (incl labour)		
• NSW	$25 million	$27.5 million
• Australia (ex. NSW)	$20 million	$22 million
• International	$5 million	$5.5 million
• Total	$50 million	$55 million
Taxes and Royalties		
• Rates and VPA payments	$0.3 million	$0.3 million
• Royalties	$2 million	$3 million
Source: Hera Resources Pty Limited		

2.9 REHABILITATION, FINAL LANDFORM AND DECOMMISSIONING

2.9.1 Introduction

Section 2.15 of RWC (2011) provides an overview of the approved rehabilitation and decommissioning activities, and the approved final landform. In addition, the Proponent has prepared a *Mining Operations Plan* dated June 2013 (RWC, 2013). That document provides a detailed description of the anticipated rehabilitation objectives, indicators and criteria for each of the rehabilitation domains within the Mining Lease. The Proponent would prepare an amended *Mining Operations Plan* to reflect the revised Mine layout should the Proposed Modification be approved. This subsection provides a brief overview of the approved rehabilitation procedures identified in the above documents.

2.9.2 Rehabilitation Objectives

As presented in Section 4.3.4 of RWC (2013) outlining the Proponent's rehabilitation objectives for the Project which would remain unchanged as a result of the Proposed Modification. In summary, these objectives include the following.

- Remove all items of infrastructure.
- Stabilise all disturbed areas and minimise erosion and dust generation.
- Create a low maintenance, geotechnically stable and safe, non-polluting final landform consistent with the surrounding topography and suitable for the end land use of nature conservation and agriculture.

- Establish a soil profile capable of sustaining the specified end land use.
- Establish native vegetation with the species diversity commensurate with surrounding vegetation.
- Protect and enhance those sections of the Project Site with remaining vegetation.

2.9.3 Final Land Use

As described in Section 4.3.2 of RWC (2013), the final land uses considered by the Proponent for the Project Site include a combination of agriculture and conservation of biodiversity. The approved final land uses would remain unchanged as a result of the Proposed Modification.

2.9.4 Final Landform

As described in Section 4.3.3 of RWC (2013), the final landform will include the following.

- A bunded and fenced box cut with the portal sealed and backfilled in a manner that will allow re-opening in the event that mining operations re-commenced in the future. The slopes of the walls of the box cut will be reduced to approximately 1:3 (V:H) through backfilling of the box cut or blast profiling of the walls.
- Two sealed ventilation rises. The ventilation rises will be capped with a suitably designed and engineered cap that will permit reopening of the rises at a later time if required.
- An appropriately covered and dome-shaped, free draining Tailings Storage Facility with embankment slopes of approximately 1:3 (V:H) or less.
- A shaped, covered and revegetated Surface Facility Area with all infrastructure removed.

All other infrastructure, including the access roads, will be retained. The approved final landform would remain largely unchanged as a result of the Project Modification.

2.9.5 Rehabilitation Methods and Procedures

The rehabilitation methods and procedures would be as described in RWC (2013). In summary the rehabilitation methods and procedures would be as follows.

Phase 1: Decommissioning

- Buildings and infrastructure would be removed, with the exception of infrastructure that will be retained.
- Appropriate drainage controls would be installed.

Phase 2: Landform Establishment

- Material within the ROM pad would be used to backfill the box cut or be transported underground.

- The footprints of the Waste Rock Emplacements would be ripped and re-profiled to create a landform consistent with the completion criteria.
- The Box Cut would have a bund constructed around the perimeters and would be reshaped.
- The portal to the open cut would be backfilled and sealed, and ventilation rises would be capped and fenced.
- The tailings storage facility would be capped with a layer of clay and waste rock material, and appropriate drainage structures installed.
- Water management structures would be decommissioned and any material present removed.
- Haul roads, access tracks and hardstand areas would be ripped and shaped.

Phase 3: Growth Medium Development

- All areas of disturbance would be covered with previously stockpiled soil and subsoil.

Phase 4: Ecosystem Establishment

- All disturbed areas would be seeded with an appropriate seed mix.

Phase 5: Ecosystem Development

- Vegetation would be periodically monitored to determine if the ecosystem has developed to the point where it is comparative with similar, analogue sites.

2.9.6 Rehabilitation Monitoring and Maintenance

The Proponent would maintain an ongoing rehabilitation monitoring program in accordance with Section 5 of RWC (2013). In summary, the Proponent would undertake regular monitoring of soils and vegetation prior to, during and following establishment of the final landform until the Proponent and relevant regulators are satisfied that the final landform and land use have achieved the rehabilitation completion criteria identified in RWC (2013) or subsequent versions of that document. Any failure of the rehabilitation actions would be remediated and rectified.

2.10 BIODIVERSITY OFFSET

The Proponent has prepared a *Biodiversity Offset Strategy* dated October 2012 (YTC, 2012). That document describes the current *Biodiversity Offset Strategy* and was submitted to Office of Environment and Heritage and Local Land Services. While the strategy has yet to be formally approved, it has been implemented by the Proponent.

In summary, the Proponent has purchased the "Chelsea" property, located approximately 25km to the south of the Project Site with the intention of using a section of the property for a Biodiversity Offset (**Figure 10**). The "Chelsea" property is approximately 1 950ha in size. The Biodiversity Offset Strategy identifies that the following vegetation communities and areas (in parenthesis) have been set aside for offsetting purposes, with further vegetation available for offsetting at a future date.

- Benson 103/WE91 – Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (425ha).
- Benson 174 – Mallee – Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (200ha).
- Benson 184/WE58 – Dwyer's Red Gum – Currawang low woodland mainly of the Cobar Peneplain Bioregion (100ha).

The Proponent proposes to increase the areas of the following communities set aside for offsetting as follows. The proposed additional areas of each community are presented in parenthesis.

- Benson 103/WE91 – Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (10ha).
- Benson 184/WE58 – Dwyer's Red Gum – Currawang low woodland mainly of the Cobar Peneplain Bioregion (8.2ha).

Section 4.2.5 provides further information on the proposed Biodiversity Offset Strategy.

2.11 DEVELOPMENT ALTERNATIVES

2.11.1 Introduction

The Proponent has reviewed numerous alternative modification scenarios. This subsection provides a review of a range of alternatives considered, and identifies why each was, after careful consideration, rejected.

2.11.2 No Increased Rate of Production or Mine Life

As identified in Section 2.2, the Proponent has identified additional reserves within the approved Mining Lease. As a result, the total reserves identified exceeded the amount of ore that is permitted to be extracted under Condition 6 of Schedule 2 of PA 10_0191. The additional time required to mine the enlarged resource would result in mining operations not being completed by 31 December 2020.

Failure to increase the amount of ore permitted to be extracted annually or over the life of the Mine or to extend to life of the Mine would result in underutilisation of an identified resource potentially making the Mine less financially robust and reducing the benefits of the Mine that would flow to the community with no significant environmental benefit.

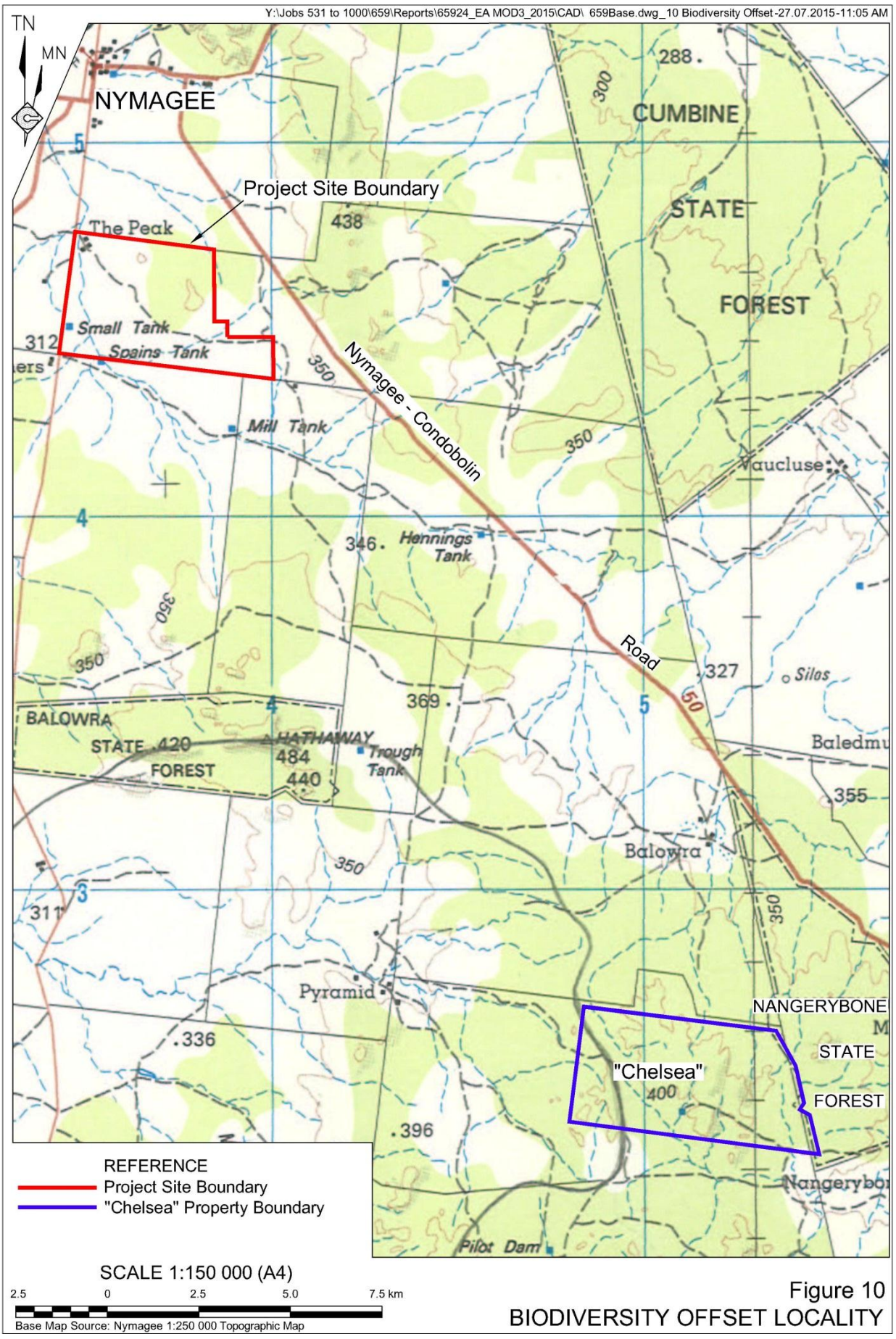


Figure 10
BIODIVERSITY OFFSET LOCALITY

2.11.3 No Northern Waste Rock Emplacement

As identified in Section 2.3, following changes to the mining schedule the amount of waste rock to be generated by the Mine would be greater than originally anticipated. As a result, the approved waste rock emplacement would not have sufficient capacity to store the additional waste rock that would be brought to surface.

Failure to construct an additional waste rock emplacement at the surface would require the Mine to be developed in a suboptimal manner, reducing the robustness of the Mine and adversely impacting on the Proponent's ability to support its employees, contractors and suppliers.

In addition, the proposed Northern Waste Rock Emplacement would separate potential acid forming substances and non-acid forming substances. Failure to construct an additional non-acid forming waste rock emplacement would result in an increased risk of acid mine drainage, and would result in additional negative impacts on the surface water within and surrounding the Mine.

2.11.4 Alternatives to the Waste Rock Emplacement

The Proponent considered two alternatives to store the additional waste rock that would be brought to surface. The two locations rejected in favour of the proposed Northern Waste Rock Emplacement are as follows.

- Height increase of the approved waste rock emplacement.
- The Proponent determined that the volume of additional waste rock to be brought to surface is greater than that which could be accommodated by increasing the height of the approved waste rock emplacement. As a result, the alternative of placement of waste rock in the approved waste rock emplacement was rejected.
- Extension of the approved waste rock emplacement.
- A range of infrastructure surrounds the approved waste rock emplacement (**Figure 3**). As a result, the Proponent is not able to extend the approved waste rock emplacement.

2.11.5 No Extension of the ROM Pad

As identified in Section 2.2, following changes to the mining schedule the amount of ore to the extracted and processed by the Mine would be greater than originally anticipated. As a result, the approved ROM pad would not have sufficient capacity to store and blend the additional ore that would be extracted and processed in a safe and efficient manner.

Failure to construct an extended ROM pad would require the Mine to be developed in a suboptimal manner to ensure the safety of its workers, reducing the robustness of the Mine and adversely impacting on the Proponent's ability to safely support its employers, contractors and suppliers.

2.11.6 Alternative Locations for the Proposed Extended ROM Pad

A range of infrastructure surrounds the ROM Pad. To the southwest and west of the ROM Pad is the processing plant and Southern Waste Rock Emplacement, precluding expansion of the ROM Pad in those directions (**Figure 3**). As a result, the proposed ROM Pad can only be extended to the east without significant disruption to the approved activities.

2.11.7 No Proposed Hardstand Area

Failure to construct a hardstand area would require the Mine to be operate in a suboptimal manner, reducing the robustness of the Mine and adversely impacting on the Proponent's ability to safely support its employers, contractors and suppliers and prevent damage to goods during the proposed modifications to the processing facility

2.11.8 Alternative Locations for the Proposed Hardstand Area

The location of the proposed Hardstand Area was determined due to its proximity to the processing plant and the existing surface water management infrastructure. An alternative location to the west of the approved Waste Rock Emplacement would be too steep and would require substantial earthworks to reduce the slopes.

2.11.9 No Proposed Expanded Car Park

The proposed expanded car park would allow for additional parking for employees and contractors of the Mine. Failure to construct an expanded car park would restrict access of employees and contractors to the Mine.

2.11.10 Alternative Locations for the Proposed Expanded Car Park

The approved car park is located adjacent to the existing, approved car park and in close proximity to the Proponent's site office and controlled entry facility. Expansion of the approved car park to the south or east would adversely impact on adjacent infrastructure and to the north would disturb surface water management infrastructure.

3. CONSULTATION AND PLANNING ISSUES

3.1 INTRODUCTION

In order to undertake a comprehensive assessment of the Proposed Modification, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. To ensure this has occurred, a program of community and government consultation, and a review of previous environmental studies, environmental monitoring and environmental planning documentation was undertaken. The following subsections provide a summary of the results of consultation activities and a review of planning legislation, plans and guidelines.

3.2 CONSULTATION

3.2.1 Community Consultation

Introduction

The Proponent has maintained an open and honest relationship with the community surrounding the Mine through a range of formal and informal consultations held with individual community members and groups. The following provides a brief overview of consultation that has been undertaken.

Community Consultative Committee

The Hera Mine Community Consultative Committee (CCC) meetings are held quarterly. The meetings are attended by community representatives. The CCC meetings discuss environmental and operational progress of the Mine and provide an opportunity to discuss any concerns held by the community.

The Proposed Modification was formally presented to the CCC at a meeting on 25 June 2015. The committee was briefed on the Proposed Modification and were provided with an opportunity, both at the meeting and subsequently, to ask questions and present matters that they would like to see addressed in this document. No matters relevant to the Proposed Modification were raised and no specific issued to be addressed were identified.

Community Newsletter

The Proponent regularly distributes the "Hera News" to the community of Nymagee and surrounds to provide operational and environmental updates.

The Proposed Modification is described in the "Hera News" newsletter dated June 2015. The newsletter is distributed to the local community and neighbours and is available on the Proponent's website.

No enquiries regarding the Proposed Modification were received following the publication of this newsletter.

Landholder Consultation

An informal meeting has been held, and written correspondence commenced between the Proponent and the family holding the land to the north of the Project Site in relation to the Proponent's proposed activities. That consultation was ongoing at the time of finalisation of this document and further consultation is proposed.

3.2.2 Consultation with Government Agencies

A *Background Paper* (RWC, 2015) was prepared to provide background information regarding the Proposed Modification to government agencies.

The Department of Planning and Environment was provided with the *Background Paper* and a summary of the Proposed Modification on 18 May 2015 in order to assess if Secretary's Environmental Assessment Requirements (SEARs) were required to be submitted.

The following government agencies were provided with a copy of the *Background Paper* and a summary of the Proposed Modification on 21 May 2015 in order to determine any requirements to be addressed within this *Environmental Assessment*.

- Department of Trade and Investment, Division of Resources and Energy (DRE).
- Office of Environment and Heritage (OEH).
- Environment Protection Authority (EPA).
- DPI Water.

Cobar Shire Council was provided with a copy of the *Background Paper* and a summary of the Proposed Modification on 22 May 2015 in order to determine any requirements to be addressed within this *Environmental Assessment*.

Responses received from all agencies, with a tabulated summary of agency requirements and where each is addressed presented in **Appendix 1**.

3.3 REVIEW OF PLANNING ISSUES

3.3.1 State Legislative Planning Issues

At the time of the approval of PA 10_0191, *State Environmental Planning Policy (Major Development 2005)* identified the Mine as a Major Project for which project approval under Part 3A of the EP&A Act was necessary as its capital investment value was of more than $30 million.

Clause 2(1)(a) of Schedule 6A of the EP&A Act identifies that approved Projects, including the Mine, may be classified as transitional Part 3AProjects. Clause 3(1) of that Schedule identifies that Part 3A, including Section 75W, continues to apply to such projects, As a result, the Proposed Modification may be made under the now repealed Section 75W of the EP&A Act.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

This SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development as defined in NSW legislation.

The Application of this SEPP to the Mine, and by extension to the Proposed Modification, is presented in **Table 7**.

Table 7
Application of SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Relevant SEPP Clause	Description	EA Section
12AA: Significance of resource	Consideration is given to the significance of the resource that is the subject of the application, having regard to:	
	• the economic benefits, both to the State and the region; and	2.8
	• the advice provided by the DG of DTIRIS as to the relative significance of the resource in comparison with other mineral resources across the State.	NA
12AB: Non-discretionary development standards for mining	Consideration is given to development standards that, if complied with, prevents the consent authority from requiring more onerous standards for those matters.	NA
12: Compatibility with other land uses	Consideration is given to:	
	• the existing uses and approved uses of land in the vicinity of the development;	1.5
	• the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	NA
	• any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	NA
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	NA
	Measures proposed to avoid or minimise any incompatibility are considered.	NA
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	NA
	Measures taken by the Proponent to avoid or minimise any incompatibility are considered.	NA
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	NA

Table 7 (Cont'd)
Application of SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Relevant SEPP Clause	Description	EA Section
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:	
	• impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4.3 and 4.4
	• impacts on threatened species and biodiversity are avoided or minimised; and	4.2
	• greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	4.7
	Consider any certification by the Chief Executive of OEH or the DG of DPI that measures to mitigate or offset the biodiversity impact of the proposed development would be adequate.	NA
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	1.4.3 and 2.3
16:Transportation	The following transport-related issues are considered.	
	• The transport of some or all of the materials from the Project Site by means other than public road.	NA
	• Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	NA
	• The preparation of a code of conduct for the transportation of materials on public roads.	NA
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including:	
	• the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	2.9.1
	• the appropriate management of development generated waste;	2.3
	• remediation of any soil contaminated by the development; and	NA
	• the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.9.4

State Environmental Planning Policy (Infrastructure) 2007

This SEPP identifies, amongst other things, the matters to be considered in the assessment of development adjacent to particular types of infrastructure.

The Proposed Modification does not seek to amend any activities in the vicinity of the classes of infrastructure identified by this SEPP. As a result, this SEPP is not relevant to this application.

State Environmental Planning Policy 33 – Hazardous and Offensive Development

This SEPP identifies that hazardous and offensive industries, and potentially hazardous and offensive industries, may pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment without the implementation of appropriate impact minimisation measures.

An assessment of the Mine under this SEPP is presented in RWC (2011). In summary, that assessment determined that risk levels associated with the use of Potassium Amyl Xanthate, Sodium Cyanide, Hydrogen Peroxide and Lead Nitrate would be acceptably low. As the Proposed Modification would not change the activities identified as potentially hazardous under that SEPP, it is not relevant to the Proposed Modification.

State Environmental Planning Policy 55 – Remediation of Land

This SEPP required that consent for any development cannot be granted unless the consent authority has considered whether the land is contaminated.

No land within the Project Site is contaminated. As a result, this SEPP is not relevant to the Proposed Modification.

3.3.1.1 Local Planning Issues

The Mine occurs within the Cobar Local Government Area. The Mine is zoned RU1 – Primary Production under the *Cobar Local Environment Plan 2012* (Cobar LEP). While underground mining is not identified as permissible with consent within that zone, Clause 70(1)(b) of the Mining SEPP has the effect that mining is permissible with consent within the Project Site. **Figure 2** presents the land zoning within and surrounding the Project Site.

4. ASSESSMENT OF KEY ENVIRONMENTAL ISSUES

4.1 INTRODUCTION

Section 4 of RWC (2011) provides a range of background information in relation to aspects of the environment within and surrounding the Project Site. That section also provides an assessment of anticipated impacts associated with the Mine as it was then understood. This section provides an assessment of anticipated changes to the Mine's impacts that would result from the Proposed Modification. The structure of this section broadly reflects the structure of Section 4 of RWC (2011).

The following background information has not been changed significantly since RWC (2011) was finalised, and is not repeated in this document. For ease of reference, text in parenthesis identifies the relevant Sections of that document.

- Topography and drainage (Section 4.1.2 of RWC (2011)).
- Climate (Section 4.1.3 of RWC (2011)).
- Local and regional geology (Section 4.1.4 of RWC (2011)).
- Surrounding land ownership, residences and land use (Section 4.1.5 of RWC (2011)).
- Surrounding community (Section 4.1.6 of RWC (2011)).

4.2 ECOLOGY

4.2.1 Introduction

OzArk Environmental and Heritage Management Pty Ltd (OzArk) undertook the ecological assessment for the original application for Project Approval (OzArk, 2011a). Since that date, OzArk have undertaken flora and fauna monitoring programs within the Project Site and the "Chelsea" property on three occasions (OzArk, 2013, 2014 and 2015a).

OzArk were engaged to prepare an impact assessment for the Proposed Modification and to update the current Biodiversity Offset Strategy for the Mine in light of the Proposed Modification. The assessment was undertaken following *Framework for Biodiversity Assessment 2014*. That report is presented in **Appendix 2** and is referred to hereafter as OzArk (2015b). The following subsections present an overview of that report.

4.2.2 Existing Setting

OzArk (2011a) identifies four principal vegetation communities within the Project Site as follows.

- Benson 103 – Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion. This vegetation community dominates the Project Site and can be classified further into sub-communities reflecting the change in dominant canopy, as follows.
  - Benson 103 – Poplar Box – Gum-barked Coolibah – White Cypress Pine.
  - Benson 103 – Bimble Box dominated.
  - Benson 103 – White cypress pine dominated. This community is characterised by variable density of vegetation from very dense to open.
  - Benson 103 – Eremophila and hopbush regrowth.
  - Benson 103 – Yarren (Acacia hemaphylia).
- Benson 174 – Mallee – Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion. This vegetation type occurs in clusters within Benson 103.
- Benson 180 – Grey Mallee – White Cypress Pine woodland on rocky hills of the eastern Cobar Peneplain Bioregion. This vegetation community occurs on The Peak and integrates with Benson 174.
- Disturbed land.

In addition, 135 species of flora have been identified, including two species of noxious weeds and one population of an EPBC Act-listed species, namely Lobed Blue-grass (*Bothriocloa biloba*).

Finally, 103 vertebrate fauna species (97 native and six introduced) were recorded by OzArk (2011a), comprising:

- 17 mammal species;
- 5 reptile species:
- 3 frog species; and
- 78 bird species.

4.2.3 Assessment Methodology and Results

OzArk undertook a field assessment of the proposed disturbance areas on 6 and 7 July 2015. That assessment focused on areas of proposed disturbance only and comprised five vegetation plots and a series of transects. In addition, reliance has been placed on OzArk (2011a, 2013, 2014 and 2015a) to identify threatened species likely to be present within the Project Site and proposed areas of disturbance. Sections 3 and 4 of OzArk (2015b) provide further detail in relation to the assessment methodology and results.

The results of the field work may be summarised as follows.

Vegetation Communities

Three vegetation communities were identified within the proposed disturbance footprint. **Table 8** presents the anticipated areas of disturbance for each. Both vegetation communities were identified by OzArk (2015b) as being in Moderate to Good (poor) condition under the BioBanking Assessment Methodology.

Table 8
Vegetation Communities

Vegetation Community	Area (ha)
WE58 Dwyer's Red Gum – Currawang low woodland mainly of the Cobar Peneplain Bioregion (Benson 184).	4.05
WE91 Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (Benson 103).	2.55
Disturbed land.	0.60
Total	**7.20**
Source: OzArk (2015b) – After Section 3.1	

Threatened Species

OzArk (2015b) identified the following in relation to threatened species within the Project Site and the proposed areas of disturbance.

- No threatened species were identified during a targeted search on 6 July 2015.
- The following threatened species have been observed during previous surveys.
  - Major Mitchells Cockatoo.
  - Spotted Harrier.
  - Hooded Robin.
  - Turquoise Parrot.
  - Grey-crowned Babbler (eastern subspecies).
  - Diamond Firetail.
  - Little Pied Bat.
  - Yellow-bellied Sheathtail Bat.
  - Eastern Bentwing Bat.
  - Eastern Cave Bat.
  - Large-eared Pied Bat.
- A targeted assessment of the proposed disturbance areas did not identify suitable breeding sites for the Turquoise Parrot.
- OzArk (2015b) state that it is highly unlikely that the Cobar Greenhood Orchid occurs within the proposed disturbance areas.

4.2.4 Management and Mitigation Measures

All management and mitigation measures identified in Section 4.2.5 of RWC (2011) and the *Biodiversity Management Plan* would continue to be implemented. In addition, the following additional measures identified by OzArk (2015b) would also be implemented.

- Clearly mark all areas of approved disturbance on the ground and ensure that vegetation outside the approved disturbance footprint is not disturbed.
- Retain felled timber, where practicable, for fauna habitat on the rehabilitated landform.
- Ensure that weeds within the Project Site are managed through appropriate inspection and cleaning of equipment arriving on site and regular weed control programs
- Ensure that all food scraps and rubbish are securely disposed of to discourage foxes, rats, wild dogs and feral cats.

4.2.5 Proposed Modified Biodiversity Offset Strategy

4.2.5.1 Current Biodiversity Offset Strategy

The Current Biodiversity Offset Strategy is described in the document *Hera Mine, via Nymagee - Biodiversity Offset Strategy* dated October 2012. In summary, the Proponent purchased the "Chelsea" property, located approximately 25km south of the Project Site **(Figure 10**). **Figure 11** identifies the current Biodiversity Offset Area within the "Chelsea" property. In summary, the current Biodiversity Offset Area reserves approximately 725ha for protection of the following vegetation communities. Areas in parenthesis are the approximate areas of each community protected. As the "Chelsea" property is approximately 1 950ha in size, additional areas remain available for offsetting additional disturbance within the Project Site.

- Benson 103/WE91 – Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion (425ha).
- Benson 174 – Mallee – Smooth-barked Coolibah woodland on red earth flats of the eastern Cobar Peneplain Bioregion (200ha).
- Benson 184/WE58 – Dwyer's Red Gum – Currawang low woodland mainly of the Cobar Peneplain Bioregion (100ha).

It is noted, however, that the western portion of the "Chelsea" property (approximately 295ha) occurs within the Western (Nymagee-Rankins Springs) Catchment. This is the same catchment as the Project Site. The remaining section of the "Chelsea" property (approximately 1 655ha) occurs within the Central West CMA (Nymagee-Rankins Springs) Catchment. While it is the preference of Office of Environment and Heritage that Biodiversity Offset Areas be within the same catchment as the development area, in this case, the presence of the Nangerybone State Forest adjacent to the eastern boundary of the "Chelsea" property (see **Figure 11**) means better connectivity and patch size is achieved through establishment of the Biodiversity Offset Area adjacent to the eastern boundary of the property.

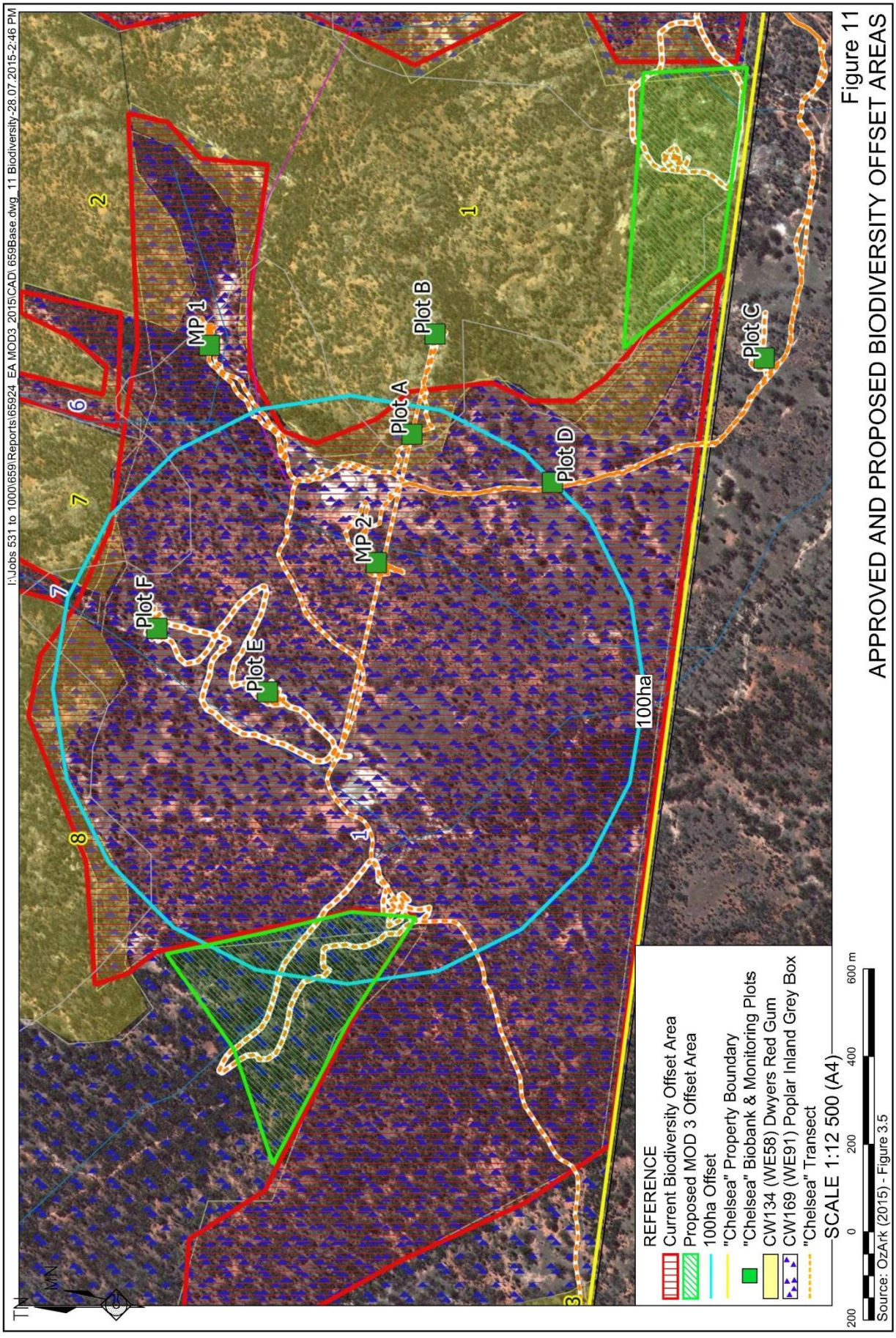


Figure 11
APPROVED AND PROPOSED BIODIVERSITY OFFSET AREAS

The *Biodiversity Offset Strategy* identifies the following threatened species as occurring or potentially occurring within the Biodiversity Offset Area.

- Superb Parrot.
- *Swainsona murrayana*.
- Grey-crowned Babbler (eastern subspecies).
- Hooded Robin.
- Kultarr.
- Major Mitchell's Cockatoo.
- Yellow-bellied Sheathtail.
- Little Pied Bat.
- Brown Treecreeper.
- Speckled Warbler.
- Pied Honeyeater.
- Black-chinned Honeyeater.
- Turquoise Parrot.
- Spotted Harrier.
- Pine Donkey Orchid.
- Cobar Greenhood Orchid.
- Lobed Bluegrass.

The following management measures are embodied within the *Biodiversity Offset Strategy* and would continue to be implemented.

- Control of access to the Biodiversity Offset Area for the purposes of biodiversity management.
- Retention of regrowth and remnant native vegetation, as well as fallen and dead timber.
- Management of grazing for conservation purposes, including management of fuel loads.
- Thinning monocultures of White Cypress Pine.
- Management and control of weeds and pests.
- Management of erosion, sedimentation and natural flow regimes.
- Regular monitoring of flora and fauna within the Biodiversity Offset Area.

Finally, the *Biodiversity Offset Strategy* would be secured in perpetuity through one of the following mechanisms, or similar.

- A Conservation Agreement under the *National Parkes and Wildlife Act 1974*.
- A Trust Agreement under the *Nature Conservation Trust Act 2001*.
- A Planning Agreement under the *Environmental Planning and Assessment Act 1979.*

4.2.5.2 Proposed Modified Biodiversity Offset Strategy

Figure 11 presents the proposed Modified Biodiversity Offset Strategy. In summary, the Modified Biodiversity Offset Strategy would include two additional areas as follows.

- 8.2ha of WE58 – Dwyer's Red Gum – Currawang low woodland mainly of the Cobar Peneplain Bioregion.
- 10ha of WE91 – Poplar Box – Gum-barked Coolibah – White Cypress Pine shrubby woodland mainly in the Cobar Peneplain Bioregion.

In addition, the management measures described above would continue to be implemented within the proposed additional Biodiversity Offset Areas.

In light of the above, OzArk (2015b) undertook an assessment of the proposed Modified Biodiversity Offset Strategy using the BioBanking Assessment Methodology and Credit Calculator Operation Manual. The results of that assessment are presented in **Table 9**. In summary, OzArk (2015b) determined that the proposed Modified Biodiversity Offset Strategy would achieve a Tier 1 biodiversity outcome.

4.2.5.3 Consistency with Biodiversity Offsetting Policy

Finally, in addition to demonstrating that the proposed Modified Biodiversity Offset Strategy provides an adequate number of credits to offset the proposed disturbance, the Proponent notes that the Strategy must also be consistent with the principles that underpin the *NSW Biodiversity Offsets Policy for Major Projects*. The following provides an assessment against those principles.

Principle 1: Before offsets are considered, impacts must first be avoided and unavoidable impacts minimised through mitigation measures. Only then should offsets be considered for the remaining impacts.

The Proponent has avoided impacts to the maximum extent possible by:

- minimising the area required to be disturbed;
- locating the proposed Northern Waste Rock Emplacement, extended ROM Pad, hardstand area and car park immediately adjacent to existing areas of disturbance, thereby minimising fragmentation of habitat; and

Table 9
Biodiversity Offset Calculator Results

Vegetation Community	The Development Area		The Offset Area					Can offsetting be achieved?
	Area Impacted (ha)	Credits Required	Available ha in Offset Area	Number of Credits Generated	No. Credits Generated/ ha	No. of hectares required to offset	Surplus credits to offset	
WE91 - Benson 103 Poplar Box – Gum-barked Coolibah	2.55	74	95.3	714	7.49	9.9	640	**YES**
WE58 – Dwyer's Red Gum – White Cypress Pine – Currawang low shrub-grass woodland of the Cobar Peneplain Bioregion	4.05	81	80.17	799	9.97	8.1	718	**YES**
Total	**6.60**	**155**	**175.47**	**1 513**	**N/A**	**18.0**	**N/A**	

Source: OzArk (2015b) – After Table 11-1

- preparing and implementing an updated *Sediment and Erosion Control Plan*, thereby minimising the potential for downstream impacts associated with the Proposed Modification.

Principle 2: Offset requirements should be based on a reliable and transparent assessment of losses and gains.

OzArk (2015b) undertook an assessment of the proposed Modified Biodiversity Offset Strategy using the BioBanking Assessment Methodology and Credit Calculator Operation Manual

Principle 3: Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities.

The proposed Modified Biodiversity Offset Strategy will result in like-for-like offsetting, with a Tier 1 outcome.

Principle 4: Offsets must be additional to other legal requirements.

The proposed Modified Biodiversity Offset Strategy would be additional to all other legal requirements.

Principle 5: Offsets must be enduring, enforceable and auditable.

The Biodiversity Offset Strategy would continue to be secured via one of the methods identified in Section 4.2.5.1 and would be enduring, enforceable and auditable.

Principle 6: Supplementary measures can be used in lieu of offsets.

No supplementary measures are proposed.

4.2.6 Assessment of Impacts

In conclusion, the Proponent contends that the Proposed Modification would:

- not result in significant impacts on an threatened species, population or endangered community;
- achieve a Tier 1 biodiversity offset outcome; and
- be consistent with the principles of the *NSW Biodiversity Offsets Policy for Major Projects*.

4.3 GROUNDWATER

4.3.1 Introduction

A groundwater assessment of the original application for Project Approval was undertaken by The Impax Group (Impax, 2011). That assessment determined that the Mine, as originally proposed, would result in the following groundwater-related impacts.

- Groundwater levels within and surrounding the Project Site were between 50m and 70m below surface.
- Groundwater inflow during decline development would be up to 4.6L/s or 0.4ML/d, however, once initial dewatering of the fracture-controlled aquifer occurred, groundwater inflow would be likely to be approximately equal to the rate of groundwater recharge, namely approximately 0.4L/s or 0.03ML/d. Measured groundwater inflow into the Mine has been between approximately 0.55ML/d and 0.35ML/d, with current inflows gradually becoming less.
- A safe annual yield of between 250ML and 300ML should be achievable from the proposed bore field
- Groundwater recovery following completion of mining operations is expected to take between 20 and 100 years
- One registered bore, namely GW017386 located immediately south of the Project Site (**Figure 3**), was predicted to be impacted by groundwater drawdown. Access to that bore has been denied. However, the Proponent has recently constructed a monitoring bore (WB18) on its own property within 200m of GW017386. Monitoring of that bore since March 2015 indicates that standing water levels are between 62.2mbgl and 62.9mbgl.
- No impacts were anticipated to groundwater quality or groundwater dependent ecosystems.

Since the commencement of mining operations, the Proponent has relied on groundwater production from the underground workings for its water requirements, with makeup water sourced from the approved bore field located in the southern section of the Project Site. However, during 2014, the proportion of water drawn from the underground workings began to decline, requiring a greater proportion to be drawn from the bore field.

The Proponent recently engaged Aquade Groundwater Services Pty Ltd (Aquade) to undertake an assessment of the groundwater availability based on the Proponent's groundwater production records and monitoring results and to determine if a nominal extraction rate of 1ML/d (365ML/y) was achievable and sustainable. The resulting report, referred to hereafter as Aquade (2015), is presented in **Appendix 3** and the following subsections present an overview of that report.

4.3.2 Existing Setting, Groundwater Extraction and Aquafer Properties

Section 1.6.6 provides a description of groundwater monitoring presented in the AEMRs prepared for the Mine for the period 16 May 2013 to 15 May 2015. In summary:

- groundwater production from the underground workings and the borefield was 191ML in the 2014/2015 financial year;
- standing water levels at between 50mbgl and 70mbgl; and
- groundwater quality has been within identified trigger levels since those levels were adjusted in consultation with EPA and DPI Water.

Aquade (2015) provides further information in relation to groundwater extraction as follows.

- Extraction from the borefield.

  Groundwater has been extracted from bores WB8, WB10, WB11, Back Bore and House Bore (**Figure 3**), with the cumulative volumes and maximum sustained extraction rates for each presented in **Table 10**. In each case, the rate of groundwater extraction increased in late 2014/early 2015 to account for a decrease in extraction from the underground workings.

- Extraction from the underground workings.

  Groundwater extraction rates gradually increased from approximately 0.25ML/d during the initial construction of the decline in 2013, to a consistent 0.55ML/d between late 2013 and late 2014, after which extraction rates from the underground workings decreased to between 0.4ML/d and 0.35ML/d, with Aquade (2015) stating that the decreasing trend is likely to continue until the extraction rate is approximately 0.25ML/d.

Table 10
Cumulative Groundwater Extraction

Source[1]	Cumulative Extraction[1] (ML)	Maximum Sustained Extraction Rate (ML/d)
Groundwater Bores		
WB8	53.0	0.250
WB10	0.4	0.020
WB11	34.0	0.180
Back Bore	36.0	0.064
House Bore	1.2	0.026
Underground workings[1]		
Decline	~300ML	Max – Up to 1.0ML/d 2015 average -0.35ML/d to 0.40ML/d
Note 1: See **Figure 3**		
Note 2: Between October 2013 and June 2015		
Note 3: Net extraction = water removed less water pumped back underground		
Source: Aquade (2015) – After Table 1		

Aquade (2015) also reviewed the assumptions presented in Impax (2011) and monitoring results provided by the Proponent and note the following.

- The water table is a subdued reflection of the surface topography, with groundwater at higher elevations in the eastern section of the Project Site than in the western section. As a result, groundwater flows are expected to be east to west.
- The fact that the water table is tens of meters below the surface indicates that the underlying aquifer transmissivity is reasonably high.
- The gradient of the water table in the eastern section of the Project Site where the aquifer is dominated by rocks of the Mouramba Group is greater than in the western section of the Project Site which is dominated by the Lower Amphitheatre Group, indicating that the transmissivity of the Mouramba Group is greater than the Lower Amphitheatre Group.
- That the fracture permeability below 200mbgl is likely to be limited.
- That the transmissivities assumed by Impax (2011) are similar to those determined from monitoring of groundwater drawdown within the Project Site, however, the measured long-term specific yield (S_y) is generally greater than the equivalent storage coefficient values estimated by Impax (2011).

4.3.3 Management and Mitigation Measures

All management and mitigation measures identified in Section 4.3.4 of RWC (2011) and the *Water Management Plan* would continue to be implemented. In summary, these would include the following.

- Implement measures to prevent hydrocarbon contamination of surface water, groundwater or soils.
- Design and construct the Tailings Storage Facility in a manner that would minimise the risk of discharge or seepage of contaminated water.

4.3.4 Assessment of Impacts

Aquade (2015) determined based on a range of simulations that:

- an extraction rate of 1ML/d or 365ML/y would likely be sustainable for up to 10 years, provided that additional groundwater production and monitoring bores are constructed; and
- the groundwater inflow rate to the underground workings is expected to decrease from the current 0.35ML/d to a long-term yield of approximately 0.24ML/d.

Based on the above, the Proponent anticipates that potential groundwater-related impacts associated with the Proposed Modification would include the following.

- Increased extent of groundwater drawdown.

  Aquade (2015) determined that groundwater drawdown within the Project Site would be likely to be less than the current trigger level of 75mbgl identified in the *Water Management Plan*, with the exception of the southwest section of the Project Site (see below).

- Reduced groundwater quality.

  The Proposed Modification does not include any activities that would be likely to result in an increased risk of a degradation of groundwater quality.

- Impacts on surrounding groundwater users and groundwater dependent ecosystems.

  The Proponent notes that a bore belonging to a neighbouring, namely GW017386, is located to the southwest of the Project Site (**Figure 3**), potentially within an area where the standing water level may exceed the current trigger level of 75mbgl. This is consistent with the conclusions of Impax (2011). Continued monitoring of a monitoring bore within the Project Site in the vicinity of GW017386 will determine if there is any reduction in standing water levels in GW017386. If significant reductions are observed, the Proponent will ensure that continued access to water is maintained, either through deepening of GW017386 or providing an alternative water source.

No impacts to groundwater dependent ecosystems or surface discharges of groundwater are expected.

- Groundwater licencing.

  The proponent notes that it currently holds allocations to extract 240ML/y under WAL28773. In light of the proposed increased rate of production, the Proponent proposes to seek addition groundwater allocations. An assessment on 23 June 2015 of the depth of the water trading market in NSW identified that 379ML of allocation within the Lachlan Fold Belt Groundwater Source was available at between $550/ML and $1,000/ML. As a result, sufficient allocations are likely to be available for purchase should the Proposed Modification be approved. The Proponent would ensure that any required additional allocations would be purchased and transferred prior to groundwater extraction exceeding 240ML/y.

4.3.5 Monitoring

The groundwater monitoring program identified in the *Water Management Plan* would continue to be implemented. Aquade (2015) recommends that additional monitoring bores be installed and monitored as new production bores are constructed. The Proponent would ensure that this recommendation is implemented and that the *Water Management Plan* is amended to reflect the additional monitoring locations.

4.4 SURFACE WATER

4.4.1 Introduction

Strategic Environment and Engineering Consulting (SEEC) were engaged to prepare an update to the Mine's Erosion and Sediment Control Plan (ESCP) prepared to support PA 10_0191 (SEEC, 2011) based on the Proposed Modification The revised ESCP has been prepared in accordance with Landcom (2004) and DECC (2008), and is presented as **Appendix 4** and hereafter referred to as SEEC (2015). The following subsections present an overview of the results of that report.

4.4.2 Existing Setting

A description of the regional and local drainage is provided in Section 4.1.2 of RWC (2011) and remains unchanged. The Proposed Modification would result in changes to the Project Site drainage as presented in SEEC (2011).

4.4.3 Management and Mitigation Measures

The Proposed Modification would involve the construction of the proposed Northern Waste Rock Emplacement, extended ROM Pad, Hardstand Area and expanded car park. This would result in the need to relocate or construct new diversion drains and construct an additional sediment basin (**Tables 11** and **12**). SEEC (2015) presents the location of relocated and proposed sediment and erosion control structures.

4.4.4 Assessment of Impacts

The Proposed Modification would result in the construction of additional infrastructure and the disturbance of additional areas as presented in Sections 2.3 to 2.6. Given the implementation of the management and mitigation measures described in Section 4.4.3, the Proposed Modification would result in unacceptable discharges of sediment-laden water from the Project Site.

Table 11
Relocated / Proposed Diversion Drain Sizing and Details

Drain	Channel Slope (%)	Depth of Flow (m)	Velocity (m/s)	Base Width (m)	Channel Depth (m)	Side Slopes (V:H)
Clean Water Diversion Drains (CD)						
CD2	3.00	0.22	1.02	0.50	0.60	1:3
CD4	2.50	0.23	0.94	0.50	0.60	1:3
CD5	1.70	0.26	0.90	1.00	0.60	1:3
CD6	1.80	0.80	4.50	7.00	1.20	1:3
CD7	5.00	0.11	0.89	0.50	0.50	1:3
CD8	1.70	0.24	0.81	0.50	0.60	1:3
CD9	1.40	0.26	0.84	1.00	0.60	1:3
CD10	2.20	0.30	1.03	0.50	0.60	1:3
CD14	1.90	0.60	2.40	2.00	1.10	1:3
CD20	1.00	0.30	<2.00	0.50	0.50	1:3
CD21	1.00	0.30	<2.00	0.50	0.50	1:3
Dirty Water Diversion Drains (DD)						
DD1	3.50	0.37	1.72	2.00	0.70	1:3
DD2	2.00	0.39	1.40	3.00	0.70	1:3
DD4	1.00	0.29	0.80	2.00	0.60	1:3
DD7	0.50	0.20	1.00	0.50	0.50	1:3
DD8	0.50	0.20	1.00	0.50	0.50	1:3
Source: SEEC (2015)						

Table 12
Diversion Drain Sizing and Details

Sediment Basin	Total Volume	Sediment Storage Volume	Spillway Design		
			Base Width	Side Slopes	Depth
SB1 andSB2	2 820m^3	230m^3	12m	3:1 (V:H)	0.9m
Source: SEEC (2015)					

In addition, the Proposed Modification would not result in changes to the approved impacts associated with the following.

- Discharges from the final landform.
- Discharges of contaminated water.
- Surrounding surface water quality.

As a result, the Proponent contends that there would be no unacceptable surface water-related impacts as a result of the Proposed Modification.

4.4.5 Monitoring

The surface water monitoring program identified in Section 7.4 of the *Water Management Plan* (SEEC 2012) would continue to be implemented. The Proposed Modification would not require any amendments to the approved program. The results of this monitoring would continue to be made available on the Proponent's web site and would be presented and summarised within each AEMR.

4.5 NOISE AND BLASTING

4.5.1 Introduction

The Proponent notes that changes to noise-related impacts as a result of the Proposed Modification may result principally from the construction and operation of the proposed Northern Waste Rock Emplacement, extended ROM Pad, Hardstand Area and expanded car park.

Spectrum Acoustics developed a noise model and assessed potential noise and vibration-related impacts to support PA 10_0191 (Spectrum, 2011). Spectrum Acoustics was engaged to revise the noise model and to assess the changes to the noise environment based on the Proposed Modification. The resulting report presenting the revised noise assessment is presented as **Appendix 5** and is hereafter referred to as Spectrum (2015). The following subsections present an overview of that report.

No changes to blasting or off-site transportation operations are proposed. As a result, no changes to the noise or vibration-related impacts associated with these issues are anticipated and they are not discussed further within this document.

4.5.2 Existing Environment, Noise Criteria and Environmental Performance

With the exception of the commencement of the Mine, no significant changes in the noise environment surrounding the Project Site have occurred since finalisation of RWC (2011). As a result, the default *Industrial Noise Policy* assessment criteria identified in Section 4.5.3 of that document remain valid, namely:

- an $L_{eq(15\text{-minute})}$ operational noise assessment criterion for all periods of the day of 35dB(A); and
- an $L_{1(1\text{-minute})}$ sleep disturbance criterion of 45dB(A).

These criteria are consistent with those embodied in Condition 3(1) of PA 10_0191.

The environmental performance of the Mine in relation to operational noise is presented in Section 1.6.11. In summary, since the commencement of mining operations in 2013, one noise exceedance was recorded at Residence R3 in December 2013. No noise exceedances have been recoded since that date. An agreement between the Proponent and the occupier of residence R3 in relation to noise impacts has been signed.

4.5.3 Management and Mitigation Measures

All management and mitigation measures identified in Section 4.5.5 of RWC (2011) and the approved *Environmental Management Plan – Noise Management* (YTC, 2012) would continue to be implemented. In summary, these include the following.

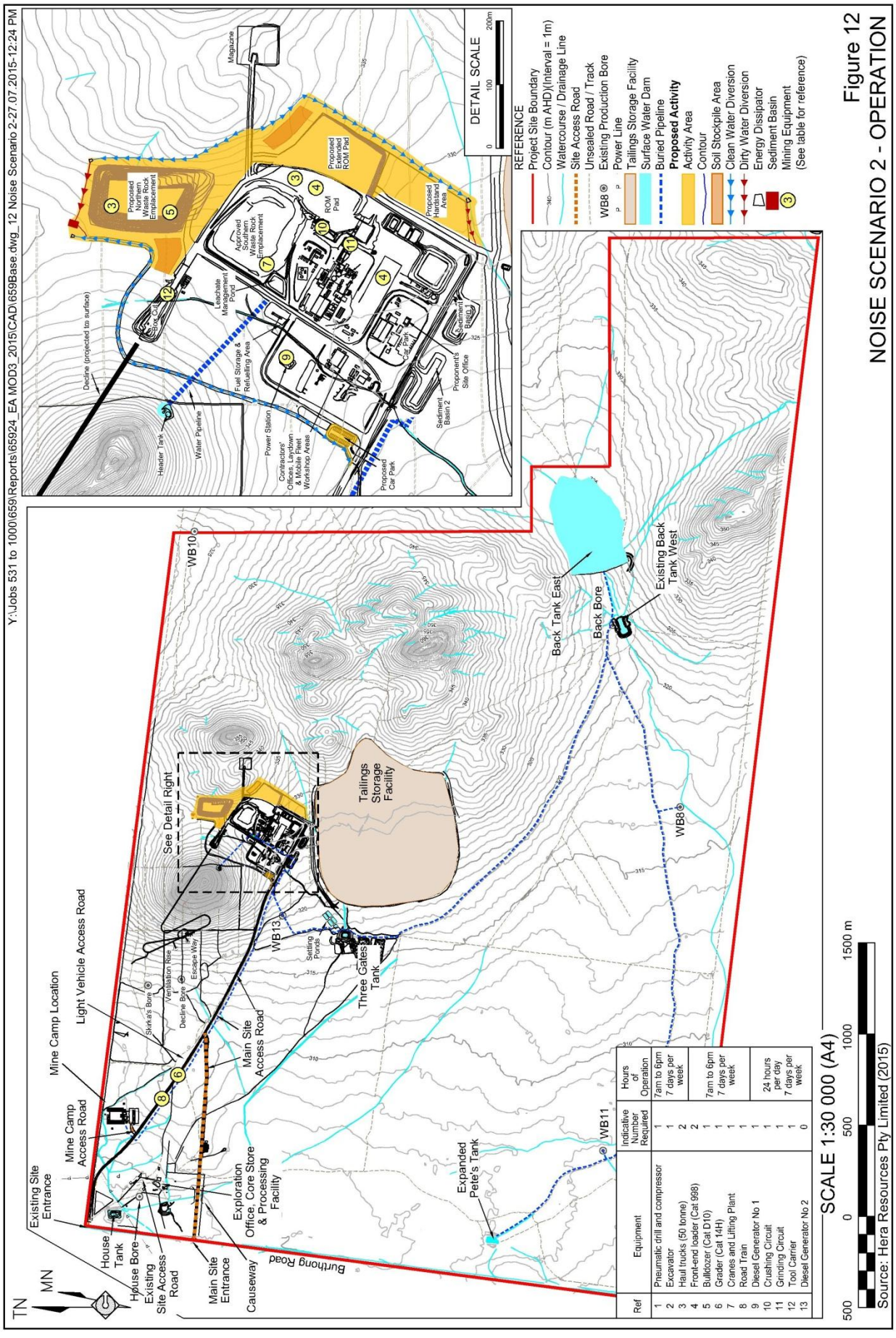
- Strictly comply with the approved hours of operation.
- Regularly service all equipment on site to ensure sound power levels of each item remains at or below the default/or factory-set values.
- Install frequency modulated reversing alarms to all mobile equipment.
- Prepare and implement a *Noise Management Plan*.
- Maintain an open dialogue with the surrounding community and neighbours to ensure any concerns over noise or vibration are addressed.

No additional noise management or mitigation measures are proposed, nor are any required.

4.5.4 Assessment of Impacts

Impacts to the four closest surrounding residences (**Figure 4**) were assessed using the noise scenario presented in **Figure 12** to obtain predicated operational noise levels at each of these residences.

Tables 13 and **14** present the results of the noise assessment, including a comparison to the results of Spectrum (2011).



Ref	Equipment	Indicative Number Required	Hours of Operation
1	Pneumatic drill and compressor	1	7am to 6pm 7 days per week
2	Excavator	1	
3	Haul trucks (50 tonne)	2	
4	Front-end loader (Cat 998)	2	
5	Bulldozer (Cat D10)	1	7am to 6pm 7 days per week
6	Grader (Cat 14H)	1	
7	Cranes and Lifting Plant	1	
8	Road Train	1	
9	Diesel Generator No 1	1	24 hours per day 7 days per week
10	Crushing Circuit	1	
11	Grinding Circuit	1	
12	Tool Carrier	1	
13	Diesel Generator No 2	0	

Table 13
Predicted Operational Noise Levels

Residence	Predicted Noise Level (Spectrum, 2011) dB(A), $L_{eq(15min)}$		Predicted Noise Level (Spectrum, 2015) dB(A), $L_{eq(15min)}$		Criterion dB(A), $L_{eq(15min)}$	Differential dB(A), L_{max}	
	Neutral	Inversion	Neutral	Inversion		Neutral	Inversion
R1	<20	<20	<20	<20	35	0	0
R2	<20	<20	<20	<20	35	0	0
R3	25	35	26	35	35	+1	0
R4	<20	28	<20	29	35	0	+1
Source: Spectrum (2015)							

Table 14
Predicted Sleep Disturbance Levels

Residence	Predicted Noise Level (Spectrum, 2015 dB(A), L_{max}	Predicted Noise Level (Spectrum, 2011) dB(A), L_{max}	Sleep Disturbance Criterion dB(A), L_{max}	Differential dB(A), L_{max}
R1	30	30	45	0
R2	31	31	45	0
R3	40	39	45	+1
R4	35	33	45	+2
Source: Spectrum (2015)				

The Proposed Modification would not result in noise levels that exceed criteria at any residence and would not significantly alter existing noise levels. As a result, the Proponent contends, that there would be no unacceptable noise-related impacts as a result of the Proposed Modification.

4.5.5 Monitoring

The noise monitoring program identified in Section 6 of YTC (2012) would continue to be implemented. The Proposed Modification would not require any amendments to the approved program. The results of this monitoring would continue to be made available on the Proponent's web site and would be presented and summarised within each AEMR.

4.6 ABORIGINAL AND HISTORIC HERITAGE

4.6.1 Introduction and Existing Setting

A heritage assessment of the original application for Project Approval was undertaken by OzArk and is referred to hereafter as OzArk (2011b). In addition, a subsequent assessment was undertaken following feedback from Office of Environment and Heritage in relation to the adequacy of an earlier survey relied upon by OzArk (2011b), namely Appleton (2004). The resulting report, referred to hereafter as OzArk (2012) covered that section of the Project Site that had been the subject of the Appleton (2004) survey.

No objects of Aboriginal heritage significance were identified within the Project Site by OzArk (2011b) or (2012). In addition, no objects of suspected Aboriginal heritage significance were identified during the construction phase for the Mine or subsequently.

No objects of historic heritage significance were identified within the Project Site. However, a number of trees with unusual notches were noted. These were identified as possible wood getters notches that may have been used to facilitate removal of the upper branches of eucalypts for mine timbers.

4.6.2 Assessment of Impacts

As no objects of Aboriginal or historic heritage significance have been identified within the Project Site, the proposed disturbance of approximately 7.2ha of additional land would not result in significant impacts to Aboriginal heritage.

4.6.3 Monitoring

The unanticipated finds procedure identified in the *Aboriginal Heritage Management Plan* would continue to be implemented and would ensure that any objects identified during site preparation activities would be appropriately protected and managed.

4.7 AIR QUALITY AND GREENHOUSE GAS

4.7.1 Introduction

An air quality and greenhouse gas assessment was conducted by Environ Australia Pty Ltd and is referred to hereafter as Environ (2011). The assessment identified that an adverse, dust-related cumulative impacts upon the environment surrounding the Project Site were unlikely, and that the greenhouse gas emissions associated with the Mine would be negligible.

An *Air Quality and Greenhouse Gas Environmental Management Plan* were prepared in 2012 (YTC, 2012b). The Proponent has implemented a real-time meteorological monitoring program in accordance with the recommendations of OEH's *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007).*

4.7.2 Existing Setting and Environmental Performance

The environmental performance of the Mine in relation to air quality is presented in Section 1.6.3. In summary, since the commencement of mining operations in 2013, the results of the air quality monitoring may be summarised as follows.

- Deposited dust – all deposited dust levels are less than the permissible 4g/m^2/month averaged over 12 months

- Suspended dust – A High Volume Air Sampler (HVAS) was installed in July 2013 to monitor PM_{10} and Total Suspended Particles (TSP). The monitor was originally located in an area where vehicular traffic generated dust that was then recorded as exceedances of the relevant criteria. In February 2014 the HVAS was moved to an alternate location (**Figure 4**). Since that date, the 24-hour PM_{10} concentrations have been significantly below the 50µg/m^3 criterion.

No dust complaints have been received since March 2013.

4.7.3 Assessment of Impacts

The Proposed Modification would result in additional clearing of approximately 7.2ha of vegetation and additional material handling activities on the proposed Northern Waste Rock Emplacement and enlarged ROM Pad.

In assessing the anticipated impacts of the Proposed Modification, the Proponent notes the following.

- The Proposed Modification would result in a minor increase in the approved disturbance area.
- The closest non-Project related residential receiver (Residence R3) is located approximately 2.6km from the Northern Waste Rock Emplacement.
- The closest Project-related residential receiver is the Mine Camp, located approximately 1.7km from the Northern Waste Rock Emplacement.
- Environ (2011) determined that Mine would contribute approximately 0.5µg/m^3 of PM_{10} at Residence R3.
- Monitoring of PM_{10} since the HVAS was relocated has indicated that 24-hour average PM_{10} concentrations are significantly less than the 50µg/m^3 criterion.

As a result, the Proponent contends that there would be no unacceptable air quality-related impacts as a result of the Proposed Modification.

4.7.4 Monitoring

The air quality monitoring program identified in Section 6 of the *Air Quality and Greenhouse Gas Management Plan* would continue to be implemented. The Proposed Modification would not require any amendments to the approved program. The results of this monitoring would continue to be made available on the Proponent's web site and would be presented and summarised within each AEMR.

4.8 TRAFFIC AND TRANSPORTATION

The Proposed Modification would not result in any changes to the approved rate of Mine-related transportation. The Proposed Modification would, however, extend the period over which that transportation may occur by two years, namely from 31 December 2020 to 31 December 2022.

Potential impacts associated with the proposed increase in mine life may include additional wear and tear on the road network. However, the Proponent notes that a Voluntary Planning Agreement has been negotiated with both Cobar and Bogan Shire Councils.

The agreement with Cobar Shire Council includes an annual contribution to road maintenance. At present that agreement is for a period of 5.5 years, with six annual payments to be made. The initial payment of $63,700 was made on 20 April 2015. The Proponent anticipates that a modification to that agreement would be sought to extend the period over which the agreement applies to cover the proposed additional Mine life, including additional annual payments.

In addition, the Proponent and Cobar Shire Council have completed necessary assessment of the intersection of the Burthong and Nymagee Hermidale Roads and road works to modify this intersection at the cost of the Proponent are scheduled for late 2015.

The agreement with Bogan Shire Council covers the maintenance of the Nymagee – Hermidale Road, with maintenance costs shared between the Proponent and Council. The Proponent received and paid the initial invoice for road maintenance activities in June 2015.

In light of the above, the Proponent contends that there would be no unacceptable traffic or transportation-related impacts as a result of the Proposed Modification.

4.9 SOIL AND LAND CAPABILITY

4.9.1 Introduction

A soil and land capability assessment of the original application for Project Approval was undertaken by SEEC and is referred to hereafter as SEEC (2011b). The following assessment of soils and land capability-related impacts has been undertaken by RWC, drawing information from SEEC (2011b), to determine the potential impact of the additional soil disturbed.

4.9.2 Existing Setting

SEEC (2011b) identifies that the area of proposed additional disturbance occurs within the Yackerboon Land System. That land system comprises three soil units as follows.

- Unit 1 – Ridge Crests: Acid Red Earths with areas of loamy Lithosols. Abundant quartz and other gravel.
- Unit 2 – Ridge Slopes: Neutral pH Red Earths and areas of calcareous red earths.
- Drainage Tracts: Calcareous Red Earths with pockets of deep sandy alluvial soil.

As the Project Site is located in Far Western NSW there is no Agricultural Land Classification mapping available. However, SEEC (2011b) concluded that the Agricultural Land Classes applicable to the Project Site are:

- Class IV for Red Earths; and
- Class V for Lithosols.

4.9.3 Management and Mitigation Measures

The Proposed Modification would disturb approximately 7.2ha of the Yackerboon Land System. All management and mitigation measures identified in Section 4.10.3 of RWC (2011) and summarised in Section 2.3.4 of this document would continue to be implemented. In particular, topsoil located within the areas of disturbance would be stripped to a depth of 30cm and stored within soil stockpiles shown on **Figures 5** to **7**.

No additional measures are required to manage the disturbance associated with the Proposed Modification.

4.9.4 Assessment of Impacts

The Proposed Modification would result in disturbance of an additional approximately 7.2ha of soils. Based on a stripping depth of approximately 30cm, approximately 21 600m^3 of soil would be stripped as a result of the Proposed Modification, with the indicative location of the soil stockpiles shown in **Figures 5** to **7**.

The Proposed Modification, whilst resulting in a slightly larger disturbance area than the approved Project, would follow the previously identified and accepted soil management and mitigation practices.

As a result, the Proponent contends, that there would be no unacceptable soil or land capability-related impacts as a result of the Proposed Modification.

4.10 VISUAL AMENITY

4.10.1 Introduction

An assessment of visual amenity has been undertaken for the Proposed Modification, drawing information from RWC (2011) to determine the potential impact of the disturbed area. The following subsections present an assessment of visual amenity-related impacts as a result of the Proposed Modification.

4.10.2 Existing Setting

As presented in Section 4.11.2 of RWC (2011), the existing visual character surrounding the Project Site is consistent with rural lands in western NSW, namely a combination of exposed and vegetated land supporting agricultural activities and residential buildings in a flat to gently undulating landscape.

The Northern Waste Rock Emplacement is likely to be the item of proposed infrastructure that has the greatest potential to be visible from vantage points to the north of the Project Site. **Plates 2** to **4** present views of the Project Site of the Project Site from Burthong Road. In summary, views from these locations are restricted by vegetation, in particular cypress pines which have dense vegetation to ground level.

Plate 2 View from Burthong Road looking south

4.10.3 Assessment of Impacts

Views of the Mine from the south are unlikely to change as a consequence of the Proposed Modification as the tailings storage facility would limit the visibility of the proposed Northern Waste Rock Emplacement, extended Rom Pad, Hardstand Area and Car Park from the south.

Views of the Mine from the East are unlikely to change as a consequence of the Proposed Modification, as topography limits the views of the Mine from the Nymagee-Condobolin Road.

Plate 3 View from Burthong Road looking southeast

Plate 4 View from Burthong Road looking east-northeast

The visibility of the Mine from the north and west may be increased as a result of the Proposed Modification. However, as indicated previously, visibility would be limited by screening of native vegetation and distance from publicly accessible vantage points.

Based on the relative isolation of the Mine from surrounding residential locations and public vantage points, such as major roads, combined with the fact that topography and native vegetation limits the visibility of the Mine, the Proponent contends that there would be no unacceptable visual impacts as a result of the Proposed Modification.

4.11 BUSHFIRE HAZARD

4.11.1 Introduction

A bushfire hazard assessment has been undertaken by RWC, drawing information from RWC (2011) to determine the potential impact of the Proposed Modification. The following subsections present an assessment of bushfire-related impacts as a result of the Proposed Modification.

4.11.2 Existing Setting and Management Measures

The bush fire attack category of the Mine was determined to be Level 3 (Extreme) by RWC (2011) based on the fire danger index, the vegetation and fuel load within the Project Site and the topography of the Project Site. It was determined that given the management and mitigation measures described in Section 4.12.3 of RWC (2011), the Mine was unlikely to increase the fire hazard rating of the Project Site and the surrounding areas.

The Proponent would ensure that management and mitigation measures identified in RWC (2011) would be implemented to minimise the fire hazard rating of the Proposed Modification.

4.11.3 Assessment of Impacts

The Proposed Modification would result in the construction of additional infrastructure and the clearing of additional vegetation as presented in Section 2. However, the proposed infrastructure would not be susceptible to bushfire attack. In addition, the Proposed Modification would not increase the risk of a bushfire being started within the Project Site.

As a result, the Proponent contends, that there would be no unacceptable bushfire-related impacts as a result of the Proposed Modification.

4.12 WASTE MANAGEMENT

4.12.1 Introduction

RWC (2011) identifies five waste streams, of which only one, waste rock, would be affected by the Proposed Modification. An assessment of waste management has been undertaken by RWC, drawing information from RWC (2011), to determine the potential impact of the Proposed Modification. The following subsections present an assessment of waste management-related impacts as a result of the Proposed Modification.

4.12.2 Design Features, Operational Controls and Management Measures

Figure 6 and Section 2.3 present the design features of the proposed Northern Waste Rock Emplacement, which would store only non-acid forming waste rock. The design features of the approved Waste Rock Emplacement are presented in Section 2.6 and Section 2.7.3 of RWC (2011). As indicated in Section 2.3.2, the approved Waste Rock Emplacement would be used to store potentially acid forming waste rock only.

Operational controls and management measures that would be implemented are presented in Section 2.7.3 of RWC (2011) and Section 2.3 of this document. In summary, key operational controls and management measures would be as follows.

- All waste rock material would be classified as non-acid forming or potentially acid forming prior to extraction and transportation to the surface, with non-acid forming material placed within the Northern Waste Rock Emplacement only and potentially acid forming material within the approved Southern Waste Rock Emplacement only.
- Surface water within the Southern Waste Rock Emplacement would be collected and treated as contaminated water.
- Surface water within the Northern Waste Rock Emplacement would be managed as part of the Mine's dirty water system.
- Potentially acid forming waste rock would preferentially be transported underground for placement within stopes. Non-acid forming waste rock would be preferentially retained at surface for use during rehabilitation of the Project Site.

4.12.3 Assessment of Impacts

The Proposed Modification is expected to facilitate appropriate management of waste rock within the Project Site, enabling better separation of potentially acid forming and non-acid forming materials.

As a result, the Proponent contends that the Proposed Modification would result in improved waste management and reuse.

4.13 SOCIO-ECONOMIC CLIMATE

4.13.1 Introduction

An analysis of the socio-economic climate associated with the Mine has been undertaken by RWC, drawing information from RWC (2011) to determine the potential impact of the Proposed Modification. The following subsections present an assessment of socio-economic impacts as a result of the Proposed Modification.

4.13.2 Existing Setting

Section 4.16 of RWC (2011) identifies the socio-economic setting of the Mine and surrounding community which may be summarised as follows.

- The Project Site is located within the Cobar Local Government Area, approximately 4k south of the village of Nymagee and 100km southeast of Cobar.
- The 2006 Census identified the following statistics in relation to the State Suburb of Nymagee, the wider Cobar Local Government Area and NSW as a whole.
  - Nymagee had a population in 2006 of 108 persons, with 4 919 residing within the Cobar Local Government Area, with a slight decline in the population of both between the 2001 and the 2006 census.
  - The unemployment rate in Nymagee in 2006 was 24% compared with the average for Cobar Local Government Area and the State of 4.9% and 6.0% respectively, with agriculture being the dominant industry in 2006.
  - Median household income in Nymagee in 2006 was $579 per week, substantially less than the median incomes for the Cobar Local Government Area and NSW as a whole.
  - Median housing costs in Nymagee in 2006 were substantially less than those in Cobar or NSW as a whole.
- Nymagee is a small community, with 55 occupied residences in 2011. The village includes a range of community facilities, including a hall, sporting fields and air strip, with the residents reliant on Cobar for services and access to social, commercial, education and employment facilities.

Since commencement of the Mine, a range of employment and other opportunities for residents of Nymagee have been developed, generating economic activity that would not otherwise have existed. However, a range of impacts on the community have also occurred, principally related to increased traffic levels and noise. The Proponent has, to the extent practicable, consulted with individual residents and the community as a whole to ensure that it is able to identify and address issues as they arise.

4.13.3 Assessment of Impacts

Section 2.8 identifies the economic contribution of the Mine as approved and as proposed. In summary, the Proposed Modification would result in payment annually of approximately:

- $15 million in wages and salaries (up from $13 million);
- $55 million in goods and services (up from $50 million); and
- $3 million in royalties (up from $2 million).

A proportion of these payments would be retained within the area immediately surrounding the Project Site, including within Nymagee and the wider Cobar Local Government Area, providing economic stimulus to the local economy. The Mine also provides an opportunity for training and development of local and other personnel.

In addition, the Proponent ensures that it regularly consults with the local community to ensure that any issues of concern are addressed as soon as practicable.

As a result, the socio-economic impact of the Mine as approved and the Proposed Modification are overwhelmingly positive.

5. EVALUATION AND JUSTIFICATION OF THE PROPOSED MODIFICATION

5.1 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

5.1.1 Introduction

Throughout the design of the Hera Project, both in its original application for Project Approval and the Proposed Modification, the Proponent has endeavoured to address each of the sustainable development principles. The following subsections draw together the features of the Proposed Modification that reflect the four principals of sustainable development, namely:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing on environmental resources.

5.1.2 The Precautionary Principle

The Precautionary Principle identifies that if there are threats of serious or irreversible environmental damage; lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In preparing and planning the Proposed Modification, the Proponent engaged the Specialist Consultants identified in Section 1.8 to provide advice or to assess critical aspects of the Proposed Modification. Each of these specialists are experts in their field and provided the Proponent with detailed and specific advice and recommendations which the Proponent has adopted. These specialists have also undertaken an assessment of the Proposed Modification and determined, based on their experience and expertise, that the Proposed Modification would not significantly impact on the particular aspect of the environment the subject of their assessment.

This approach demonstrates that throughout the development of the Proposed Modification, the Proponent and its consultants have, by undertaking an appropriate level of research, baseline investigations and environmental evaluation, adopted an anticipatory approach to potential impacts. These controls, safeguards and/or mitigation measures have therefore been planned with a comprehensive knowledge of the existing environment and the potential risk of environmental degradation posed by the Proposed Modification.

5.1.3 Social Equality

Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes both inter-generational (between generations) and intra-generational (within generations) equity considerations.

If approved, the Proposed Modification would ensure intra-generational equality through:

- its commitment to provide employment and training opportunities for members of the community surrounding the Project Site, without adversely affecting the ability of other employers in the community to maintain suitably qualified staff;
- support for the community through increased economic activity and infrastructure improvements (e.g. purchase of locally produced goods and services and the continued contribution to the maintenance of roads used by Proponent-generated traffic); and
- informal support for the community through continuation of the Proponent's local-first purchasing policy and support to community organisations, groups and events.

If approved, the Proposed Modification would ensure inter-generational equality through:

- the establishment of a final landform that would be safe, stable, non-polluting, self-sustaining and suitable for a final land use of a combination of agriculture and conservation of biodiversity; and
- ongoing weed management and habitat conservation works.

The Proposed Modification would ensure that the Mine is as robust as possible, and that resources would continue to be available to ensure that these benefits would continue.

5.1.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short- or long-term.

Additional disturbance associated with the Proposed Modification would be limited to 7.2 ha of vegetation. The limited areas of disturbance to native vegetation and fauna habitats associated with the Proposed Modification would be compensated for the extension of the Biodiversity Offset Strategy. As a result, the Proposed Modification would minimise the potential impacts on threatened flora and fauna to the greatest extent practicable.

5.1.5 Improved Valuation and Pricing of Environmental Resources

The issues that form the basis of this principle relate to:

- the acceptance that all resources are appropriately valued;
- cost-effective environmental stewardship is adopted; and
- the adoption of user pays prices based upon the full life cycle of the costs.

In line with these objectives, the Proponent's principal objective of the Proposed Modification is the design and operations of the Mine in a manner that minimises impacts on the environment and surrounding residents, as well as researching, planning and designing of the environmental safeguards and mitigation measures to prevent irreversible damage to environmental resources. In doing so, the Proponent has and would continue to invest considerable resources in the management and mitigation of environmental risks. In addition, the Proponent contends that the Proposed Modification, if approved, would ensure that the Mine is sufficiently robust to ensure that sufficient resources are available to undertake all environmental-related tasks and meet any commitments made to the local community.

5.1.6 Conclusion

The approach taken in planning for this Proposed Modification has been multi-disciplinary and involved consultation with the community, a range of Specialist Consultants and various government agencies. Emphasis has been placed on the application of appropriate safeguards to minimise any additional and potential environmental, social and economic impacts that may occur as a result of the Proposed Modification. The design of the Proposed Modification has addressed each of the sustainable development principles and, on balance, it is concluded that the Proposed Modification achieves a sustainable outcome for the local and wider environment.

5.2 JUSTIFICATION OF THE MODIFICATION

5.2.1 Introduction

In assessing whether the Proposed Modification is justified, consideration has been given both to the predicted residual impacts on the local and wider environment and the potential benefits the Proposed Modification, if approved, would have for the Proponent, surrounding land owners and residents, the Nymagee community, the Cobar LGA, NSW and Australia. Further justification arises from the controls, safeguards and mitigation measures for impact minimisation proposed by the Proponent and the incorporation of the principles of Ecologically Sustainable Development.

This subsection discusses the above in terms of biophysical and socio-economic considerations. It also discusses the consequences of the Proposed Modification not proceeding.

5.2.2 Biophysical Considerations

The following presents an overview of the range of additional residual impacts on the biophysical environment should the Proposed Modification proceed.

- Ecology – an assessment of the proposed areas of disturbance, as well as the approved Biodiversity Offset Area was undertaken following *Framework for Biodiversity Assessment 2014.* That assessment determined that there would be no significant impacts on threatened species, populations or endangered ecological communities. In addition, the assessment determined that with the addition of a further 18ha to the current Biodiversity Offset Strategy, a Tier 1 Biodiversity Offset Outcome may be achieved.

- Groundwater – an assessment of the surrounding aquifer was undertaken based on groundwater extraction and monitoring results since the commencement of mining. That assessment concluded that extraction of up to 365ML/y of groundwater would be sustainable, provided that additional infrastructure is installed. In addition, the additional extraction would be unlikely to result in groundwater drawdown in excess of the *Water Management Plan*-identified trigger level of 75mbgl. Finally, the Proponent has established that there is sufficient depth in the water trading market to enable it to purchase the required additional water allocation.
- Surface Water – the Proposed Modification would result in the construction or relocation of diversion drains and sediment basins, leading to changes to the Project Site drainage. Given that appropriate sediment and erosion controls would be installed, the Proposed Modification would not result in adverse impacts on the surface water environment within and surrounding the Project Site.
- Noise and Blasting – revised noise modelling identifies that noise levels as a result of the Proposed Modification would remain below the relevant noise criteria at all times. However, minor increases in noise levels up to 1dB(A) anticipated at one residence during operations under neutral conditions, and an increase of up to 1dB(A) is anticipated at one residence during operations under temperature inversion conditions. A minor increase in sleep disturbance levels of between 1dB(A) and 2dB(A) is anticipated.
- Air Quality and Greenhouse Gas – monitoring has indicated that 24-hour average PM_{10} concentrations and monthly deposited dust levels are significantly less than the relevant criteria. Given that the Proposed Modification would result, minor changes to the approved disturbance area and activities, the Proposed Modification is not anticipated to result in significant air quality-related impacts.
- Soil and Land Capability – the Proposed Modification would result in the stripping of approximately 21 600m^3 of soil. Given that appropriate soil management and mitigation practices would be followed, it is considered that impacts to soil and land capability would be acceptable.
- Waste Management – the Proposed Modification would result in better separation of potentially acid forming and non-acid forming waste rock, resulting in improved waste management.

Finally, the residual impacts associated with Aboriginal and historic heritage, traffic and transportation, visual amenity and bushfire hazards would be negligible.

The Proposed Modification would therefore provide for the extraction and processing of valuable resources, while not imposing any significant adverse environmental impacts upon local residents, sensitive receivers or the environment.

5.2.3 Socio-Economic Considerations

The Proposed Modification, if approved, would provide several economic benefits to the local and regional socio-economic setting, including the following.

- Continued employment of approximately 100 full-time equivalent positions until 2022 (an increase of two years).
- Wherever practicable, employees would be sourced from within the Cobar LGA, and even if drawn from further afield would be encouraged to reside locally.

The continued employment opportunities associated with the Proposed Modification, if approved, would have additional flow-on benefits including:

- Contribution of approximately $15 million per year to the local and wider economy through wages and salaries;
- Support of local community services and projects;
- Approximately $55 million per year to the local, State and national economy through the purchases of goods and services;
- Approximately $300 000 and $3 million per year to the Local and State and Governments through the payment of voluntary contributions and royalties.

The Proposed Modification would ensure that the Mine is economically robust and would continue to operate until the end of 2022, an increase of two years. The ability to continue and extend the operation of the Mine would ensure that the above socio-economic benefits would continue to flow to the surrounding community for an extended period.

It is acknowledged that while impacts on the biophysical environment have been assessed as complying with nominated criteria or meeting environmental standards, the cumulative effect of these minor impacts may have some adverse effect on the socio-economic setting. This is often expressed as a reduction in the amenity of the local area.

An objective assessment of this impact on local amenity is difficult as what one person may consider as acceptable, may not be considered acceptable to another person. However, based on experience obtained from the assessment of similar mining developments, it is noted that the perceived impact of a project on local amenity is generally far greater than the actual impact. With respect to the Proposed Modification, where all biophysical impacts are assessed as complying with nominated criteria or standards, it is considered unlikely for impacts on local amenity to be unacceptable to a reasonable person.

5.2.4 Consequences of Not Proceeding with the Proposed Modification

The consequences of not proceeding with the Proposed Modification include the following.

- Forego the opportunity to extract the additional identified resources and extend the life of the Mine by two years.

- Inability to adequately store and separate acid forming and non-acid forming waste rock at the surface, adequately store and blend ore or store equipment and bulky items, introducing inefficiencies in the approved mining operation.
- Forego the opportunity to increase the efficiencies of the approved Mine, resulting in a less robust Mine.

It is therefore considered that the benefits of proceeding with the Proposed Modification far outweigh the minor impacts on the environment that would result.

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