



Evolution
MINING

SECTION 1

Introduction

SECTION 2

Description of Approved Cowal Gold Operations

SECTION 3

Description of the Modification

**COWAL GOLD OPERATIONS
MINE LIFE MODIFICATION**

Environmental Assessment
2016

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1 INTRODUCTION

This document is an Environmental Assessment (EA) for a modification to the Cowal Gold Operations (CGO), which is located approximately 38 kilometres (km) north-east of West Wyalong in New South Wales (NSW) (Figures 1-1 and 1-2).

Evolution Mining (Cowal) Pty Limited (Evolution) is the owner and operator of the CGO.

This EA has been prepared to support a request to modify the CGO Development Consent (DA 14/98) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) for the CGO Mine Life Modification (the Modification). A copy of the CGO Consolidated Development Consent (DA 14/98) is provided in Attachment 1.

The Modification involves the continuation of open pit mining and processing operations at the CGO for an additional operational life of approximately 8 years (i.e. to end 2032).

1.1 EXISTING COWAL GOLD OPERATIONS OVERVIEW

The location of the CGO is shown on Figures 1-1 and 1-2. The area of land to which the CGO's Development Consent (DA 14/98) is relevant includes that underlying Mining Lease (ML) 1535 and the CGO's water supply pipeline and Bland Creek Palaeochannel Borefield (Figures 1-1 and 1-2).

In addition, Evolution holds Development Consent (DA 2011/64) for the operation of the Eastern Saline Borefield (Figure 1-2) which was granted by the Forbes Shire Council on 20 December 2010.

ML 1535 encompasses approximately 2,650 hectares (ha). It is bordered by Evolution's Exploration Licence (EL) 7750 and is north-west of Evolution's EL 1590 (Figure 1-1).

Relevant land ownership within the immediate vicinity of the CGO is shown on Figures 1-3a and 1-3b.

Open pit mining operations at the CGO are supported by on-site facilities including water management infrastructure/storages, a process plant and TSFs. Mined waste rock from the open pit is hauled to waste rock emplacements. Ore mined from the open pit is hauled directly to the primary crusher (adjacent to the process plant), run-of-mine (ROM) pads or low grade ore stockpiles prior to processing.

Mineralised material is also separately stockpiled for potential future processing.

Gold is extracted from the ore using a conventional carbon-in-leach cyanide leaching circuit in the process plant. Tailings are pumped from the process plant via a pipeline to the TSFs. The gold product is recovered and poured as gold bars or doré.

A detailed description of existing operations at the CGO is provided in Section 2.

1.2 MODIFICATION OVERVIEW

The Modification involves continued operations at the existing CGO within ML 1535 for an additional 8 years to allow an additional 1.7 million ounces (Moz) of gold production (i.e. a total of approximately 5.5 Moz over the life of the modified CGO).

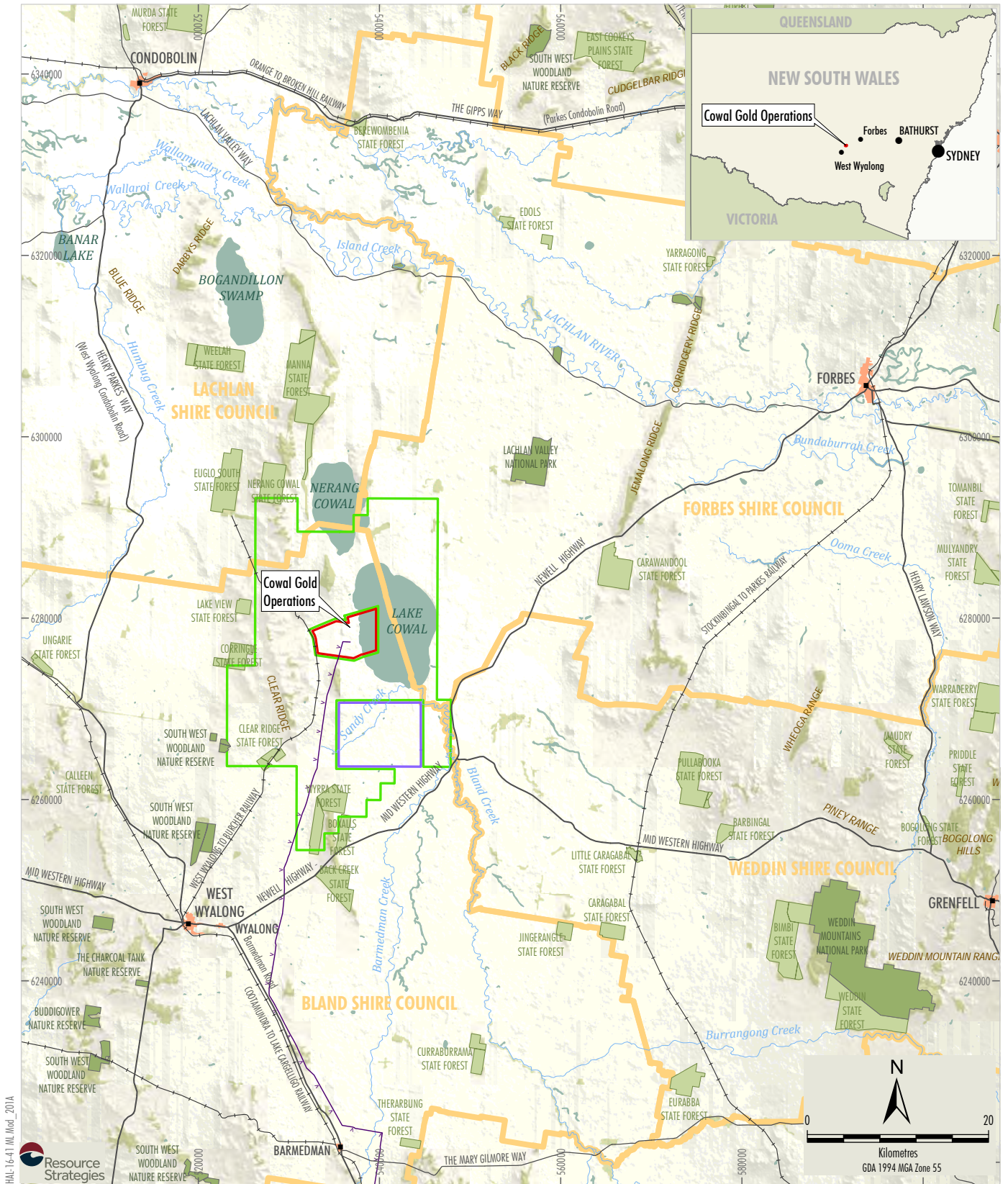
To allow the increase in the total gold produced over the life of the CGO, an increase to the depth of the existing open pit would be required to access additional gold-bearing ore (Figure 1-4).

Existing CGO infrastructure would continue to be used for the Modification, with some alterations where necessary, including modification of the existing TSFs to maximise/increase tailings storage capacity (Figure 1-4) and upgrades to the existing leach circuit within the process plant.

In general, there would be no change to the existing functionality of the CGO due to the Modification, as the Modification would involve:

- continued mining in the existing open pit for the extraction of gold-bearing ore and waste rock;
- continued use of existing waste rock emplacements for the placement of waste rock extracted from the open pit;
- continued use of existing ore processing infrastructure, with some upgrades to the leach circuit; and
- continued use of existing TSFs, with some alterations to increase the storage capacity of the facilities.

Table 1-1 provides a summary comparison of the approved CGO and the Modification components.



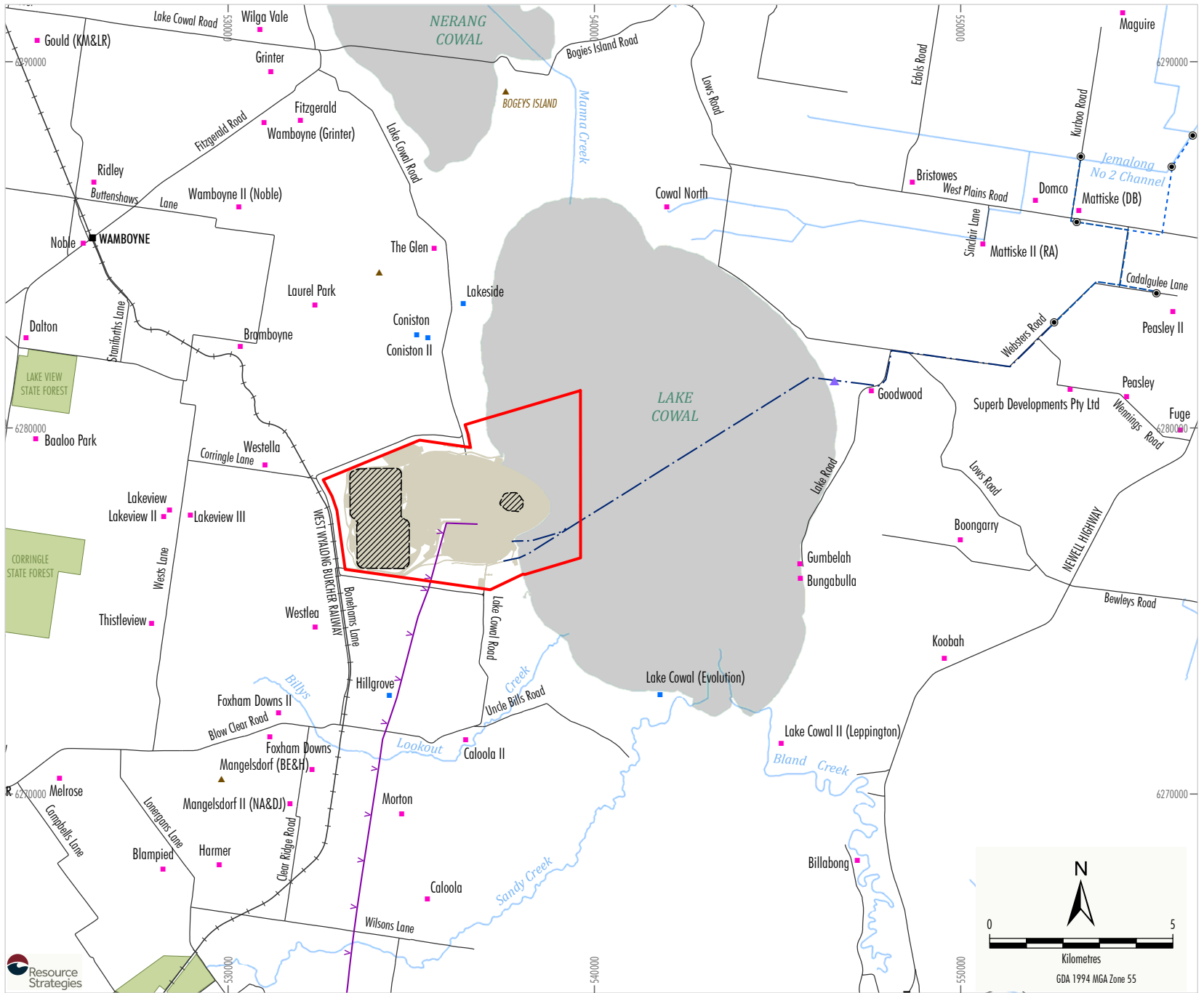
- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Exploration Licence (EL 1590)
 - Exploration Licence (EL 7750)
 - National Park & Nature Reserve
 - State Forest
 - Local Government Area Boundary
 - Electricity Transmission Line
 - Railway

Source: Geoscience Australia (2006); NSW Department of Industry (2016)



CGO MINE LIFE MODIFICATION
Regional Location

Figure 1-1



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Approximate Extent of Approved Surface Development
 - Modification Components
 - State Forest
 - Company-owned
 - Privately-owned
 - Railway
 - Electricity Transmission Line
 - Mine Water Supply Pipeline
 - Bland Creek Palaeochannel Borefield
 - Eastern Saline Borefield
 - ▲ Eastern Pump Station

Source: Evolution (2016); Land and Property Information (2016)



CGO MINE LIFE MODIFICATION
Cowl Gold Operations Location

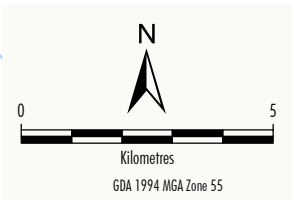
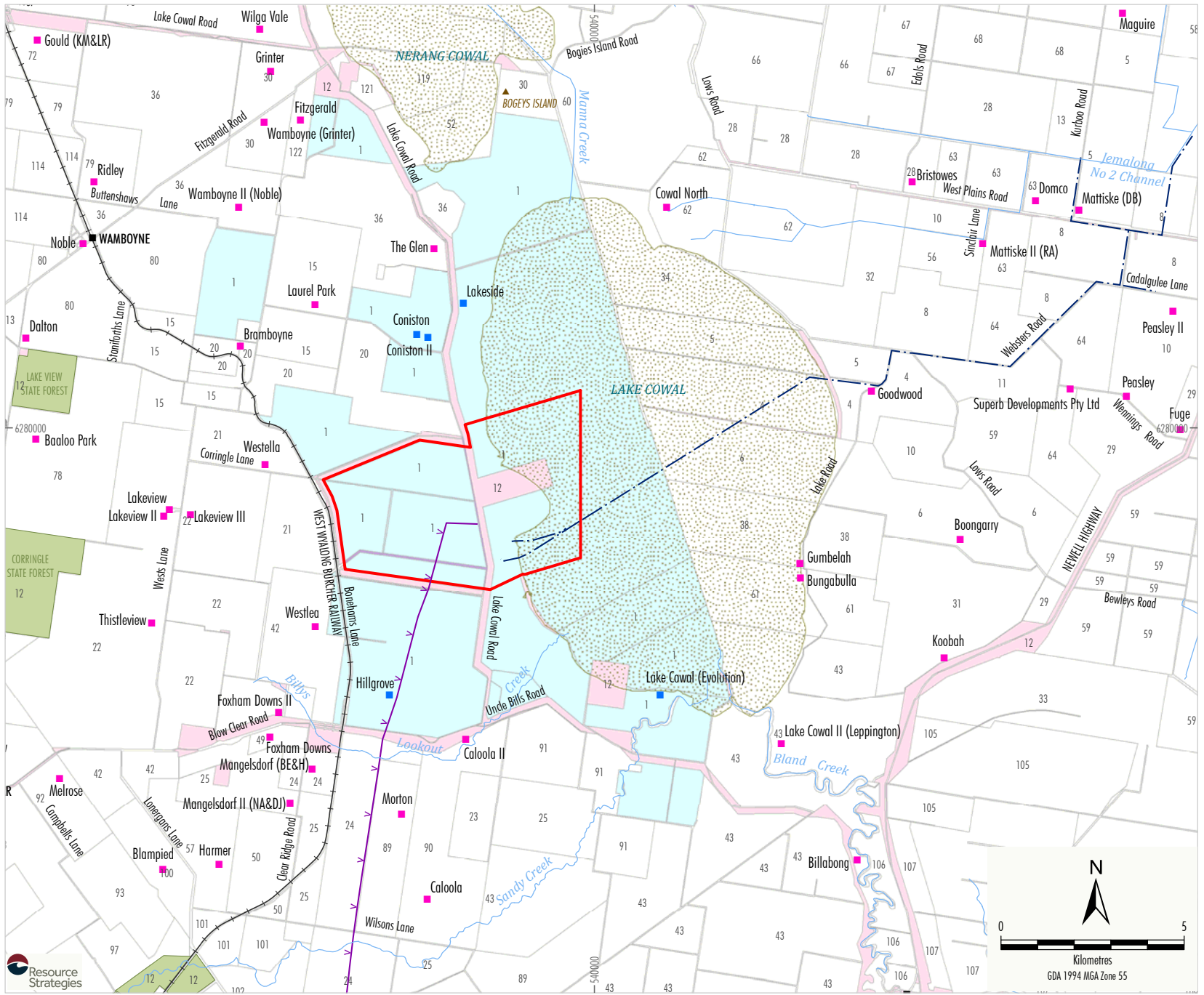


Figure 1-2



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Railway
 - Pipeline
 - Electricity Transmission Line
 - State Forest
 - Company-owned
 - Crown Land
 - Local Government
 - Privately Owned
 - Company-owned Dwelling
 - Privately-owned Dwelling

Refer to Figure 1-3b for Landholder Key
 Source: Evolution (2016); Land and Property Information (2016)



**CGO MINE LIFE MODIFICATION
 Land Tenure**

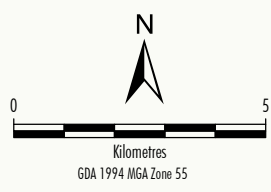


Figure 1-3a

Reference No	Landholder	Reference No	Landholder
1	Evolution Mining (Cowl) Pty Limited	71	LM & TJ Mackay and LJ & RP Grayson
2	Bland Shire Council	72	KM & LR Gould
3	Graincorp Operations Limited	73	CI Ridley
4	BE Mattiske	74	HM Corliss and JA & FG Ridley
5	DB Mattiske	75	The Grain Handling Authority Of New South Wales
6	IW Low	77	Country Rail Infrastructure Authority
8	PG Hammond	78	CF Fuller
10	SL Peasley	79	IO Ridley
11	RG Hammond	80	TG & JM Dalton
12	The State of New South Wales	81	West Wyalong Local Aboriginal Land Council
13	West Plains (Forbes) Pty Limited	82	LJ Doecke
15	HJ & WJ Buttenshaw	83	RJ Moore
20	WJ Buttenshaw	85	JM Ridley
21	AJ McClintock	89	GM & BM Morton
22	The West Pastoral Company Pty Limited	90	RJ Granleese and PJ & DK Donohue
23	EA & M Mangelsdorf	91	GR Spackman
24	BE & H Mangelsdorf	92	KA Lindner & GP Lindner
25	NA & DJ Mangelsdorf	93	EJ McCarthy
27	State Rail Authority of New South Wales	95	JD & VH Boneham
28	Bristowes Pastoral Pty Ltd	96	BY & IG Boyd
29	NJ Fuge	97	Clevedon Properties Pty Ltd
30	SK & RC Grinter	98	MM Rees
31	JA Duff	100	AJ & LF Blampied
32	HE & AJ Duff	101	MM & MD Carnegie
33	AJ Duff	102	W Goodwin
34	HE Duff	103	LR Martin
36	MM & G Noble	104	MM & MD Carnegie
38	BR Dent	105	MK & RT Coles
42	GJ Davies	106	FR Maslin
43	Leppington Pastoral Co Pty Limited	107	Marsden Minoru Pty Limited
44	MH Duff	109	EH & JW Maslin
49	CL Lee	113	BC & DW Rogers
50	GF Carnegie	114	WJ Worner
51	HC & GK West	116	IJ Ridley
52	HJ Buttenshaw	118	AB & KM Maslin
56	RA Mattiske	119	ML & CI Ridley
57	RF Harmer	120	Forbes Shire Council
58	Twynam Pastoral Co Pty Limited	121	BJ & RK Gould
59	Wyalong Rural Investments Pty Limited	122	DG Fitzgerald
60	SJ & EP Mickan	123	Telstra Corporation Limited
61	ML Dent	124	AGL Pipelines (NSW) Pty Limited
62	WR Low	126	D Williams
63	Domco Trading Pty Limited	130	N.S.W. Grain Corporation Limited
64	Superb Developments Pty Ltd	131	IH Shephard
66	BV Tooth	132	CR & RD McManus
67	HWR McDonald	133	MA Squier
68	AJR McDonald	134	JT Gray
69	GLR McDonald	135	NA Wilson
70	KA Maguire		

Source: Evolution (2016) and Land and Property Information (2016)



CGO MINE LIFE MODIFICATION
Landholder Key

Figure 1-3b



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Approximate Extent of Approved Surface Development
 - Modification Components

Source: Evolution - Orthophoto (August 2016)



**CGO MINE LIFE MODIFICATION
Modification General Arrangement**

Figure 1-4

**Table 1-1
Summary Comparison of Approved CGO and the Modification**

Development Component	Approved CGO¹	Proposed Modification
Tenement	Development approved to occur within the Development Application areas, including ML 1535.	No change.
Mining Method	Open pit mining operations.	No change.
Life of Mine	20 year operational life of the CGO.	28 year operational life of the CGO, up to 31 December 2032.
Gold Production	Producing a total of approximately 3.8 Moz of gold over the life of the CGO.	The modified CGO is expected to produce a total of approximately 5.5 Moz of gold over the life of the CGO.
Open Pit Extent	Development of the open pit in stages as it is progressively deepened and widened within the existing disturbance area. Total open pit area of approximately 131 ha.	An increase to the approximate final depth of the open pit by approximately 70 metres (m).
Ore Production and Processing	Approximately 128 million tonnes (Mt) of ore produced over the life of the CGO.	Approximately 158 Mt of ore produced over the life of the CGO.
	Gold extracted from the ore using a conventional carbon-in-leach cyanide leaching circuit.	No change to processing method. The Modification would involve upgrades to the existing leach circuit within the process plant to treat flotation tailings and improve gold recovery.
	Ore processing rate of up to 7.5 million tonnes per annum (Mtpa).	No change.
	Processing of mineralised material, if appropriate market conditions allow.	Processing of approximately 31 Mt of mineralised material.
Waste Rock Management	Mined waste rock emplaced in the northern, southern and perimeter waste rock emplacements over the life of the CGO. Total waste rock emplacement area of approximately 419 ha.	No change to footprint of waste rock emplacements.
	Approximately 296 Mt of waste rock produced over the life of the CGO.	Approximately 309 Mt of waste rock produced over the life of the CGO.
	Stockpiling of mineralised material adjacent to the northern waste rock emplacement to a maximum design height of approximately 273 m Australian Height Datum (AHD).	A temporary increase to the height of the mineralised material stockpile to approximately 288 m AHD before recovery of the material for processing.
	Northern waste rock emplacement to be constructed to a maximum design height of approximately 308 m AHD.	No change.
	Southern waste rock emplacement to be constructed to a maximum design height of approximately 283 m AHD.	No change.
	Perimeter waste rock emplacement to be constructed to a maximum design height of approximately 223 m AHD.	No change.
Soil Management	Application of soil resources management strategies/objectives in accordance with the existing Erosion and Sediment Control Management Plan (ESCMP).	No change.
	Development of new soil stockpiles (including soil stockpile located in the north of ML 1535).	No change.

Table 1-1 (Continued)
Summary Comparison of Approved CGO and the Modification

Development Component	Approved CGO ¹	Proposed Modification
Tailings Storage Facilities (TSFs)	Tailings deposited in two TSFs (northern and southern). Each TSF is approved to be subdivided into two cells (i.e. four cells in total available for tailings deposition).	Continued tailings deposition in the two existing TSFs. Maximising the storage capacity of existing TSFs via additional lifts and converting the area between the existing TSFs into a new storage area. Incorporation of a rock fill buttress cover using waste rock on the outer slopes of the TSF embankments to provide long-term stability.
	The TSF footprints cover an area of approximately 350 ha.	Minor extension of TSF footprints to accommodate the rock buttress within currently approved disturbance areas.
	Northern and southern tailings storage facilities to be constructed to a maximum design height of approximately 248 m AHD and 255 m AHD, respectively.	An increase to the maximum design heights of the northern and southern tailings storage facilities, to approximately 264 m AHD (16 m increase) and 272 m AHD (17 m increase), respectively.
	Construction work on the TSF embankments within the hours of 7.00 am to 6.00 pm.	No change. An increase to the TSF embankment lift fleet.
Cyanide Concentration Levels	Use of cyanide in accordance with the approved Cyanide Management Plan (CMP). Cyanide concentrations in the aqueous component of the tailings slurry stream at the process plant not to exceed the following: <ul style="list-style-type: none"> • 20 milligrams per litre (mg/L) weak acid dissociable cyanide (CN_{WAD}) (90th percentile over 6 months); and • 30 mg/L CN_{WAD} (maximum permissible limit at any time). 	No change.
Cyanide Consumption	Cyanide consumption for the primary and oxide circuits is approximately 0.3 and 0.8 kilograms (kg) of cyanide per tonne of ore, respectively.	Upgrades to the existing leach circuit would increase cyanide consumption during primary ore processing to approximately 0.7 kg of cyanide per tonne of primary ore. Cyanide consumption for the oxide circuit would not change as the leach circuit upgrades would not be relevant to oxide ore processing.
Water Supply Sources and Infrastructure	Water used for ore processing is sourced from the following internal and external sources: <ul style="list-style-type: none"> • Return water from the TSFs. • Open pit sump and dewatering borefield. • Rainfall runoff from mine waste rock emplacements, and other areas which is collected as part of the Internal Catchment Drainage System (ICDS) in contained water storages. • Saline groundwater supply borefield which is pumped from four² production bores located in the south-east of ML 1535. • Eastern Saline Borefield³ located approximately 10 km east of Lake Cowal's eastern shoreline. • Bland Creek Palaeochannel Borefield which comprises four production bores within the Bland Creek Palaeochannel located approximately 20 km to the east-northeast of the CGO. • Licensed water accessed from the Lachlan River which is supplied via a pipeline from the Jemalong Irrigation Channel (i.e. Bore 4 offtake). 	No change.

Table 1-1 (Continued)
Summary Comparison of Approved CGO and the Modification

Development Component	Approved CGO¹	Proposed Modification
Water Supply Sources and Infrastructure (continued)	Approval for construction of a new pump station and associated diesel generator and access track on the eastern side of Lake Cowal adjacent to the existing mine water supply pipeline to improve capacity/flows. Approval for construction of a new water supply storage (D10) within ML 1535.	No change.
Bland Creek Palaeochannel Borefield Extraction Limits	The maximum extraction of water from the Bland Creek Palaeochannel will not exceed: <ul style="list-style-type: none"> • 15 megalitres per day (ML/day); or • 3,650 megalitres per annum (ML/annum). Extraction is managed to maintain groundwater levels above the established NSW Office of Water (NOW) trigger levels.	No change.
Site Water Management Infrastructure	The existing CGO water management infrastructure is comprised of the following major components: <ul style="list-style-type: none"> • Up-catchment Diversion System (UCDS) and the ICDS (including the contained water storages); • lake isolation system (comprising the temporary isolation bund, lake protection bund and perimeter waste rock emplacement); • integrated erosion, sediment and salinity control system; and • open pit sump and dewatering borefield. 	No change.
Biodiversity Offset Strategy	The Biodiversity Offset Strategy is shown conceptually in Appendix 4 of Development Consent DA 14/98.	No change.
Power Supply Activities	Electricity to the site via a 132 kilovolt (KV) electricity transmission line (ETL) from Temora, approximately 90 km south of the CGO.	No change.
Exploration	Exploration activities undertaken within ML 1535 in accordance with relevant authorisations.	No change.
Site Access Road	Site access road following existing roads from West Wyalong to the CGO. Light vehicle access from Condobolin and Forbes.	No change.
Hours of Operation	24 hour operations, seven days a week.	No change.
Employment	The average workforce employed at the CGO is currently approximately 385 people (including Evolution staff and on-site contractor's personnel). During peak periods, the CGO employs up to 435 people.	No change, however there would be an additional 8 years of employment opportunity.

¹ Approved CGO approved on 26 February 1999 as modified.

² Evolution has currently installed two of the four approved production bores.

³ The operation of the Eastern Saline Borefield is approved separately under the EP&A Act.

The Modification involves **no change** to the following key components of the existing CGO:

- mining tenements;
- lake isolation system;
- existing/approved surface development extent of the CGO;
- water management system and design objectives;
- mining methods;
- ore processing rate;
- waste rock emplacement disturbance areas;
- cyanide destruction method;
- approved cyanide concentration limits in the aqueous component of the tailings slurry;
- water supply sources;
- approved daily or annual extraction limits of the Bland Creek Palaeochannel Borefield;
- site access road;
- power supply;
- exploration activities;
- average or peak annual employment;
- hours of operation; or
- TSF embankment construction hours of 7.00 am to 6.00 pm.

1.3 NEED FOR THE PROPOSED MODIFICATION

Evolution exploration has identified additional gold resources within the E42 ore deposit at depths greater than the currently approved final depth of the existing open pit.

The Modification provides for the continuation of open pit mining operations at the CGO for a period of approximately 8 years to produce an additional 1.7 Moz of gold (i.e. a total of approximately 5.5 Moz over the life of the CGO).

The Modification would facilitate the continuity of employment for the CGO workforce, providing job security for local mine employees and contractors, and would continue to stimulate demand in the local and regional economy.

The Modification would include implementation of mitigation measures, and management measures (including performance monitoring), to minimise potential impacts on the environment and community (Section 4).

The Modification would result in additional contributions to regional and NSW output and business turnover and household income for an additional 8 years.

1.4 CONSULTATION

Consultation has been conducted with key State government agencies, local councils, and the local community during the preparation of this EA. A summary of this consultation to date is provided below.

Consultation will continue during the public exhibition of this EA and the assessment of the Modification.

1.4.1 State Government Agencies

NSW Department of Planning and Environment

Evolution met with the NSW Department of Planning and Environment (DP&E) in August 2016 to discuss the scope of environmental assessment for the Modification and the assessment and approvals process.

Following this, Evolution wrote to DP&E on 1 September 2016 confirming the Modification environmental assessment scope and proposed approvals process.

The DP&E subsequently responded on 29 September 2016 confirming the approval process for the Modification (i.e. under section 75W of the EP&A Act), environmental assessment scope and consultation requirements.

Regulatory Agencies

Evolution provided briefing letters in September and October 2016 presenting an overview description of the Modification and proposed scope for the environmental assessment to the following regulatory agencies:

- NSW Environment Protection Authority (EPA);
- NSW Department of Primary Industries (Water) (DPI – Water);
- NSW Division of Resources and Energy (DRE) (within the Department of Industry, Skills and Regional Development [DISRD]);

- NSW Office of Environment and Heritage (OEH);
- Dams Safety NSW; and
- NSW Roads and Maritime Services (RMS).

Evolution also briefed the EPA, DRE and DPI-Fisheries during the Annual Review site visit October 2016 on the Modification and potential environmental impacts. Feedback from these agencies included:

- EPA – requested that Evolution clearly describe any increase in noise levels resulting from the Modification.
- DRE – understood that Evolution would revise the current Mining Operations Plan (MOP) to reflect the Modification (subject to approval of the Modification).
- DPI – Fisheries – understood that the Modification would involve no change to the existing water management measures including the lake isolation system.

Evolution separately briefed the DPI-Water in October 2016 on water management issues associated with the Modification. Long-term seepage drainage, final void water levels and use of Lachlan River water as part of the CGO water supply were discussed.

Dams Safety NSW

On 5 October 2016, the Concept Design for the modified TSFs was submitted to Dams Safety NSW for consideration. The Concept Design was subsequently presented at Dams Safety NSW meetings held on 25 October and 2 November 2016.

1.4.2 Local Councils

ML 1535 is located within the Bland Local Government Area (LGA), while the Bland Creek Palaeochannel and Eastern Saline Borefields are located within the Forbes LGA (Figure 1-1). In addition, one of the preferred access routes to the CGO (i.e. from Condobolin) is located within the Lachlan LGA.

On 30 August 2016, Evolution provided a presentation on the proposed Modification at a Community Environmental Monitoring and Consultative Committee (CEMCC) meeting of which representatives from the Bland, Forbes and Lachlan Shire Councils are members.

Following this, Evolution provided a briefing letter dated 2 September 2016 to the Bland Shire Council, Forbes Shire Council and Lachlan Shire Council outlining the scope of the Modification, approval process and environmental assessment.

Evolution also met representatives of the Bland Shire Council, Forbes Shire Council and Lachlan Shire Council in November 2016 to discuss the Modification.

1.4.3 Public Consultation

Community Environmental Monitoring and Consultative Committee

The CEMCC has been established in accordance with Condition 9.1(d) of the CGO Development Consent (DA 14/98). The CEMCC currently consists of:

- four community representatives (including one member of the Lake Cowal Landholders Association);
- one representative of the Lake Cowal Foundation (LCF);
- one representative of the Wiradjuri Condobolin Corporation (WCC);
- one representative of the Bland Shire Council;
- one representative of the Forbes Shire Council;
- one representative of the Lachlan Shire Council;
- an independent chairperson; and
- two representatives of Evolution.

The CEMCC provides a mechanism for ongoing communication between Evolution and the community.

The CEMCC holds quarterly meetings, and consultation regarding the Modification was conducted during the August 2016 meeting. The findings of this EA will be discussed at the CEMCC's December 2016 meeting. This EA will also be made available to all CEMCC members following submission to the DP&E.

Affected Landowners

Evolution consulted with the local community in October and November 2016. Feedback received from the local community was that key issues were in relation to potential noise and blasting impacts and that these aspects should be considered in the EA.

Potential noise and blasting impacts associated with the Modification are provided in Appendix D and Sections 4.3 and 4.5.2.

Cowal Update Newsletter

Evolution regularly publishes the “Cowal Update” newsletter to provide the wider community with an update on CGO operations and involvement in community activities and sponsorships. The “Cowal Update” newsletter is mailed out to households in the Bland, Forbes and Lachlan LGAs on an annual basis, and is also distributed with the local West Wyalong newspaper, the “West Wyalong Advocate”.

The November 2016 edition of the “Cowal Update” contains a description of the Modification, the assessment process and potential environmental impacts.

Attachments 1 and 2, and Appendices A to F provide supporting information as follows:

Attachment 1	Cowal Gold Operations Development Consent (DA 14/98).
Attachment 2	Aquifer Interference Policy Considerations and Water Licensing.
Appendix A	Hydrogeological Assessment.
Appendix B	Hydrological Assessment.
Appendix C	Geochemistry Assessment.
Appendix D	Noise and Blasting Assessment.
Appendix E	Air Quality and Greenhouse Gas Assessment.
Appendix F	Rehabilitation Proposal.

1.5 STRUCTURE OF THIS EA

This EA is structured as follows:

Section 1	Provides an overview of the approved CGO, describes the nature of the Modification and proposed need for the Modification and includes a summary of the consultation undertaken in relation to the Modification.
Section 2	Provides a description of the approved CGO.
Section 3	Provides a description of the Modification.
Section 4	Provides a review of the existing environment, assesses potential impacts associated with the Modification and describes the existing CGO environmental management systems and proposed measures to manage and monitor any additional potential impacts.
Section 5	Describes the rehabilitation and landscape management strategy for the Modification.
Section 6	Provides the planning framework and justification for the Modification.
Section 7	Lists references referred to in Sections 1 to 6 of this EA.
Section 8	Lists abbreviations, acronyms and terms referred to in Sections 1 to 6 of this EA.

2 DESCRIPTION OF APPROVED COWAL GOLD OPERATIONS

The existing CGO is shown on Figure 2-1, and the approved layout of the CGO is shown on Figure 2-2.

A summary of existing approvals and operations undertaken at the CGO is provided below. Where relevant, a description of measures incorporated into the existing CGO layout and operation designed to minimise potential environmental impacts is also provided.

2.1 COWAL GOLD OPERATIONS APPROVAL HISTORY

A study into the compatibility of the CGO with critical conservation values of Lake Cowal over the long-term was completed and reported in the *Cowal Gold Project Environmental Impact Statement (EIS)* (North Limited, 1998). A Commission of Inquiry was held in November 1998 into the environmental aspects of the CGO and related infrastructure.

Development Consent (DA 14/98) for the CGO and Bland Creek Palaeochannel Borefield water supply pipeline (Figure 1-2) was granted by the NSW Minister for Urban Affairs and Planning under Part 4 of the EP&A Act on 26 February 1999.

Separate approvals processes were also undertaken during the same period for the following related infrastructure components for the CGO:

- Upgrade of the mine access road from West Wyalong to the CGO: Approval for the upgrade of the mine access road was granted by the Bland Shire Council on 21 April 1999 under Part 5 of the EP&A Act.
- Temora to Cowal 132 kV ETL: Approval for the ETL (Figure 1-2) was granted by the NSW Minister for Urban Affairs and Planning on 3 August 1999 under Part 5 of the EP&A Act.

The CGO Development Consent (DA 14/98) has been modified on 12 occasions, *viz.* 11 August 2003 (Mod 1), 22 December 2003 (Mod 2), 4 August 2004 (Mod 3), 23 August 2006 (Mod 4), 12 March 2008 (Mod 5), 11 February 2009 (Mod 7), 28 August 2009 (Mod 8), 10 March 2010 (Mod 6), 17 January 2011 (Mod 9), 6 July 2011 (Mod 10), 22 July 2014 (Mod 11) and 13 May 2016 (Mod 12).

The majority of these modifications have involved minor changes to the CGO, and were assessed under section 96 of the EP&A Act.

Five modifications (Mods 6, 9, 10, 11 and 12) have been assessed under section 75W of the EP&A Act. Mod 11 is the most recent to involve more substantive changes including increases to open pit depth and area, waste rock emplacements, soil stockpiles, TSFs and water storage.

Development Consent (DA 2011/64) for the operation of the Eastern Saline Borefield (Figure 1-2) was granted by the Forbes Shire Council on 20 December 2010. The approved operation of the Eastern Saline Borefield includes the use of two production bores to extract water from the Cowra Formation aquifer and the use of existing associated works (including a pipeline) to deliver the saline water to the Bland Creek Palaeochannel Borefield pipeline. Mod 10 of Development Consent (DA 14/98) approved the introduction of saline water from the Eastern Saline Borefield to augment the CGO's external water supply.

2.2 ORE DEPOSIT DESCRIPTION AND LIFE OF MINE

The CGO currently mines the E42 ore deposit, which occurs within a sequence of semi-conformable sedimentary, volcanoclastic and volcanic rock, and is overlain by recent sedimentation of the Bland Creek Palaeochannel and lake-fill events.

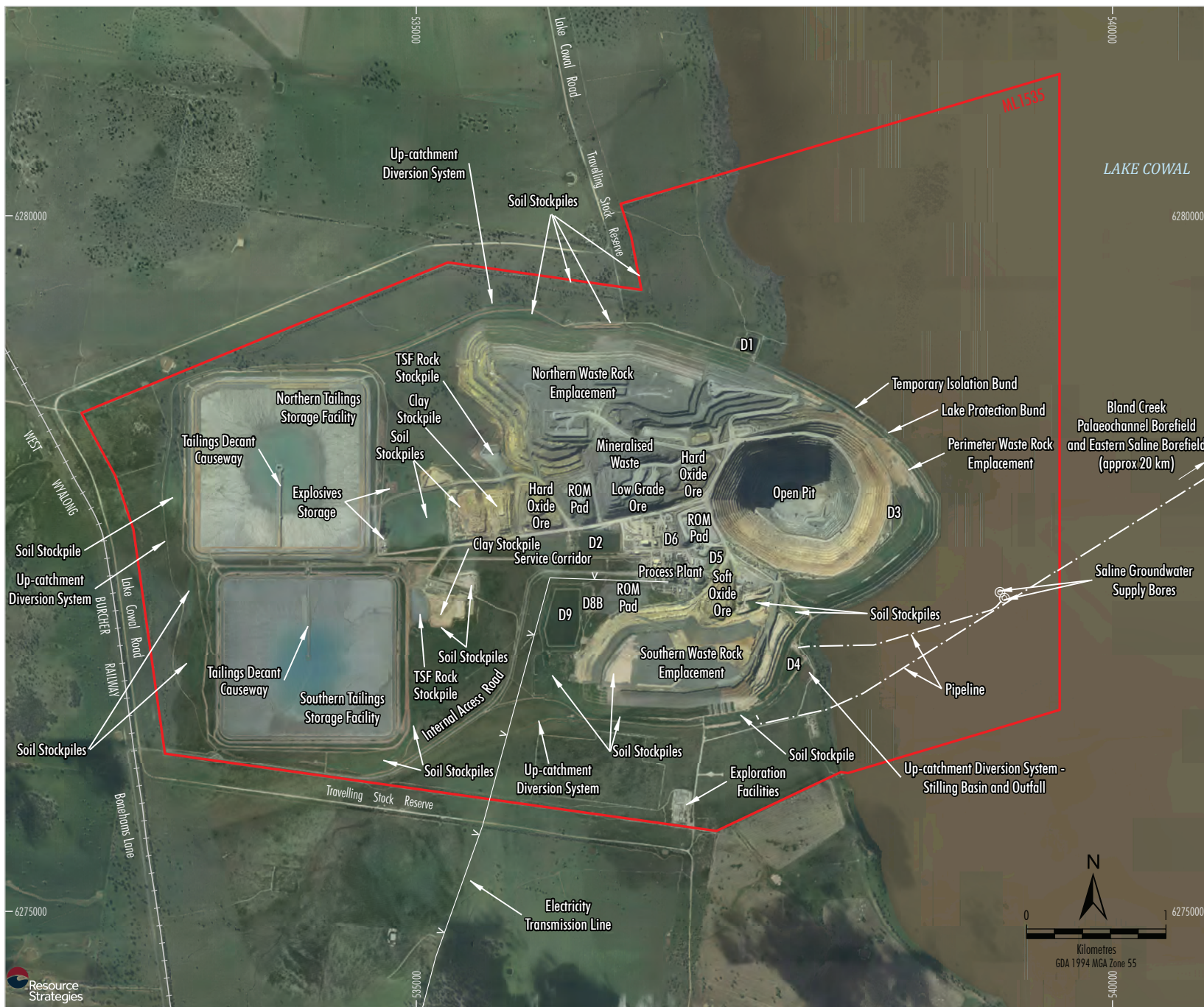
Two ore types are mined at the CGO:

- primary ore, which constitutes 80 percent (%) of the E42 ore deposit; and
- oxide or weathered ore, which comprises the upper 20% of the orebody.

The two ore types are selectively handled and separated during mining and processing due to the different mineral processing requirements for gold extraction.

The CGO is approved to produce approximately 128 Mt of ore over the mine life. Based on ore grade estimates, total gold production for the approved CGO is approximately 3.8 Moz. In addition, mineralised material is stockpiled separately, and is approved to be processed in the future, subject to market conditions (Section 2.4.2).

Mining operations at the CGO commenced in 2005, and operations are currently approved to continue until 31 December 2024.



LEGEND
 Mining Lease Boundary (ML 1535)

Source: Evolution - Orthophoto (August 2016)

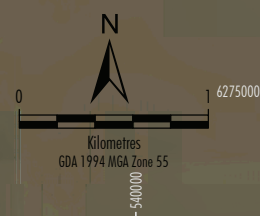
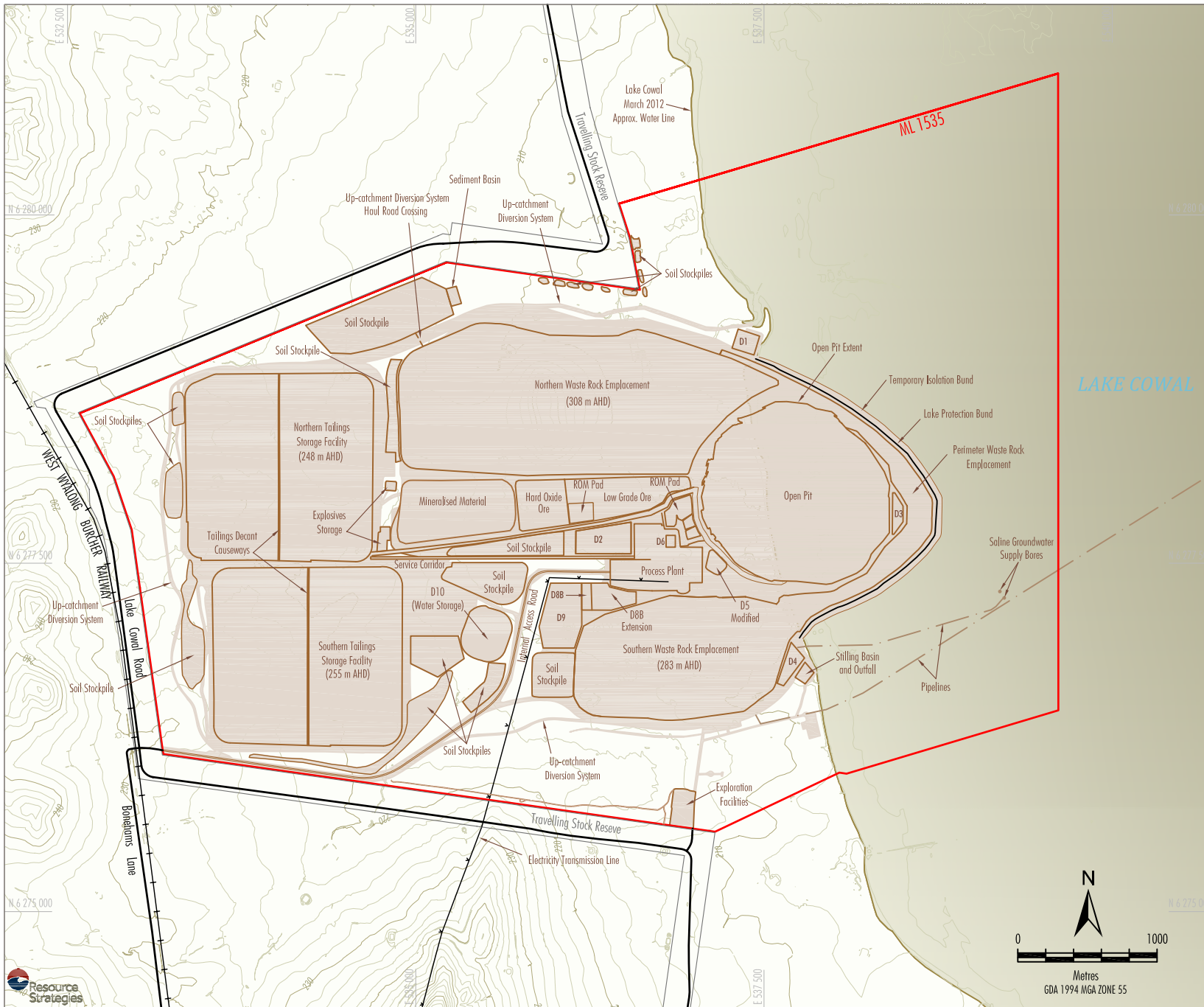
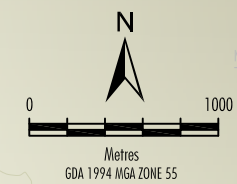


Figure 2-1



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Road
 - Contour m AHD (2 m Interval)
 - Approximate Extent of Approved Surface Development

Source: Evolution (2016)



CGO MINE LIFE MODIFICATION
Currently Approved CGO Layout

Figure 2-2

2.3 MINING OPERATIONS

Mining operations at the CGO are currently conducted in accordance with Development Consent (DA 14/98) and the conditions of ML 1535.

The CGO operates 24 hours per day, 7 days per week.

2.3.1 Mining Method Overview

Conventional open pit mining methods are used at the CGO. Waste rock and ore is broken through a routine sequence of in-pit drilling and blasting.

Broken waste rock is loaded into large rear dump trucks using hydraulic excavators and is then hauled from the open pit to be placed within the dedicated waste rock emplacements (or for use as construction material). Ore is hauled from the open pit direct to the primary crusher (adjacent to the process plant), ROM pads or to the low grade ore stockpile (Figure 2-2).

The open pit has been developed in stages as the orebody is progressively mined via widening and deepening of the open pit.

2.3.2 Open Pit Design

The current open pit area is shown on Figure 2-1. The final dimensions of the currently approved open pit are a surface area of approximately 131 ha and a depth of approximately -263 m AHD (approximately 470 m below the natural ground surface).

The open pit has been designed to operate in consideration of factors of safety appropriate for operating conditions and for the long-term stability of the lake protection bund. Ongoing review of pit wall stability is conducted at the CGO, and berm widths and slopes angles are reviewed and monitored through on-going geotechnical studies.

The *Cowal Gold Project Monitoring Programme for Detection of any Movement of Lake Protection Bund, Water Storage and Tailings Structures and Pit-Void Walls* (LPBMP) describes a monitoring programme and management measures in the event of detection of any movement of the open pit walls.

2.3.3 Mobile Equipment Fleet

The existing/approved mobile equipment fleet used for ore extraction, waste rock handling and TSF lift construction includes:

- excavators;

- haul trucks;
- dozers;
- loaders;
- water trucks;
- articulated dump trucks;
- compactors;
- graders; and
- drill rigs.

2.3.4 Blasting

Ore and waste rock material is broken by drill and blasting techniques. The magnitude of blast sizes is typically approximately 172 kg maximum instantaneous charge. The blasting frequency employed at the CGO is limited to one blast event per day (a single blast event may include a split blast with a number of individual blasts fired in quick succession).

2.4 MINE WASTE ROCK MANAGEMENT

Waste rock is placed in a contiguous waste rock emplacement around the open pit consisting of the following three areas (Figure 2-2):

- northern waste rock emplacement;
- southern waste rock emplacement; and
- perimeter waste rock emplacement.

2.4.1 Waste Rock Geochemistry

Waste rock geochemistry investigations (North Limited, 1998; Environmental Geochemistry International Pty Ltd, 2004; Geo-Environmental Management Pty Ltd [GEM], 2008; and GEM, 2013) have been conducted for the waste rock mined at the CGO, which have classified waste rock as non-acid forming (NAF). The results indicate:

- oxide waste rock will typically be saline but NAF; and
- primary waste rock will typically be non-saline and NAF, however sulphate salts will be generated if exposed to surficial weathering processes.

As the waste rock is typically NAF, no specific acid rock drainage management measures have been required at the CGO. However, due to the potential for saline seepage occurring from the waste rock emplacements, the waste rock emplacements have been constructed to direct any permeating waters towards the open pit (Section 2.4.2).

2.4.2 Northern and Southern Waste Rock Emplacements

The northern waste rock emplacement has been designed to contain the majority of the waste rock generated from the CGO. The northern waste rock emplacement and the southern waste rock emplacement are located to the north-west and south-west of the open pit, respectively (Figure 2-1).

The approved maximum height of the northern waste rock emplacement is 308 m AHD, and the approved maximum height of the southern waste rock emplacement is 283 m AHD (Figure 2-2).

The outer batters of the northern and southern waste rock emplacements are designed to have a final profile with an overall 1 vertical (V):5 horizontal (H) slope.

Design configurations for the northern and southern waste rock emplacements are detailed in the CGO MOP, which is approved by the DRE.

The mine waste rock emplacements have been designed to meet the long-term goal of directing potential seepage generated from waste rock emplacement areas during operation and post-closure toward the open pit.

This has involved construction of a low permeability basal layer for the waste rock emplacements which slopes towards the open pit and would provide drainage control (i.e. the base drainage control zone). Waters permeating through the waste rock emplacements would be intercepted by this low permeability layer and ultimately flow to the open pit.

In accordance with Environment Protection Licence (EPL) 11912 for the CGO, the waste rock emplacement base drainage control zones have been designed with a minimum slope towards the open pit of 1(V):200(H).

The northern waste rock emplacement also contains segregated mineralised material and temporary ROM pad areas. Evolution's current proposal is to process mineralised material if appropriate market conditions allow. However, if appropriate market conditions do not prevail, the mineralised material is proposed to remain as part of the final northern waste rock emplacement landform.

2.4.3 Perimeter Waste Rock Emplacement

The perimeter waste rock emplacement has been constructed to surround the open pit to the north, east and south (Figure 2-1).

The perimeter waste rock emplacement forms part of the series of embankments (i.e. temporary isolation bund and lake protection bund) between the open pit and Lake Cowal. The perimeter waste rock emplacement is located behind the lake protection bund (Figure 2-1) and has been constructed from mined oxide waste rock.

The approved maximum height of the perimeter waste rock emplacement is 223 m AHD.

Evolution regularly reviews the factors of safety appropriate for the long-term stability of the perimeter waste rock emplacement. These factors are incorporated into the design and development of the perimeter waste rock emplacement as appropriate.

The existing temporary isolation bund and lake protection bund are described further in Section 2.7.

2.5 ORE PROCESSING

Ore at the CGO is differentiated into oxide and primary ore. Gold is extracted from the ore using a conventional carbon-in-leach cyanide leaching circuit in the process plant.

The process plant operates at approximately 890 tonnes per hour (tph) for oxide ore and approximately 925 tph for primary ore on average. The annual ore processing rate at the CGO is currently approved up to 7.5 Mtpa.

The gold extracted from the ore is recovered and poured as gold bars or doré. The finely ground rock residue left after the leaching process (i.e. tailings) is passed through a cyanide destruction process before being discharged to the TSFs.

2.5.1 Cyanide Use and Process Consumables

The use of cyanide at the CGO is managed in accordance with the CMP. Sodium cyanide is taken from the storage facility at the CGO as required and mixed in a dedicated mixing tank. The cyanide solution (mixed to 30%) is conveyed to a storage tank then to the leaching circuit in the process plant. Cyanide consumption for the primary and oxide circuits is approximately 0.3 and 0.8 kg of cyanide per tonne of ore, respectively.

In addition to cyanide, a number of process consumables (including chemicals and reagents or equivalents) are currently stored and used at the CGO.

2.5.2 Cyanide Destruction

As described above, the tailings slurry is passed through a cyanide destruction process before being discharged to the TSFs.

The CGO Development Consent (DA 14/98) details the approved cyanide concentrations in the aqueous component of the tailings slurry stream at the process plant (measured via an automated sampler), which are:

- 20 mg/L CN_{WAD} (90th percentile over 6 months); and
- 30 mg/L CN_{WAD} (maximum permissible limit at any time).

CN_{WAD} levels in the aqueous component of the tailings slurry stream are monitored twice daily. To date, there has been no exceedance of the approved cyanide concentrations detailed in the CGO Development Consent (DA 14/98).

Cyanide destruction at the CGO is achieved via the use of either Caro's Acid or the INCO (sulfur dioxide) process.

Caro's Acid is a mixture of sulphuric acid and hydrogen peroxide. The INCO process involves the introduction of sulphur dioxide as sodium metabisulphite (SMBS). Similar to Caro's Acid, the main by-product from the INCO destruction process is cyanate which decays through natural processes.

The quantity of reagents added to the tailings (for either the use of Caro's Acid or the INCO process) is regulated by an online free cyanide measurement to monitor the effectiveness of cyanide destruction in the tailings.

The most recent independent re-certification audit to the International Cyanide Management Code occurred in March 2016, and found that the CGO maintained full compliance during the previous 2 years.

2.6 TAILINGS MANAGEMENT

Tailings are delivered from the process plant via a pipeline to two TSFs located approximately 3.5 km west of the Lake Cowal shoreline (Figure 2-1). The approved maximum heights of the northern and southern tailings storage facilities are 248 m AHD and 255 m AHD, respectively (Figure 2-2).

An initial starter embankment for each TSF was constructed to provide storage for tailings produced at the commencement of operations at the CGO.

As the TSFs are progressively filled, the embankments are raised in a series of upstream lifts constructed using waste rock stockpiled during mining operations, with the lift section extending from the existing embankment crest and supported by the dry tailings beach.

The batter slope of each lift is approximately 1(V):3(H), with the overall batter slope of the TSFs approximately 1(V):5(H).

The TSFs embankments are constructed using a mix of clay oxide and primary waste rock material stockpiled during mining operations.

The required free-board is maintained as the storage fills with tailings via the series of embankment lifts.

Following tailings deposition, supernatant water drains to the central pond and decant towers. The decant tower is accessible via a causeway. An underdrainage pipe network has also been installed to facilitate drainage of the tailings mass. The bulk of the water from each tailings storage drains from the surface of the tailings and collects in the central decant area/well.

This water, as well as underdrainage water, is reclaimed and used within the process plant. The decant system (including access causeway) is progressively raised during development of the TSFs.

Decant causeways across the full width of each TSF are approved, however not yet constructed. If constructed, this would allow each of the existing storages to be divided into two cells.

A number of seepage control measures have been incorporated into the TSFs for the CGO, including:

- the pre-stripping of surficial soils beneath each storage footprint;
- construction of a moisture-conditioned and compacted-low-permeability storage floor, where necessary, to achieve permeability criteria;
- excavation of a central cut-off trench along the length of the starter embankment to a nominal 2.5 m below surface level or to the depth of a low-permeability clay layer, and backfilled with compacted and moisture-conditioned low permeability clay;
- installation of an underdrainage and decant network; and
- installation of a seepage drainage system including perimeter collector pipes on the TSF embankments and sumps at the eastern toe of the northern tailings storage facility and southern tailings storage facility and the area between the TSFs.

Seepage measures are progressively implemented and informed by investigations such as geophysical testwork, piezometer installation and monitoring and geotechnical drilling.

2.7 SITE WATER MANAGEMENT INFRASTRUCTURE

The CGO water management infrastructure is designed to contain potentially contaminated water (contained water) generated within the mining area, and to divert all other water around the perimeter of the site. The existing CGO water management infrastructure is comprised of the following major components described below.

2.7.1 Lake Isolation System

The lake isolation system has been constructed to hydrologically isolate the open pit development area from Lake Cowal during mining and post-mining. The lake isolation system is comprised of a series of isolation embankments designed to prevent the inflow of water from Lake Cowal into the open pit development area. The lake isolation system includes the temporary isolation bund, lake protection bund and perimeter waste rock emplacement (Figure 2-1).

Plate 2-1 shows Lake Cowal at its maximum capacity during the 2012 and 2016 lake-fill events, as well as the components of the lake isolation system and the separation of the lake and the open pit.

2.7.2 Up-catchment Diversion System

The UCDS conveys upper catchment surface runoff around the western edge of the CGO and into existing drainage lines to the north and south of the CGO (Figure 2-1). The function of the UCDS on the northern side of the CGO is shown on Plate 2-1.

2.7.3 Internal Catchment Drainage System

The function of the ICDS is to separate surface runoff external to the CGO from contained waters generated within the CGO disturbance area.

The ICDS is a permanent water management feature that involves a low bund running alongside the UCDS from the western side of TSFs extending around the northern and southern perimeter of the northern and southern waste rock emplacements, respectively.

Surface water that is collected within the ICDS is managed by a series of contained water storages, bunds and drains.

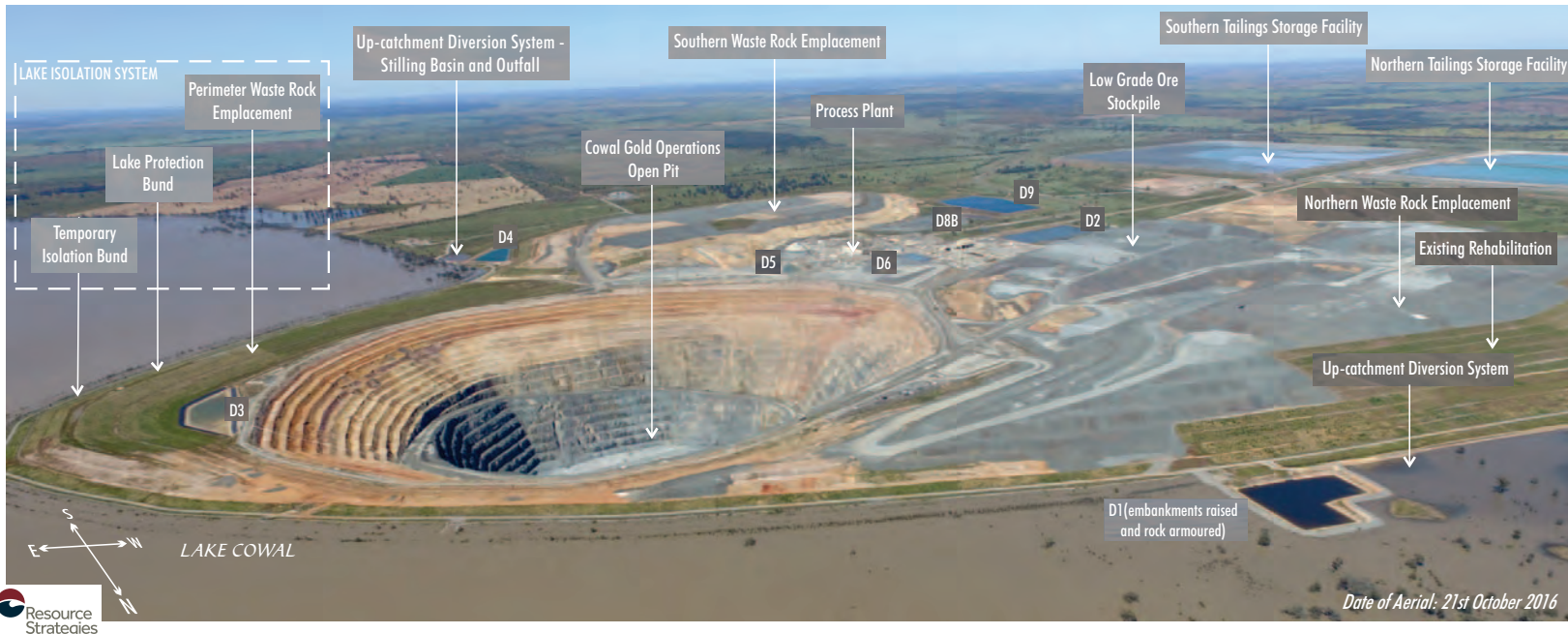
Contained water storages D1 to D5 and D8B (Figure 2-2) are used to contain surface water runoff from the mine waste rock emplacements and general site area. Water is pumped to contained water storages D6 or D9 (process water supply storages) (or D10 once constructed) (Figure 2-2) for use during ore processing. The contained water storages have been designed to contain a minimum 1 in 100 year average recurrence interval (ARI) rainfall event or greater. However, D5, D6, D9 and D10 have been designed to contain a 1 in 1,000 year ARI rainfall event.

Any overflow from contained water storages within the ICDS would be directed towards the open pit.

Contained water storages are shown on Plate 2-1. A summary of the function and characteristics of the existing/approved contained storages is provided in Table 2-1.

2.7.4 Integrated Erosion, Sediment and Salinity Control System

Sediment control structures, dams and waterways around individual infrastructure components have been constructed at the CGO as part of the ICDS, in accordance with the erosion and sediment control strategies described in the ESCMP.



HML-16-41.ML.Mod_002C



CGO MINE LIFE MODIFICATION

Cowl Gold Operations
Lake-fill Conditions

**Table 2-1
Contained Water Storages**

Storage Number	Catchment/Function	Approximate Storage Capacity (ML)
D1 (Existing)	Runoff from northern perimeter of the northern waste rock emplacement. Collected water is pumped to D6.	57
D2 (Existing)	Runoff/seepage from ROM and low grade stockpile areas from the northern waste rock emplacement area, the batters of the northern tailings storage facility and other areas within the ICDS. Collected water is pumped to D6 or D9.	195
D3 (Existing)	Runoff from perimeter catchment surrounding the open pit and the perimeter waste rock emplacement areas. Collected water is pumped to D6.	39
D4 (Existing)	Runoff from the southern perimeter of the southern waste rock emplacement. Collected water is pumped to D6 or D9.	69
D5 (Existing and approved to be modified)	Process plant area drainage collection. Water is pumped to D6.	92
D6 (Existing)	Process water supply storage. Main source of process plant make-up water requirements.	10
D8B (Existing)	Runoff from southern waste rock emplacement, the batters of the southern tailings storage facility and other areas within the ICDS. Water is pumped to D9.	43
D9 (Existing)	Process water supply storage. Storage for raw water. Water is pumped to D6. Some water used for TSFs lift construction.	726
D10 (Approved but not yet constructed)	Process water supply storage. Storage for raw water. Water is pumped to D9.	1,500

Source: After Appendix B.

2.7.5 Open Pit Sump and Dewatering Borefield

An open pit dewatering programme is currently in operation at the CGO to manage surface water and groundwater inflows to the open pit.

The surface catchment area draining to the open pit during operation is restricted to the open pit (i.e. incident rainfall) and the small perimeter area enclosed by an external bund.

Water management structures have been installed to divert water from other areas outside the external bund to contained water storages.

The open pit includes water management structures (face seepage collection drains) and an in-pit sump in the floor of the open pit with capacity to contain a 1 in 10 year ARI rainfall event.

The open pit dewatering bores are located on the periphery and within the open pit extent. Individual bores have been located to coincide with structures/features (shear zones, fractured dykes and faults). Saline groundwater generated during open pit dewatering is pumped to the contained water storages for use in ore processing. Open pit inflows are licensed by Water Access Licences (WALs) 36615 and 36617 (Attachment 2). A network of piezometers has been installed to monitor groundwater draw-down levels over time.

2.8 WATER SUPPLY

Water requirements for the CGO include ore processing, as well as dust suppression and potable and non-potable uses.

The total water supply requirement for the process plant is estimated to be approximately 0.9 kilolitres per tonne (kL/t) for primary ore processing and up to approximately 1.7 kL/t for oxide ore processing.

The majority of water used in processing operations is recycled within the process plant. Water losses from the system include tailings pore water and evaporative loss principally from the TSFs. Water used for ore processing is sourced from the following internal and external sources:

- Internal water sources (within the ICDS):
 - water returned from the TSFs, which is stored in contained water storage D6 (process water supply storage);
 - water from the open pit sump and dewatering borefield which is stored in contained water storages D6 and/or D9 (process water supply storages); and

- runoff water from the waste rock emplacements, open pit area and other areas within the ICDS which is collected in contained water storages and transferred to the process water supply storages (D6 and/or D9) for re-use in the process plant.
- External water sources (i.e. outside the ICDS):
 - water from the saline groundwater supply bores within ML 1535;
 - water from the Eastern Saline Borefield located approximately 10 km east of Lake Cowal's eastern shoreline;
 - water from the Bland Creek Palaeochannel Borefield, which is pumped from four production bores located approximately 20 km to the east-northeast of the CGO in accordance with approved extraction limits; and
 - licensed water accessed from the Lachlan River, which is supplied via a pipeline from the Jemalong Irrigation Channel.

Some water from the external water supply sources is treated by a Reverse Osmosis (RO) plant prior to use in the process plant or to satisfy other operational requirements. Brine from the RO plant is disposed of in the TSFs.

Further description of external water sources is provided below.

2.8.1 Saline Groundwater Supply

The locations of the existing saline groundwater supply bores within ML 1535 are shown on Figure 2-1.

Water extraction from the saline groundwater supply borefield within ML 1535 is licensed by WAL 36615 under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*, which has an annual extraction limit of 366 ML¹.

In practice, water extraction from the saline groundwater is currently limited to a maximum of approximately 0.7 ML/day (256 ML/annum) due to the capacity of existing pumping infrastructure.

The existing saline groundwater supply bores are not currently operational due to the inundation of Lake Cowal (i.e. these bores have been decommissioned and would be recommissioned when lake levels recede).

¹ Based on 1 ML per unit share.

2.8.2 Eastern Saline Borefield

The location of the existing Eastern Saline Borefield is shown on Figure 1-2.

Operation of the Eastern Saline Borefield is approved under Development Consent (DA 2011/64) (issued by the Forbes Shire Council) (Section 1.1). The CGO's Development Consent (DA 14/98) was modified on 6 July 2011 to allow the introduction of saline water from the Eastern Saline Borefield to augment the CGO's external water supply.

Water extraction from the bores within the Eastern Saline Borefield is licensed by WAL 36569 under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*. The Eastern Saline Borefield licences have a zero ML licence allocation with an allowable temporary transfer of up to 750 ML/annum per bore.

2.8.3 Bland Creek Palaeochannel Borefield

The location of the existing Bland Creek Palaeochannel Borefield is shown on Figure 1-2.

Water extraction is licensed by WAL 31864 under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*, which has an annual extraction limit of 3,650 ML². The CGO Development Consent (DA 14/98) currently limits extraction from the Bland Creek Palaeochannel Borefield to 15 ML/day or 3,650 ML/year.

Groundwater Contingency Strategy

In addition to the above, existing extraction from the Bland Creek Palaeochannel Borefield is managed in accordance with groundwater trigger levels developed in consultation with DPI-Water and other water users within the Bland Creek Palaeochannel, including stock and domestic users and irrigators, as detailed in the CGO Water Management Plan (WMP).

The trigger levels are as follows:

- Bland Creek Palaeochannel Borefield area: Bore GW036553 (trigger levels of 137.5 m AHD and 134 m AHD).
- Billabong area: Bore GW036597 (trigger level 145.8 m AHD).
- Maslin area: Bore GW036611 (trigger level 143.7 m AHD).

² Based on 1 ML per unit share.

Groundwater levels associated with the Bland Creek Palaeochannel Borefield are monitored on a continuous basis by DPI-Water's groundwater monitoring bore GW036553.

Investigation and mitigation contingency measures have been developed should groundwater levels reach either relative level (RL) 137.5 m AHD (trigger for investigation) or RL 134 m AHD (trigger for mitigation).

The effect of the above is that pumping from the Bland Creek Palaeochannel Borefield ceases when required to meet the trigger levels described above, and water requirements at the CGO are met by alternative internal or external water supplies, including Lachlan River Water Entitlements (Section 2.8.4).

2.8.4 Lachlan River Water Entitlements

Access to water from the Lachlan River Regulated Water Source is licensed by Evolution's High Security WAL 14981 (80 Units), High Security WAL 13749 (zero allocation), and General Security WAL 13748 (zero allocation).

High security and general security zero allocation WALs held by Evolution allow water from the Lachlan River to be accessed, when required, by purchasing temporary water available from the regulated Lachlan River trading market (Appendix B).

During the life of the existing CGO there has been reliable supply of temporary water available from the Lachlan River trading market, including during years of drought.

2.9 ELECTRICITY SUPPLY

Electricity to the site is provided via the existing 132 kV ETL from Temora.

2.10 OTHER SUPPORTING INFRASTRUCTURE AND SERVICES

The CGO has extensive existing infrastructure and services to support its operations, including (in addition to those described in the preceding sub-sections):

- mineral exploration infrastructure;
- open pit dewatering bores;
- waste storage and transfer facility;
- administration buildings;
- workshop facilities;
- TSF fence; and
- ML 1535 perimeter fence.

2.11 WORKFORCE

The existing operations at the CGO have an average workforce (including Evolution staff and on-site contractor's personnel) of approximately 385 people. During peak periods, the CGO employs up to 435 people.

2.12 MANAGEMENT OF CHEMICALS AND WASTES

Dangerous Goods and Hazardous and Liquid Wastes

The transport of hazardous and dangerous goods required for the existing CGO is conducted in accordance with the approved Transport of Hazardous Materials Study (THMS). The on-site storage and management of hazardous and dangerous goods and liquid wastes is undertaken in accordance with the CGO's approved Hazardous Waste and Chemical Management Plan (HWCMP). These approved plans have been prepared in accordance with relevant legislation, Australian Standards and codes.

Recyclable Domestic Waste

Recyclable domestic waste from office buildings and workforce areas is collected regularly and managed by waste disposal contractors.

Putrescible and Non-Putrescible Waste

General solid (putrescible) waste and general solid (non-putrescible) waste (as defined in the EPA's [2014] Waste Classification Guidelines) is either recycled or disposed in the waste rock emplacements on-site or in an off-site landfill.

Bioremediation Waste

Site-generated hydrocarbon-impacted material (general solid [putrescible] waste) is treated in the on-site designated Bioremediation Facility and is either used as subsoil or disposed within the waste rock emplacements.

Trash Screen Oversize Waste

Trash screen oversize waste from the milling circuit (general solid [putrescible] waste) is disposed within the waste rock emplacements.

Waste Tyres

Waste tyres are disposed of within designated areas of the waste rock emplacements.

Sewage Treatment and Effluent Disposal

Sewage is treated in the on-site sewage treatment plant and is disposed of to the satisfaction of the Bland Shire Council and the EPA (including the conditions of EPL 11912).

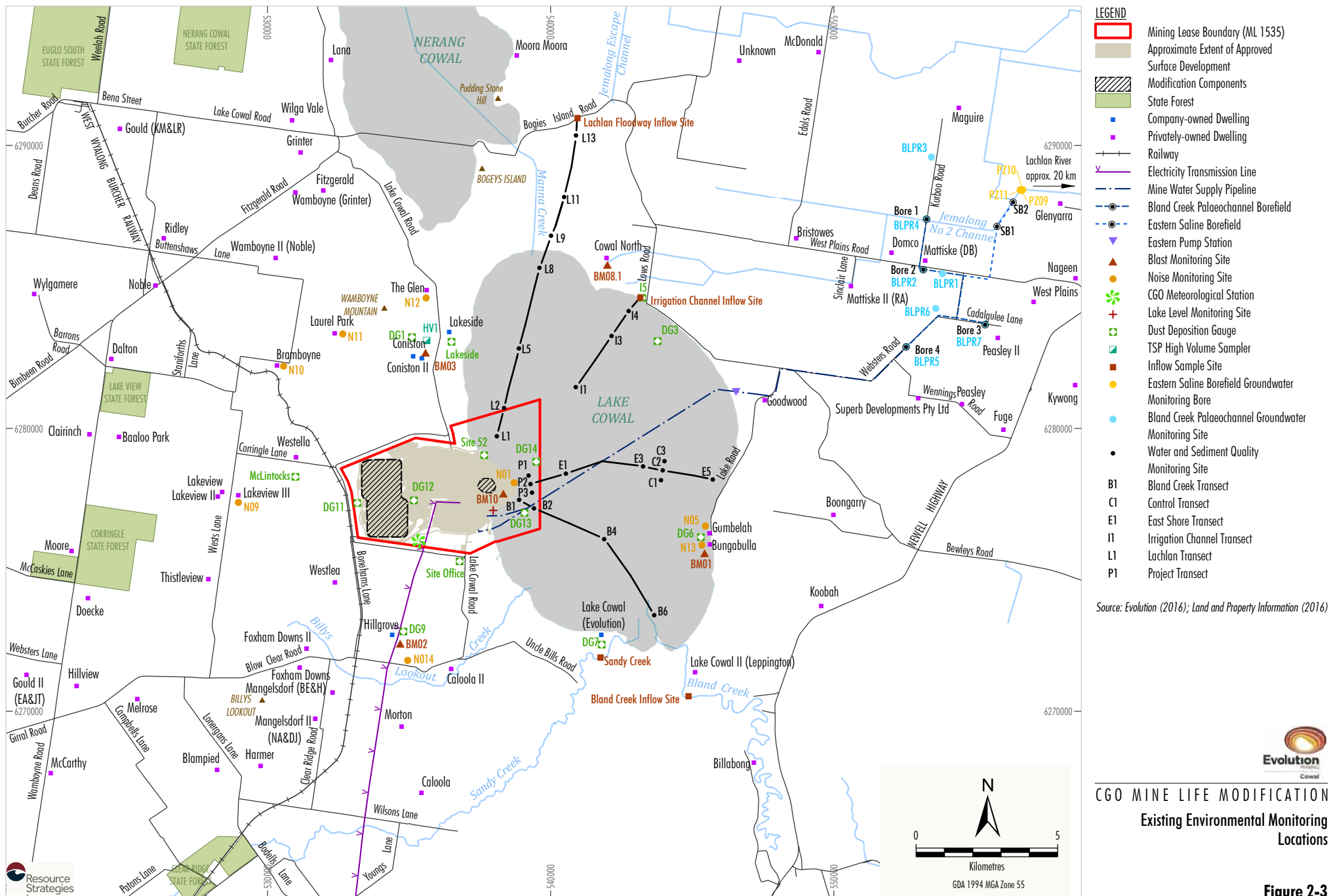
- LPBMP;
- Noise Management Plan (NMP);
- Rehabilitation Management Plan (RMP);
- WMP;
- Soil Stripping Management Plan (SSMP);
- Surface Water, Groundwater, Meteorological and Biological Monitoring Programme (SWGMBMP); and
- THMS.

Evolution maintains an extensive monitoring programme (Figure 2-3) whereby data is collected, analysed and maintained for reporting, future examination and assessment.

2.13 ENVIRONMENTAL MONITORING AND MANAGEMENT

Environmental management at the CGO encompasses a range of management plans and monitoring programmes overseen by statutory planning provisions. Approved and internal management plans/monitoring programmes include:

- Air Quality Management Plan (AQMP);
- Biodiversity Offset Management Plan (BOMP);
- Blast Management Plan (BLMP);
- Bushfire Management Plan;
- Compensatory Wetland Management Plan (CWMP);
- CMP;
- Emergency Response Plan/Pollution Incident Response Management Plan (ERP/PIRMP);
- Environmental Management Strategy (EMS);
- ESCMP;
- Final Hazard Analysis (FHA);
- Fire Safety Study;
- Flora and Fauna Management Plan (FFMP);
- Hazard and Operability Study (HAZOP);
- HWCMP;
- Heritage Management Plan;
- Implementation of the Threatened Species Management Protocol (TSMP) (including Threatened Species Management Strategies);
- Indigenous Archaeology and Cultural Heritage Management Plan (IACHMP);
- Land Management Plan (LMP);



3 DESCRIPTION OF THE MODIFICATION

The Modification would involve the continued development of open pit mining and ore processing operations at the CGO for an additional 8 years (i.e. until end 2032).

In general, the Modification would not change the functionality of the currently approved CGO, as it would involve the continued use of the existing open pit, waste rock emplacements, TSFs and ore processing facilities within ML 1535, with some alterations where necessary to enable the mine life extension.

In comparison to the approved CGO, the Modification would involve the following changes:

- increasing the final depth of the open pit by 70 m to enable mining of additional ore and an increase in total gold production;
- extending the life of the approved CGO by up to 8 years, to 31 December 2032;
- upgrades to the existing leach circuit within the processing plant to improve gold recovery;
- increasing the total life of mine ore production/volume of tailings and mined waste rock;
- maximising tailings storage capacity of the existing TSFs via additional lifts and converting the area between the existing TSFs into a new storage area;
- incorporation of a rock fill buttress cover on the outer slopes of the TSF embankments to provide long-term stability; and
- an increase to the TSF embankment lift fleet.

Changes to the approved CGO layout as a result of the Modification are shown on Figure 3-1. Conceptual general arrangements of the Modification for Years 14 (2018) and 18 (2022) and post-mining are shown on Figures 3-2 to 3-4.

The sub-sections below describe the Modification in further detail. Where relevant, a description of additional measures designed to minimise potential environmental impacts is also provided below.

3.1 MINING TENEMENT

Mining operations for the CGO are conducted within ML 1535.

No change to ML 1535 and no additional mining tenements would be required for the Modification.

3.2 ORE DEPOSIT AND LIFE OF MINE

The Modification would involve continued development of the existing open pit to access additional gold-bearing ore within the E42 ore deposit.

The Modification would extend the life of the CGO to approximately 28 years. Mining within the open pit would occur up to Year 20 and ore processing would be undertaken up to Year 28.

An indicative mining schedule for the Modification is provided in Table 3-1.

3.3 MINING OPERATIONS

Mining Method and Schedule

The Modification would involve the continuation of existing CGO open cut mining methods (Section 2.3). Mining operations would continue to be conducted 24 hours per day, 7 days per week, with tailings lift construction limited to daytime hours only (i.e. 7.00 am to 6.00 pm).

Open Pit Design

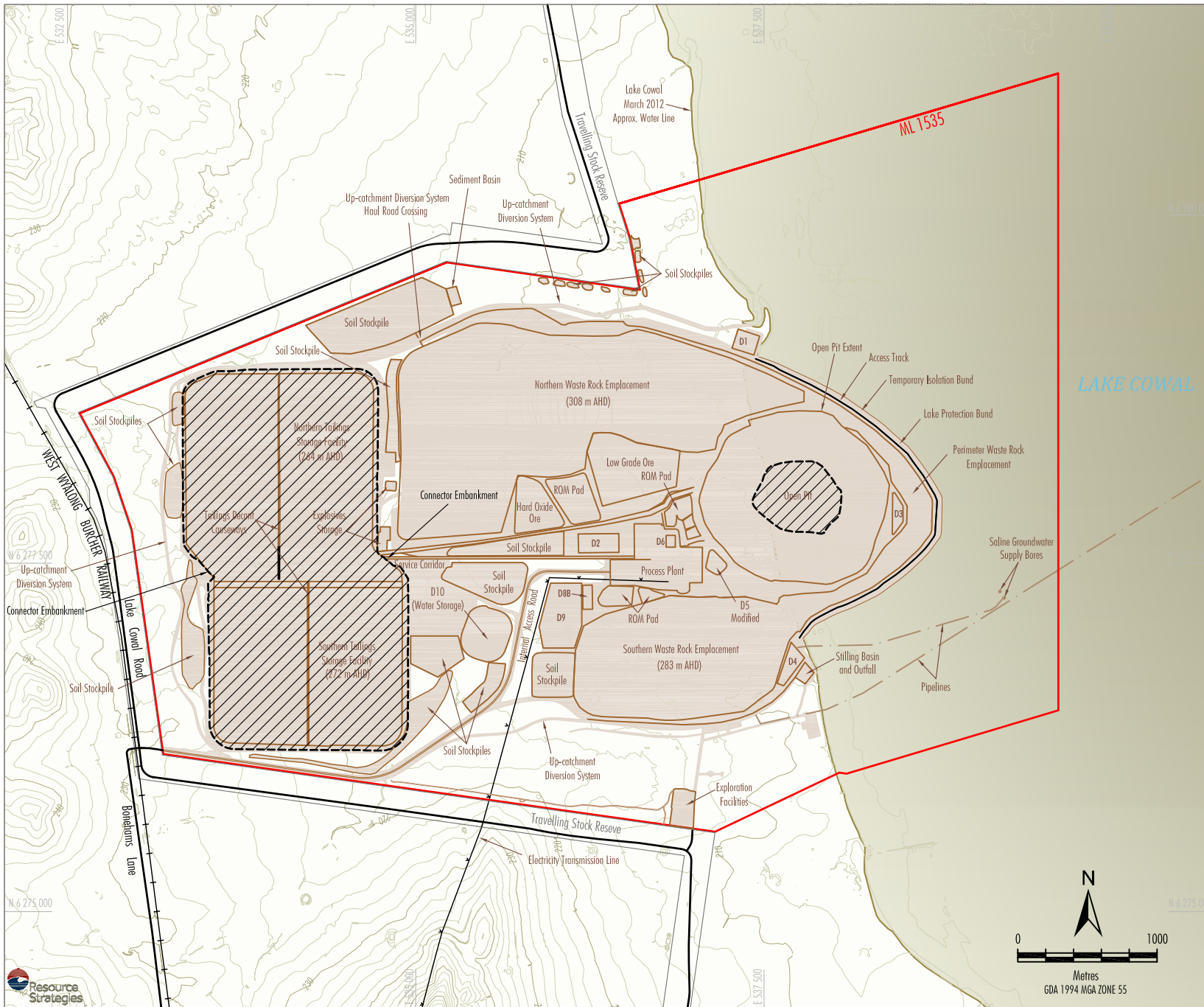
The Modification would not increase the surface area of the existing/approved open pit. However, the open pit would be deepened by approximately 70 m (Figure 3-1) within the deeper primary rock zone. At the end of mining, the open pit would have a maximum depth of approximately -331 m AHD (i.e. approximately 540 m below the natural surface level).

The deepening of the open pit has been designed to maximise ore recovery, while maintaining factors of safety appropriate for operating conditions and the long-term stability of the lake isolation system.

Consistent with existing operations, the pit slope design criteria of the deepened open pit have been developed based on findings of geotechnical investigations. The geotechnical modelling and analysis undertaken to determine suitable pit slope design criteria considered historical slope performance and geotechnical data gained over previous and current studies for the existing open pit for both surficial (soil/highly weathered rock) and hard rock material.

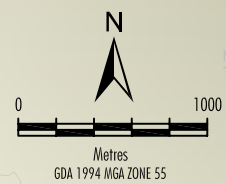
Batter angles, berm widths and inter-ramp angles in oxide rock would remain unchanged.

Primary rock would be mined in multiple benches, with berms up to 13 m in width, batter angles between 60 to 90° and with an inter-ramp angle of 40 to 60° (variable according to open pit sector).



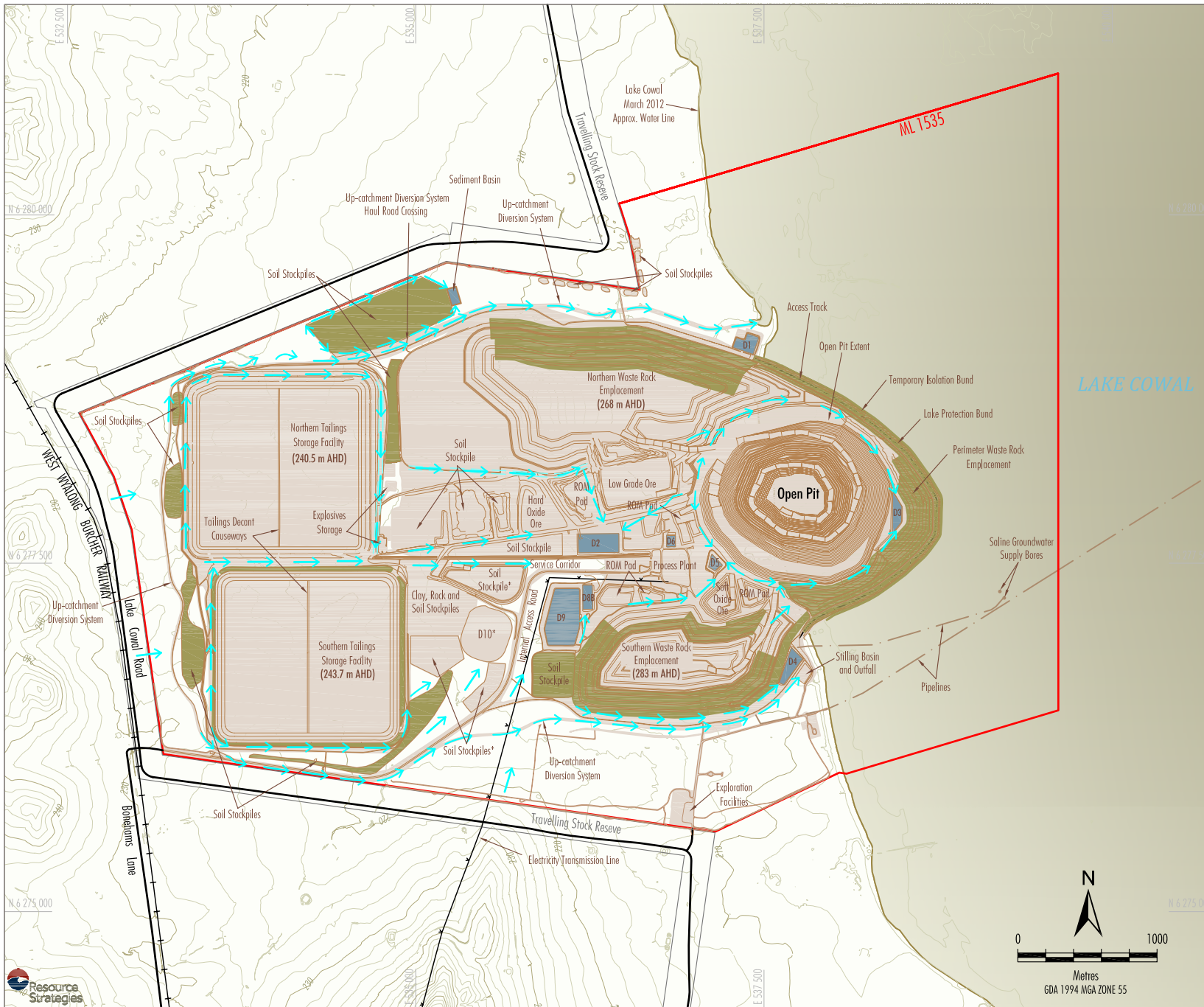
- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Road
 - Contour m AHD (2 m Interval)
 - Approximate Extent of Approved Surface Development
 - Modification Components

Source: Evolution (2016)



CGO MINE LIFE MODIFICATION
Modification Layout

Figure 3-1



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Road
 - Contour m AHD (2 m Interval)
 - Approximate Extent of Approved Surface Development
 - Contained Water Storage
 - + Infrastructure not yet constructed
 - Rehabilitated Area (shaped and covered with rock mulch and/or topsoil and vegetation)
 - Drainage Path

Source: Evolution (2016)



CGO MINE LIFE MODIFICATION
Conceptual General Arrangement
Year 14 (2018)

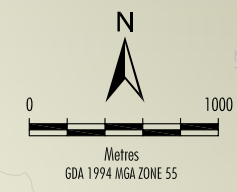
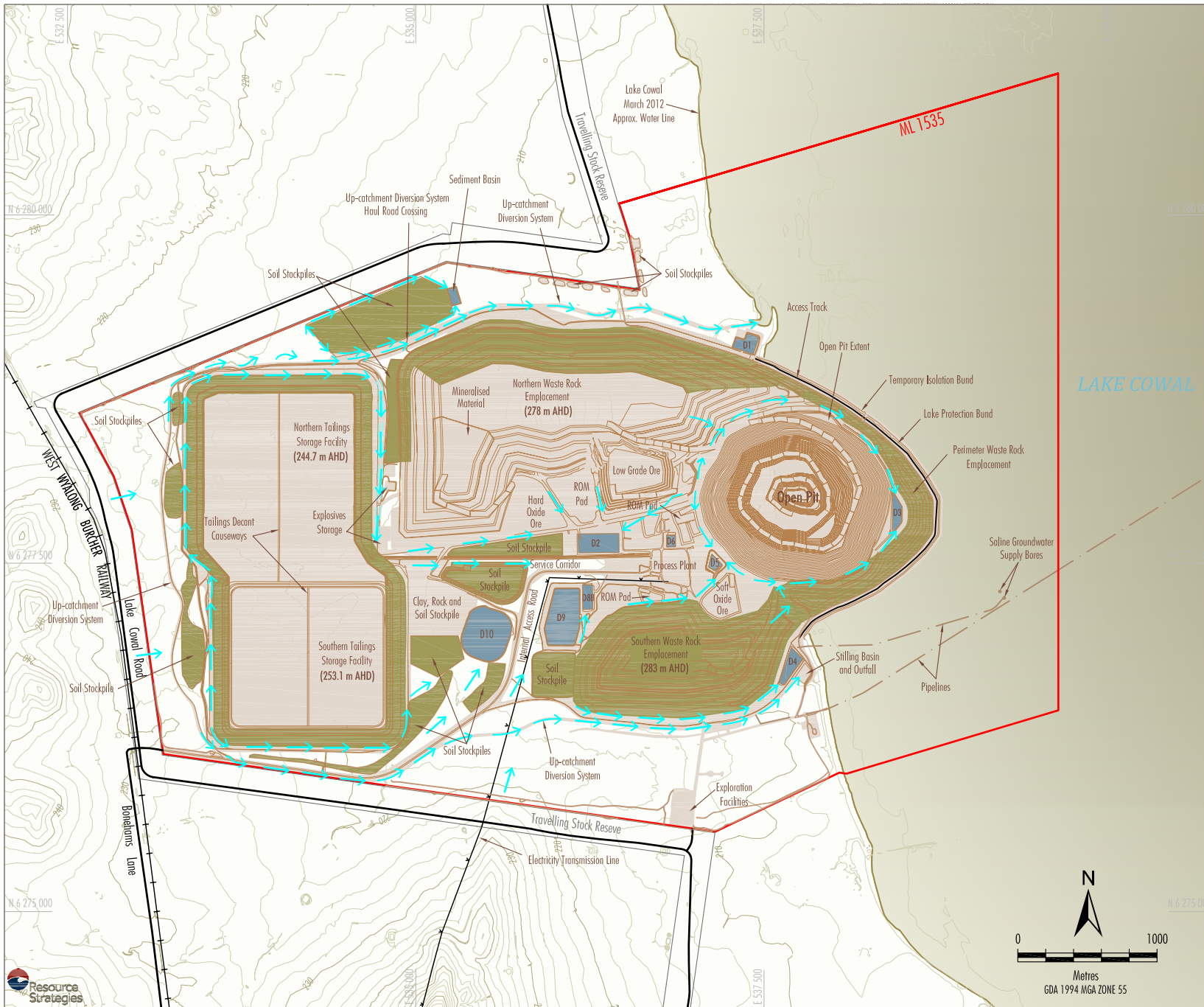
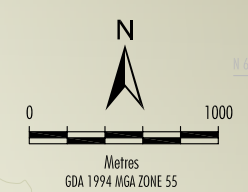


Figure 3-2



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Road
 - Contour m AHD (2 m Interval)
 - Approximate Extent of Approved Surface Development
 - Contained Water Storage
 - Rehabilitated Area (shaped and covered with rock mulch and/or topsoil and vegetation)
 - ➔ Drainage Path

Source: Evolution (2016)



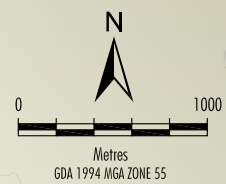
CGO MINE LIFE MODIFICATION
Conceptual General Arrangement
Year 18 (2022)

Figure 3-3



- LEGEND**
- Mining Lease Boundary (ML 1535)
 - Road
 - Contour m AHD (2 m Interval)
 - Rehabilitated Area
 - Final Void
 - Final Void Batter
 - Drainage Channel
 - Swale

Note: Landform elevations are approximate
Source: Evolution (2016)



CGO MINE LIFE MODIFICATION
Conceptual General Arrangement
Post-mining

Figure 3-4

**Table 3-1
Indicative Mining and Ore Processing Schedule**

	Calendar Year	CGO Year	Ore Mined ² (Mt)			Mineralised Material Mined ² (Mt)			Ore Processed ^{1,2} (Mt)			Waste Rock Mined ² (Mt)
			Oxide	Primary	Total	Oxide	Primary	Total	Oxide	Primary	Total	
Existing CGO	2005 to 2016	1 to 12	16.5	82.5	99.0	5.0	12.2	17.2	5.8	69.2	75.0	211.6
Modified CGO	2017	13	-	9.4	9.4	-	1.1	1.1	-	7.5	7.5	12.6
	2018	14	0.1	9.1	9.2	0.2	1.0	1.1	-	7.4	7.4	22.1
	2019	15	-	5.5	5.5	-	1.2	1.2	-	7.3	7.3	23.5
	2020	16	-	2.4	2.4	-	1.4	1.4	3.8	3.7	7.5	21.5
	2021	17	-	10.5	10.5	-	4.5	4.5	-	7.5	7.5	10.8
	2022	18	-	11.9	11.9	-	2.7	2.7	-	7.4	7.4	4.1
	2023	19	-	8.4	8.4	-	1.6	1.6	-	7.3	7.3	2.1
	2024	20	-	1.9	1.9	-	0.1	0.1	-	7.5	7.5	0.8
	2025	21	-	-	-	-	-	-	-	7.5	7.5	-
	2026	22	-	-	-	-	-	-	-	7.5	7.5	-
	2027	23	-	-	-	-	-	-	-	7.5	7.5	-
	2028	24	-	-	-	-	-	-	-	7.5	7.5	-
	2029	25	-	-	-	-	-	-	-	7.5	7.5	-
	2030	26	-	-	-	-	-	-	2.3	5.2	7.5	-
	2031	27	-	-	-	-	-	-	7.5	-	7.5	-
	2032	28	-	-	-	-	-	-	2.3	-	2.3	-
		<i>Sub-Total</i>		0.1	59.1	59.2	0.2	13.5	13.7	15.9	98.1	114.1
Total			16.6	141.6	158.1	5.2	25.7	30.9	21.8	167.3	189.1	309.1

¹ The maximum annual ore processed would be 7.5 Mtpa.

² The sequence and quantities of mining and processing primary and oxide ores, mineralised material and waste rock may change over the life of the mine, subject to detailed mine planning requirements.

Note: Discrepancies in totals due to rounding.

The berm widths and slope angles would continue to be reviewed and monitored through ongoing geotechnical studies and data collection during mine development. The design configuration for the modified open pit would be detailed in a revised MOP which would be prepared in consultation with and subject to approval by the DRE.

The LPBMP would be revised to include a description of the Modification open pit design and monitoring (i.e. survey assessment) requirements.

As there would be no change to the extent of the open pit, there would be no change the existing lake isolation system that currently separates the open pit from Lake Cowal (comprising the temporary isolation bund, lake protection bund and perimeter waste rock emplacement).

Mobile Mine Equipment Fleet

The existing mobile mine equipment fleet used at the CGO (Section 2.3.3) would be increased for the Modification to reflect the deeper open pit. The revised fleet list is provided in the Noise and Blasting Assessment (Appendix D). The existing TSF construction fleet would also be increased to enable the rock buttressing, connection and heightening of the TSFs.

Following Year 17 (2021), the mobile mine equipment fleet required would decrease proportionally with the decrease in the total waste and ore mined (Table 3-1).

Blasting

The typical blast design details and the average blasting frequency (i.e. maximum of one blast event per day) for the existing operations (Section 2.3.4) would remain unchanged for the Modification.

3.4 MINE WASTE ROCK MANAGEMENT***Mine Waste Rock Schedule***

Approximately 97 Mt of additional waste rock (i.e. a total of approximately 309 Mt of waste rock) would be mined during the life of the Modification (Table 3-1).

The maximum quantity of waste rock mined in any one year would be approximately 23.5 Mt (Table 3-1). As such, the Modification would not increase the maximum quantity of annual waste rock mined compared to the approved CGO.

Following Year 15 (2019), annual waste rock quantities would progressively decrease as the ore-to-waste ratio improves.

Mineralised material would continue to be separately stockpiled adjacent to the northern waste rock emplacement (Figure 3-1). The Modification would involve temporarily increasing the design height of the existing mineralised material stockpile to approximately 288 m AHD. However, as the Modification would involve processing of this material, the mineralised material stockpile would be progressively removed (Table 3-1).

Mine Waste Rock Geochemistry

An assessment of the acid-generating potential and metal-leaching behaviour of mine waste rock associated with the development of the Modification has been undertaken (Appendix C).

The waste rock produced from the Modification would have similar geochemical characteristics to waste rock from the approved CGO (Appendix C). On this basis, existing mine waste rock management strategies would continue to be implemented for the Modification.

Mine waste rock material suitable for use as a cover system for the waste rock emplacements (i.e. for rehabilitation) would also be segregated for use as described in Appendix F.

Waste Rock Emplacements

A waste rock balance was conducted for the Modification and it was found that the volume of additional waste rock produced as a result of the deepening of the open pit would be approximately similar to the volume of waste rock required for construction of the rock buttresses surrounding the TSFs.

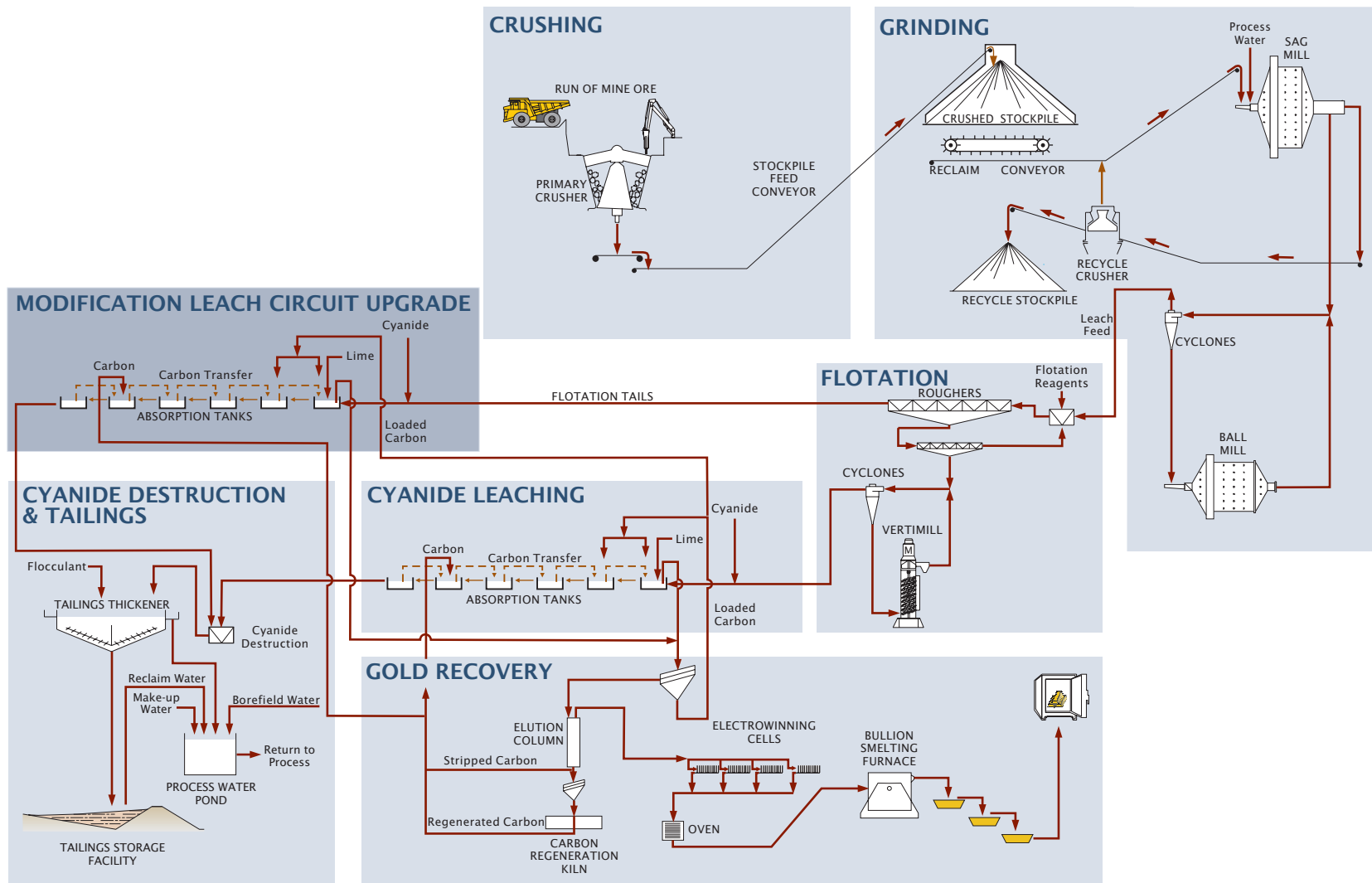
Therefore, as the additional waste rock mined would be used for buttressing the TSFs, no additional waste rock would be emplaced at the northern, southern or perimeter waste rock emplacements, and there would be no change to the extent of the northern, southern or perimeter waste rock emplacements.

3.5 ORE PROCESSING***Ore Processing Rate and Gold Recovery Methods***

The approved maximum ore processing rate of up to 7.5 Mtpa would not change for the Modification.

Gold would continue to be extracted from ore using a conventional carbon-in-leach cyanide leaching circuit. However the Modification would involve upgrades to the existing primary ore leach circuit to allow the recovery of gold from flotation tailings and to improve gold recovery from the CGO process plant (i.e. the existing flotation tails stream would be leached to improve the overall rate of gold recovery). A conceptual primary ore processing flowsheet including the leach circuit upgrades is provided in Figure 3-5. The additional leach circuit components would be located within the existing process plant area (Figure 3-1).

Operation of the upgraded leach circuit would involve an increase in cyanide consumption and some other reagents/process consumables (Section 3.5.1). However, no new reagents/process consumables would be used, and no change to the CGO's existing consumables storage areas, handling or transport methods would be required for the Modification.



HAL-16-41 ML Mod 003A



Source: Evolution (2016)



CGO MINE LIFE MODIFICATION

Indicative Primary Ore Process Flowsheet

Figure 3-5

Ore Processing Schedule

Oxide ore would be processed in two separate campaigns over the life of the Modification (i.e. during Year 16 [2020] and Years 26, 27 and 28 [2030 to 2032]). The majority of oxide ore would be processed during Year 27 of the CGO. The sequence of processing primary and oxide ore however may change over the life, subject to detailed scheduling of mining and processing requirements.

Any changes to the ore processing schedule would be detailed in a revised MOP which would be prepared in consultation with and subject to approval by the DRE.

3.5.1 Cyanide Use and Process Consumables

The upgrades to the existing leach circuit would increase cyanide consumption to approximately 0.7 kg of cyanide per tonne of primary ore. No change to cyanide consumption for oxide ore processing (i.e. approximately 0.8 kg of cyanide per tonne of ore) would occur as the leach circuit upgrades would be relevant to primary ore processing only.

The upgraded leach circuit would also involve increased use of other consumables used and stored at the CGO, including:

- hydrochloric acid;
- lime;
- oxygen (for cyanide destruction);
- SMBS; and
- sodium hydroxide.

Additional heavy vehicle deliveries would be associated with the additional use of some consumables.

Section 3.10 describes the management measures for the storage, use and transport of chemicals and wastes.

3.5.2 Cyanide Destruction

The Modification would not change:

- the existing cyanide destruction methods currently used at the CGO (i.e. either Caro's Acid or the INCO process) (Section 2.5.2); or
- the approved CN_{WAD} concentration limits of the aqueous component of the tailings slurry stream (Section 2.5.2).

The quantity of cyanide destruction reagents added to the tailings (for either Caro's Acid or INCO processes) would continue to be regulated by an on-line free cyanide measurement.

The mitigation and management measures described in the CMP (including the cyanide monitoring process) would continue to be implemented for the Modification.

3.6 TAILINGS MANAGEMENT

Geochemical Characteristics of Tailings

It is expected that the tailings generated from the Modification would have similar geochemical characteristics to those from the approved CGO tailings geochemistry (Appendix C). As such, existing tailings management strategies would continue for the Modification (Appendix C).

Tailings Storage Facilities

The existing northern and southern tailings storage facilities (Section 2.6) would continue to be used to store the additional tailings produced during the life of the Modification.

In approximately Year 16 (2020) construction works would commence to enable the use of the area in between the northern tailings storage facility and southern tailings storage facility as additional tailings storage. Construction works would include:

- construction of connector embankments between the northern tailings storage facility and southern tailings storage facility;
- construction of a low permeability basement layer and other seepage control measures; and
- extension of the existing northern tailings storage facility decant causeway into the new tailings storage area, prior to the point when tailings deposition in the new area overtops the Stage 6 northern tailings storage facility embankment.

Following construction of the connector embankments, tailings would be deposited into the central section and the northern tailings storage facility simultaneously.

Consistent with approved operations, tailings would be deposited in the central section via spigots (nominally 60 m apart). These spigots would be located on the connector embankments and along the downstream side of the northern face of the southern tailings storage facility.

Tailings would be deposited in the central section until the tailings surface is level with the Stage 6 embankment of the northern tailings storage facility. Subsequent to this, the northern tailings storage facility and central section would act as one continuous area for tailings deposition (Figure 3-6), with the existing decant causeway for the northern tailings storage facility extended to the northern face of the southern tailings storage facility embankment (Figure 3-3).

In addition to connecting the TSFs, the approximate final heights of the northern and southern tailings storage facilities would increase to approximately 264 m AHD and 272 m AHD, respectively, to accommodate additional tailings.

To maintain suitable geotechnical factors of safety appropriate for operating conditions and long-term stability, a rock buttress cover would be constructed on the outer slopes of the TSFs' embankments once the final height has been reached. This would include a minor expansion of the footprint of the TSFs within currently approved surface disturbance areas.

Conceptual cross-sections of the modified northern and southern tailings storage facility embankments and the central connector embankment are shown on Figures 3-7, 3-8 and 3-9, respectively.

In accordance with existing operations, as the TSFs are filled, the embankments would continue to be raised in a series of upstream lifts. The additional upstream lifts would use the same construction materials and follow the same lift construction methodology as the existing CGO (Section 2.6). During operations, each upstream lift would also involve placement of an interim rock buttress on the outer slope of the lift. Once the final embankment is constructed, placement of the final rock buttress would occur (Figures 3-7 and 3-8).

Consistent with existing operations, the TSFs would be progressively raised during Years 13 to 28 (i.e. over the life of the Modification) at a rate of not more than approximately 5 m per year.

As the heights of the TSFs increase, and the effective area for tailings deposition decreases, the effective rate of rise of the tailings beaches would increase.

As described in Section 2.6, the existing decant causeways are approved to be extended to the opposite side of the storages. This would allow each storage to be divided into two cells.

The design configuration for the TSFs would continue to be detailed in a revised MOP which would be prepared in consultation with and subject to approval by the DRE. The design, construction, operation and monitoring of the TSFs would continue to be conducted in consultation with and to the satisfaction of Dams Safety NSW (formerly the NSW Dams Safety Committee).

Tailings Storage Facility Water Management

Prior to the point when tailings deposition in the new area overtops the Stage 6 northern tailings storage facility embankment, water would be reclaimed for re-use from the central section via the a new decant, comprising a series of concrete rings installed from ground level up, surrounded by filtration rock. Water would be pumped from the centre of the concrete rings back to the contained water storage (D6) for use in processing.

Following the integration of the new area with the northern tailings storage facility, the northern tailings storage facility decant would service the new tailings area (as well as the northern tailings storage facility itself).

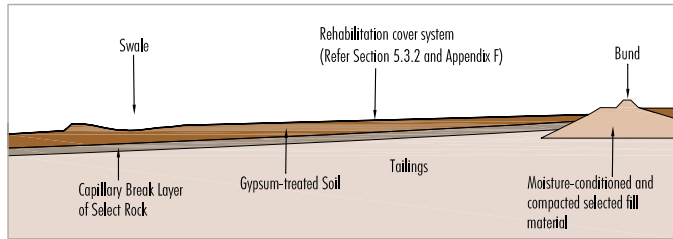
No changes to the water management for the existing TSFs would be required for the Modification (Section 2.6).

The low permeability basement layer constructed for the existing TSFs (e.g. targeted vertical permeability of no greater than 1×10^{-9} metres per second [m/s]) and other existing seepage control measures (Section 2.6) would be replicated for the space between the existing TSFs, and would continue to control seepage from the TSFs for the life of the Modification.

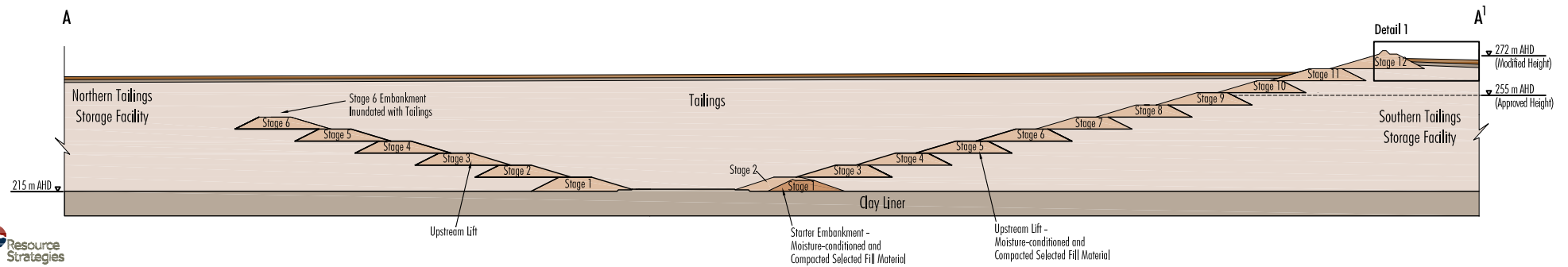
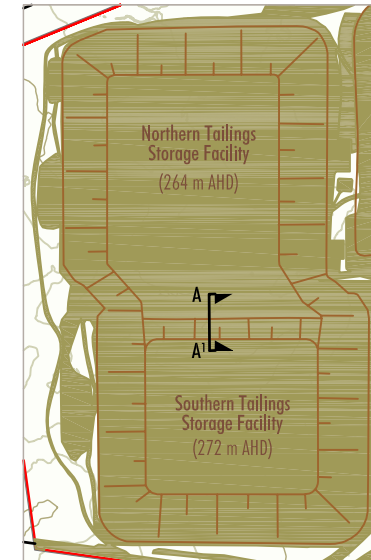
In general, the connector embankments would adjoin existing TSF embankments made entirely of homogeneous (clayey) material.

Some of the existing lifts include rockfill shoulder material. Accordingly, the connector embankments would incorporate measures to prevent seepage through the rock fill shoulder material. A low permeability cut-off using slurry/grouting would be constructed in existing embankments for seepage control where necessary.

No changes to seepage flows are expected for the Modification (i.e. the open pit would continue to act as a sink for seepage flows from the TSFs) (Appendix A).



DETAIL 1



PANEL 6-41 (M. Mod.) 1058

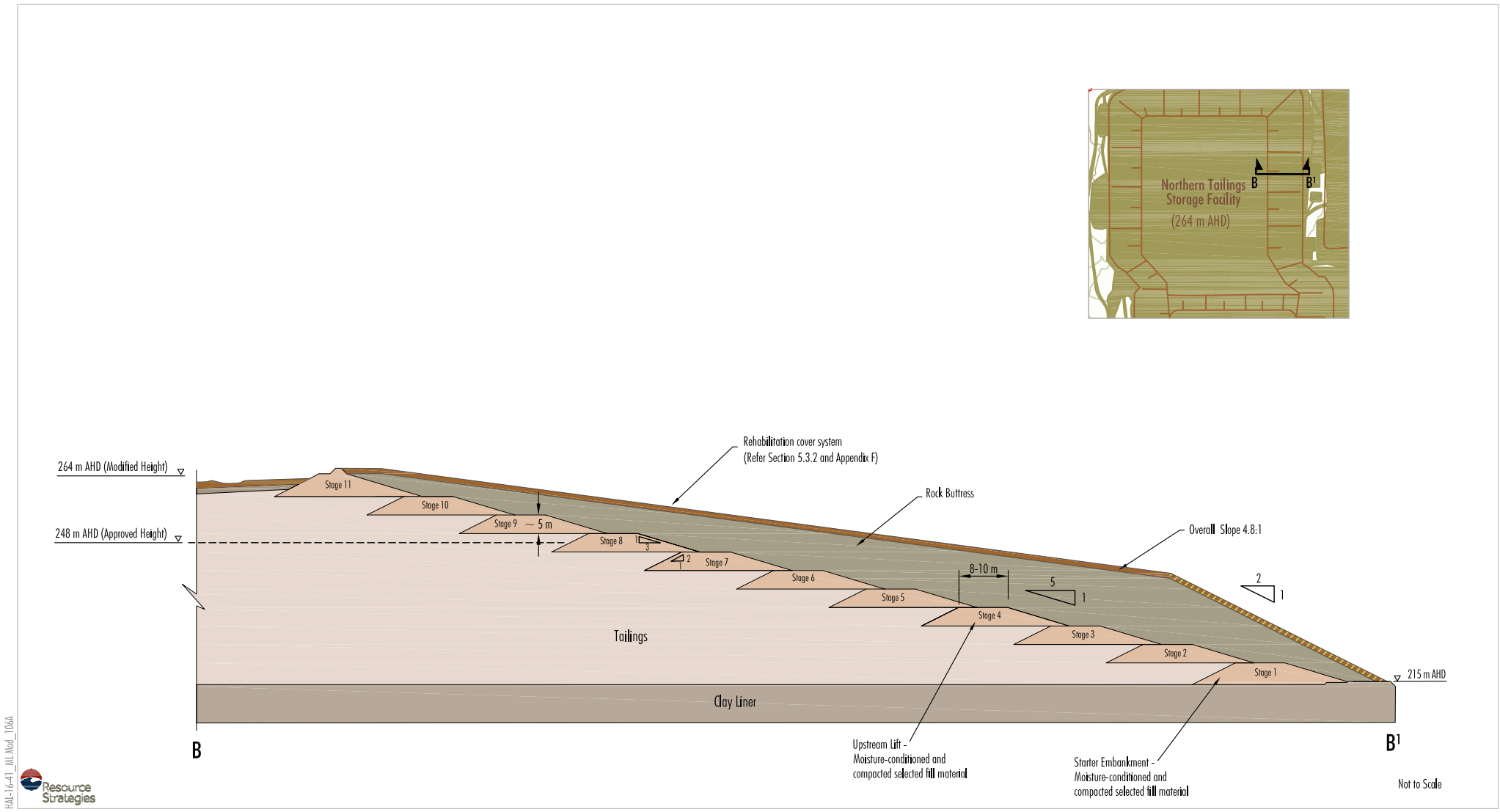


Source: AECOM (2016)



CGO MINE LIFE MODIFICATION
 Conceptual Cross-section of Central
 Tailings Storage Facility Area

Figure 3-6



PANEL 6-41 (M. Wood) 106A



Source: AECOM (2016)



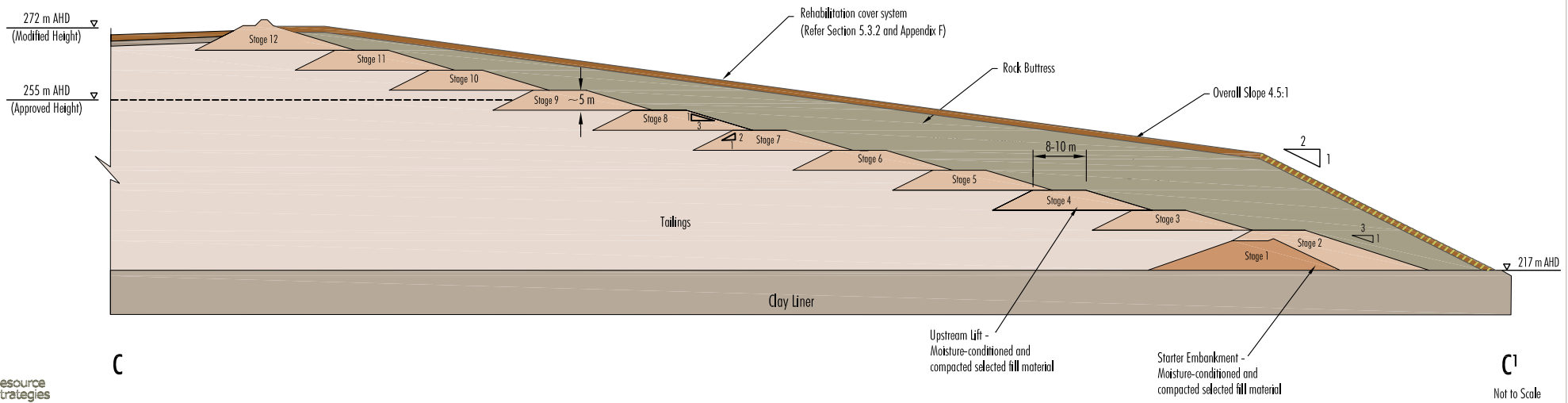
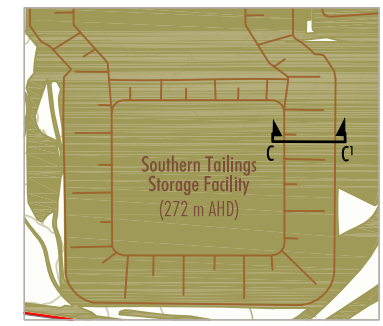
CGO MINE LIFE MODIFICATION
 Conceptual Embankment Section of
 Modified Northern Tailings Storage Facility

Figure 3-7

HAL-16-41 - Mt. Wood - 107A



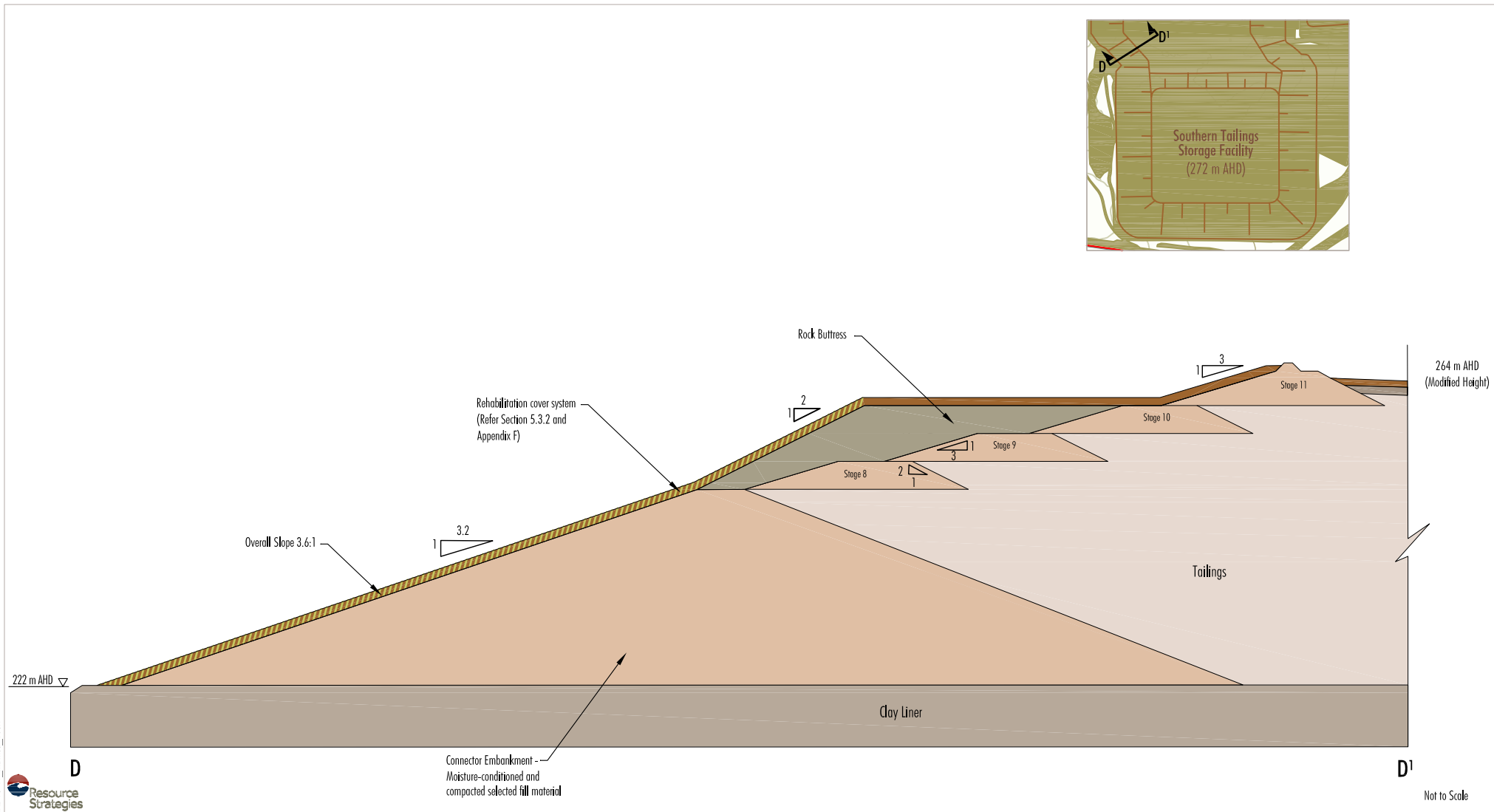
Source: AECOM (2016)



CGO MINE LIFE MODIFICATION
 Conceptual Embankment Section of
 Southern Tailings Storage Facility



Figure 3-8



PANEL 6-41 (M. Wood) 108A



Source: AECOM (2016)



CGO MINE LIFE MODIFICATION
 Conceptual Embankment Section of
 Tailings Storage Facility Connector
 Embankment
Figure 3-9

3.7 SITE WATER MANAGEMENT INFRASTRUCTURE

There would be no change to the design objectives of the existing surface water management system (Section 2.7). That is:

- the UCDS would continue to divert up-catchment runoff around the CGO;
- the ICDS would continue to control runoff from active mining areas; and
- the lake isolation system would continue to separate Lake Cowal from the CGO.

There would be no changes to water management infrastructure (Section 2.7) required to maintain the design objectives of the existing water management system as a result of the Modification.

The Modification would not result in any changes to the existing integrated erosion, sediment and salinity control system (Section 2.7.4).

The Modification would not change the approved CGO pit dewatering methods (Section 2.7.5).

3.8 WATER SUPPLY

The Modification would not change existing annual water supply requirements or sources of internal and external water supply for the approved CGO (Section 2.8).

Given there would be no increase in the ore processing rate for the Modification, annual water demand would not materially change in comparison to the existing operations. However, as the Modification would involve the continuation of operations at the CGO for an additional 8 years, total life-of-mine water demand would increase.

No additional water supply infrastructure would be required for the Modification.

3.8.1 Site Water Supply Requirements

Water supply for the Modification would continue to be required for ore processing in the process plant, as well as dust suppression (e.g. haul roads) and other potable and non-potable uses. Supply sources are described in Section 3.8.3.

Consistent with existing operations, the total water supply requirement for the process plant is estimated to be approximately 0.9 kL/t for primary ore processing and 1.7 kL/t for oxide ore processing (Section 2.8).

3.8.2 Revised Site Water Balance

A revised site water balance has been conducted by Hydro Engineering & Consulting Pty Ltd (HEC) for the life of the Modification, and is presented in Appendix B. A summary of the simulated water balance for the life of the Modification under various climatic scenarios is provided in Table 3-2.

It is expected that the majority of total water requirements for the Modification would continue to be supplied from internal water sources, with the remainder supplied from external water sources (Table 3-2).

3.8.3 Water Supply Sources

Consistent with existing operations, site water supply would continue to be preferentially supplied from internal and external water sources according to the following priority:

1. TSF return water.
2. Open pit sump dewatering borefield.
3. Contained water storages.
4. External water sources (i.e. water supply priority from external water sources subject to water market conditions):
 - Saline groundwater supply bores within ML 1535.
 - Eastern Saline Borefield.
 - Bland Creek Palaeochannel Borefield.
 - Lachlan River licensed extraction.

Further detail regarding external water sources is provided below.

Saline Groundwater Supply

The existing saline groundwater supply bores within ML 1535 (Section 2.8.1) would continue to be used for the Modification (during suitable lake conditions) in accordance with existing licence conditions under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.

The revised site water balance for the Modification has considered the expected availability of the existing saline groundwater supply bores due to the inundation of Lake Cowal (Appendix B).

**Table 3-2
Simulated Water Balance for the Life of the Modification**

Expected Water Demand/Supply	10 th Percentile Rainfall Sequence (Dry)	Median Rainfall Sequence	90 th Percentile Rainfall Sequence (Wet)
	(ML/annum)		
Outflows			
Total Expected Water Requirements¹	8,963	8,950	8,974
Inflows			
<i>Internal Water Sources</i>			
Catchment Runoff	837	1,084	1,285
Tailings water return	3,861	3,861	3,861
Open Pit Groundwater	199	199	199
<i>Subtotal – Internal Water Sources</i>	<i>4,897</i>	<i>5,144</i>	<i>5,345</i>
<i>External Water Sources</i>			
Saline Groundwater Supply Bores within ML 1535	137	94	86
Eastern Saline Bores	522	516	507
Bland Creek Palaeochannel Borefield	1,998	1,917	1,871
Lachlan River Licensed Extraction ²	1,445	1,329	1,268
<i>Subtotal – External Water Sources</i>	<i>4,102</i>	<i>3,856</i>	<i>3,732</i>
Total Expected Water Supply	8,999	9,000	9,077

Source: After Appendix B.

¹ Includes water requirements/losses associated with ore process, evaporation, haul road dust suppression and tailings lift construction.

² Modelled volume of water actually reaching the CGO – excludes irrigation channel losses.

Eastern Saline Borefield

The operation of the existing Eastern Saline Borefield (Section 2.8.2) would continue for the Modification in accordance with Development Consent (DA 2011/64) and existing licence conditions under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.

Bland Creek Palaeochannel Borefield

The operation of the existing Bland Creek Palaeochannel Borefield (Section 2.8.3) would continue for the Modification in accordance with existing licence conditions under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.

There would be no change to the existing Groundwater Contingency Strategy (i.e. trigger levels) for the management of groundwater levels in the Bland Creek Palaeochannel (Section 2.8.3) due to the Modification.

The Hydrogeological Assessment for the Modification (Appendix A) predicts that a maximum sustainable yield of 5.1 ML/day from the Bland Creek Palaeochannel Borefield over the life of the Modification would maintain groundwater levels above the relevant trigger levels at groundwater bores GW036553, GW036597 and GW036611.

As there be would no change to the existing Groundwater Contingency Strategy (i.e. agreed trigger levels) for the ongoing management of groundwater levels in the Bland Creek Palaeochannel or existing daily and annual extraction limits, no additional impacts to other groundwater users are predicted due to the continued use of the Bland Creek Palaeochannel Borefield for the Modification (Appendix A).

Lachlan River Water Entitlements

Water from the Lachlan River would continue to be accessed for the Modification, when required, by purchasing temporary water available from the regulated Lachlan River trading market.

During the life of the existing CGO there has been reliable supply of temporary water available from the Lachlan River trading market, including during periods of drought. DPI-Water trading records show that between approximately 4,000 ML and 274,000 ML of temporary water has been traded annually since records began in 2004 (Appendix B). By comparison, the predicted average water requirement from the Lachlan River under a 10th percentile (dry) rainfall sequence is 1,445 ML/annum over the life of the Modification (Table 3-2).

Given the above, it is expected there would be continued reliable supply of water available from the Lachlan River trading market for the Modification (Appendix B).

3.9 INFRASTRUCTURE AND SERVICES

Mineralised Material Stockpile Area

The Modification would involve temporarily increasing the design height of the existing mineralised material stockpile to approximately 288 m AHD (Section 3.4) and temporarily integrating this stockpile with the adjacent northern waste rock emplacement. As the Modification would involve processing of mineralised material, the mineralised material stockpile would be progressively removed (Table 3-1).

Administration Buildings, Exploration and Workshop Facilities

The existing administration buildings, exploration and workshop facilities on-site would continue to be used during the life of the Modification.

Mine Access

There would be no change to the preferred access routes to the CGO for the Modification.

Use of the primary access road from West Wyalong for light and heavy vehicles would continue for the Modification. Light vehicle and employee shuttle bus access from Condobolin and Forbes would also continue for the Modification.

Electricity Supply and Distribution

Electricity to the site would continue to be provided via the existing 132 kV ETL from Temora.

Power on-site would continue to be transferred either by overhead cable or underground cable. Standard electrical safety laws and practices (including vehicle clearance considerations) would apply.

Site Security and Communications

Existing site security measures (including the ML 1535 perimeter fence and perimeter buoys during periods of lake inundation) would be retained for the Modification. The existing communications systems would also be retained with augmentations as required over the life of the Modification (i.e. as technological advances allow).

Potable Water

The potable water supply for use on-site would continue to be trucked to the CGO. The existing potable water supply network on-site would continue to service the Modification.

3.10 MANAGEMENT OF CHEMICALS AND WASTES

As discussed in Section 3.5, the Modification would result in an increase in the consumption of several reagents. Notwithstanding, the existing management measures as for the approved CGO (Section 2.12) would continue to apply for the Modification.

3.11 ROAD TRANSPORT

The Modification would include upgrades to the leach circuit which would result in additional deliveries (i.e. an additional 2 to 4 movements per day or 1 to 2 trucks in, 1 to 2 trucks out) during periods of processing primary ore. There would, however be no change during oxide ore processing campaigns. Therefore, there would be no change to the total maximum daily truck movements (Section 4.5.1).

The additional heavy vehicle deliveries would be assessed in an update of the Transport of Hazardous Materials Study which would be prepared in consultation with relevant Councils, the RMS and the transport provider, and would be subject to approval by the DP&E (Hazards Branch) (Section 4.5.1).

There would be no changes to employee vehicle movements or other road transport movements associated with the Modification (Section 4.5.1).

3.12 WORKFORCE AND OPERATING HOURS

Consistent with the existing operating hours at the CGO, operation of the Modification would be 24 hours a day, 7 days a week. Construction of TSFs embankment lifts would continue to be restricted to daytime hours only (i.e. 7.00 am to 6.00 pm).

The Modification would facilitate the continuity of employment for the existing CGO workforce for an additional 8 years.

There would be no change to the average or peak CGO workforce due to the Modification.

3.13 CONSTRUCTION ACTIVITIES

The major components of the Modification (i.e. deepening of the open pit and increased heights of the TSFs) are considered to be part of the continuation of mining operations of the CGO, as opposed to construction activities.

Construction activities associated with the Modification are considered to include construction of the rock buttresses around the TSFs and construction of the upgrades to the leach circuit within the process plant.

Construction of the rock buttresses around the TSFs would occur from approximately Year 13 (2017) and would involve transport of waste rock from the open pit to the embankments of the TSFs for deposition.

Construction of the rock buttresses for the TSFs would be restricted to daytime hours only.

Construction of the leach circuit upgrade is anticipated to commence in Year 13 (2017) and would occur over approximately six months.

Descriptions of the construction activities associated with the leach circuit upgrade and TSF rock buttresses are provided in Sections 3.5 and 3.6, respectively.