Nowa Nowa Iron Project

East Gippsland, Victoria

Environmental Management Plan

EASTERN IRON LIMITED

DOCUMENT REVISION LIST

Revision Status / Number	Revision Date	Description of Revision	Approved By
Revison 0	October 2013	Draft	Greg De Ross
Revision 1	October 2013	Final Draft	Greg De Ross
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Contents

FOREWORD

Eastern Iron Limited, through their wholly owned subsidiary Gippsland Iron Pty Ltd, has prepared a referral to the Minister for Planning for a decision as to whether an Environmental Effects Statement (EES) is required for the proposed Nowa Nowa Iron Project ('the Project') pursuant to the *Environment Effects Act 1978* ('the EES Referral').

The Project is a greenfield development of a high grade magnetite/haematite deposit located approximately 7 km north of Nowa Nowa, which is situated on the Princes Highway between Bairnsdale and Orbost in East Gippsland, Victoria.

This *Environmental Management Plan* (EMP) has been prepared to support the EES Referral. It outlines Eastern Iron's commitments to ensure environmental and social risks associated with the Project are appropriately managed and monitored during the construction, operations, decommissioning and closure of the Project. The EMP also provides a comprehensive environmental and social baseline for the Project and provides a risk assessment of potential Project issues.

This EMP should be viewed in conjunction with the *Project Description and Proposed Mine Plan* (EES Referral Attachment 1) which provides a detailed outline of the proposed Project.

A detailed Environmental Management System (EMS) framework has been developed for the Project, consistent with ISO 14001 and relevant Victorian legislation and guidelines. The proposed EMS is designed to demonstrate that the environmental and social management and mitigation commitments outlined in the various Project plans will be effectively implemented, and the environmental performance of the Project will be monitored to allow 'continuous improvement' over the Project life. The EMS is also consistent with Eastern Iron's *Environmental Policy, Social Policy and Health* and *Safety Policy*.

The development of environmental and social management measures for the Project in the EMP is supported by a number of additional Attachments which provide further information regarding key Project aspects. These attachments include:

- Attachment 3- Stakeholder Engagement Plan
- Attachment 4- Evaluation of Project Alternatives
- Attachment 5 - Surface and Ground Water Baseline and Assessment
- Attachment 6 - Environmental Geochemical Assessment of Waste and Ore
- Attachment 7- Nowa Nowa Iron Project Traffic Impact Assessment
- Attachment 8- Flora, Fauna and Ecological Characteristics and Assessment
- Attachment 9- Aquatic and Wetland Ecology Study
- Attachment 10- 5 Mile Deposit Area: Aboriginal Cultural Heritage Management Plan Interim Report
- Attachment 11- Land and Water Use Study
- Attachment 12- Socioeconomic and Health Baseline and Evaluation
- Attachment 13- Air Quality, Noise and Vibration Study and Monitoring Plan

Through the Referral documentation provided, Eastern Iron aims to demonstrate that consideration of environmental and social issues has been integrated into the Project design to ensure impacts are avoided and minimised wherever possible.

Furthermore, with careful implementation of the commitments outlined in the management plans provided, Eastern Iron believes that the Project can be implemented without causing significant long term effects on the local or regional environment during operations or post-closure, whilst maximising potential economic and social benefits for the local, regional and State economy.

1 PROJECT OVERVIEW AND GENERAL REQUIREMENTS

1.1 Introduction

This *Environmental Management Plan* (EMP) has been prepared for the Nowa Nowa Iron Project ('the Project') to support a referral to the Minister for Planning for advice as to whether an Environment Effects Statement is required for the Project pursuant to the *Environment Effects Act* 1978.

The EMP describes the environmental and social mitigation, management and monitoring measures to be implemented during the construction and operation phases of the mine development. The objectives of this EMP are to:

- Summarise the environmental and social baseline for the Project;
- Summarise key environmental and social risks associated with the Project development;
- Describe the environmental management system to be implemented for the Project;
- Outline Eastern Iron's commitments to management and monitoring of environmental and social aspects over the Project life; and
- Provide an overall framework and an implementation plan for rehabilitation and closure activities for the proposed Project, to achieve a self-sustaining and environmentally stable site post-closure.

The Environmental Management Plan (EMP) is a dynamic document and is therefore subject to periodic revision. With each revision of the EMP, management strategies will be reviewed in each section to ensure continuous improvement of environmental and social management of the Project. It is expected that the EMP will be revised prior to commencement of Project construction.

1.1.1 Project Description Overview

The Project involves an open cut mining operation from a single pit with dry processing at the site to upgrade the material to a saleable product. It is anticipated that the Project will produce up to 1 Mt of ore per annum, over an initial mine life of 8-10 years. The mine will be operated using a mining contractor and local employees (i.e. no onsite accommodation).

It is proposed to transport the processed ore by road to the existing South East Fibre Exports (SEFE) wharf at the Port of Eden in Edrom, NSW ('the Port'). The main transport route between the mine and the Port is via the Princes Highway. The material will be temporarily stockpiled before being loaded onto 50-60,000t vessels and exported to international markets.

A Waste Rock Dump (WRD) is proposed to be developed adjacent to the open pit to store waste rock. Ore will be hauled from the open pit to the ROM pad and processed via dry Low Intensity Magnetic Separation (dry LIMS). Low grade ore produced in the dry LIMS process will be temporarily stockpiled adjacent to the open pit and either reprocessed later in the sold or placed in the pit (subaqueous) on closure.

The site will be fully rehabilitated at closure with the removal of all mine infrastructure and revegetation with native vegetation. Water levels in the open pit will rebound leaving a water resource for potential public use.

The main components of the Project include the:

- Open Pit;
- Mine Infrastructure (includes the Run of Mine (ROM) pad, processing plant and Mine Operations Centre (MOC);
- Waste Rock Dump;
- Temporary Low Grade Ore Stockpile;
- Water Storage Infrastructure;
- Mine Access and Haul Roads; and
- Ancillary Infrastructure.

Figure 1.1 below illustrates the proposed Project Layout.

Further details of the Project, including the design and layout of the mine site, are provided by the ***Project Description and Proposed Mine Plan*** (EES Referral Attachment 1).

1.1.2 Proponent Details

The Proponent is Eastern Iron Limited ('Eastern Iron'), through its wholly owned subsidiary Gippsland Iron Pty Ltd. Eastern Iron is a minerals exploration and development company that was listed on the ASX in May 2008 (ASX:EFE). Eastern Iron has its main office in New South Wales, Australia and has the objective of discovering and delineating iron ore projects in eastern Australia. Since listing the company has drilled and announced maiden resources at four project areas – Cobar iron pisolite project in western NSW, Eulogie and Hawkwood iron-vanadium projects in Queensland and the Nowa Nowa Iron Project.

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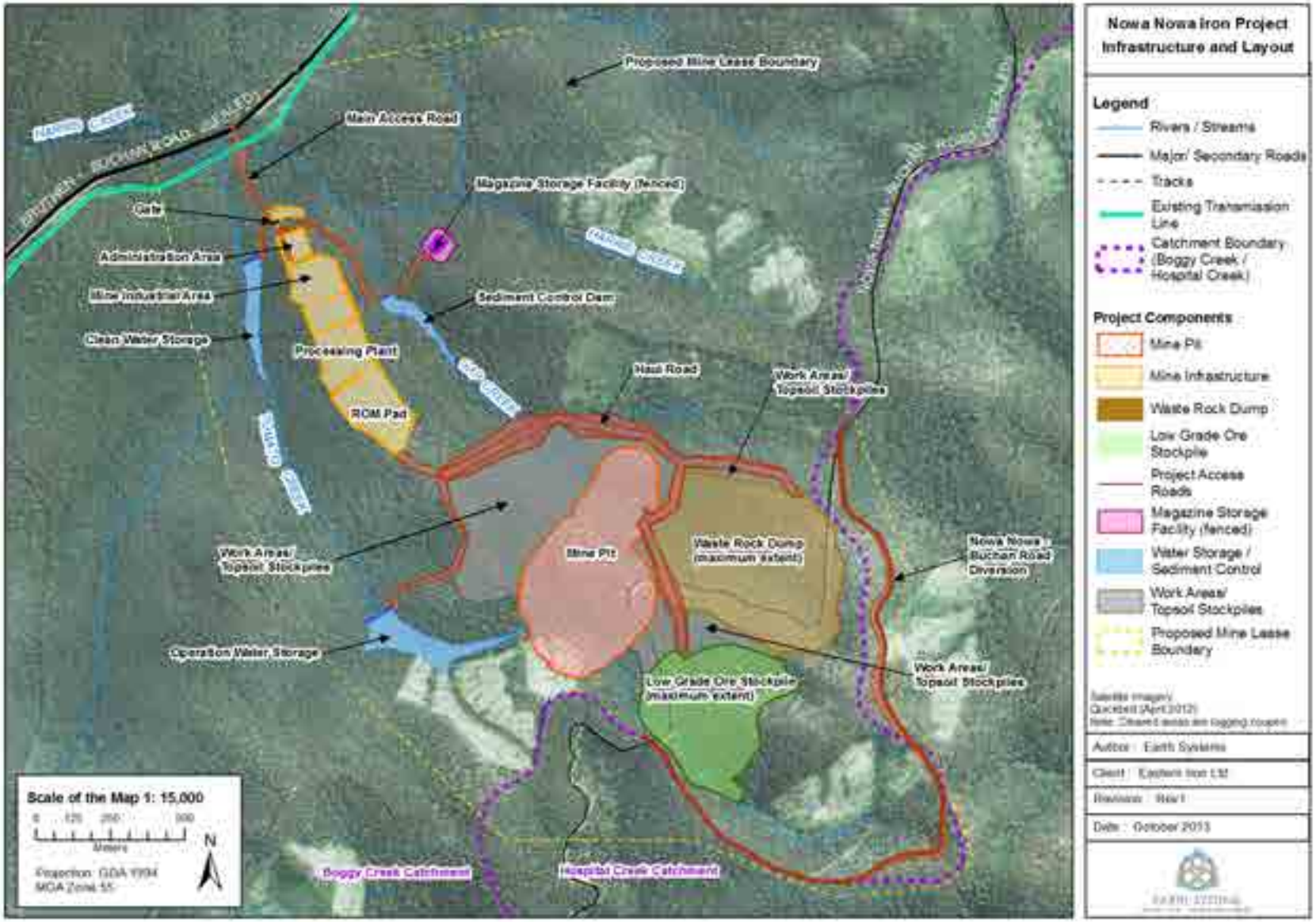

Figure 1.1 Proposed Project Infrastructure and Layout

1.2 Legislative and Policy Framework

1.2.1 Legislation and Policies

Mining licence holders are required to prepare an EMP as part of the work plan approvals process. As per Regulation 9 of the *Mineral Resources Development (Mining) Amendment Regulations* (2010), information required in work plan for a mining licence exceeding 5 hectares includes an environmental management plan which:

1. identifies the key environmental issues for the proposal and includes details of background data, baseline studies or existing conditions in relation to environmental issues;
2. includes proposals for the management of environmental impacts including nomination of targets and proposals for the mitigation, control or reduction of impacts;
3. includes proposals for the management of wastes including consideration of the principles of waste minimisation;
4. includes a proposed monitoring program addressing the key environmental issues;
5. includes a proposal for reporting outcomes of the plan to the local community.

Relevant legislation and policies for the Project are summarised in Table 1.1 below.

Table 1.1 Relevant Legislation and Policies

Legislation	Date
State of Victoria	
Environment Effects Act	1978
Planning and Environment Act	1987
Mineral Resources (Sustainable Development) Act	1990
Environmental Protection Act	1970
Aboriginal Heritage Act	2006
Traditional Owner Settlement Act	2010
Water Act	1989
Land Act	1958
Crown Land (Reserves) Act	1978
Archaeological and Aboriginal Relics Preservation Act	1972
Flora and Fauna Guarantee Act	1988
Victoria's Native Vegetation Framework	2002
Wildlife Act	1975
National Parks Act	1975
Fisheries Act	1995
Forests Act	1958
Catchment and Land Protection Act	1994
Coastal Management Act	1995
Climate Change Act	2010

Legislation	Date
Conservation Forest and Land Act	1987
National Parks Act	1975
Safe Drinking Water Act (Vic)	2003
Occupational Health and Safety Act	2004
Dangerous Goods Act	1985
Relevant State Environment Protection Policies (SEPP)	-
Relevant State Waste Management Policies (WMP)	-
Management of Victoria's Ramsar Wetlands	2002
Protocol for Environmental Management: Mining and Extractive Industries	2007
Commonwealth	
Environment Protection and Biodiversity Conservation Act	1999
Environmental Protection Measure for Ambient Air Quality	-
National Pollutant Inventory	-
Water Act	2007
Fisheries Management Act	1991
National Parks and Wildlife Conservation Act	1975
Aboriginal and Torres Strait Islander Heritage Protection Act	1984
Native Title Act	1993
Wetland Policy of the Commonwealth Government of Australia	1997
National Greenhouse and Energy Report Act	2007
Energy Efficiency Opportunity Act	2006
Clean Energy Act	2011
Water for Future	
National Water Initiative	2004
Regulations	
Occupational Health and Safety Regulations	2007
Mineral Resources Development Regulations	2002 (Amended 2010)
Management of Victoria's Ramsar Wetlands	2002
Wetland Policy of the Commonwealth Government of Australia	1997
Dangerous Goods (Storage and Handling) Regulations	2012
Aboriginal Heritage Regulations	2007
Scheduled Premises and Exemptions Regulations	2007

Additional New South Wales legislation will apply in relation to ore transportation to Eden Port in New South Wales and any other activities undertaken in proximity to the Port.

State and local policy, plans and strategies are shown in Table 1.2 below.

Table 1.2 Relevant local / regional policies, plans and strategies

Policies, Plans and Strategies	Date
State of Victoria	
Victorian Health Priorities Framework 2012–2022: Rural and Regional Health Plan	2012-2022
National Environmental Health Strategy	2007-2012
Victorian Coastal Strategy	2002
Regional Tourism Action Plan	(2009 – 2012)
Victorian EPA's Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry	2002
Local	
East Gippsland Planning Scheme	2013
Gippsland Regional Plan	2010
East Gippsland Shire Council - Council Plan	2009-13 (updated for 2012/2013)
East Gippsland Shire Council - Council Plan (draft)	2013 – 2017
East Gippsland Economic Development Strategic Plan	2010
East Gippsland Community Wellbeing Plan	2009-2013
10 Point Plan for East Gippsland	2011
Unlocking the Future–Long Term Community Vision 2030	2012
East Gippsland Tourism Policy	2013
East Gippsland Strategic Tourism Plan	2006- 2011
Urban Design Framework - Orbost and District, Lake Tyers Beach	2007
East Gippsland Environmental Sustainability Strategy	2008-2013
Regional Growth Plan (draft)	2013
East Gippsland Regional Catchment Strategy	2013
East Gippsland Forest Management Plan	1997
East Gippsland Wood Utilisation Plan	2011/12 to 2013/14
Gippsland Region Fire Protection Plan	-
Fire Operations Plan	2012/13-2014/15.
Nowa Nowa, Wairewa & Lake Tyers Aboriginal Trust Community Plan	2012-2016

1.2.2 Best Practice Guidelines and Standards

Best practice guidelines and standards relevant to the Project are listed below in Table 1.3.

Table 1.3 Best practice guidelines and standards relevant to the Project

Guidelines or Standard	Date
Guidelines	
Managing Urban Stormwater - Soils and Construction Volume 2E: Mines and Quarries (DECC)	2008
Environmental Guidelines for Major Construction Sites (EPA Victoria)	1996
Guide to preparing a Cultural Heritage Management Plan (DPCD)	2010
Victoria Environmental Guidelines for Major Construction Sites (Victorian EPA)	1996
EPA Victoria Guidelines for Control of Noise from Industry in Regional Victoria (NIRV)	2011
Community Engagement Guidelines for Mining and Mineral Exploration in Victoria, (Department of Primary Industries)	2008
Guidance Note: Emergency planning at a major hazard facility (Worksafe Victoria)	2011
EPA Victoria Industrial Waste Resource Guidelines	2009
Guidance Note: Emergency planning at a major hazard facility (Worksafe Victoria)	2011
Industrial Waste Resource Guidelines (EPA Victoria)	2009
HB 436:2004 /Amdt 1:2005 Risk Management Guidelines Companion to AS/NZS 4360:2004	2005
Guidance Note Surface exploration drilling checklist, WorkSafe Victoria	2010
Guidance Note Safety Management Systems for Major Hazard Facilities, WorkSafe Victoria	2011
Guidance Note Hazard Identification at a Major Hazard Facility, WorkSafe Victoria	2011
Guidance Note Control Measures for a Major Hazard Facility, WorkSafe Victoria	2011
Guidance Note Safety Assessment for a Major Hazard Facility, WorkSafe Victoria	2011
National Minerals Industry Safety and Health Risk Assessment Guideline, Minerals Industry Safety and Health Centre	2005
Guidance Note Sun Protection For Construction And Other Outdoor Workers, WorkSafe Victoria 200	2005
Leading Practices and Standards	
A Guide to Leading Practice Sustainable Development in Mining (DRET)	*2007*
Leading Practice Sustainable Development Program for the Mining Industry: Community Engagement and Development, (Department of Resources, Energy and Tourism).	2006
Leading Practice Sustainable Development Program for the Mining Industry Hazardous Materials Management (DRET)	2009

Guidelines or Standard	Date
Leading Practice Sustainable Development Program for the Mining Industry: Evaluating Performance, Monitoring and Auditing (DRET)	2009
Industry Standard Contaminated Construction Sites: Construction and Utilities (Worksafe Victoria)	2005
Industry Standard Contaminated Construction Sites: Construction and Utilities (Worksafe Victoria)	2005
AS/NZS ISO 31000:2009 Risk management - Principles and guidelines	2009
Approved Criteria for Classifying Hazardous Substances (National Occupational Health and Safety Commission)	2004
Standards for Recording Victorian Aboriginal Heritage Places and Objects (DCPD)	2008
The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS)	1999
Performance Based Standards Scheme – the Standards and Vehicle Assessment Rules (National Heavy Vehicle Regulator)	2008
Protocols and Manuals	
Protocol For Environmental Management State Environment Protection Policy (Air Quality Management) Mining And Extractive Industries (Victorian EPA)	2009
Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry (Victorian EPA)	2002
Emergency Management Manual Victoria (Department of Justice's Police and Emergency Management Division)	2012
Bulletins and Handbooks	
Oversize Load Carrying Vehicles –Information Bulletin (Vic Roads)	2007
HB 436:2004 OHS Risk Management Handbook	2004
Controlling OHS hazards and risks – A handbook for workplaces, WorkSafe Victoria	2007
Fatigue in Mines, A handbook for Earth Resources	2009
Minerals Industry Safety Handbook – NSW Department of Minerals Resources	2002

1.2.3 Mining Licence

The Mining Licence for the Project will set out a range of requirements relevant to the environmental management and rehabilitation of the site.

The Order Granting Mining Licence will specify the terms and conditions of the rehabilitation bond that Eastern Iron will enter into. The Schedule of Conditions will outline requirements applicable to rehabilitation and closure. Relevant sections may include:

- Work Plans and Environmental Management
- Roads
- Surface Disturbance
- Drainage and Discharge Control
- Groundwater

- Erosion
- Dust Emissions
- Buffer Zones and Visual Screening
- Progressive Rehabilitation
- Final Rehabilitation
- Heritage Sites
- Rehabilitation Bond

In particular, the Schedule of Conditions is expected to include the following:

- Work shall be carried out in accordance with the approved work plan, (incorporating a rehabilitation plan) as amended from time to time in accordance with the Mineral Resources Development Act 1990 (MRD Act).
- Progressive rehabilitation will be conducted as per the rehabilitation plan. In addition, any further rehabilitation work will be carried out at the direction of an Inspector.
- Final reclamation will be in accordance with the rehabilitation plan and any additional requirements as directed by an Inspector.

  Failure to complete works in accordance with the rehabilitation plan or in accordance with the directions of an Inspector, shall constitute grounds upon which the rehabilitation bond may be forfeited either in whole or in part in accordance with Section 83 of the MRD Act.
- The licensee shall lodge with the DEPI rehabilitation bond as described in Section 80(1) of the Act.

The rehabilitation bond will be set at a given amount as a condition of the mining license. However, Eastern Iron will review the level of the bond in consultation with DEPI as part of the rehabilitation and closure planning process. The bond amount is reviewed every five years by DEPI.

2 EXISTING ENVIRONMENT

2.1 Geomorphology, Geology and Soils

2.1.1 Regional Geology

The area is dominated by Palaeozoic acid volcanics, with lithosol soils (Bell, 1959). The iron deposits are situated in the north-south trending Buchan Rift basin filled with Silurian felsic Thorkidaan volcanics (lavas, ignimbrites and sediments), and the overlying Buchan Group of Silurian limestones, calcareous mudstone and very minor volcanogenic clastics.

2.2 Climate

The climate of East Gippsland is temperate, with a mean annual rainfall of approximately 821 mm recorded at Mount Nowa Nowa, in close proximity to the Project area. Mean maximum temperatures recorded at Mount Nowa Nowa are highest in January (25°C) and mean minimum temperatures are lowest in July (6°C). Relative humidity levels range between 57% (in January) and 78% (in May). Mean wind speeds recorded at Mount Nowa Nowa are approximately 12 km/hr. The prevailing wind direction is from the north-west in the morning and south-east in the afternoon.

Meteorological data is collected at a number of Bureau of Meteorology (BOM) weather stations in proximity to the Project area (refer Table 2.1).

Table 2.1 Bureau of Meteorology weather stations in proximity to the Project area.

Location	Station No	Data Collection Period
Mount Nowa Nowa	84144	1995-2012
Nowa Nowa	84028	1948-2012
Lake Tyers	84045	1953-2012
Lakes Entrance (Eastern Beach Road)	84150	2006-2012

2.2.1 Rainfall

Meteorological records from the Mount Nowa Nowa station indicate that monthly rainfall varies between approximately 50 mm and 90 mm, with highest mean rainfall occurring in June, November and December (Figure 2.1). The annual average rainfall at Mount Nowa Nowa is approximately 820.6 mm. The highest mean monthly rainfall event between 1995 and 2012 recorded at Mount Nowa Nowa was 346 mm in June 2007, and the highest 24hr rainfall event was 127.6mm in August 2011. Major flooding occurred in the East Gippsland region in June/July 2007.

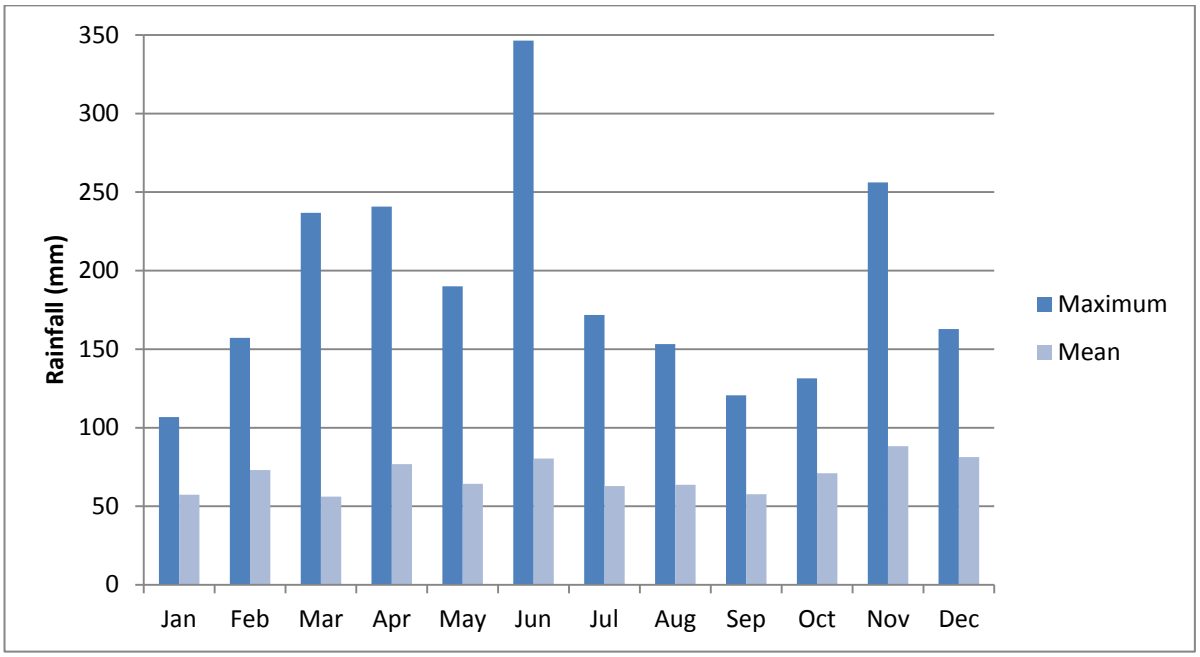

Figure 2.1 Maximum and average monthly rainfall at Mount Nowa Nowa (1995-2012) (BOM, 2013).

Although based on varying periods of data collection, there is slight variation in the average annual rainfall between sites, ranging from 739.1 mm at Lakes Entrance to 865.3 mm at Nowa Nowa annually (Figure 2.2).

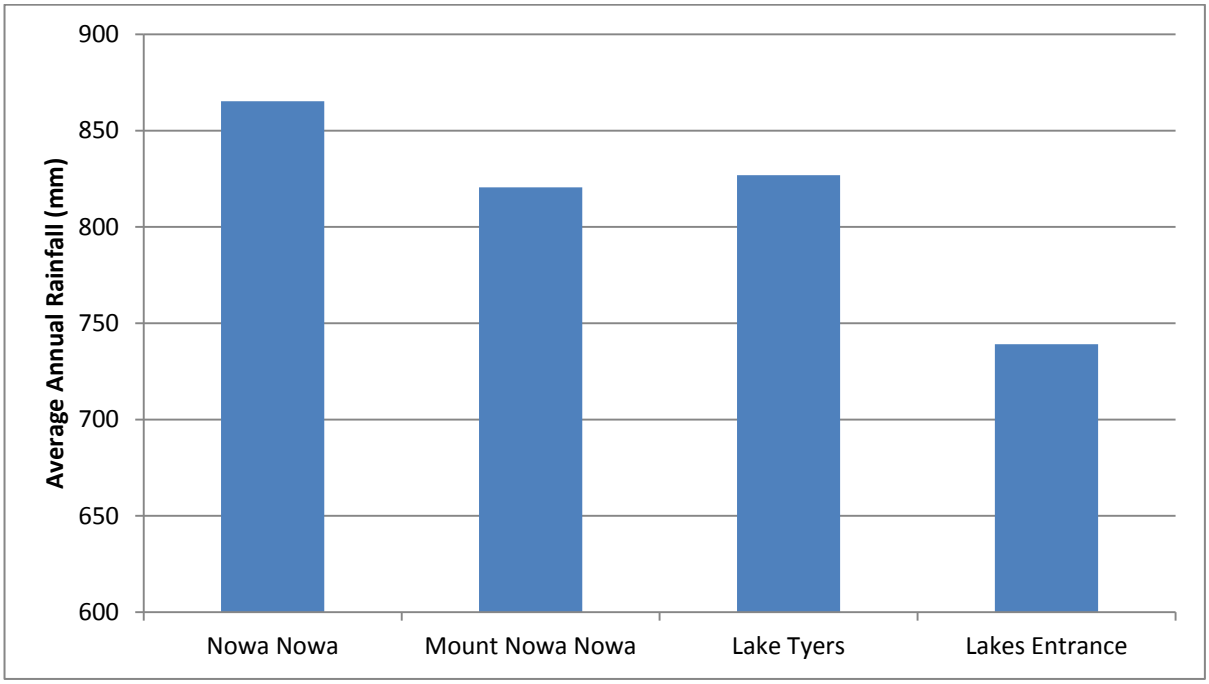

Figure 2.2 Average annual rainfall in the vicinity of Project area (Data source: BOM, Data collection periods are indicated in Table 2.1).

Figure 2.3 below shows the intensity of rainfall events (mm/hour) based on the rainfall event's duration and Average Recurrence Interval (ARI) at Mount Nowa Nowa. ARI represents a statistical estimate of the average period between exceedances of a given rainfall total over a given duration.

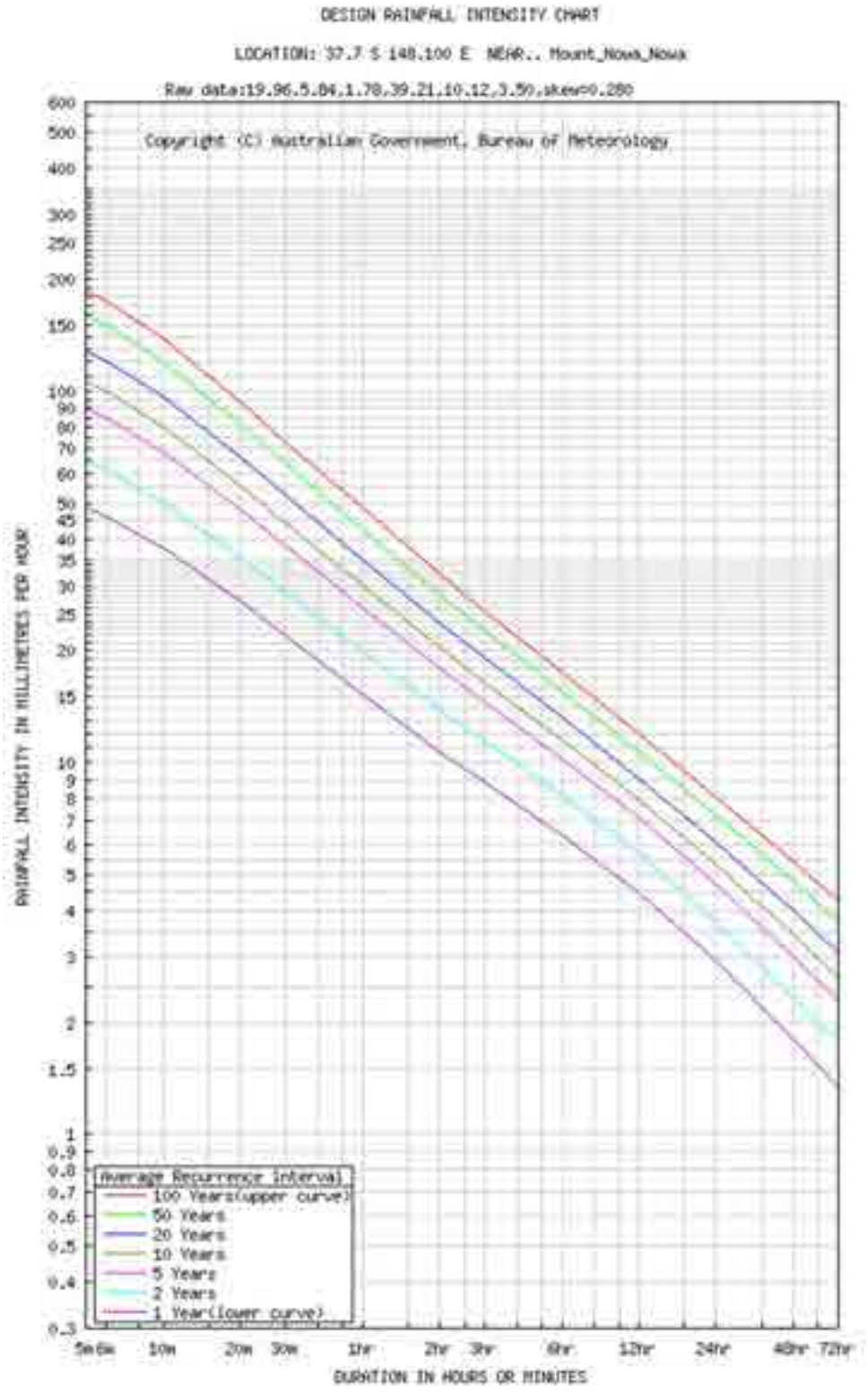

Figure 2.3 Rainfall Intensity at Mount Nowa Nowa (BOM, 2012).

2.3 Hydrology and Hydrogeology

2.3.1 Hydrology

There are a number of creeks (permanent and ephemeral) that are located within the Project area and downstream of the Project area which ultimately drain to Lake Tyers. The Five Mile deposit is located on Gap Creek and Tomato Creek, which drain into Harris Creek. Harris Creek flows into Yellow Waterholes Creek upstream of Boggy Creek which flows into Lake Tyers at the town of Nowa Nowa. Lake Tyers is separate from the other lakes in the Gippsland Lakes system.

Surface water flows were estimated for the catchments draining the proposed Project area using Source Catchments software (eWater CRC). The assumptions used in the development of baseline flow rate estimates are outlined in ***Surface and Ground Water Baseline and Assessment*** (EES Referral Attachment 5).

Theoretical surface water flow rate estimates were calculated for the receiving water catchments, downstream of the propose Project area, at the following locations (Figure 2.4):

- Harris Creek, downstream of the confluence with Tomato and Gap Creeks.
- Yellow Waterholes Creek, downstream of the confluence with Harris Creek.
- Boggy Creek, downstream of the confluence with Yellow Waterholes Creek.
- Boggy Creek at Nowa Nowa, upstream of Lake Tyers.

The theoretical flow rate estimates for Harris Creek, indicate that flow from Harris Creek is highly variable, ranging from no flow up to approximately 2-7 m^3/s. Highest flows occur in the months of June and July coinciding with the higher winter rainfall periods. The lowest flows in Harris Creek are in late summer and early autumn coinciding with periods of lower rainfall and higher evaporation in these months.

The flow rate estimates for Yellow Waterholes Creek indicate flows are highly variable ranging from no flow up to 47-140 m^3/s. Highest flows occur in the winter months of June and July coinciding with the higher winter rainfall periods. The lowest months for flows in Yellow Waterholes Creek are between late summer and early autumn, coinciding with lower rainfall and higher evaporation.

Similar patterns for estimated flows are observed for Boggy Creek downstream of the confluence with Yellow Waterholes Creek and at Nowa Nowa, upstream of Lake Tyers. Monthly statistics for theoretical flow rate estimates for each of the locations are presented in ***Surface and Ground Water Baseline and Assessment*** (EES Referral Attachment 5).

Theoretical estimates of annual flow rates in Boggy Creek, between 1949 and 2012, are highly variable indicating variation by up to a factor of approximately 4-5 above average annual flows and as low as a small fraction of the annual average flow.

Figure 2.4 Surface water flow estimate locations and baseline water quality monitoring locations.

2.3.2 Hydrogeology

Regionally, groundwater flow is generally from the recharge areas in the north and northwest to offshore in the south (DSE, 2010). Discharge for aquifer units closer to the surface are likely to occur as baseflow to the lower reaches of the rivers and smaller creeks flowing over the coastal plains. However, such areas do not occur in the direct vicinity of the Project. Additional groundwater discharge will also occur to the Gippsland Lakes and other estuarine bodies (eg. Lake Tyers) (DSE, 2010).

Southern Rural Water (SRW, 2009) have prepared aquifer yield and salinity maps for the groundwater systems in South Eastern Victoria. The aquifer yield and salinity maps include the proposed Project area, however the Project area is located on the margins of the mapped areas (AECOM, 2013). Aquifer salinity (total dissolved solids (TDS)) maps (SRW, 2009) indicate:

- TDS concentrations between 1,000 - 3,500 mg/L for water table aquifers in the vicinity of the proposed Project area.
- TDS concentrations between 500 – 3,500 mg/L for Lower Tertiary to mid Tertiary aquifers in the vicinity of the proposed Project area.

Theoretical aquifer bore yields were mapped and are based on a number of assumptions; actual bore yields may differ significantly (SRW, 2009). Mapped theoretical aquifer bore yields in the vicinity of the proposed Project area (SRW, 2009) indicate:

- Estimated yields of <1 L/s for water table aquifers.
- Estimated yields of 1-10 L/s for Lower Tertiary to mid Tertiary aquifers.

Locally, baseline hydrogeological investigations (including monitoring of groundwater levels and quality) were conducted between April and July 2013 in three piezometers and three exploration holes within the Project are (Figure 2.5). Groundwater levels were relatively constant over the monitoring period (Figure 2.6). Several significant rain events were recorded at Mount Nowa Nowa BoM station in May 2013 during the monitoring period (up to approximately 30 mm/day), however there were negligible changes in the groundwater levels in response to these rainfall events. A significant decrease in the groundwater levels (~0.5 m) in all three bores was observed in mid-June, coinciding with the installation of three new monitoring bores in the proposed Project area and extraction of groundwater inflow to the new monitoring bores during installation.

Water levels ranged between approximately 37 m below ground level (NRC027) and 50 m below ground level (NRC022) during the monitoring period. Groundwater discharge / contribution to local stream flows appear negligible in the Project area.

Groundwater level data indicate localised groundwater flow within the Project area from the south-east to a north-west direction (Figure 2.5); consistent with the local topography. However regionally, groundwater is expected to flow in a southerly direction with some discharge of groundwater potentially occurring in the lower reaches of Boggy Creek or Lake Tyers (DSE, 2010). Groundwater flow directions in the south east of the proposed Project area are not known.

Groundwater quality data is presented in Section 2.6

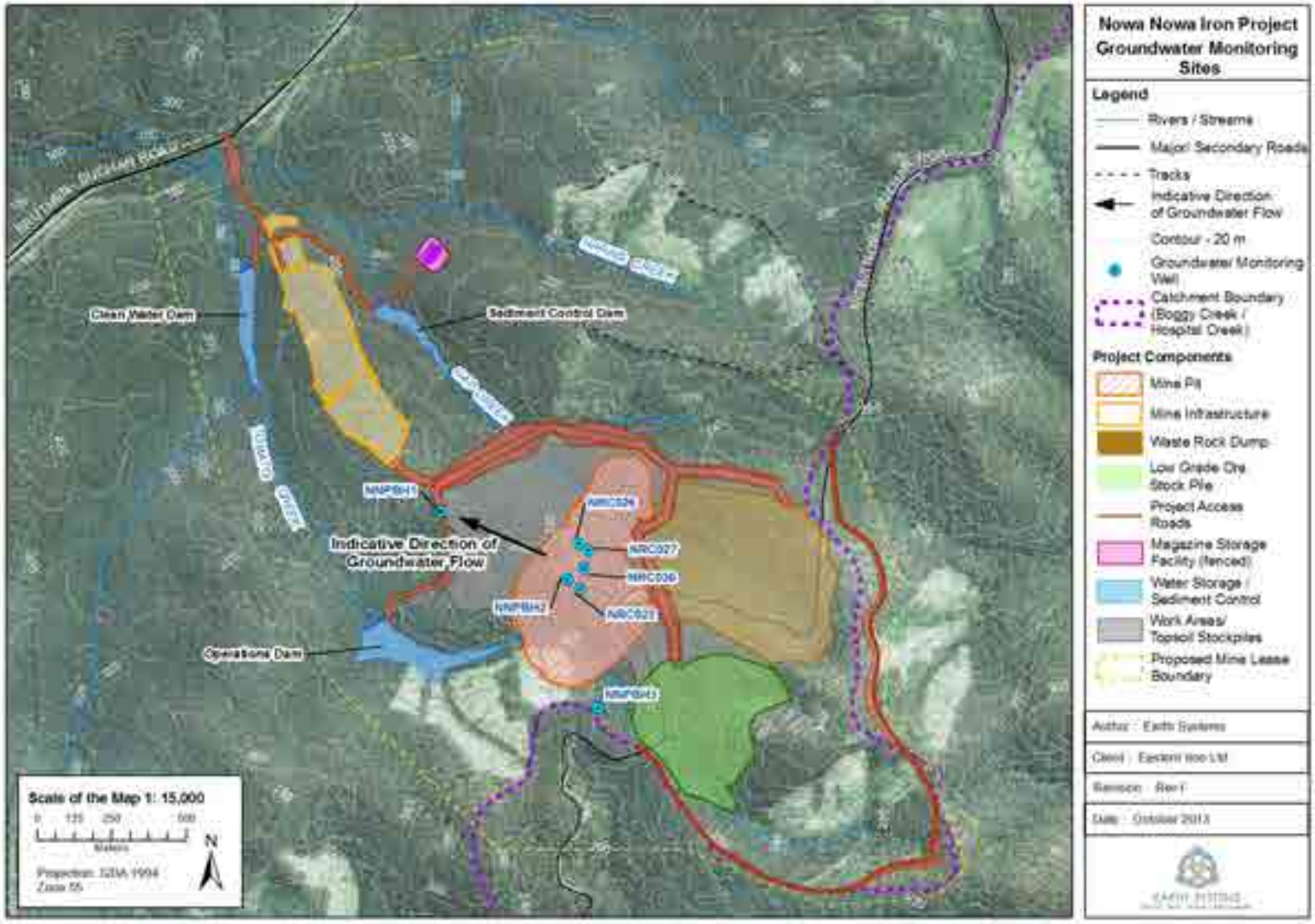

Figure 2.5 Groundwater monitoring bore locations and indicative flow direction within the proposed Project area.

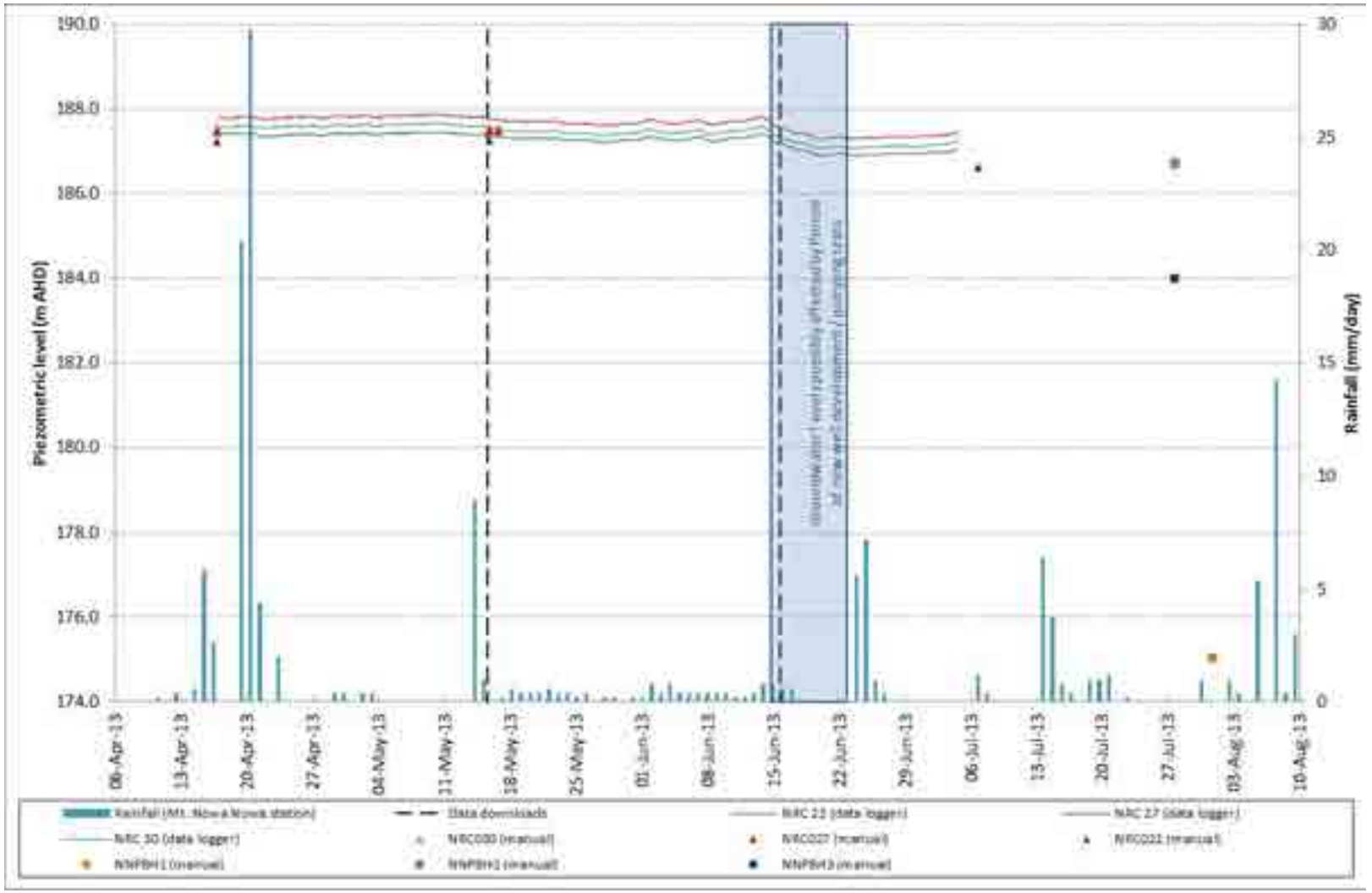

Figure 2.6 Piezometric levels (m AHD), primary y-axis, taken manually using a dipper (represented by points) and groundwater level loggers (represented by lines) between April and July 2013. Daily rainfall (mm/day) recorded over the monitoring period at the Mount Nowa Nowa BoM station is plotted on the secondary y-axis.

2.4 Land Use

2.4.1 Land Use Setting

No landscape or environmental significance overlays were identified in the vicinity of the proposed mine site, and no landscape values of regional or State significance have been identified in the area.

The proposed mining area is located entirely on Crown Land within the Tara State Forest which is zoned as a Public Conservation and Resource Zone (PCRZ), and currently managed by the Victorian Department of Environment and Primary Industries (DEPI) for timber harvesting. This area is currently significantly disturbed from previous logging activities, with most of the area having been logged over the last 60 years. Several recently cleared logging coupes are present in the area, with additional logging proposed in the current Timber Release Plan.

In addition to timber harvesting, the Tara State Forest is utilised for small-scale apiculture and is also available for recreational use, although rarely used for this purpose. There are no designated recreation areas within the Project Area (e.g. picnic, camping, walking tracks). The closest recreational (walking tracks) are located at Lake Tyers and Nowa Nowa.

No agricultural or urban land is located in the vicinity of the proposed mine site, with the closest farmland over 2 km from the mine site and the closest settlement being the farming hamlet of Wairewa located approximately 4 km southeast of the mine footprint. The Nowa Nowa-Buchan Road runs through the area of the proposed mine site, which is an unsealed road with a low volume of traffic (mainly used by forestry vehicles). An existing 22 kV transmission line is located adjacent to the proposed mine site, running along the eastern side of the sealed Bruthen-Buchan Road.

Forestry

Tara State Forest is managed under the three Forest Management Zones. The proposed mine site occurs mainly within a Special Management Zone and also intersects a Special Protection Zone. Some sections of forest include areas approved as timber coupes in the VicForests' latest Timber release Plan, including several areas within the proposed mine footprint.

During site visits and fieldwork conducted for the Project, it was evident that there has been significant habitat disturbance by previous logging activities. As discussed in the ***Flora, Fauna and Ecological Characteristics and Assessment*** (EES Referral Attachment 8), historical timber harvesting has resulted in significant habitat fragmentation and degradation and has also increased the number of weeds and pests.

2.5 Water Resource Use

2.5.1 Water Use Setting

The proposed mine site occurs principally within the catchment of Boggy Creek, and is located adjacent to the boundary of the Hospital Creek Catchment. Several small creeks intersect the mine site area, which are ephemeral/intermittent and dry for most of the year. There is little standing water and no natural or man-made water bodies in the vicinity. Surface water allocations in the subcatchment of the mine site (Boggy Creek) are managed by Southern Rural Water.

The Boggy Creek catchment is classed as a Declared Water Supply Catchment, and therefore use of land within the Catchment is regulated by the *Catchment and Land Protection Act* 1994. Up until 2007, water from Boggy Creek was extracted for industrial purposes (e.g. sawmills) and as a drinking water supply for Nowa Nowa township. However, the catchment is no longer used for drinking water supply as drinking water for Nowa Nowa township is now sourced from the Mitchell River. The main downstream water uses at the current time are associated with the use of Lake Tyers as a recreational area and tourist site. The main part of the lake is a popular tourist destination and is used by nearby residents and visitors for a number of shore-based and water-based recreational activities. The lake is also an important biodiversity conservation area, forming part of the Gippsland Lakes Ramsar Site (refer EES Referral Attachment 9). Beneficial uses of downstream water for aquatic ecosystems are therefore of significant importance.

There are no Groundwater Management Areas in the Nowa Nowa region. No direct utilisation of groundwater resources has been identified within 2 km of the mine site, as no residential or agricultural areas occur within this area.

2.5.2 Site Geology

The mineralization of the site is characterised by massive magnetite-haematite with lesser chlorite,

talc/carbonates, pyrite, quartz with minor chalcopyrite. Magnetite is late stage and replaces specular haematite. The iron mineralisation is quite massive and at the 40% Fe Cut-off there is little internal waste once the overburden is removed. A typical drill section of the Five Mile deposit is shown in Figure 2.7.

The 5 Mile deposit consists of a massive magnetite/haematite ore body within Silurian felsic volcanics (Thorkidaan Volcanics) and turbidites (Pinnak Sandstone). The style of mineralisation appears to be skarn-style or carbonate replacement. The mineralisation is characterised by massive magnetite-haematite with lesser chlorite, talc, pyrite and quartz with trace chalcopyrite. Magnetite appears to be late stage replacing specular haematite, but where extensive weathering is apparent haematite appears to occurs after magnetite.

The Thorkidaan Volcanics consist of andesites, rhyolites, felsic ignimbrites, volcaniclastics and volcanic breccias, and represent the dominant hangingwall lithology. Footwall lithologies include mudstones, shales, sandstones and some limestone. The magnetite mineralisation dips roughly to the south at an angle of approximately 20–30°.

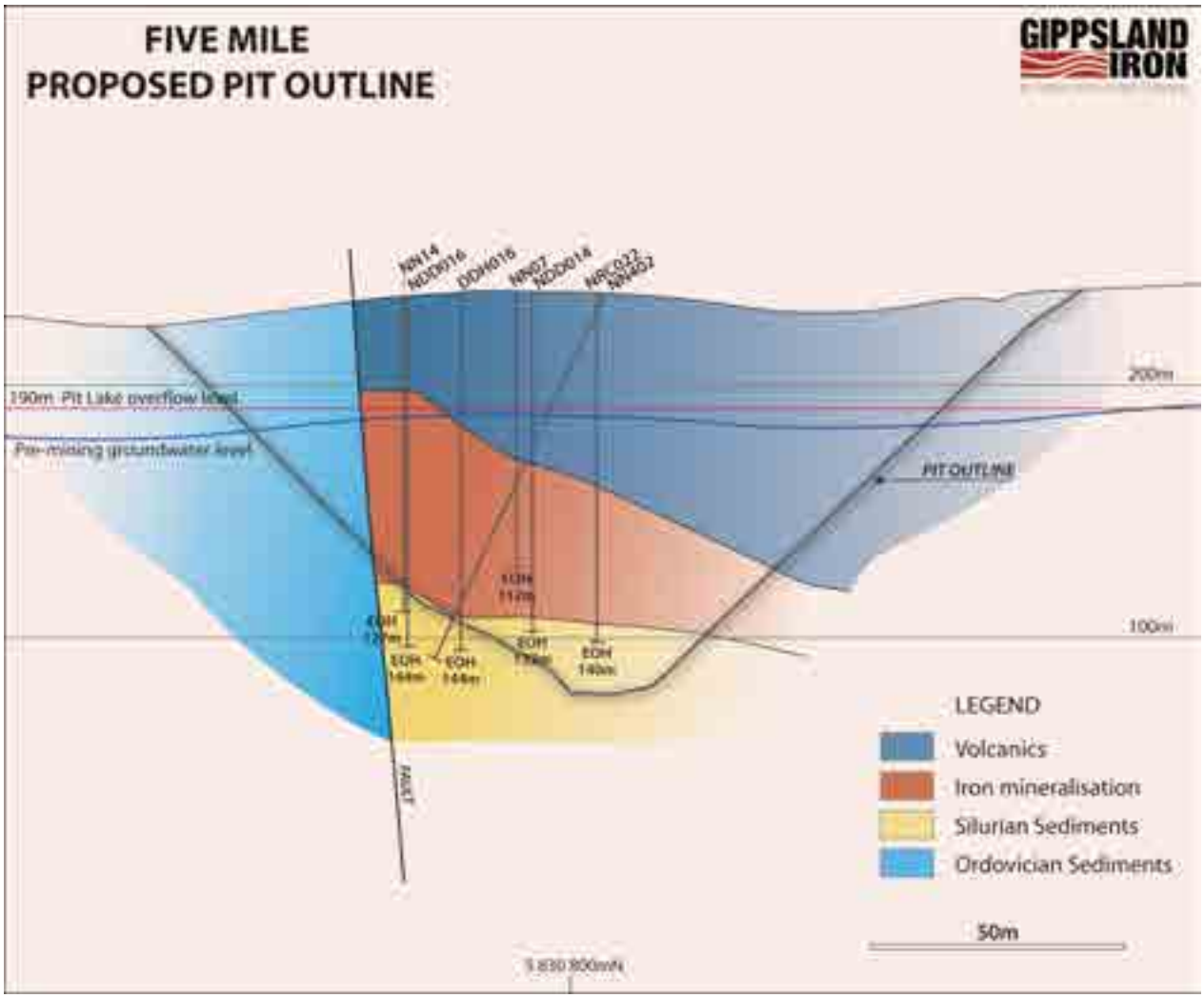

Figure 2.7 Drill Section of 5 Mile Deposit Showing Proposed Pit Outline

2.6 Water Quality

2.6.1 Creeks

Baseline surface water quality monitoring sites were monitored by Earth Systems between August 2012 and July 2013, including (Figure 2.4):

- Harris (NOWA2) and Yellow Waterholes (NOWA11) Creeks.
- Boggy Creek (NOWA1, NOWA6 and NOWA14).
- Ironstone Creek (NOWA3).
- Bill (NOWA7) and Hospital (NOWA8 & 9) Creeks.

The water quality objectives used for comparison with surface water quality were State Environment Protection Policy (SEPP) Waters of Victoria (State Government of Victoria, 2003) environmental quality objectives for the segment – Cleared Hills and Coastal Plains: Lowlands of Yarra, Western Port, Latrobe, Mitchell, Tambo, Snowy, Thomson and Macalister catchments, which also define the relevant toxicants thresholds applied to the catchment from the ANZECC/ARMCANZ water quality guidelines (2000). Beneficial use and water quality objectives have been developed for the Gippsland Lakes (Schedule F3, SEPP Waters of Victoria); however these objectives do not encompass the Boggy Creek and Lake Tyers catchments.

Water quality results are presented in detail in the ***Surface and Ground Water Baseline and Assessment*** (EES Referral Attachment 5).

Harris and Yellow Waterholes Creeks

Harris Creek is an ephemeral creek draining the proposed Project area. Tomato Creek and Gap Creek are the major tributaries and also drain the proposed Project area. The Harris Creek catchment is located within the Tara and Kenny State Forests.

The water quality monitoring site NOWA2 is located on Harris Creek directly downstream of the Project area and the confluence with Tomato and Gap Creeks (Figure 2.4 and Plate 2.1). It is located within a forested area, with some sections of the forest recently subjected to logging.

Yellow Waterholes Creek is an ephemeral creek. Harris Creek is a tributary of Yellow Water Holes Creek, and Yellow Waterholes Creek discharges into Boggy Creek.

The water quality monitoring site NOWA 11 is located on Yellow Waterholes Creek, upstream of the Project area and the confluence with Harris Creek (Plate 2.1). The monitoring site is located downstream of agricultural activity including pasture and cattle grazing land.

Overall water quality results indicate relatively good water quality, near neutral with low to moderate salinity and low dissolved metals concentrations. The key results from the field measurement and laboratory analysis of water quality include:

- Overall the in-situ water quality parameters indicate near neutral pH (6.18 - 7.12) and low to moderate salinity (238 – 562 µS/cm).
- The water was very clear with all turbidity measurements recorded as 0 NTU, within the environmental water quality objective (≤10 NTU; SEPP, 2003).
- Dissolved oxygen values at both Harris Creek and Yellow Waterholes Creek were below of ambient surface water quality environmental objective (85-110%; SEPP, 2003).
- Salinity in the water at Harris Creek and Yellow Waterholes Creek is characterised by high chloride (57- 133 mg/L) and sodium (30 – 61 mg/L) concentrations.
- Dissolved metal concentrations were generally within the ambient surface water quality environmental objectives (SEPP, 2003).
- Nutrient concentrations, including total nitrogen (0.6 mg/L) and total phosphorus (0.03 mg/L), at Yellow Waterholes Creek (upstream site) were higher than Harris Creek, however were within ambient surface water quality environmental objectives (0.6 and 0.045 mg/L; SEPP, 2003).

Plate 2.1 Photos of Harris Creek (top) and Yellow Waterholes Creek (bottom).

Boggy Creek

Boggy Creek is an ephemeral creek which discharges into the Nowa Nowa Wetlands at the northern end of the Nowa Nowa Arm of Lake Tyers. The Project area drains into Boggy Creek via Harris and Yellow Waterholes Creek (Figure 2.4). Boggy Creek passes through the Kenny and Tara State Forests, where land use includes agriculture and forestry. Three sites were monitored on Boggy Creek (Plate 2.2) including:

- NOWA1 – Boggy Creek, downstream Yellow Waterholes Creek.
- NOWA6 – Boggy Creek at Nowa Nowa, upstream of Lake Tyers.
- NOWA14 – Boggy Creek, upstream of Yellow Waterholes Creek (ie. upstream of potential influence from the proposed Project).

Overall water quality results indicate relatively good water quality, near neutral with low to moderate salinity and low dissolved metals concentrations. The key results from the field measurement and laboratory analysis of water quality include:

- Overall the in-situ water quality parameters indicate near neutral pH (5.54 - 7.91) and low to high salinity (70 – 1,368 µS/cm).
- The water was very clear to turbid with turbidity measurements ranging between 0 and 53 NTU, maximum turbidity measurements at NOWA1, NOWA6 and NOWA14 were all above ambient water quality environmental objectives (≤10 NTU; SEPP, 2003).
- Mean and maximum dissolved oxygen concentrations at NOWA6 (86.9 % and 107.9 %) were within ambient water quality environmental objectives (85-110%; SEPP, 2003). Dissolved oxygen values at both NOWA1 and NOWA14 were below of ambient surface water quality environmental objectives (85-110%; SEPP, 2003).
- Salinity at NOWA1, NOWA6 and NOWA14 is dominated by chloride (60- 282 mg/L) and sodium (33 – 118 mg/L).
- Dissolved metal concentrations were mostly within the ambient surface water quality environmental objectives (SEPP, 2003).
- Total phosphorus concentrations were within ambient surface water quality environmental objectives at NOWA1 and NOWA14 (0.045 mg/L; SEPP, 2003). Mean and maximum total phosphorus concentrations at NOWA6 (0.06 and 0.12 mg/L) were above ambient surface water quality environmental objectives.

Plate 2.2 Boggy Creek water quality monitoring sites NOWA 1 (top left), NOWA 6 (top right) and NOWA14 (bottom).

Ironstone Creek

The source of Ironstone Creek is located to the south of Mount Nowa Nowa, approximately 2 km south of the Project area. The Project area does not drain to Ironstone Creek, however Ironstone Creek does drain into Lake Tyers (Figure 2.4). Runoff from the decommissioned Nowa Nowa quarry, near the town of Nowa Nowa, is released into Ironstone Creek upstream of Nowa Nowa-Buchan Road. Some sulfidic minerals have been observed in the quarry wallrock and waste rock. Iron (red colouring) staining is visible on some of the rocks in the creek and iron (Fe3+) precipitates were observed in the Creek in August 2012.

The water quality monitoring site NOWA3 is located on Ironstone Creek directly downstream of the decommissioned Nowa Nowa quarry (Plate 2.3).

Overall water quality results indicate relatively good water quality, near neutral with low to high salinity and low dissolved metals concentrations. The key results from the field measurement and laboratory analysis of water quality include:

- Field measurements indicate that the water quality in Ironstone Creek at NOWA3 is influenced by the oxidation of sulfidic minerals from the decommissioned Nowa Nowa quarry.
- Overall the in-situ water quality parameters indicate acidic pH (3.82 - 4.87) and low to high salinity (133 – 1,483 µS/cm).
- The water was very clear with turbidity measurements ranging between 0 and 10.5 NTU generally within the ambient water quality environmental objective (≤10 NTU; SEPP, 2003).
- Maximum dissolved oxygen concentrations in Ironstone Creek (86.9 %) was within the ambient water quality environmental

objective (85-110%; SEPP, 2003). Mean and minimum dissolved oxygen concentrations were below the ambient water quality environmental objective.

- Salinity in the water in Ironstone Creek is dominated by sulfate (21 - 265 mg/L), chloride (49 - 248 mg/L) and sodium (28 – 125 mg/L).
- Dissolved metal concentrations were generally within the ambient surface water quality environmental objectives (SEPP, 2003).
- Minimum total phosphorus concentrations were within the ambient surface water quality environmental objective in Ironstone Creek (0.045 mg/L; SEPP, 2003) but mean and maximum total phosphorus concentrations (0.05 and 0.09 mg/L) were above the ambient surface water quality environmental objective.

Plate 2.3 Ironstone Creek water quality monitoring site NOWA3 (top) and the decommissioned Nowa Nowa quarry (bottom).

Hospital Creek Catchment

Hospital Creek flows in a southerly direction, passing approximately 5 km to the east of the proposed Project. Bill Creek is located to the south-east of the proposed Project and flows south through the small township of Wairewa. Bill Creek and Hospital Creek both flow through areas of intense agricultural activity upstream of the town of Tostaree. Bill Creek joins Hospital Creek several kilometres south of the township of Wairewa and Hospital Creek then flows to the south-east towards the coast. The Hospital Creek catchment is not a tributary of Lake Tyers and surface water discharge from the proposed Project is not expected to influence this catchment (Figure 2.4), but was monitored to determine if it may be a suitable reference catchment.

Three sites were monitored in the Hospital Creek catchment including (Plate 2.4):

- NOWA7 – Bill Creek, upstream of confluence with Hospital Creek.
- NOWA8 – Hospital Creek, upstream of Wairewa and confluence with Bill Creek.
- NOWA9 – Hospital Creek at Tostaree, downstream of confluence with Hospital Creek.

Overall water quality results indicate relatively good water quality, near neutral with moderate to high salinity and low dissolved metals concentrations. The key results from the field measurement and laboratory analysis of water quality include:

- Overall the in-situ water quality parameters indicate near neutral pH (5.82 – 8.02) and moderate to high salinity (101 – 1,946 µS/cm).
- The water in Bill Creek and Hospital Creek ranges from very clear to slightly turbid, with turbidity measurements ranging from 0 up to 28 NTU, above the ambient surface water quality environmental objective (≤10 NTU; SEPP, 2003).
- The maximum dissolved oxygen concentration in Hospital Creek at NOWA9 (94.3) was within the ambient water quality environmental objective (85-110%; SEPP, 2003). All other dissolved oxygen readings in Hospital Creek, at NOWA8 and NOWA9, were below the ambient water quality environmental objective.
- Salinity in the water at Bill Creek at NOWA7 and Hospital Creek at NOWA9 and NOWA10 are dominated by elevated chloride (69-634 mg/L), sodium (38 – 310 mg/L) and bicarbonate alkalinity (9–245 mg/L).
- Dissolved metal concentrations were mostly within the ambient surface water quality environmental objectives (SEPP, 2003).
- Total phosphorus concentrations were within the ambient surface water quality environmental objective in Bill Creek at NOWA7 and Hospital Creek at NOWA8 (0.045 mg/L; SEPP, 2003). However, mean and maximum total phosphorus concentrations (0.05 and 0.07 mg/L) in Hospital Creek at NOWA9 were slightly above the ambient surface water quality environmental objective.

Plate 2.4 Bill Creek water quality monitoring site NOWA7 (top left) and Hospital Creek site NOWA8 (top right) and NOWA9 (bottom).

2.6.2 Downstream Water Bodies / Wetlands

Lake Tyers covers approximately 25 km^2, with an average depth of 3-4 m, and is located downstream of the Project area. It is an estuary consisting of a main lake connected to two main riverine arms: Nowa Nowa and Toorloo. Boggy Creek and Ironstone Creek flow into the Nowa Nowa arm of Lake Tyers (Figure 2.4). The estuary is intermittently blocked from Bass Strait by a sand bar which leads to variations in water quality (particularly salinity levels, dissolved oxygen concentrations, aquatic vegetation growth and turbidity levels), however, the waters are generally well-mixed as a result of wind driven circulation (DPI, 2007). Lake Tyers is not connected to the other lakes in the Gippsland Lakes system.

Two sites were monitored by Earth Systems on the Nowa Nowa arm of Lake Tyers, between August 2012 and July 2013, including (Figure 2.4 and Plate 2.1):

- NOWA5 – Lake Tyers, at Nowa Nowa.
- NOWA10 – Lake Tyers, below Ironstone Creek.

Surface water quality results from Lake Tyers have been compared with the following water quality guidelines:

- Water quality guidelines for Victorian Riverine Estuaries (EPA, 2011).
- Water quality guidelines for protection of aquatic ecosystems – Estuaries (ANZECC/ARMCANZ, 2000).

Lake Tyers water quality results are presented in ***Surface and Ground Water Baseline and***

Assessment (EES Referral Attachment 5). Overall water quality results indicate relatively good water quality, near neutral with highly variable salinity, low dissolved metals concentrations and slightly elevated nutrient (nitrogen and phosphorus) concentrations likely to be influenced by agricultural activity in the greater catchment area. The key results from the field measurement and laboratory analysis of water quality include:

- Overall the in-situ water quality parameters indicate near neutral pH (6.05 – 7.64) and moderate to high salinity (894 – 57,200 µS/cm).
- EC measurements in Lake Tyers at NOWA5 and NOWA10 indicated that the salinity of the water approaches that of sea water during the summer and autumn months when minimal freshwater flow from the surrounding creeks occurs.
- The water in Lake Tyers at NOWA5 and NOWA10 ranged from very clear to slightly turbid, with turbidity measurements ranging between 0 and 55 NTU. Maximum turbidity measurements at NOWA5 (25 NTU) and NOWA10 (55 NTU) were slightly above the ambient estuary surface water quality guidelines (18 NTU; EPA, 2011; 10 NTU; ANZECC/ARMCANZ, 2000). Elevated turbidity was measured during the monitoring event in July 2013 and is likely to be a result of suspended sediment loads from the freshwater creeks flowing into Lake Tyers.
- Mean dissolved oxygen concentrations in Lake Tyers at NOWA5 (81.3 %) and NOWA10 (75.75 %) were within the ambient estuary surface water quality guidelines (70-110%; EPA, 2011).
- Dissolved metal concentrations were mostly within the ambient estuary surface water quality guidelines (EPA, 2011; ANZECC/ARMCANZ, 2000).
- Ammonia as N (<0.01-0.14 mg/L) concentrations were within the Victorian water quality guideline for riverine estuaries (0.5 mg/L NH3-N; EPA, 2011).
- Minimum ammonia as N concentrations at NOWA5 and NOWA10 were within the water quality guideline for estuaries of south-east Australia (0.015 mg/L NH3-N; ANZECC/ARMCANZ, 2000). However, mean and maximum ammonia as N concentrations at NOWA5 (0.07 and 0.12 mg/L) and NOWA10 (0.09 and 0.14 mg/L) were above water quality guidelines for estuaries of south-east Australia (0.015 mg/L NH3-N; ANZECC/ARMCANZ, 2000).
- Minimum nitrite and nitrate as N concentrations at NOWA5 and NOWA10 were within the water quality guideline for estuaries of south-east Australia (0.015 mg/L NOx-N; ANZECC/ARMCANZ, 2000). However, mean and maximum nitrite and nitrate as N concentrations at NOWA5 (0.03 and 0.1 mg/L) and NOWA10 (0.02 and 0.06 mg/L) were above the water quality guideline for estuaries of south-east Australia (0.015 mg/L NOx-N; ANZECC/ARMCANZ, 2000).
- Total phosphorus concentrations (0.03-0.08 mg/L) at NOWA5 and NOWA10 were within the Victorian water quality guideline for riverine estuaries (0.1 mg/L; EPA, 2011).
- Minimum total phosphorus concentrations at NOWA10 (0.03 mg/L) were within the water quality guideline for estuaries of south-east Australia (0.03 mg/L; ANZECC/ARMCANZ, 2000). However, mean and maximum total phosphorus concentrations at NOWA5 (0.06 and 0.08 mg/L) and NOWA10 (0.04 and 0.08 mg/L) were above the water quality guideline for estuaries of south-east Australia (0.03 mg/L; ANZECC/ARMCANZ, 2000).

Plate 2.5 Lake Tyers water quality monitoring site NOWA5 (top) and NOWA10 (bottom).

2.6.3 Groundwater

Groundwater quality was measured in three piezometers installed within the proposed Project area, during a one-off sampling event in June 2013 (NNPBH1, NNPBH2 and NNPBH3) (Figure 2.5).

Groundwater quality results have been compared with surface water quality guidelines, as groundwater will need to be extracted from the pit, given that mining of the open pit is to proceed below the water table. The water quality objectives used for comparison with groundwater quality were State Environment Protection Policy (SEPP) Waters of Victoria (State Government of Victoria, 2003) environmental quality objectives for the segment – Cleared Hills and Coastal Plains: Lowlands of Yarra, Western Port, Latrobe, Mitchell, Tambo, Snowy, Thomson and Macalister catchments.

Groundwater quality results are presented in ***Surface and Ground Water Baseline and Assessment*** (EES Referral Attachment 5). The key results from the field measurement and laboratory analysis of groundwater quality include:

- Overall the water quality indicates near neutral pH (6.35 - 7.51) and moderate conductivity (1,965 – 3,974 µS/cm conductivity / 1,275 - 2,582 mg/L TDS), with dissolved metals mostly within ambient surface water quality environmental objectives.
- pH measurements from two of three monitoring bores (NNPBH1 and NNPBH2) were within ambient surface water quality environmental objectives (6.4-7.7; SEPP, 2003).
- EC measurements from none of the three monitoring bores were within ambient surface water quality environmental objectives (≤500 µS/cm; SEPP, 2003).
- Salinity in the groundwater is dominated by chloride (437- 1,120 mg/L), sodium (183 – 402 mg/L) and bicarbonate alkalinity (118 – 386 mg/L).
- Dissolved metal concentrations were mostly within the ambient surface water quality environmental objectives (SEPP, 2003).
- Total phosphorus concentrations (0.04 mg/L) in one of three of the monitoring bores (NNPBH1) were within the ambient water quality environmental objectives (0.045 mg/L; SEPP, 2003).

2.7 Air Quality, Noise and Vibration

2.7.1 Baseline Air Quality

The identification of existing air emission sources entails the differentiation between man-made and natural sources. The potential man-made sources include:

- Motor vehicles;
- Industrial processes;
- Domestic and industrial incineration; and
- Heating and power generation.

The potential natural sources include:

- Windblown dust;
- Bushfires;
- NOx from biogenic sources;
- VOCs from eucalypt trees; and
- Salt spray (marine aerosols) from the ocean.

Ambient sources existing locally are expected to consist of smoke particles generated by domestic wood heating, motor vehicles, transportation related to the timber and milling industry, dust storms or bush fires that can generate particulate concentrations in excess of national guidelines.

There are no major industries close to the proposed mine site area. The closest industries identified in the area surrounding the proposed mine site are two saw mills operating in Nowa Nowa, approximately 6 km to the south of the proposed mine site. At a regional scale, fine particles can be expected to follow plume dispersion from industrial and urban activities sourced from Greater Melbourne or the Latrobe Valley. Under these conditions, concentrations are expected to decrease with distance.

2.7.2 Baseline Noise and Vibration

Inspections of the study area found the existing noise environment to be characterised by natural noise sources. There was also a low volume of normal speed traffic on the Bruthen-Buchan Road and ambient noise was observed to be low. The local industry consists of two saw mills operating in Nowa Nowa, which represent a potential influence on the ambient noise levels at nearby receptors.

The majority of the transport route between the mine site and the Port of Eden is via the Princes Highway, which is identified as an arterial highway

under the control of VicRoads. The existing and historical use of this road includes significant heavy vehicles movements, including those associated with the forestry industry in the region.

2.8 Terrestrial Biodiversity

A three-tiered approach was adopted to assess the biodiversity/ecological characteristics of the Nowa Nowa Iron Project area and surrounds and is detailed in the ***Flora, Fauna and Ecological Characteristics and Assessment*** (EES Referral Attachment 8).

1. Literature and available database search to determine species previously recorded in the area (within 10 km);
2. An overview site visit of the Project area and broader region;
3. Detailed flora and fauna field surveys of the Project area and surrounding ~1.5 km of habitat.

2.8.1 Vegetation and Habitat

The EPBC Act Protected Matters Search Tool identified that there may be one nationally significant ecological community within a 10 km radius of the Project area. However this community does not exist near to, or within, the Project area.

There is a patch of FFG Act listed Warm Temperate Rainforest community south east of the Project area, 150 m from Five Mile Track.

The vegetation and habitats of the Project area have been heavily modified by previous logging activities (refer Plate 2.6 to 2.11). The Tara State Forest area in which the Project occurs appears to be primarily managed for timber production, with many recent logging coupes and access roads present. The remaining forest within the Project area is primarily regeneration forest. No intact or old growth vegetation was observed in the direct vicinity of the deposit area.

The Project area intersects both the East Gippsland Lowlands and East Gippsland Uplands bioregions (DEPI, 2013). The East Gippsland Lowlands has gently undulating terraces flanked by coastal plains, dunefields and inlets. The East Gippsland Uplands consists of tablelands and mountains up to 1400 metres elevation.

Victorian Government maps of Ecological Vegetation Classes (EVCs) indicate that the main vegetation classes in the vicinity of the Project area are Shrubby Dry Forest, Damp Forest (along creeklines) as well as Lowland Forest (Table 2.2). The conservation status of these EVCs are all classified as 'Least Concern'. Warm Temperate Rainforest was identified in the Study Area, but will not be impacted by the mine footprint or other Project components at the mine site. Warm Temperate Rainforest is classified as Rare (by the DEPI) within both bioregions.

Several different habitat types were identified within the Project area, most habitats were differentiated based on the time since logging. The lowest quality habitats were post-logging regrowth, being logged within the last 5 to 10 years. Large old trees were generally from the genus Eucalyptus and had diameter at breast (1.3 m) height (DBH) of greater than 70 cm. But these large old trees were rare and restricted to riparian and rainforest habitats.

No 'critical habitat' was identified during field surveys or from a search of the literature (EPBC or FFG Acts).

Table 2.2 Descriptions of the main Ecological Vegetation Classes in the vicinity of the Project area (Davies et al. 2002)

EVC Name	Conservation Status	Description
Shrubby Dry Forest	Least Concern	Occurs on a range of rock types in the foothills associated with shallow rocky sites on exposed aspects such as ridges and medium to steep upper slopes on shallow soils. The overstorey is a low, open forest consisting of a range of eucalypts. The understorey lacks a secondary tree layer but a well-developed medium to low shrub layer is present. The ground layer is often very sparse with tussock-forming graminoids being the dominant life form.
Damp Forest	Least Concern	Damp Forest grows on a wide range of fertile parent rock types on a variety of aspects, from sea level to submontane elevations. It is dominated by a tall eucalypt layer over a shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types such as prickly or small-leaved shrubs. The ground layer includes forbs and grasses as well as moisture-dependent ferns.
Lowland Forest	Least Concern	A very widespread dry forest vegetation type that is found in the foothills of the Great Dividing Range from East Gippsland to the western edge of the study area as well as the foothills of the Strzelecki ranges and Wilsons Promontory National Park. The understorey varies from shrubby to heathy to sedgy and may even be grassy as fertility increases.

Plate 2.6. Cleared area with previous mining disturbance in 5 Mile deposit area

Plate 2.7. Young eucalypt forest at the proposed mine site

Plate 2.8. Eucalypt forest in mine site area

Plate 2.9. Regeneration within recent logging coupe nearby

Plate 2.10. View of disturbed vegetation north of proposed mine site

Plate 2.11. Regeneration of eucalypts in nearby logging coupes

2.8.2 Fauna and Flora Species

No EPBC Act or FFG Act threatened flora, mammal, reptile or amphibian species were identified during surveys of the Project area and surrounding habitat. One FFG Act threatened bird species, masked owl (*Tyto novaehollandiae novaehollandiae*), was observed on Telephone Rd. The masked owl observed near the Project area appeared to be hunting and it is likely that two other FFG Act listed owl species (known to occur in the region) also use the area to hunt.

Nine DEPI recognised species were also found within or near to the Project area. This included six Rare flora, one Near Threatened bird, one Endangered reptile and one Critically Endangered amphibian. These nine are not recognised by, or qualify for, the FFG Act or EPBC Act because their populations are sustainable and stable elsewhere in Victoria and/or Australia.

All other species observed near or within the Project area are common and widespread in Victoria and/or Australia, with many being introduced. In total, 141 flora, 43 bird, 10 mammal, 3 reptile and 2 frog species were detected within or near to the Project area.

The DSEWPaC Protected Matters Search Tool and the DEPI Victorian Biodiversity Database indicated that 155 threatened species (under EPBC Act, FFG Act, DEPI Advisory Lists) have the potential or have been recorded within 10 km of the Project area (in the last 100 years). However, many of these species have never been recorded in the area and may have become regionally extinct. Additionally, there is no suitable habitat for most of these 155 species within the greater 10 km. In fact, it is only regionally threatened species (i.e. DEPI Advisory Lists) that are likely to inhabit the Project area with regularity or in abundance.

2.8.3 Protected Areas

No national or internationally protected areas directly intersect the proposed Project area. The closest National Parks are the Tara Range National Park, Gippsland Lakes Coastal Park and Snowy River National Park, which are located over 10 km from the Project area.

The Project area occurs directly within the Tara State Forest, which is managed by the DEPI and covers a total area of 14595 ha. State forest in Victoria is generally afforded a low level of protection. These areas are managed to balance a variety of values include conserving flora and fauna, protecting water catchments and water supply, providing timber for sustainable forestry, protecting landscape, archaeological and historic values, and providing recreational and educational opportunities. As discussed in Section 2.7.2, the forest in the vicinity of the Project area is heavily modified by human activities and appears to be managed primarily for timber production. Part of the Project area is also classified as Special Protection Zones (SPZs) and Special Management Zones (SMZs) for the management of large forest owl species and sustainable timber harvesting.

2.9 Downstream Biodiversity

A two-stage approach was adopted to assess the biodiversity/ecological characteristics of the downstream region of the Project area and is detailed in Aquatic and Wetland Ecology Study (Attachment 9).

1. Literature and available database search to determine species previously recorded in the area (20 km radius of downstream catchment);
2. An overview site visit of the downstream region.

All vertebrate fauna seen or heard within the downstream region were recorded. It was not possible to survey for exclusively aquatic species and surveys were not targeted or comprehensive.

2.9.1 Significant Wetlands and Ecological Communities

Gippsland Lakes Ramsar site

Part of the Gippsland Lakes Ramsar Wetland site, Lake Tyers, occurs approximately 15 km downstream of the Project area. The Gippsland Lakes were listed under the Ramsar Convention in 1982 because it fulfilled several critical criteria, including providing essential breeding habitat for wetland species. The Gippsland Lakes system is protected under the international Ramsar Convention on wetlands by the Commonwealth EPBC Act. The international governance allows for sustainable use and management of the site, but also recognises that the character of the wetlands will fluctuate/change with time.

The Gippsland Lakes Ramsar site also includes nationally and State protected parks and reserves.

For example the Gippsland Lakes Coastal Park (national park) and Lake Tyers State Park form part of the larger Ramsar Site.

The Gippsland Lakes Ramsar Site consists of a group of coastal lagoons in eastern Victoria, separated from the sea by sand dunes and fringed on the seaward side by the Ninety Mile Beach (Ramsar, 1999). The wetlands cover a total area of 60,015 ha. The Gippsland Lakes form the largest navigable inland waterway in Australia and has a distinctive regional landscape of wetlands and flat coastal plains which is of considerable environmental significance in terms of its landforms, vegetation and fauna. The main lakes of the Gippsland Lakes system are Lake Wellington, Victoria and King, and these lakes are linked to the sea by an artificial entrance at Lakes Entrance. The Ramsar boundary does not include much of the land surrounding the lakes, protecting mostly the lakes themselves.

The permanence of the main lakes and the relatively regular flooding of the adjacent wetlands mean that this wetland system is an important drought refuge for many waterfowl. The lakes and their associated swamps and morasses regularly support an estimated 40000 to 50000 ducks, swans, coots and other waterfowl. The Gippsland Lakes also offer a wide range of conditions for aquatic and emergent vegetation, and supports a number of threatened flora species.

Lake Tyers

Lake Tyers is an estuary consisting of a main lake connected to two main riverine arms: Nowa Nowa and Toorloo. The estuary is intermittently blocked from Bass Strait by a sand bar which leads to variations in water quality (particularly salinity levels, dissolved oxygen concentrations, aquatic vegetation growth and turbidity levels), however, the waters are generally well-mixed as a result of wind driven circulation. Consequently, Lake Tyers is predominantly made up of brackish or saline lagoons.

Lake Tyers is not directly connected to the rest of the Gippsland Lakes Ramsar Site, that is, there is no direct exchange of water from Lake Tyers and Lake King to the west. Water exchange between Lake Tyers and the rest of the Ramsar Site would only occur in extreme flood events.

Ecological Communities

The literature review identified that the following communities may inhabit the broad downstream region:

- Three nationally significant ecological communities were identified by the EPBC Act search as potentially occurring, although no field records were identified of these communities in the downstream region;
- Six FFG Act ecological communities:
  - » Coastal Moonah Woodland;
  - » Dry Rainforest (Limestone) Community
  - » Four different types of Warm Temperate Rainforest.
- Twenty-four Ecological Vegetation Classes (EVCs), most of which (18 EVCs) are considered to cover an area less than 50% of their pre-European extent (i.e. R, D, VU, EN);

2.9.2 Flora and Fauna

The overview field survey identified:

- No EPBC Act threatened species;
- Ninety vertebrate fauna species;
- Three bird species are protected under Migratory and Marine EPBC Act statuses;
  - » Eastern great egret (*Ardea modesta* FFG Act; Vulnerable DEPI)
  - » White-bellied sea-eagle (*Haliaeetus leucogaster* FFG Act; Vulnerable DEPI)
  - » Cattle egret (*Ardea ibis*)
  - » Pod of 4 to 6 Burranun dolphins (*Tursiops australis* Nominated for listing under the FFG Act; Endangered DEPI).

Literature review identified (previously recorded in region):

- A total of 835 flora species (including sub-species and variants);
- Three EPBC Act Vulnerable flora: flora thick-lip spider-orchid (*Caladenia tessellata*), Colquhoun grevillea (*Grevillea celata*) and limestone blue wattle (*Acacia caerulenscens*)
- Two hundred and seventy-five birds (including 11 introduced, 75 threatened, migratory or marine under EPBC Act, FFG Act and/or DEPI);

- Fifty-seven species of mammal, including 11 introduced (14 recognised by EPBC Act, FFG Act and/or DEPI);
- Seventeen reptile and 18 amphibian species, two reptiles and five frogs are recognised by the state and federal governments;
- Twenty-nine fish and three invertebrates (no threatened fish or invertebrates identified).

2.10 Socioeconomic Setting

2.10.1 Community and Health Profile

East Gippsland Shire

The local government area (LGA) covering the area of the proposed mine site is the East Gippsland Shire. This LGA is a predominantly rural area, with settlement concentrated around the coastal areas of Gippsland Lakes in the south-west, and relatively sparsely settled areas elsewhere. In 2011, East Gippsland Shire was comprised of a population of approximately 42,193 residents, with a steady out-migration of school leavers and young professionals to Melbourne (East Gippsland Shire, 2013). Bairnsdale is the largest commercial centre and Lakes Entrance, located along the coast, is the largest tourist centre in East Gippsland. At the 2011 Census, there were approximately 17,662 households, consisting primarily of couples without children (33.2%), lone persons (27.6%) and couples with children (22.3%).

Aboriginal and Torres Strait Islander people comprise approximately 3% of the East Gippsland region population, relative to 0.6% for Victoria.

Communities in the Vicinity of the Project

There are no nearby residences in the area within or surrounding the proposed mine site. The nearest communities to the mine site are the small township of Nowa Nowa and the hamlet of Wairewa, located approximately 7 km to the south and 4 km to the southeast of the mine site respectively. In 2011, the population of Nowa Nowa township was approximately 147 (ABS, 2011). The small hamlet of Wairewa is comprised of approximately 20 dwellings, however statistics regarding the population of this settlement are not available. In 2011, Bete Bolong State Suburb (which includes Wairewa and communities of Tostaree, Wombat Creek and Waygara) had a population of approximately 231 residents. The Indigenous population of the State Suburb comprised an estimated 1% of the local population (ABS, 2011).

While no residences occur in the area directly surrounding the proposed mine site, a number of isolated farmhouses occur on agricultural land in the broader area. Those nearest to the mine site are:

- Single farmhouse on agricultural land associated with Wairewa hamlet just over 4 km southeast of pit and 3.5 km southeast of the mine footprint; and
- Single farmhouse on agricultural land adjacent to Bruthen-Buchan Road approximately 3.6 km west of the processing plant, 4 km west of the pit and 3.3 km west of mine footprint.

Indigenous Groups and Residents of Lake Tyers Reserve

The Gunaikurnai Land & Waters Corporation (GLaWAC) are the native title holders for the area and the traditional owners of Gippsland. There are approximately 3,000 Gunaikurnai people, and the native title agreement area extends from west Gippsland near Warragul, east to the Snowy River and north to the Great Dividing Range. Under the 2010 native title agreement, 10 national parks and reserves (including Gippsland Lakes Coastal Park) were transferred to the Gunaikurnai to be jointly managed by the Gunaikurnai and the State.

There is limited demographic information available for Lake Tyers Reserve, due to the small population for the area. At the 2011 census, there were 127 residents (54% males and 46% females), in a characteristically young community relative to the surrounding area (median age of 29 years, compared with 47 years for Nowa Nowa State Suburb).

2.10.2 Social and Health Infrastructure

While some infrastructure and services are available locally in the immediate vicinity of Nowa Nowa and Wairewa, the closet "service towns", where more comprehensive services can be accessed are Lakes Entrance and Bairnsdale.

Children and Essential Health Services

Childcare and education facilities in the study area include a charity-funded kindergarten and government primary school in the immediate vicinity of Nowa Nowa and Wairewa. These are currently only able to cater to a relatively small population

catchment of Nowa Nowa, Wairewa and Lake Tyers communities.

Essential health services availability in the immediate vicinity of the mine site include the Nowa Nowa community Health Centre and a health and childrens' services clinic for the aboriginal community in Lake Tyers. Maternal and child health services in the immediate vicinity of the Project are also limited to the Nowa Nowa community health centre, where a doctor is available on-site one day/week.

Sports and Recreation Planning and Maintenance

Sports and recreation facilities in the study area include Nowa Nowa Recreation Reserve, Nowa Nowa Mountain Bike Park and local tennis courts in Wairewa. Funding for sport and recreation facilities across East Gippsland Shire are coordinated and managed through the Councils' Parks and Open Space Development unit. Council has committed to funding a range of development and open space upgrades over 2013-2017 throughout the Shire.

At the local level, issues and interests identified through the community planning process for Nowa Nowa, Wairewa and Lake Tyers include:

- Need to develop a Masterplan for Nowa Nowa Recreation Reserve;
- Need for maintenance improvements for the bike track network;
- Nowa Nowa tennis court maintenance;
- Increased organised sporting activities for school children.

2.10.3 Tourism and Recreation

Key tourist attractions of the East Gippsland LGA include its nine (9) national parks, four (4) marine national parks, and various state forest drives and walks.

East Gippsland has traditionally been competitive in attracting the 'Conventional Family Life (CFL) segment' – categorised as a lower yield, long stay, single destination market, attracted by camping, fishing and river or beach activities.[1] East Gippsland also attracts a significant car touring market, comprised of both domestic and international visitors, on trips ranging from 'short tours' (1 week) to 'grand tourers' (1 – 6 months).

Within the Mine site, there are no designated recreation areas. Downstream of the Project site, Lake Tyers is an important recreational fisheries reserve. The Lake Tyers Forest Park which extends to Mount Nowa Nowa is a destination for shore-based activities including bushwalking and camping. Hikers and cyclists are attracted to the East Gippsland Rail Trail which follows the disused Bairnsdale-Orbost railway, passing through Nowa Nowa.

The majority of tourism establishments, including holiday homes are concentrated in Lakes Entrance and Bairnsdale, with accommodation in Nowa Nowa limited to one (1) motel and two (2) caravan parks.

2.11 Cultural Heritage

2.11.1 Aboriginal Cultural Heritage

Eastern Iron is currently preparing a Cultural Heritage Management Plan (CHMP) to comply with the Aboriginal Heritage Act 2006 and its Aboriginal Heritage Regulations 2007 (CHMP no. 12547). Dr. Tim Stone has been assigned as Cultural Heritage Advisor for the Project and a Notice of Intention to Prepare a CHMP has been submitted to the Office of Aboriginal Affairs Victoria (OAAV) for this project, with a copy also sent to the Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC).

The standard assessment (surface survey) component of the CHMP has been completed and the Cultural Heritage Advisor has completed an interim report entitled ***5 Mile Deposit Area: Aboriginal Cultural Heritage Management Plan Interim Report*** (refer EES Referral Attachment 10). The background information below is summarised from this report.

Native Title Holders

The Gunaikurnai people hold Native Title (VID482/2009) over a large area of Gippsland, including the Project area. The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is recognised as the sole holder and representative body of these native title rights and interests on behalf of all Gunaikurnai people. Eastern Iron currently holds an agreement with the Native Title holders for the exploration phase of the Project. The

[1] Tourism Victoria segments the national market in a number of ways - the 'Roy Morgan' Value Segments in particular have been used by Tourism Victoria to distinguish markets with the highest yield potential and to summarise their holiday needs.

GLaWAC is the sole Registered Aboriginal Party (RAP) in the Project area.

Previous Archaeological Studies

Few systematic archaeological studies have been undertaken in the vicinity of Nowa Nowa and as a consequence the archaeological record of this part of East Gippsland is poorly understood. Stone artefact scatters representing Aboriginal campsites appear to be the most common site type in the region.

Prior to commencement of the Aboriginal Heritage Act 2006, a number of regional and local archaeological studies had been conducted in East Gippsland, although few in the vicinity of the Project area. Below is an account of the relevant studies.

Wood and Lance (1990) assessed potential impacts on Aboriginal sites of laying the proposed Sydney to Melbourne Optical Fibre Cable. This desktop study identified areas of archaeological sensitivity along the Bruthen - Nowa Nowa Road and between Nowa Nowa and Mt Nowa Nowa. The cable was subsequently installed along the road in a powerline easement, where it was found by Clark (2000) to have disturbed two sites at the Stony Creek crossing. The disturbed sites are not in the vicinity of the Nowa Nowa Iron Project area.

In a follow-up survey of a proposed Telecom cable route between Nowa Nowa and Mt Nowa Nowa, McNiven and Russell (1993) located one isolated artefact on a track leading to Mt Nowa Nowa, ~3 km north of Nowa Nowa. However, this artefact find was never registered with AAV, according to Clark (2001). In any case, it is not significant and McNiven and Russell (1993) concluded that no significant Aboriginal site would be impacted by cable installation.

Clark et al. (2000) and Clark (2001) surveyed a proposed road re-alignment of the Bruthen - Nowa Nowa Road west of the Nowa Nowa township locating six isolated artefacts (8522/0216-0221, VAHR), all within 300 m of creek lines. Subsurface testing in the vicinity of the finds was recommended prior to road works because of poor ground surface visibility.

Clark (2001) considered non-Aboriginal historic sites as part of his investigation, including the disused Bairnsdale to Orbost Railway Line (now East Gippsland Rail Trail). The proposed road works had potential to damage this site also and Clark (2001) recommended further consultation with Heritage Victoria and the Australian Heritage Commission beforehand.

Clark and Lewis (2001) later assessed a road re-alignment within the Nowa Nowa township. During their survey, one isolated artefact (8522/0213, VAHR) and a zone of archaeological sensitivity were identified. Rather than subsurface testing, Clark and Lewis (2001) recommended monitoring of initial earth works by an archaeologist and Aboriginal community member for artefact finds. Monitoring is an unacceptable practice under the Aboriginal Heritage Act 2006.

Clark and Lewis (2001) also recommended monitoring for historic archaeological deposits on the north side of the Princes Highway, although no new historic sites were identified.

Murphy (2006) surveyed the proposed Lakes Entrance to Nowa Nowa pipeline route locating two Aboriginal and two historic cultural heritage sites. The two Aboriginal sites are low density stone artefact scatters, both located south of the Nowa Nowa township and highly disturbed. Murphy (2006) concluded that the areas most likely to contain high numbers of stone artefacts were within 100m of Stony Creek (also known as Toorloo Arm) and Boggy Creek at Nowa Nowa.

According to Aboriginal Affairs Victoria's (AAV) Victorian Aboriginal Heritage Register (VAHR), no Aboriginal sites have been previously located in the Project area. However, forty (40) sites have been recorded within a ~10 km radius around the Project area. Parts of the Project area are also located within 200 m of watercourses. As stipulated in the Aboriginal Heritage Regulations 2007; any land within 200 m of a waterway is an area of cultural heritage sensitivity. Site types include stone artefact scatters, a quarry/raw material source area, scarred trees and an Aboriginal historical place. Clark et al. (2000) located the majority of these sites in January 2000 during their survey of the Bruthen-Nowa Nowa Road area for VicRoads. Most of the sites recorded are in and around the township of Nowa Nowa.

The closest known Aboriginal cultural heritage sites to the mine site include:

- Surface scatter of fine grained chipped stone flakes, with evidence of a silcrete source area, along Junction Creek track ; and
- Surface scatter of fine grained chipped stone flakes along Lemon Hill Road (Hunt, undated).

These sites are located to the east of the mine site, northwest of Wairewa township. The closest surface scatter is located approximately 3 km east of the mine site. An Aboriginal quarry site is located approximately 4 km east from the mine site.

Results of Cultural Heritage Surveys Undertaken for the CHMP

A cultural heritage surface survey of the 5 mile area was conducted Dr. Tim Stone and GLaWAC representatives from 4-6 April, with a focus on identifying any areas that may have been used by aboriginal hunting/camping parties or aboriginal quarries.

Two Aboriginal sites were identified during the survey. Both are Aboriginal campsites represented by scatters of stone artefacts located on ridgetops in the vicinity of the confluence of Harris, Tomato and Gap creeks. These sites are located in the vicinity of the proposed Project access road options for the Project (close to the Bruthen-Buchan Road). No Aboriginal sites were identified in other parts of the Project Footprint.

2.11.2 Historic Heritage

No European historic sites have been previously recorded in the vicinity of the Project site, and none were observed in the Aboriginal cultural heritage surveys described above, or other fieldwork conducted for other technical studies for the Project.

Most known European historic sites in the region are associated with existing road and rail infrastructure. Heritage Victoria's Victorian Heritage Database lists eight historic sites in the vicinity of Nowa Nowa township (Table 2.8). Two of these are of State Significance and listed on the Victorian Heritage Register (VHR), including one with the National Trust (NT). Sites of Local Significance are listed on Heritage Victoria's Heritage Inventory (HI) and the Victorian War Heritage Inventory (VWHI).

The closest site identified to the Project Area is the Red Knob Surveyor's Tree located approximately 7 km southwest of the Project site adjacent to the Bruthen-Buchan Road (Heritage Inventory Number H8522-0009).

3 ENVIRONMENTAL MANAGEMENT FRAMEWORK

An Environmental Management System (EMS) has been developed for the Project and will be implemented throughout the duration of the Project. The EMS is consistent with an international standard of management (ISO 14001) and the concept of 'continuous improvement'. The EMS, including the EMP, will be regularly reviewed and updated over the Project life.

As a key component of the overall EMS, the objectives of the EMP will be to:

- Implement a fully functional and effective environmental management system that is used to drive improved environmental performance and reduced environmental risk;
- Define the legislative and contractual requirements that must be fulfilled;
- Identify specific environmental management actions required to meet the conditions of the works approvals process and the environmental assessment process s (if required);
- Provide an framework for effectively managing potential environmental and community impacts throughout all phases of the Project;
- Incorporate leading practice environmental sustainability principles to minimise the potential impacts of construction and operation to the environment and community;
- Ensure that line management ownership of the EMS can be demonstrated at all times and employee knowledge and use of the system remains high;
- Ensure that continuous improvement in the environmental performance of the operation is achieved through monitoring, annual improvement plans, audit and inspection processes, training programs and effective corrective action systems.

3.1 ISO14001

Eastern Iron bases its EMS on the founding principles of ISO 14001. The objective of this Standard is to specify requirements for an environmental management system (EMS) to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects. It applies to those environmental aspects that the organization identifies as those which it can control and those which it can influence.

The overall aim of the Standard is to support environmental protection and prevention of pollution in balance with socio-economic needs. Key requirements of ISO 14001 which Eastern Iron are committed to include:

- Establish, document, implement, maintain and continually improve its EMS in accordance with the requirements of this International Standard;
- Defining and documenting the scope of its environmental management system;
- Establishing a policy, or commitment statement, developed by top management relative to the scope of the EMS that conforms to the standard;
- Identification of environmental aspects and impacts, and the significant environmental impacts that the organisation may cause;
- Development of a register of legal and other requirements;
- Development of objectives and targets, and their environmental management programs;
- Definition of resources, roles, responsibilities and authorities for environmental management;
- Development of competence, training and awareness procedures;
- Development of a communication process of the EMS to all stakeholders and interested parties;
- Development of EMS documentation as required by the standard;

- Development of document control procedures, as well as operational control procedures;
- Development of emergency preparedness and response procedures;
- Development of procedures for monitoring and measuring of operations that can have significant impact on the environment;
- An evaluation of compliance procedure;
- Procedures developed for the management of non-conformance, corrective and preventative actions; and
- Records management procedure.

3.2 Environmental Policies

Eastern Iron has developed a series of policies to guide its actions at all levels of the organisation. Company policies relevant to the implementation of the EMP include:

- Environment Policy;
- Code of Conduct Policy;
- Community Policy;
- Discrimination, Harassment and Equal Employment Opportunity Policy;
- Fitness for Work Policy; and
- Health and Safety Policy.

These policies will be reviewed and updated by Eastern Iron prior to commencement of the Project.

3.3 Planning

3.3.1 Environmental Assessments

Environmental and social baseline studies have been undertaken for the Project to determine potential impacts arising from project development. The following aspects have been identified as having potential for negative environmental and social impacts, unless managed appropriately:

- Water;
- Erosion and Sediment;
- Management of Mine Materials;
- Biodiversity and Conservation;
- Cultural Heritage;
- Traffic and Transport;
- Air Quality;
- Noise and Vibration;
- Social and Community Health Management;
- General Waste;
- Hazardous Materials;
- Energy and Greenhouse Gas;
- Environmental Awareness and Training;
- Landscape and Visual;
- Bushfire and Fire Management;
- Emergency Preparedness and Response; and
- Rehabilitation and Closure.

The areas identified above have guided the development of this EMP. Management and monitoring plans for each of these aspects have been developed as part of this report and are detailed from Chapter 5 - Chapter 22.

3.3.2 Commitments and Actions

Each management plan provides commitments and actions for management and monitoring activities.

3.4 Implementation and Operation

3.4.1 Roles and Responsibilities

The implementation, day-to-day management and continued improvement of the EMP will be the responsibility of the Mine Manager. The Manager Environment will also play a key role in ensuring the EMP is implemented effectively and ensuring compliance with relevant legislation and Company policies. Further, it is the responsibility of all Eastern Iron staff and contractors to comply with the commitments and procedures set out in the Project's management plans, and to carry out their work in such a manner as to minimise potential adverse environmental and social impacts.

Specific duties and responsibilities of various personnel are outlined below in Table 3.1.

Table 3.1 Roles and Responsibilities.

Role	Duties and Responsibilities
Mine Manager	• Developing an EMS and associated corporate management systems; • Preparing, reviewing and updating the EMP, as well as site-based EMPs; • Liaison with stakeholders and environmental staff as required.
Manager Environment	• Ensuring the management practices described in the EMPs are implemented effectively; • Ensuring compliance is achieved with relevant legislation and company policy by establishing and maintaining appropriate management and monitoring systems; • Ensuring that contractors fulfil their contractual obligations (detailed environmental and social management requirements are included in contracts as enforceable conditions); • Providing specialist advice on EMP strategies, as required, to departmental managers, contractors and other mine personnel; • Monitoring the performance of EMP strategies; • Regular liaison with the government, community and other stakeholders regarding environmental management; • Ensuring environmental/social induction procedures and appropriate training for Project personnel and contractors is provided. • Environmental reporting.
Environmental Technical Specialists	• Ensuring that environmental safeguards, surveys and monitoring, inspections and remediation are undertaken in accordance with the EMP; • Co-ordination and delivery of environmental inductions; • Co-ordination of environmental monitoring programs; • Scheduling and co-ordination of environmental management plans; • Review of monitoring data and compilation of compliance and performance records; • Manage and maintain environmental records and databases;

Recruitment and Staff Training

Eastern Iron will continue to recruit those individuals that possess the appropriate experience and qualifications to ensure the required knowledge and skills are available at its mining and exploration locations as well as its support infrastructure. Accordingly, this will enable Eastern Iron to consistently and effectively achieve its environmental and community relations policies, objectives and targets.

All new employees and contractors will be required to complete a structured site-focused induction that includes as a minimum:

- The various legislative requirements relevant to the Project;
- The site layout and any environmental sensitivities;
- Examples of standard operating procedures and safe work instructions;
- Community sensitivities and cultural awareness information;

- Safe work practices and emergency response procedures;
- Incident reporting requirements and processes.

The site Induction manual will include specific sections addressing employee and contractor awareness and responsibilities regarding the Environment and Community Relations.

Training opportunities will be ongoing with the focus of continually improving the environmental and social understanding, as well as the capabilities and performance of personnel and contractors through generic and task focused skill and knowledge enhancement opportunities. In addition, specific training will be provided to personnel involved in tasks related to:

- The maintenance and operation of pollution control equipment;
- Storage and handling of hazardous material;
- The response to environmental incidents and emergencies; and
- Work activities that involve potential or actual significant environmental risk.

Cross-cultural awareness will be included in both the induction and training programs and records of completion are consistently maintained. Staff and contractors will be required to recomplete the site focused induction at regular intervals

3.4.2 Communication

Communication is crucial to the environmental management process to ensure that Eastern Iron staff, contractors and project stakeholders are fully informed of the environmental management strategy being implemented for the Project.

All community consultations will be conducted in accordance with the ***Stakeholder Engagement Plan*** (EES Referral Attachment 3). This Plan was prepared consistent with the *Community Engagement Guidelines for Mining and Mineral Exploration in Victoria* (DPI 2008). These guidelines provide assistance to the minerals industry about the requirements for community engagement under the *Mineral Resources (Sustainable Development) Act 1990* and the *Mineral Resources Development Regulations 2002*.

Eastern Iron will be responsible for communicating information regarding the project's environmental and social impacts to external stakeholders. Internal communications will be undertaken in accordance with Eastern Iron's corporate communications protocols.

3.4.3 Documentation

Project documentation will be managed through a formal document control system which will be developed to ensure that documents and records are easily accessible.

Environmental management documentation will include:

- Eastern Iron's Policies,
- Management objectives and targets,
- Relevant environmental management documents including EMPs, closure and rehabilitation plans and standard operating procedures developed by Eastern Iron,
- Annual monitoring and corrective action report; and
- Documented commitments and actions for environmental management.

3.4.4 Reporting

In circumstances where the Minister responsible for the MRSDA determines that the Project is a declared mine, reporting will be undertaken in accordance with the Declared Mines and Quarries Guideline for Preparation of Six Monthly and Annual Reports (DEPI 2012).

Annual Reports

The Annual Report needs to provide a review of performance for the preceding year and indicate planned alterations to ground stability management. The main purpose of the report is to:

- Review system performance against targets;
- Cover operational faces, permanent batters, floor, overburden dumps, storages
- Confirm adequacy of hydrogeological and geotechnical risk management practices or highlight were practices are to be changed to better manage risks; and
- Provide a work plan to address key risk issues or works to be managed in the next 12 month period.

Six Month Reports

The 6 Month Report will:

- Provide a summary of performance since the previous annual report;
- Provide a summary of progress against the annual risk management work program;
- Cover operational faces, permanent batters, floor, overburden dumps, storages;
- Highlight any significant technical outcomes or issues in the preceding 6 months; and
- Summarise altered practices for stability risk management.

Six monthly reporting requirements are specified in the Mineral Resources Development (Mining) Amendment Regulations 2010 as follows:

1. *The holder of a mining licence that relates to a declared mine must report in writing to the Department Head in respect of each period of 6 months——*

    a. *ending on 30 June or 31 December, or*

    b. *if the Department Head nominates other dates in writing to the holder, ending on a date so nominated—*

and must provide the report to the Department Head within 3 months after the end of the period to which it relates.

2. *A report under subregulation (1) must include—*

    c. *the outcomes of reviews of the assessment, plan and controls for the management of geotechnical and hydrogeological risks for the declared mine, taking into account the results of monitoring carried out under the monitoring plan, and details of—*

        i. *the implementation of control measures;*

        ii. *any stability modelling undertaken;*

        iii. *any significant changes in the operation of the declared mine;*

        iv. *implications for the mine design components;*

    d. *the results of the monitoring plan set out in the work plan;*

    e. *a description of activities taken to implement the declared mine stability controls and the groundwater control system set out in Part 2 of Schedule 13 and any recommended changes to the work plan.*

Incident / Event Reporting

Some events require specialist reporting, as per the *Guidance Note on Reportable Events for Mineral and Extractive Operations* (DEPI 2012). A reportable event is an event, abnormal to expected or usual operations, that results, or may result, in significant impacts on public safety, the environment or infrastructure. Reportable events include:

- Visible and current events that have or are in the process of happening ie:
    - » Explosion or fire with potential to impact offsite;
    - » Incidence of flyrock from blasting
    - » A breach or non-compliance with the Mining Licence or Extractive Industry Work Authority conditions (e.g. clearing of native vegetation or other works outside the approved area; slopes, benches, batter heights or underground workings that differ from design as contained in the work plan; failure or expected inability to meet a rehabilitation program).
- Events indicated through monitoring or inferred from other noted occurrences i.e.:
    - » A potentially unstable area as indicated by an increased rate of monitored ground movement.
    - » Where consistent monitoring indicates a significant and unexpected change in; groundwater movement, ground movement, slope pore pressure or aquifer pressures, which require modification or implementation of control measures and/or access procedures.
    - » Exceedance of authorised environmental emissions such as noise or dust.
- Events that may contribute to a significant increase in risk to external parties i.e.

- » Failure to meet work program objectives where those objectives relate to batter, slope, floor, wall or roof stability.
- » Imminent overtopping or instability in storage structures due to an abnormal weather event.
- » The inability to meet work program targets concerned with stability related works that may have the consequence of increasing stability risks

In accordance with the *Mineral Resources Sustainable Development Act*, Eastern Iron will establish procedures to notify DEPI as soon as practicable after becoming aware of any Reportable Event at the mine site.

3.4.5 Emergency Preparedness and Response

A framework for emergency preparedness and response has been developed as part of the EMP (Chapter 20). The Emergency Preparedness and Response Plan will address possible emergency scenarios and accidents and how Eastern Iron will respond to them. The plan will include a process for annual revision and updating, as well as a schedule for testing procedures and strategies in case of emergency. A detailed Bushfire and Fire Management Plan will also be developed as part of the EMP (Refer to Section 19 for further information).

3.5 Checking

3.5.1 Monitoring, Auditing and Reporting

Complaints Management Process

Building and maintaining a good relationship with the local community and stakeholders is an important consideration for the Project and for the company in general. Eastern Iron has developed a complaints management procedure to address any complaints from the public or specific Project stakeholders. Further details on this procedure are provided in the ***Stakeholder Engagement Plan*** (refer to Section 13).

The mechanism for the lodgement of grievances, complaints or other communications and inquiries will be well publicised and all impacted stakeholders will be informed of its existence.

Monitoring

The implementation of an appropriate monitoring strategy as part of the EMP is important to ensure that existing management measures are effective and to identify the need for improved or additional measures.

Eastern Iron will establish an environment and social monitoring program specifically for the Project. Monitoring will be undertaken to verify compliance with environmental conditions and commitments, satisfy regulatory and reporting requirements, track environmental performance and measure the effectiveness of environmental management measures.

The monitoring program will include five categories of monitoring: operations monitoring, discharge monitoring, ambient monitoring (environmental and social), investigations monitoring and post-closure monitoring. Eastern Iron's commitments to monitoring for each environmental and social aspect are detailed in the sub-plans within this EMP.

Reporting and Audit Schedule

In addition to the incident reporting system outlined above, Eastern Iron will also develop internal and external reporting systems to ensure that EMP objectives are being achieved.

Daily and weekly activities will be recorded by the Supervisor on pre-prepared checklists addressing EMP requirements. Monthly and annual reports will be prepared for internal distribution and submission to regulatory authorities (where required). The annual report will cover environmental reporting requirements as per the *Mineral Resources (Sustainable Development) Act 1990* and Schedule 15 Guide - Statutory Reporting for the Mining Industry. The EMP is a live document and will be reviewed and updated annually to ensure commitments remain effective and applicable. The Victorian Department of Primary Industries (and other agencies) will be notified of any significant changes to the Work Plan or EMP.

Eastern Iron will develop an auditing schedule and regularly commission routine internal and independent external audits of the EMP and Environmental Management System (EMS). Audits will investigate:

- The appropriateness of the EMP to the current development stage and operating practices of the mine;

- Workforce awareness of the EMP and associated plans;
- The performance of managers and operators in implementing and maintaining the EMP strategies; and
- Whether sufficient time, resources and expertise are available to implement the EMP.

3.5.2 Corrective Action

Environmental conditions will be continually monitored throughout the Project's life cycle. If a measure is found to be ineffective, corrective actions will be put in place to mitigate and manage that particular impact in the future.

3.6 Continual Improvement

The environmental and social performance of the Project will be reviewed on an annual basis to determine whether updates to the management and monitoring program are required. This could include additional commitments and actions.

3.7 Stakeholder Identification and Engagement

Community engagement is recognised as an important element in the planning and decision-making process of the Victorian mining industry (DPI, 2008). It also helps Project owners achieve and maintain a 'social license to operate' allowing the Project to maximise benefits, both for the Project and stakeholders and minimise negative consequences. The overall aim of public and stakeholder consultation for the Project is to enhance the sustainable development outcomes of the Project through effective, inclusive and equitable involvement of Project stakeholders, to ensure the long-term viability of the Project and to enhance potential Project benefits.

Eastern Iron is committed to transparent and effective stakeholder engagement and consultation at all stages of Project development. Stakeholder engagement will be part of the formal consultation for project approvals and will continue throughout all stages of Project development from design to construction, operation and decommissioning.

A ***Stakeholder Engagement Plan*** has been prepared for the Project in accordance with the *Mineral Resources (Sustainable Development) Act 1990*, *the Mineral Resources Development Regulations 2002* and the *Community Engagement Guidelines for Mining and Mineral Exploration in Victoria* (DPI, 2008), and is included as EES Referral Attachment 3.

Stakeholder identification and analysis was undertaken to identify stakeholders potentially affected by the Project, including Government authorities and community organisations or interest groups with an active interest in the Project area in Victoria or NSW. The list of stakeholders, and engagement measures, will continue to evolve over the life of the Project.

4 PROJECT RISK ASSESSMENT

The purpose of the following risk assessment is to provide an overall assessment of potential environmental risks and opportunities arising from the development of the Project based on the proposed Project design and layout, in order to guide the development of management and mitigation measures in the EMP and ensure they are appropriate to the levels of risk exposure for each aspect. This risk assessment has been conducted at an early stage in the Project development process based on the principle that risk based decision making will be integrated into every part of the project life cycle.

A detailed outline of the preferred Project approach is provided in the ***Project Description and Proposed Mine Plan*** (EES Referral Attachment 1). Risks associated with the various alternatives considered in the Project planning process are considered separately in the ***Evaluation of Project Alternatives*** (EES Referral Attachment 4).

4.1 Risk Assessment Methodology

The methodology for this Risk Assessment is based upon AS/NZS ISO31000 Risk Management — Principles and Guidelines, 2009 and ISO31010 Risk Management – Risk Assessment Techniques, 2009.

The construction and operation of any mining project will necessarily alter the natural environment resulting in some environmental and social impacts (both positive and negative). A risk assessment framework has been used to identify and evaluate key economic, environmental and social risks potentially resulting from the Project.

The risk assessment is initially conducted for the development scenario assuming implementation of Project 'controls' (risk avoidance/control measures integrated into the Project design), but prior to any additional management and mitigation, with the goal being to identify the most significant potential risks in the absence of additional mitigation. Following the assessment of the initial risk ranking, additional measures are identified to avoid or minimise the identified risks according to the level of risk, and a revised risk ranking is provided for residual risks. Measures focus on either reducing the likelihood of occurrence or on decreasing the magnitude of the consequence. As a result, the expected residual risk is typically significantly lower than the initial risk ranking.

Notably, this risk assessment only assesses the risks of the Project based on the proposed Project design – it does not assess Project alternatives. The details of the Project description and layout (including 'controls') are provided in the ***Project Description and Proposed Mine Plan*** (EES Referral Attachment 1). Risks associated with Project alternatives considered in the project design and feasibility process are outlined in the ***Evaluation of Project Alternatives*** (EES Referral Attachment 4).

4.1.1 Definitions

Risk

As per AS/NZS ISO31000, risk is defined as the "effect of uncertainty on objectives", noting that an 'effect' is a deviation from that which is expected and can be either positive and/or negative. In the case of the current Project, the risk of uncertainty lies in the ability to achieve the Project objectives as defined in Section 1.4 of the ***Project Description and Proposed Mine Plan*** (EES Referral Attachment 1). The methodology used to identify the level of risk exposure is further detailed in Section 4.1.2.

Further definitions in relation to risk as per AS/NZS ISO31000 include:

- Residual risk is defined herein as the 'risk remaining after risk treatment'.
- Risk source is the 'element which alone or in combination has the intrinsic potential to give rise to risk'.
- A Risk event is the 'occurrence or change of a particular set of circumstances', noting that an event can be one or more occurrences, and can have several causes. For the case of the Nowa Nowa Iron Project this refers to the possible events/hazards (and their consequent effects) that could occur as a result of implementing the proposed Project.

Consequence

As per AS/NZS ISO31000, Consequence can be defined as the "outcome of an event affecting objectives'.

As outlined in the ISO standards:

- An event can lead to a range of consequences. A consequence can be certain or uncertain and can have positive or negative effects on objectives
- Consequences can be expressed qualitatively or quantitatively.
- Initial consequences can escalate through knock-on effects.

The descriptions of each numerical consequence rankings used are described in their respective environmental and social and contexts in Table 11-2 below.

Likelihood

As per AS/NZS ISO31000, Likelihood is defined as the "chance of something happening". In risk management terminology, the word 'likelihood' is used to refer to the chance of something happening, whether defined, measured or determined objectively or subjectively, qualitatively or quantitatively, and described using general terms or mathematically (such as a probability or a frequency over a given time period).

Descriptors for each likelihood rank are outlined in Table 4.1 below.

Table 4.1 Likelihood Description

Likelihood		Summary
1	**Rare**	Highly unlikely to occur. The aspect / event may occur in very exceptional circumstances.
2	**Unlikely**	May occur at some time over the Project life. The aspect / event has happened elsewhere under similar conditions.
3	**Likely**	Expected to occur. The aspect / event occurs in most circumstances.
4	**Almost Certain**	Very likely to occur within a 12 month timeframe. The aspect / event regularly occurs elsewhere under similar conditions.
5	**Certain**	Will occur. The aspect / event is certain based on the current Project description, or as near to certainty as makes no significant difference.

Controls

Controls are defined in AS/NZS ISO31000 as 'the measure that is modifying risk'. Controls include any process, policy, device, practice, or other actions which modify risk. For this risk assessment, controls have been further defined specifically as the existing features of the proposed Project will act to minimise negative risk or enhance positive opportunities. These include the features of the proposed Project design and layout (refer EES Referral Attachment 1), the requirements for a mining project set out in applicable legislation and policy, as well as standard operating procedures (e.g. for construction equipment).

Additional management measures to be implemented in addition to the controls are defined separately below.

Management and Mitigation Measures

For the purposes of this risk assessment, management and mitigation measures are defined as additional measures to be implemented in addition to the Project 'controls' (refer above). These may include measures to further avoid, manage, or monitor certain aspects to minimise negative risk or enhance positive opportunities.

Table 4.2 Consequence Description

Consequence		Economic	Environmental	Social	Public Health and Safety
1	Negligible	Very minor localised and/or short term impacts. No significant effect on local or regional businesses. Reduction in tourist visitation within normal variation.	Slight / temporary impact on environment. Localised alteration or disturbance to ecosystem. Change within natural variation or contained within design requirements without additional impact. Or minor < 50 litre non-acutely hazardous spill or emission on site. Recovery in less than 1 day.	Temporary or slight impact on community wellbeing in local area. Written / verbal complaint from community. Immediately recoverable with no lasting effects.	Minor injury or illness for 10 or less individuals over Life of Mine.
2	Minor	Short term impacts on local or regional businesses recoverable within 1 year. Short term but detectable reduction in tourist visitation beyond normal yearly variation. Recovery in less than 1 year.	Minor environmental impact. Detectable impacts on biophysical environment outside normal variation. Spill contained within secondary containment, with no additional impacts. Or < 500 litres of non-acutely hazardous spill or equivalent emission on site. Functional recovery in less than 1 year.	Short term impact on community health / wellbeing in local area or region. Partial and/or localised impact on one or more Aboriginal heritage sites. Activites temporarily restricted in a localised area. Functional recovery in less than 1 year.	Medical Aid Injury with no risk of permanent impacts. Minor injury or illness for 10-100 individuals over Life of Mine.
3	Moderate	Significant impact on local and/or regional businesses. Moderate reduction in tourist visitation. Recovery within 1-5 years.	Significant environmental impact. Requires < 2 weeks remediation. Impacts on biophysical environment, managed locally. Loss (> 1 hectare or fauna replaceable or compensatable, but at a cost) of non-endangered flora / fauna (including aquatic life). Any amount > 500 litres contained within area already impacted by mining. Quickly contained & corrected hazardous spills or emission on or off site. Functional recovery in 2-5 years.	Significant impacts on community health / wellbeing in local area or region. Recoverable without significant lasting reputational or relationship impacts. Substantial impact / removal of one Aboriginal heritage sites. Permanent restriction of activities in a localised area. Functional recovery in 2-5 years.	Long-term medical treatment required for an individual. Some hospitalisation. Minor injury or illness for 100-1000 individuals over Life of Mine.
4	Major	Major impact on economic viability of local and/or regional businesses. Substantial reduction in tourist visitation. Not easily recoverable. Recovery expected within 5-10 years.	Major significant impact and/or minor non-compliance with relevant legislation and policies. High local impacts on biophysical environment resolvable but up to $5M. Significant detectable impact on listed flora / fauna species and/or communities (including aquatic life). Significant contaminant outside containment but on mine	Major impact on community health / wellbeing in local area or region. Community perception that Project areas have been significantly damaged. Substantial impact / removal of numerous Aboriginal heritage sites. National and/or	Single fatality. Multiple extensive injuries / industrial diseases requiring significant hospitalisation. Permanent severe life altering impact on one person.

Consequence		Economic	Environmental	Social	Public Health and Safety
			site. Non acutely hazardous spill / or equivalent emission off site. Functional recovery in 5-10 years.	international concerns. NGO / stakeholder activism resulting in reputational damage. Difficult to resolve quickly. Functional recovery in 5-10 years.	
5	**Extreme**	Major permanent impact on economic viability of businesses affected. Permanent loss of iconic tourist sites. Permanent flow on effects for local and regional businesses. Recovery in greater than 10 years if at all.	Severe impacts on biophysical environment. Major non-compliance with relevant legislation and policies. Very difficult to resolve and remediation > $5M. Significant loss of listed flora / fauna species and/or communities (including aquatic life). Acutely hazardous spill or equivalent emission off site. Functional recovery in greater than 10 years, if at all.	Complete breakdown of relationship with one or more key stakeholders. Sustained negative media coverage on a national or international level. Cessation or severe restriction of operations. Public outrage. Destruction of numerous Aboriginal heritage sites across multiple areas. Functional recovery in greater than 10 years, if at all.	Multiple fatalities. Permanent severe life altering disabilities for multiple people. Large number of people requiring long term hospitalisation. Minor injury or illness for >1000 individuals over Life of Mine.

4.1.2 Risk Assessment Process

The methodology used for each step in the risk assessment process for the assessment is outlined below. Figure 4.1 shows how the risk assessment process fits within the overall Risk Management Process.

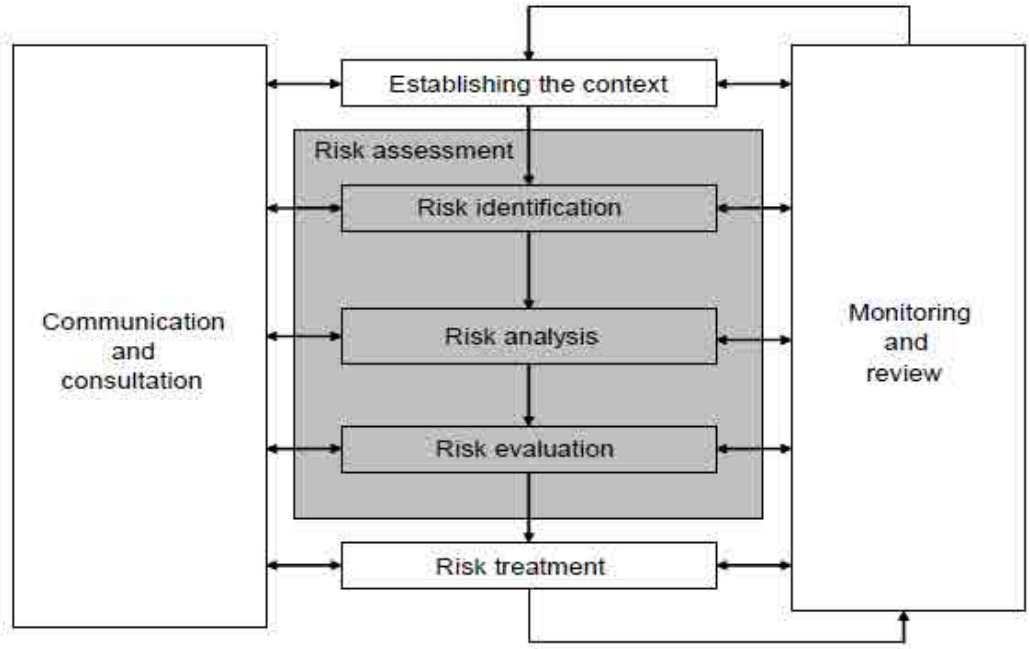

Figure 4.1 Risk Assessment Process (shaded) within the overall Risk Management Process (AS/NZS ISO31000)

Further detail regarding each step taken in the risk assessment process for the Project is provided below.

Communication and Consultation

> "Communication and consultation with external and internal stakeholders should take place during all stages of the risk management process.
>
> Therefore, plans for communication and consultation should be developed at an early stage. These should address issues relating to the risk itself, its causes, its consequences (if known), and the measures being taken to treat it. Effective external and internal communication and consultation should take place to ensure that those accountable for implementing the risk management process and stakeholders understand the basis on which decisions are made, and the reasons why particular actions are required."
>
> AS/NZS ISO31000

Communication and consultation have been conducted with a variety of stakeholders during the assessment process. These have included consultations with:

- Government Authorities (Commonwealth , State, local);
- Indigenous groups; and
- Other stakeholders.

Further detail regarding the various stakeholders consulted is provided in the **Stakeholder Engagement Plan** (EES Referral Attachment 3).

Establishing the Context

> "Before starting the design and implementation of the framework for managing risk, it is important to evaluate and understand both the external and internal context of the organization, since these can significantly influence the design of the framework."
>
> AS/NZS ISO31000

This part of the risk assessment process involved a comprehensive review of the external and internal factors to be taken into account when managing risk,

to set the scope and risk criteria for the remaining process. This included:

- Undertaking a site visits and fieldwork for technical studies;
- Conducting consultations with relevant stakeholders (refer Chapter 14);
- Compiling and reviewing available information on the Project.

Risk Identification

"The purpose of risk identification is to identify what might happen or what situations might exist that might affect the achievement of the objectives of the system or organization. Once a risk is identified, the organization should identify any existing controls such as design features, people, processes and systems.

The risk identification process includes identifying the causes and source of the risk (hazard in the context of physical harm), events, situations or circumstances which could have a material impact upon objectives and the nature of that impact"

ISO31010

The risk identification process involved the generation of a comprehensive list of potentially significant environmental and social risks based on events that might create, enhance, prevent, degrade, accelerate or delay the achievement of Project objectives. For the current risk assessment, this process included:

- A review of risks previously identified in:
  - » Consultations with relevant stakeholders (see above);
  - » Scoping studies and feasibility reports;
  - » Specialist environmental and social technical studies (refer EES Attachments).
- Expert knowledge regarding the potential risks and impacts of mining project construction and operations; and
- Benchmarking against other similar projects.

Risk Analysis

"Risk analysis consists of determining the consequences and their probabilities for identified risk events, taking into account the presence (or not) and the effectiveness of any existing controls. The consequences and their probabilities are then combined to determine a level of risk.

Risk analysis involves consideration of the causes and sources of risk, their consequences and the probability that those consequences can occur. Factors that affect consequences and probability should be identified. An event can have multiple consequences and can affect multiple objectives."

ISO31010

For this assessment this step involved consideration of the causes and sources of risk, their positive and negative consequences, and the likelihood that those consequences would occur. This involved an assessment of expected likelihood and consequences, based upon:

- A thorough understanding of the Project environmental and social baseline;
- The presence/absence of existing controls associated with exploration activities;
- Expert knowledge regarding the potential impacts of mining project construction and operations, as well as the likely effectiveness of mitigation measures.

Risk Evaluation

"Risk evaluation involves comparing estimated levels of risk with risk criteria defined when the context was established, in order to determine the significance of the level and type of risk.

Risk evaluation uses the understanding of risk obtained during risk analysis to make decisions about future actions. Ethical, legal, financial and other considerations, including perceptions of risk, are also inputs to the decision."

ISO31010

A semi-quantitative evaluation of the level of the risk exposure for each risk identified was conducted. Based on the results of previous steps, risks were evaluated by allocating a 'Level of Likelihood' and 'Level of Consequence' to each of the risks. The evaluation of Likelihood and Consequence were based on criteria outlined in Table 4.1 and Table 4.2 espectively. Risk exposure is identified as either Low, Medium, High or Very High as per Table 4.3 and Table 4.4.

Risk exposure levels were evaluated separately for each risk for the following two scenarios:

1. Post implementation of controls, but prior to implementation of additional management / mitigation measures; and
2. Post implementation of controls as well as additional management / mitigation (residual risk).

Further information on the approach to risk treatment in the EMP is provided in Section 4.2.

Table 4.3 Risk Matrix (Threats)

Likelihood		Consequence (Adverse)				
		1	2	3	4	5
		Negligible	Minor	Moderate	Major	Extreme
5	Certain	Medium	Medium	High	Very High	Very High
4	Almost certain	Medium	Medium	High	High	Very High
3	Likely	Low	Medium	Medium	High	High
2	Unlikely	Low	Low	Medium	Medium	High
1	Rare	Low	Low	Low	Medium	Medium

Table 4.4 Risk Matrix (Opportunities)

Likelihood		Consequence (Beneficial)				
		1	2	3	4	5
		Negligible	Minor	Moderate	Major	Extreme
5	Certain	Medium	Medium	High	Very High	Very High
4	Almost certain	Medium	Medium	High	High	Very High
3	Likely	Low	Medium	Medium	High	High
2	Unlikely	Low	Low	Medium	Medium	High
1	Rare	Low	Low	Low	Medium	Medium

4.2 Approach to Risk Treatment in the EMP

"Having completed a risk assessment, risk treatment involves selecting and agreeing to one or more relevant options for changing the probability of occurrence, the effect of risks, or both, and implementing these options.

This is followed by a cyclical process of reassessing the new level of risk, with a view to determining its tolerability against the criteria previously set, in order to decide whether further treatment is required."

ISO31010

As discussed in Section 4.1, the risk assessment is initially conducted post implementation of 'controls' (risk avoidance/control measures integrated into the Project design), but prior to any additional management and mitigation with the goal being to identify the most significant potential risks in the absence of mitigation.

After evaluating anticipated risks in the project Process given the implementation of the controls imbedded into the Project design, additional management measures have been identified for the mitigation and/or reduction of risk. The development of these measures has taken into account the level of risk exposure for each aspect.

The key controls and additional proposed risk management and mitigation measures for each of the economic, environmental and social risks considered are provided in the detailed results tables for each phase of the Project are provided in Annex A. Based on the outcomes of the risk assessment, details of Eastern Irons commitments management and mitigation for each aspect are provided in each of the sub-plans within this EMP (refer Sections 5-21).

Notably, the residual risk ranking does not take into account the provision of offsets. Where impacts are unavoidable (e.g. some native vegetation loss will occur at the mine site), such impacts may be minimised through providing offsets. Offsets for residual impacts are discussed in the relevant sub-plan sections of this EMP (e.g. refer Section 8 regarding vegetation offsets).

4.3 Risk Assessment Results

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
Physical Risks and Aspects											
Hydrology	Significant adverse impacts on catchment hydrological conditions downstream of mine site.	Construction	Capture of surface water drainage from the waste rock dump, temporary low grade ore stockpile, open pit and ROM pad in the Operation Water Storage for mine water supply. Altered flow regime through development of Sediment Control Dam and Clean Water Storage.	Mine layout designed to avoid impact to surface water flows in Harris Creek (ie. water storages located on Gap and Tomato Creeks upstream of confluence with Harris Creek). Mine site layout limited to the greater Boggy Creek catchment to avoid potential impacts to surface water flows in Hospital Creek catchment. No discharge from Operations Water Storage during operations. Allowance for provision of environmental flows from the Sediment Control Dam and Clean Water Storage. Recycling of mine site water, where possible.	3	3	Medium	Monitoring and maintenance of drainage structures. Hydrology monitoring.	3	2	Medium
		Operations			3	3	Medium		3	2	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Closure	Use of surface water storages to facilitate rapid filling of open pit lake post-closure. Changes to surface water drainage through development of open pit lake and engineered wetland systems in Tomato Creek. Flows in Gap Creek reduced as water from open pit will be diverted to Tomato Creek	Once full, water will be allowed to discharge from the open pit post-closure, water quality permitting.	3	2	Medium	Hydrology monitoring.	3	1	Low
Hydrogeology	Significant adverse impacts on local hydrogeological conditions surrounding the mine site.	Construction	Extraction of groundwater from pit dewatering bores and open pit sumps lowers the local groundwater table surrounding the open pit.	Limiting groundwater extraction for mine water supply to open pit dewatering. Recycling of mine site water, where possible.	3	2	Medium	Monitoring of groundwater levels and quality up and down hydraulic gradient of the open pit.	3	2	Medium
		Operations			3	2	Medium		3	2	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Closure	Rebound of groundwater levels to pre-mining levels is slow post-closure.	Groundwater rebound in the open pit may be artificially increased by pumping water from the three water storages at closure.	2	1	Low		2	1	Low
Erosion and Sediment Transport	Increases in total suspended solids and sedimentation downstream.	Construction	Vegetation clearance for exploration and mine construction, earthworks, construction/upgrade of access roads, poor soil stabilisation/revegetation.	Capture of potential sediment affected drainage in Sediment Control Dam, Operations Water Storage and Clean Water Storage. Implementation of erosion and sediment control structures. Adherence to legislative requirements and leading practice standards.	4	4	High	Implementation of progressive rehabilitation of disturbed areas. Management and maintenance of erosion and sediment control structures. Monitoring of site and downstream water quality.	3	3	Medium
		Operations	Vegetation clearance, earthworks, maintenance of access/haul roads, poor soil stabilisation/revegetation.		3	3	Medium		2	3	Medium
		Closure	Poor / slow establishment of site rehabilitation.	Implementation of mine rehabilitation and closure plan.	3	2	Medium		2	2	Low

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
Water Quality	Significant adverse impacts on surface water and groundwater quality / beneficial use of water downstream of mine site from alkalinity, nutrients, pathogens, and other hazardous materials.	Construction	Release of alkaline concrete batching water; Release of nutrients / pathogens from construction workforce wastewaters (eg. sewage, grey water); spills of hydrocarbons or potentially hazardous reagents.	Mine site layout limited to the greater Boggy Creek catchment to avoid potential impacts to surface water quality in Hospital Creek catchment. Maintenance of all potentially affected drainage on-site for operational water supply in the Operations Water Storage, with no discharge to downstream environments during operations. Adherence to legislative requirements and leading practice standards.	2	4	Medium	Monitoring of site and downstream water quality.	2	4	Medium
		Operations	Release of nutrients / pathogens from operations workforce wastewaters (eg. sewage, grey water); drainage from spills / residues of ammonium nitrate based blasting preparations (ANFO); spills of hydrocarbons or other potentially hazardous reagents.		2	4	Medium		2	4	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Closure	Drainage residues of ammonium nitrate based blasting preparations (ANFO); drainage from areas where fertilizer has been applied for revegetation; spills of hydrocarbons at decommissioning.	Passive (active, if required) treatment of water to lower potential residual nutrient loads from open pit and waste rock dump. Water will only be allowed to discharge from site if applicable water quality standards are achieved. Adherence to legislative requirements and leading practice standards.	2	3	Medium	Monitoring of site and downstream water quality. Review of site rehabilitation strategy throughout operations to confirm feasibility of rehabilitation strategy.	2	3	Medium
Acid and Metalliferous Drainage (AMD), Neutral and Metalliferous Drainage (NMD) and sulfate salinity	AMD / NMD / sulfate salinity generated by oxidising sulfidic waste rock, temporary low grade ore stockpile, ROM ore, pit wallrock leads to decrease in downstream	Construction	N/A		-	-	-	N/A	-	-	-
		Operations	Oxidation of sulfidic material. Release of potential AMD / NMD / sulfate salinity to downstream environment or local groundwater.	Maintenance of all potentially affected drainage on-site for operational water supply in the Operations Water Storage, with no discharge to downstream environments during operations. Adherence to legislative requirements and leading practice standards.	2	4	Medium	Monitoring of site and downstream water quality (surface water and groundwater). Treatment of water to allow for re-use on-site, if required.	2	3	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	surface water and groundwater quality / beneficial use.	Closure		Mine site layout limited to the greater Boggy Creek catchment to avoid potential impacts to surface water quality in Hospital Creek catchment. Design of Project to ensure long-term geochemical stability of Project geological materials. Design of passive water treatment systems (eg. engineered wetland systems) to lower potential residual sulfate and metal concentration. Water will only be allowed to discharge from site if applicable water quality standards are achieved. Adherence to legislative requirements and leading practice standards.	2	4	Medium	Monitoring of site and downstream water quality. Review of site rehabilitation strategy throughout operations to confirm feasibility of rehabilitation strategy.	2	3	Medium
Air Quality, Noise and Vibration	Significant mine site noise/vibration impacts on local	Construction Operations	Mine site equipment and vehicle use, blasting.	Mine site located over 3 km from nearest residence. Legislative criteria for noise. Compliance with relevant	2	3	Medium	Low-noise equipment selection. Monitoring.	2	3	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	communities.	Closure	Excavations and heavy machinery associated with rehabilitation activities	noise/vibration quality legislation and criteria including EPA Environmental Guidelines for Major Construction Sites (1996).	1	3	Low	Vehicle maintenance, Noise monitoring.	1	3	Low
	Significant transport noise/vibration/air quality impacts on local communities.	Construction	128 light vehicles and 6 heavy vehicles added to the road per day.	Mine site located over 3 km from nearest residence.	3	3	Medium	Vehicle maintenance, Noise monitoring.	2	3	Medium
		Operations	216 light vehicles and 368 heavy vehicles added to the road per day; trucks at transport depot.	All roads approved for B-Double use. Transport route to Port of Eden is primarily on Princes Highway and by-passes residential areas. Compliance with relevant noise/vibration/air quality legislation and criteria including EPA Environmental Guidelines for Major Construction Sites (1996).	3	3	Medium	Driver 'Code of Behaviour', Vehicle maintenance, Noise monitoring.	2	3	Medium
		Closure	Decrease in road activity, with approximately 600 vehicles per day removed from the road.	NA	NA	NA	NA	NA	NA	NA	NA

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	Significant mine site air quality impacts on local communities.	Construction	Dust is likely to be the most common air quality issue. Dust may be generated from road traffic, construction activities, cleared areas, spoil stockpiles etc. Also vehicle emissions.	Mine site located over 3 km from nearest residence. Compliance with relevant legislation and criteria including EPA Environmental Guidelines for Major Construction Sites (1996).	2	3	Medium	Dust minimisation measures such as road watering and stockpile stabilisation, Transport management to minimise transportation needs, Revegetation, Enforcement of speed limits in villages, Ongoing monitoring, Air quality monitoring.	1	3	Low
		Operations									
		Closure			1	3	Low				
	Greenhouse gas emissions.	Construction	Land clearance, emissions from vehicles, on-site electricity generation, explosives consumption (ANFO), fuel consumption on site. Carbon sequestration from revegetation	Adherence to Government guidelines and legislative requirements for control and reporting of GHG emissions. Provision of native vegetation offsets.	5	2	Medium	Monitoring of GHG emissions, monitoring of revegetation.	5	2	Medium
		Operations			5	2	Medium		5	2	Medium
		Closure		Progressive revegetation in accordance with DEPI guidelines	5	2	Medium		5	2	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
General Waste and Hazardous Materials	Significant contamination from temporary construction areas (i.e. from sewage, grey water, littering, dumping etc.)	Construction	Lack of education of project workforce regarding environmental issues. Lack of monitoring and enforcement.	Waste water treatment plant. Adherence to government guidelines and legislative requirements for waste management.	2	2	Low	Education programs for workforce, Monitoring and enforcement	1	2	Low
		Operations			2	2	Low		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Significant unnecessary generation of general waste, and excess waste going to landfills	Construction	Lack of waste management program, Lack of monitoring and enforcement of waste management procedures	Adherence to government guidelines and legislative requirements for waste management.	2	2	Low	Waste management registers and procedures (following waste management hierarchy), monitoring of waste management actions.	1	2	Low
		Operations			2	2	Low		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Spillage from diesel pumps and generators	Construction	Inappropriate siting of diesel pumps and generators, inappropriate handling of diesel.		2	2	Low	Emergency response procedures.	1	2	Low
		Operations			2	2	Low		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Spill (fuel storage)	Construction	Inappropriate fuel storage, inappropriate	Legislative standards. A bunded concrete refuelling	2	2	Low	Emergency response procedures.	1	2	Low

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Operations	handling of fuel.	slab will be constructed.	2	2	Low		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mine contaminated soil	Construction	Spill of hazardous materials. Seepage from temporary stockpiles.	Adherence to government guidelines and legislative requirements for waste management. Best Practice design of stockpiles and storage facilities.	2	3	Medium	EMP Implementation, Adaptation and implementation of existing Eastern Iron waste management registers and procedures (e.g. waste management hierarchy), monitoring of waste management actions.	2	3	Medium
		Operations			2	3	Medium		2	3	Medium
		Closure		NA	NA	NA	NA	NA	NA	NA	NA
Accidental Events and Natural Hazards	Water Storage Dam Failure	Construction	Poor design, Lack of maintenance	Best practice dam design for natural hazards. Engineering approval and licencing to the satisfaction of Southern Rural Water. Preparation of Emergency Response Plan.	1	4	Medium	Ongoing maintenance of dams, employee emergency management training, adaptation of emergency management procedures.	1	4	Medium
		Operations									
		Closure									

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	Onsite Fire or Bushfire	Construction	Machinery sparks, Carelessness, Inadequate Fire asset protection zones and emergency procedures	Spark arrestors on all machinery, fire asset protection zones around all buildings in accordance with guidelines. Standard fire prevention and management controls. Preparation of Emergency Response Plan.	1	4	Medium	Training of staff on fire and bushfire prevention and safety. Emergency response procedures.	1	4	Medium
		Operations									
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mine Collapse	Construction	Poor design.	Best practice mine design. Bench design according to standards.	1	5	Medium	Emergency response procedures.	1	5	Medium
		Operations			1	5	Medium		1	5	Medium
		Closure			1	5	Medium		1	5	Medium
Road Transport	Vehicle crash release of ore / diesel / hazardous materials along transportation routes	Construction	Use of inappropriate storage containers, use of driver who has not undertaken required training.	Adherence to the requirements of the Environment Protection (Industrial Waste Resource) Regulations 2009	2	3	Medium	Driver training, Emergency response procedures.	1	2	Low
		Operations			2	3	Medium		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Significant damage to road as a result of	Construction	128 light vehicles and 6 heavy vehicles added to the road per day.	Stakeholder Engagement Plan includes engagement with VicRoads.	3	2	Medium	Ongoing co-operation with road authorities. Traffic Management Plan.	3	2	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	increased vehicle activity.	Operations	216 light vehicles and 368 heavy vehicles added to the road per day; trucks at transport depot.		3	2	Medium		3	2	Medium
		Closure	Decrease in road activity, with approximately 600 vehicles per day removed from the road.		NA	NA	NA	NA	NA	NA	NA
Ecological Risks and Aspects											
Terrestrial Biodiversity	Native vegetation and fauna habitat loss (mine footprint)	Construction	Clearance of mine footprint	No significant vegetation and habitat occurs in footprint; DEPI *Permitted clearing of native vegetation*; Clause 52.17 of Victoria's Planning Provisions and *Planning and Environment Act 1987*	5	3	High	Monitoring of vegetation clearance. Minimise clearance where possible. Use of already cleared areas (e.g. roads, logged areas).	5	3	High
		Operations			2	3	Medium		2	3	Medium
		Closure	Revegetation and rehabilitation activities		4	2	Medium	Monitor rehabilitation and revegetation activities.	5	2	Medium
	Habitat fragmentation (mine footprint)	Construction	Clearance of mine footprint creating new open spaces, exposing vegetation in ecotones	No significant vegetation and habitat occurs in mine footprint; DEPI *Permitted clearing of native vegetation*;	5	3	High	Monitoring of vegetation clearance. Minimise clearance where possible. Use of already cleared	5	2	Medium
		Operations			2	3	Medium		2	2	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
			and removing wildlife corridors	Clause 52.17 of Victoria's Planning Provisions and *Planning and Environment Act 1987*				areas (e.g. roads, logged areas).			
		Closure	Revegetation and rehabilitation activities		4	2	Medium	Monitor rehabilitation and revegetation activities.	5	2	Medium
	Significant adverse impacts on listed flora species / communities	Construction	Removal of native vegetation may include rare flora species	No significant vegetation and habitat occurs in mine footprint; DEPI *Permitted clearing of native vegetation*; Clause 52.17 of Victoria's Planning Provisions and *Planning and Environment Act 1987*	3	3	Medium	Monitoring of vegetation clearance. Minimise clearance where possible. Implement measures to minimise risk of introduction of exotic flora. Use of already cleared areas (e.g. roads, logged areas).	3	3	Medium
		Operations			2	3	Medium		2	3	Medium
		Closure	Increased access may lead to increased collection of firewood		3	1	Medium	Monitor rehabilitation and revegetation activities.	3	1	Medium
	Significant adverse impacts on listed fauna species	Construction	Foraging and/or breeding habitat removed. Disturbance from mining activity (eg. noise / vibration). Accidental death of listed fauna	No significant vegetation and habitat occurs in mine footprint; DEPI *Permitted clearing of native vegetation*; Clause 52.17 of Victoria's Planning Provisions and	4	3	High	Staff training and instruction regarding high risk/listed wildlife. High quality habitat to be 'no-go' zones. Lidded bins to be provided to avoid attracting animals. Prior to	3	3	Medium
		Operations									

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
			individuals from vehicular collisions and other mining-associated activities.	*Planning and Environment Act 1987*				vegetation removal, encourage animals to move out of area			
		Closure	Disturbance from revegetation programs and general human disturbance. Increased access.		2	3	Medium	Monitor rehabilitation and revegetation activities.	2	3	Medium
	Introduction of exotic flora	Construction	Carried in by mining activities (e.g. vehicles)	Follow standard operating procedures and guidelines according to the *Catchment and Land Protection Act 1994: "Invasive Plants and Animals Policy Framework"*	4	3	High	Staff training and instruction regarding high risk weeds. Key ID documents of noxious local weeds. Vehicle wash-down procedures. Lidded bins to be provided to avoid spread of weeds and diseases	3	3	Medium
		Operations									
		Closure	Increased access results in increased vectors (e.g. vehicles, walkers)		2	3	Medium	Stakeholder engagement regarding closure criteria for access tracks.	2	3	Medium
	Introduction of exotic fauna	Construction	Exotic fauna in nearby habitat attracted by mining activities (e.g. opened habitat, organic waste). Carried in by	Follow standard operating procedures and guidelines according to the *Catchment and Land Protection Act 1994: "Invasive Plants and Animals*	3	3	Medium	Staff training and instruction regarding high risk pests. Key ID documents of high risk local pests. Lidded bins to be provided to avoid	2	3	Medium
		Operations									

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
			mining activities (e.g. vehicles).	*Policy Framework"*				attracting pests			
		Closure	Reduction in disturbed / open areas reduces habitat available for exotic (disturbance tolerant) fauna		4	1	Medium	Monitor rehabilitation and revegetation activities.	5	2	Medium
Aquatic Biodiversity and Wetlands	Significant adverse impacts on aquatic habitat in Lake Tyers (Gippsland Lakes Ramsar Site)	Construction	Changes to hydrological regimes due to water capture and use at the mine site. Discharge of contaminated water and/or contaminated runoff causes surface water contamination/ toxicity.	Project designed to minimise potential impacts on water quality and hydrology (see above), Environmental Protection Act; EPBC Act; Ramsar Convention; Water regulations (see above)	1	5	Medium	Hydrology, water quality, algal and macrophyte monitoring.	1	5	Medium
		Operations									
		Closure	Changes to hydrological regimes due to altered hydrology at the mine site. Contaminated runoff causes surface water contamination/ toxicity.								
	Significant	Construction	Significant changes to	Project designed to minimise	3	4	High	Hydrology, water quality,	2	4	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	adverse impacts on listed aquatic flora and fauna species / communities	Operations	hydrological regimes and/or contaminated waste water runoff. Algal bloom. Macrophyte, flora and invertebrate die-off	potential impacts on water quality and hydrology (see above); Environmental Protection Act; EPBC Act; Water regulations (see above)				algal and macrophyte monitoring.			
		Closure	Changes to hydrological regimes due to altered hydrology at the mine site. Contaminated runoff causes surface water contamination/ toxicity.		2	4	Medium		1	4	Medium
	Significant adverse impacts on listed amphibious and aquatic-reliant species	Construction	Significant changes to hydrological regimes and/or contaminated waste water runoff. Algal bloom. Flora and invertebrate die-off	Project designed to minimise potential impacts on water quality and hydrology (see above); Environmental Protection Act; EPBC Act; Water regulations (see above)	2	4	Medium	Hydrology, water quality, algal and macrophyte monitoring.	1	4	Medium
		Operations									
		Closure	Changes to hydrological regimes due to altered hydrology at the mine site. Contaminated runoff causes surface water contamination/ toxicity.		1	4	Medium				
Social Risks and Aspects											

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
General Social Management	Lack of understanding among local communities regarding potential impacts and benefits of mine	Construction	Lack of adequate engagement and disclosure with local communities	Stakeholder Engagement Plan	2	3	Medium	Establishment of information points. Disclosure of Project information and stakeholder engagement as per the Stakeholder Engagement Plan.	1	2	Low
		Operations			2	3	Medium		1	2	Low
		Closure			2	3	Medium		1	2	Low
	Community dissatisfaction with complaints and feedback process	Construction	Project does not respond adequately or quickly enough to complaints; redress / response is not communicated to community; Residents feel that the Project is not listening.	Stakeholder Engagement Plan; Complaints and Feedback Mechanism	2	3	Medium	Regular engagement to identify community attitudes and expectations and determine the effectiveness of the complaints and feedback mechanism	1	3	Low
		Operations									
		Closure									
	Community dissatisfaction with general environmental management of the mine	Construction	Environmental management program not properly implemented; Poor stakeholder engagement; Management program	Design of Project to minimise environmental effects; Stakeholder Engagement Plan	2	2	Low	EMP implementation over Project life, Ongoing consultation and management of complaints / feedback, environmental monitoring	2	2	Low
		Operations									

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Closure	does not allow early identification of issues.	Stakeholder Engagement Plan	2	2	Low	Development of *Mine Rehabilitation and Closure Plan* in consultation with community. Complaints and feedback mechanism; Ongoing stakeholder engagement	1	2	Low
Demographics and housing	Detrimental changes to population dynamics, networks and fluctuating demand for population-based services	Construction	Minor population growth expected in Nowa Nowa and Lakes Entrance	No Project accommodation camp	3	2	Medium	Ongoing stakeholder engagement; Project support for community activities and participation in local business networks	2	2	Low
		Operations			3	2	Medium		2	2	Low
		Closure	Population decline as mine employees move elsewhere for work.		4	2	Medium		2	2	Low
	Detrimental changes to housing demand and house prices for prospective buyers and rental tenants.	Construction	Rental prices may increase as demand for short-term housing increases	No Project accommodation camp	2	2	Low	Ongoing consultation and management of complaints / feedback	2	2	Low
		Operations	As demand increases, property prices may increase		2	2	Low		2	2	Low

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
		Closure	House prices may decrease in the short term as a large number of houses enter the market at the same time		2	2	Low		2	2	Low
Amenity	Community dissatisfaction due to increased traffic (and associated, noise, dust and exhaust) along route and at transport depot.	Construction	128 light vehicles and 6 heavy vehicles added to the road per day.	Mine site located over 3 km from nearest residence, and all main access roads to site approved for heavy vehicle use.	3	2	Medium	Complaints and feedback mechanism; ongoing stakeholder engagement; environmental mitigation measures (e.g. dust suppression at mine site)	3	2	Medium
		Operations	216 light vehicles and 368 heavy vehicles added to the road per day; trucks at transport depot.	All roads approved for B-Double use. Route by-passes residential areas. Use of Princess Highway.	3	3	Medium		3	3	Medium
		Closure	Decrease in road activity, with approximately 600 vehicles per day removed from the road.	NA	2	2	Low		2	2	Low
	Significant	Construction	Run-off from Project	Project designed to minimise	2	3	Medium	Environmental monitoring	2	3	Medium

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	adverse effects on downstream water use - recreation and tourism	Operations	activities, including pit dewatering, waste dumps and low grade stockpile resulting in increased turbidity and other water quality impacts downstream	potential impacts on water quality and hydrology (see above), Environmental Protection Act; EPBC Act; Ramsar Convention; Water regulations (see above)	2	3	Medium	program; Ongoing community engagement; Complaints and feedback mechanism; Development of *Mine Rehabilitation and Closure Plan* in consultation with stakeholders	2	3	Medium
		Closure			2	3	Medium		2	3	Medium
	Light pollution causing nuisance impacts for local residents at night time.	Construction	24-hour operations resulting in light pollution at the pit and process facilities.	As currently designed, there are no residences or scenic areas with direct sight lines to the Project	1	2	Low	Ongoing community engagement; Complaints and feedback mechanism	1	2	Low
		Operations			1	2	Low		1	2	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	High visual impact of mine, resulting in adverse impacts on tourism and amenity for local communities	Construction	Land clearance and construction of Project facilities.	As currently designed, there are no residences or scenic areas with direct sight lines to the Project. Progressive revegetation legislated.	1	2	Low	Monitoring of revegetation; complaints and feedback mechanism	1	2	Low
		Operations			1	2	Low		1	2	Low
		Closure			1	2	Low		1	2	Low
Land Use	Impact on residential land forcing relocation	Construction	None	Project designed to avoid impact on residential areas	NA	NA	NA	NA	NA	NA	NA
		Operations	None		NA	NA	NA	NA	NA	NA	NA
		Closure	None		NA	NA	NA	NA	NA	NA	NA

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	of residents										
	Adverse impact on recreational areas and other use areas, including apiaries	Construction	No known designated recreational areas will be affected; 4 apiaries may require relocation	Project designed to avoid impact on designated recreational areas	2	1	Low	Ongoing stakeholder engagement; complaints and feedback mechanism	2	1	Low
		Operations			2	1	Low		2	1	Low
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cultural Heritage	Impact on cultural heritage site(s)	Construction	One Aboriginal site is expected to be directly impacted by mine access road. Land disturbance and inappropriate cultural heritage management, Lack of implementation of chance find procedures, Increased access to areas of cultural heritage significance.	CHMP completed prior to construction. Mine footprint minimised; Ensure compliance with the Aboriginal Heritage Act 2006 and its Aboriginal Heritage Regulations 2007.	5	3	High	Minimisation of land disturbance, Implement Chance Find Procedure, Staff education and awareness programs.	5	3	High
		Operations			2	3	Medium		1	2	Low
		Closure	Increased access to areas of cultural heritage significance.		2	1	Low	Stakeholder engagement regarding closure criteria for access tracks.	1	1	Low
	Stakeholder	Construction	Lack of agreed CHMP,	CHMP completed prior to	1	2	Low	Complaints and feedback	1	1	Low

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	dissatisfaction due to impacts on cultural heritage site(s)	Operations	lack of community understanding of cultural heritage management process.	construction. Ensure compliance with the Aboriginal Heritage Act 2006 and its Aboriginal Heritage Regulations 2007.	1	2	Low	mechanism, Monitoring of implementation of CHMP, Ongoing engagement.	1	1	Low
		Closure			1	2	Low		1	1	Low
Economic Risks and Aspects											
Economic development and employment	Changes to unemployment rates in the vicinity of the Project	Construction	37 full-time equivalent employees and contractors, with a peak manning number of 70. Plus spin-off jobs.	No onsite accommodation. Employees required to lived locally.	4	4	High	Complaints and feedback mechanism, Ongoing engagement; participation in local business networks	4	4	High
		Operations	120 full-time equivalent jobs and between 120 and 240 spin-off jobs created by the Project		4	4	High		4	4	High
		Closure	Reduction in employment opportunities at closure	NA	4	3	High		3	3	Medium
	Changes in	Construction	Increased consumer	No onsite accommodation.	4	4	High	Complaints and feedback	4	4	High

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	consumer activity affecting local businesses	Operations	activity and increased demand for services driving growth of local businesses.	Employees required to lived locally.	4	4	High	mechanism, Ongoing engagement.	4	4	High
		Closure	Decreased consumer activity and demand for services resulting in general slow down of the local economy	NA	4	3	High		3	3	Medium
	Ongoing viability of SEFE wharf and Port of Eden	Construction	Use of the SEFE wharf will ensure that it remains operational saving direct and spin-off jobs in Eden and further justifying Masterplan spending	Use the SEFE Wharf at Port of Eden	4	4	High		4	4	High
		Operations			4	4	High		4	4	High
		Closure	Reduction in use of the SEFE wharf at closure		3	3	Medium		3	3	Medium
	Failure to meet community expectations regarding	Construction	Increase in demand for food and other resources cause inflation, Sourcing of goods and services	Project employment requirements. Project requirement for procurement of goods and services	3	3	Medium	Ongoing stakeholder engagement; Project support for community activities and participation	2	3	Medium
		Operations			2	2	Low		2	2	Low

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	economic improvement for region	Closure	from other areas, real or perceived lack of employment and training opportunities.	NA	1	1	Low	in local business networks; complaints and feedback mechanism	1	1	Low
Tourism	Community investment and improved services leading to increased tourism.	Construction	Improved services associated with improved economic conditions and Government income resulting from the Project will increase the capacity of the area to cater to tourists	NA	3	3	Medium	Ongoing stakeholder engagement	3	3	Medium
		Operations		NA	3	3	Medium		3	3	Medium
		Closure		NA	3	3	Medium		3	3	Medium
	Adverse impact on tourism due to increased transportation	Construction	See 'Amenity' above	See 'Amenity' above	2	2	Low	See 'Amenity' above	2	2	Low
		Operations			2	2	Low		2	2	Low
		Closure			2	2	Low		2	2	Low
	Adverse impact on tourism due to presence of mine site	Construction	See 'Amenity' above	See 'Amenity' above	1	2	Low	See 'Amenity' above	1	2	Low
		Operations			1	2	Low		1	2	Low
		Closure			1	2	Low		1	2	Low
Public Health and Safety Risks and Aspects											

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
Public Health and Safety	Increased road accidents due to increase traffic on Project access routes	Construction	128 light vehicles and 6 heavy vehicles added to the road per day.	Upgrade of intersection of mine access road and Bruthen-Buchan Road. Legislative requirements.	4	4	High	Driver training and enforced 'Driver Code of Behaviour'	3	4	Medium
		Operations	216 light vehicles and 368 heavy vehicles added to the road per day.		4	4	High		3	4	Medium
		Closure	Decrease in road activity, with approximately 600 vehicles per day removed from the road.	NA	NA	NA	NA	NA	NA	NA	NA
	Improper management of explosives leading to incident / security breach	Construction	Improper storage and/or handling of explosives	Location of mine site 4 km from nearest settlement area. Legislative requirements for storage of explosives. Location of access road to Magazine Storage Facility controlled by gate.	1	4	Medium	Restricted access to site; Safety education and training	1	4	Medium
		Operations									
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Health and safety risk to public gaining unauthorised access to Project	Construction	May be due to lack of appropriate signage, fencing or lack of community safety awareness programs.	Risk will be minimised by the fairly remote nature of the site. Access to site will be restricted.	1	4	Medium	Restrictions on entry to mine at gate, Signage, Community safety awareness programs, Provision of on site medical	1	4	Medium
		Operations									

Risk / Aspect		Project Phase	Likely Primary Causes (due to Project)	Key Controls	Pre Additional Management/Mitigation Measures			Additional Key Management / Mitigation Measures	Post Additional Management/Mitigation Measures		
					Likelihood	Consequence	Risk Ranking		Revised Likelihood	Revised Consequence	Revised Risk Ranking
	facilities							services.			
		Closure		Proper design of waste rock dumps and low grade storage piles; Proper closure and decommissioning of pit and infrastructure.	2	4	Medium	Community safety awareness; signage	2	4	Medium
	Physical Injury/death from fly rock	Construction	Inappropriate blasting procedures. Lack of mitigation measures for flyrock. Lack of appropriate signage, fencing or lack appropriate management of flyrock exclusion zone.	Location of mine site 4 km from nearest settlement area, and over 3 km from nearest residence. Legislative requirements for blasting.	1	4	Medium	Development and implementation of Blasting Management Plan; Monitoring.	1	4	Medium
		Operations			1	4	Medium		1	4	Medium
		Closure	NA	NA	NA	NA	NA	NA	NA	NA	NA

4.4 Risk Assessment Results Summary – Prior to Mitigation

After Project design and control, and prior to mitigation, no 'Very High' risks were identified for the Project. A number of 'High' risks (including both threats and opportunities) prior to mitigation were identified, with the remainder being either 'Medium' or 'Low'.

The risk exposure levels for all adverse risks were able to be reduced through the implementation of management and mitigation measures. Having regard for the *Ministerial Guidelines for Assessment of Environment Effects*, the key adverse risks for the Project prior to mitigation are primarily associated with:

- Downstream water quality and hydrology;
- Ecology;
- Traffic; and
- Cultural heritage.

Key opportunities for the Project are primarily associated with:

- Employment; and
- Generation of opportunities for businesses.

4.5 Risk Assessment Results Summary – Post Mitigation

Post implementation of the proposed management and mitigation measures as outlined in this EMP, the risk assessment indicated that no 'Very High' adverse risks will occur as a result of the Project. Two 'High' risks remain for the Project which are associated with:

1. Native vegetation and habitat loss within the mine footprint; and
2. Impacts on cultural heritage.

These are discussed individually below.

Ecology

Residual ecological risks remaining for the Project are primarily associated with the vegetation clearance. The risk of 'Native vegetation and fauna habitat loss' remains 'High' post mitigation due to the unavoidable need to clear the vegetation within the Project footprint. Notably, the risk assessment did not take into account offsets. Residual ecological risks associated with native vegetation clearance are expected to be offset in accordance with Victorian legislation, resulting in an overall 'net gain' for biodiversity conservation (refer Section 8).

Notwithstanding the need to clear large areas of native vegetation, the vegetation is identified as being disturbed as a result of previous timber harvesting activities and is predominantly of an EVC identified as being of 'Least Concern' in the bioregion. No EPBC Act or FFG Act species or communities have been recorded (from databases or field surveys) at the mine site, including targeted surveys of the Colquhoun Grevillea.

Cultural Heritage

The risk associated with impact on cultural heritage values will occur due to the impact of the Project on one Aboriginal site identified in the vicinity of the mine access road. This site consists of a scatter of stone artefacts and the potential impacts of this site will be appropriately assessed and managed through the development and implementation of a Cultural Heritage Management Plan approved by GLaWAC, being the Registered Aboriginal Party for the area (see Section 10).

Other Aspects

The design of the Project incorporates significant management and mitigation measures to minimise risk to the downstream environment during all phases of the Project. This includes no discharge of potentially affected water during operations. Additional post-design management and mitigation measures are incorporated so that there are no 'high' risks to the downstream water quality environment in terms of 'likelihood' and 'magnitude' of effects over time.

As with any mining Project, there will also be some adverse impacts which occur at the end of the mine life due to the reduction in employment opportunities and other economic opportunities for local businesses created by the Project's presence. These impacts will be managed through the implementation of a *Mine Rehabilitation and Closure Plan* developed in consultation with key stakeholders. A framework for this plan is provided in EES Referral Attachment 1, with further detail provided in Section 22 of this report.

Three high opportunity risks were identified. The key opportunities are associated with employment opportunities generated by the Project, as well as business opportunities associated with provision of

goods and services to the Project, including those associated with the mine site and shipping services at the Port of Eden.

4.6 Risk Monitoring and Review

As part of the risk management process, risks and controls should be monitored and reviewed on a regular basis to verify that:

- assumptions about risks remain valid;
- assumptions on which the risk assessment is based, including the external and internal
- context, remain valid;
- expected results are being achieved;
- results of risk assessment are in line with actual experience;
- risk assessment techniques are being properly applied; and
- risk treatments are effective.

Accountability for monitoring and performing reviews should be established.'

ISO31010

Periodic risk monitoring and review are critical to managing environmental and social risks effectively over the Project life, and feed into all steps in the risk management process (refer Figure 4.1).

As part of the overall EMS, Eastern Iron is committed to developing a risk management system for the Project consistent with AS/NZS ISO31000 Risk management — Principles and Guidelines (2009). This will include:

- Establishing risk management policy;
- Ensuring that there is accountability, authority and appropriate competence for managing risk;
- Development of an organization-wide Risk Management Plan to ensure that the risk management policy is implemented and that risk management is embedded in all of the organization's practices and processes;
- Allocation of appropriate resources for risk management;
- Establishing appropriate internal and external communication and reporting mechanisms; and
- Monitoring and review of the risk management framework.

4.6.1 Monitoring and Review of the Risk Management Framework

In order to ensure that the risk management framework is effective and continues to support organizational performance, Eastern Iron will:

- Measure risk management performance against indicators, which are periodically reviewed for appropriateness;
- Periodically measure progress against, and deviation from, the risk management plan;
- Periodically review whether the risk management framework, policy and plan are still appropriate, given the organizations' external and internal context;
- Report on risk, progress with the risk management plan and how well the risk management policy is being followed (refer Section 4.3.5); and
- Review the effectiveness of the risk management framework.

Based on results of monitoring and reviews, decisions will be made on how the risk management framework, policy and plan can be improved. These decisions will aim to improve the organization's management of risk and its risk management culture.

4.6.2 Monitoring and Review of the Risk Assessment

Eastern Iron will periodically monitor and review the risk assessment conducted for the Project for the purposes of:

- Ensuring that controls are effective and efficient in both design and operation;
- Obtaining further information to improve risk assessment;
- Analyzing and learning lessons from events (including near-misses), changes, trends, successes and failures;
- Detecting changes in the external and internal context, including changes to risk criteria and

the risk itself which can require revision of risk treatments and priorities; and

- Identifying emerging risks.

Progress in implementing risk treatment measures and plans provides a performance measure. The results of the monitoring and review processes will be incorporated into the Eastern Iron's overall performance management, measurement and external and internal reporting activities.

The results of monitoring and review will be recorded and externally and internally reported as appropriate, and will also be used as an input to the review of the risk management framework

4.6.3 Risk Management Records

'Risk management activities should be traceable. In the risk management process, records provide the foundation for improvement in methods and tools, as well as in the overall process.'

ISO31010

In accordance with AS/NZS ISO31000 Risk management — Principles and Guidelines (2009) Eastern Iron will ensure that "Systems are in place to ensure that sustainability related records are established and maintained, accurate, legible, identifiable, securely stored and have established retention times based on legal requirements."

All environmental and social risk assessments conducted and associated documentation will be recorded and stored. As appropriate these records will include:

- Internal risk assessments;
- External risk assessments;
- Relevant Company procedures, standards, policies and plans;
- Relevant national and international guidelines and standards;
- Audit results; and
- Incident / event reports.

5 MANAGEMENT OF MINE MATERIALS

5.1 Objectives and Strategy

Strategies for the management of mine materials (including waste rock, ore and wall rock) for the Project have been developed specifically to maximise the long-term geochemical stability of materials and minimise the potential for water quality impacts both during operation and post-closure.

The key principles of management for geochemical stability are as follows:

- Wherever possible, sulfidic materials will be properly stored under a permanent water cover to prevent oxidation of sulfide minerals post-closure.
- Where surface storage of sulfidic materials cannot be avoided, rock dumps will be constructed so as to minimise the ingress of oxygen and water and thereby minimise the rate of oxidation.
- All drainage potentially affected by sulfide oxidation will be captured and managed so as to prevent the discharge of water that does not meet environmental objectives for the site.

5.2 Context

The strategies for mine material management described herein adhere to the environmental conservation and occupational health and safety principles of relevant State and Commonwealth legislations and guidelines, and are based on industry best practice.

5.3 Management and Monitoring

5.3.1 Operations

Waste Rock

The management measures for waste rock are as follows:

- Ongoing static and kinetic geochemical analyses of waste rock will be conducted at a sampling density at least equivalent to the mine block model.
- An environmental geochemistry layer will be created for the mine block model that identifies the management category for every waste rock block according to the following criteria:
  - » Cat. A: NAPP < 0 kg H_2SO_4/t AND total sulfur < 0.3 wt%
  - » Cat. B: NAPP < 10 kg H_2SO_4/t AND total sulfur > 0.2 wt%
  - » Cat. C: NAPP > 10 kg H_2SO_4/t
  - » Cat. N: NAPP < –40 kg H_2SO_4/t AND total sulfur < 0.6 wt%
- A Waste Rock Dump (WRD) will be constructed upstream of the open pit in Gap Creek.
- Runoff from the WRD will be directed to a sump upstream of the dump, and collected drainage will be pumped to the Operations Water Storage.
- A sump also will be constructed at the downstream base of the dump, and any drainage/seepage collected will be pumped to the Operations Water Storage.
- If drainage exceeds pump capacity (e.g. during extreme rainfall), excess runoff will report to the open pit.
- The WRD will be constructed so as to maximise the its long-term geochemical stability.
- The WRD will be constructed in thin horizontal lifts from the base of the dump upward, with compaction and moisture content optimised to minimise air entry.
- Each lift will be constructed such that drainage from the compacted surface will flow eastward toward the previous creek line (ie upstream) in order to allow all drainage to be contained in the valley depression thus formed.
- The WRD will be constructed by truck dumping with subsequent flattening and compaction (with optimum moisture content) of each layer (1–2 m) prior to placement of the next layer on top.

- Only Category A, B and N materials will be stored in the WRD.
- Category C materials will be temporarily stockpiled with low-grade ore in the adjacent upper Tomato Creek catchment such that they form a retaining wall for the low-grade ore.
- Category B materials will be encapsulated in the WRD by strategic placement so as to avoid positioning of this material close to the edge of the dump. A minimum 15 m buffer of Category A/N materials will be placed between the WRD edges and the Category B material.
- Category N materials will be placed strategically to optimise in-situ neutralisation. These layers can be located strategically so as to intercept and neutralise any migrating seepage.
- Interaction between upstream clean water and waste rock will be avoided.

Low Grade Ore

The management measures for the low-grade ore are as follows:

- The low-grade ore will be temporarily stockpiled (along with Category C waste rock) upstream of the open pit in the Tomato Creek catchment.
- A sump will be constructed at the base of the stockpile to allow any drainage collected to be pumped directly to the Operations Water Storage.
- If collected drainage exceeds pump capacity (eg. during extreme rainfall), excess runoff will report to the open pit.
- If possible, the northern arm of the open pit will be developed preferentially to the remainder of the open pit and low-grade ore stockpiled in the northern pit during operations.
- The geochemistry of the low-grade ore and the chemistry of leachate from the stockpile will be monitored throughout operations.

Pit Wall Rock

The management measures for pit wall rock are as follows:

- Drainage collected in the open pit (ie. including runoff from pit walls) will be pumped to the Operations Water Storage for operational use.
- The geochemistry of the pit wall rock and the chemistry of wall rock leachate will be monitored throughout operations.

ROM Pad

The management measures for the ROM pad are as follows:

- The size of the ore stockpile on the ROM pad will be minimised, and ore on the ROM pad will not be allowed to age for more than 6 months to ensure that there is no acid generation.
- A drainage system around the ROM pad will be installed, and all collected runoff will be pumped to the Operations Water Storage.
- The ROM pad will be constructed of low permeability clay material to minimise the potential for the percolation of seepage in the groundwater system.

5.3.2 Closure

Waste Rock

Post-closure management of waste rock will involve:

- Suitable waste rock and clay from the decommissioned sediment control dam will be placed over the final WRD to limit infiltration of water and maximise the collection of clean catchment water into the mine pit lake;
- The waste rock dump will be rehabilitated and shaped such that drainage from the surface of the dump is channelled eastward and into the adjacent Tomato Creek catchment.
- All Category C waste rock temporary stockpiled in upper Tomato Creek will be transferred into the open pit for storage under a permanent water cover.
- After placement of materials, the open pit will be allowed to flood.

Low Grade Ore

Post-closure management of low-grade ore will involve:

- Any low-grade ore remaining at surface at the end of mine life will be transferred into the open pit for storage under a permanent water cover.
- After placement of materials, the open pit will be allowed to flood.

Pit Wall Rock

Post-closure management of pit wall rock will involve:

- The open pit will be allowed to flood on closure.
- It is expected that the water level will be at or above existing groundwater table, and exposed wall rock will be volcanics and/or volcaniclastics (or lithological similar sediments).
- Flooding of the open pit will occur by the accumulation of surface water inflows and groundwater rebound.
- Flooding of the pit will flush out any acidity generated in the wall rock during operations. Passive flooding of the pit will be augmented by the addition of clean water from water storages (prior to the storages being decommissioned) until the water level reaches a level at which potential acid inflows are deemed no longer to be an issue.
- Pit lake water chemistry will be monitored during flooding and periodically post-closure.
- Neutralisation of acidity may be required during pit flooding. Treatment will be performed using mobile equipment and a suitable neutralising agent as required.

5.4 Key Commitments and Actions

Commitment	Actions
Ensure nil release of potentially impacted drainage from mine materials during operations	Eastern Iron will develop and implement Standard Operating Procedures for mine material and drainage management, and develop and implement a Mine Rehabilitation and Closure Plan.
Ensure that potentially acid forming materials are stored under a permanent water cover (min. 2 m) post-closure	Eastern Iron will ensure that all potentially acid forming materials will be placed in the open pit on mine closure and the pit allowed to flood to maintain a permanent water cover. Eastern Iron will develop and implement a Mine Rehabilitation and Closure Plan detailing this process.

6 WATER MANAGEMENT

6.1 Objectives

Management of water for the Project is based on the following objectives:

- Avoid and minimise potential adverse impacts on hydrology, hydrogeology and water quality; and
- Identify appropriate mitigation and management measures to minimise potential hydrology, hydrogeology and water quality impacts associated with the Project during construction, operations and post closure.

6.2 Context

6.2.1 Hydrology / Hydrogeology

The Project intercepts a maximum catchment area of approximately 4.7 km^2 but a short distance downstream, flows into much larger catchments (eg. Yellow Waterholes and Boggy Creeks), limiting the potential downstream hydrology impacts.

The Project represents a maximum reduction to the downstream catchment areas as follows:

- Approximately 2.5 km downstream of Project, the Project represents a 3 % reduction of the Yellow Waterholes and Tea Tree Creek catchment area.
- Approximately 5 km downstream of the Project, the Project represents a 1.8 % reduction of the Boggy Creek catchment area.
- Approximately 15 km downstream of the Project, the Project represents a 1.7 % reduction of the Boggy Creek catchment area at Nowa Nowa.

However, the reduction of the annual average flow in Boggy Creek, at Nowa Nowa, accounting for the release of environmental flows from the Clean Water Storage and Sediment Control Dam during operations is expected to be approximately 0.8 %. After decommissioning of the water storage dams post-closure, the reduction of the annual average flow in Boggy Creek, at Nowa Nowa, is expected to be up to approximately 0.4 %. The key potential issues affecting local hydrology and hydrogeology from mining projects include:

- Development of an open pit, surface water storages and construction of a waste rock dump intercepting water courses has the potential to interrupt surface flow regimes in downstream creeks during construction, operations and post-closure.
- Development of an open pit below the groundwater table will require the de-watering of the open pit which has the potential to lower the groundwater table surrounding the open pit.

6.2.2 Water Quality

The disturbance of water courses, vegetation and geological materials by mining activities has the potential to influence downstream surface water quality and local groundwater quality. The key potential issues affecting surface and groundwater quality from mining projects include:

- Clearance of vegetation and land disturbance has the potential to cause erosion and increase turbidity / suspended solids concentrations in surface water runoff.
- The oxidation of previously unweathered sulfidic minerals in waste rock, ore and pit wallrock through mining has the potential to produce (refer to EES Referral Attachment 6 – Geochemical Assessment and Management Strategies for the 5 Mile Deposit):
  - » Acid and metalliferous drainage (AMD);
  - » Neutral and metalliferous drainage (NMD); and / or
  - » Elevated sulfate salinity.
- Management of wastewaters (eg. sewage) from a site construction and operations workforce has the potential to lead to elevated nutrient concentrations and pathogens in site water.
- Residues and spills of ammonium nitrate fuel oil (ANFO) during blasting preparations may lead to elevated nutrient (nitrogen) concentrations in waters draining the open pit, waste rock dump and ore stockpiles.
- Storage and use of hazardous materials (including hydrocarbons) during construction and operations may have the potential to

affect downstream water quality if spills or improper management of materials occur.

6.2.3 Existing Water Resource Use

While the Boggy Creek catchment remains classified as a Declared Water Supply Catchment, no impact on drinking water supplies are expected to result from the Project as water from this catchment is no longer utilised as a water supply for the Nowa Nowa township.

The primary use of water downstream of the Project is related to recreational use of Lake Tyers and ecological values associated with the Nowa Nowa Wetlands and the Gippsland Lakes Ramsar Site. Limited utilisation of water for agriculture and industry occurs downstream, as the creeks downstream of the mine site primarily flow through State Forest before reaching Lake Tyers. The Project will need to be carefully designed and managed in accordance with Victorian regulations to ensure that no significant impacts on the hydrology or water quality of downstream areas including Lake Tyers occur. If managed effectively, no significant effects on downstream water uses are expected from the Project.

No impact on Groundwater Management Areas is expected to occur as no such areas occur in the region. No impact on use of groundwater resources (e.g. through dewatering of the pit) is expected to result from the Project as no direct utilisation of groundwater has been identified within 2 km of the mine site.

6.3 Water Management Strategy

6.3.1 Water Supply

Construction Water Demand

The Project will require approximately 180 ML (Engenium, 2013) for construction over approximately 8-10 months.

Operational Water Demand

Primary water demand during operations will be approximately 174 ML/y (Engenium, 2013). By recycling waste water and vehicle wash-down water for re-use where appropriate, this water demand is reduced to ~164 ML/y (Engenium, 2013).

Water Sources

To minimise potential water quality impacts on downstream environments, all surface water from catchments intercepted by the mine pit and any runoff produced within the pit, estimated to be 80–240 ML/y, will be contained and consumed by operations. Surface drainage capture is therefore likely to account for the bulk of operational water demand.

In order to mine by open cut methods, rock within the pit volume needs to be dewatered. Groundwater extraction for the purpose of pit dewatering is commenced well in advance of mining to ensure that the mined materials have been dewatered by the time mining of the affected material commences.

An assumed groundwater extraction rate of between 1–5 L/s from the commencement of operations would correspond to approximately 30–150 ML/y. Groundwater extracted for pit dewatering is therefore likely to exceed any shortfall between surface water supply and operational demand during mining operations.

Construction water demand will be met by groundwater extracted for pit dewatering, surface water collecting in the water storages (once constructed), and if additional water sources are required, commercial sources of water and/or groundwater borefield extraction.

6.3.2 Construction

The objectives of the construction water management strategy, which forms part of the Project design, are to:

- Efficiently utilise water onsite by collecting site runoff and recycling water;
- Minimise potential downstream hydrology, surface water quality and local hydrogeology impacts.

These objectives were considered in the development of the construction water management strategy, and the Project arrangement has been designed to meet the proposed water management objectives.

Key features of the construction water management strategy for the mine are as follows:

- Construction of the Sediment Control Dam and Clean Water Storage (discussed in further detail in Section 6.3.3) to allow for capture of potential sediment affected runoff from

Project construction and land clearing activities.

- Implementation of erosion and sediment control measures (refer to Section 7).
- Where possible, regular environmental flows will be maintained from the Sediment Control Dam and Clean Water Storage (water quality permitting).
- If required, process and wash water from concrete batching during the construction phase will be discharged to a lined pond (or the Operations Water Storage) for reuse, storage or, if required, treatment prior to re-use.
- Sewage from the construction workforce will be removed from the Project by vacuum truck and transported to a waste water treatment plant.
- Management of hazardous materials (including hydrocarbons) (refer to Section 6.4) to minimise potential impacts to downstream surface water quality and local hydrogeology.

6.3.3 Operations

The objectives of the operations water management strategy, which forms part of the Project design, are to:

- Efficiently utilise water onsite by collecting site runoff and recycling water;
- Minimise potential downstream hydrology, surface water quality and local hydrogeology impacts.

These objectives were considered in the development of the operations water management strategy, and the Project arrangement has been designed to meet the proposed water management objectives.

Key features of the operations water management strategy for the mine are as follows:

- A dry Low Intensity Magnetic Separation (dry LIMS) process will be used for processing of ore. This significantly reduces the Project's water requirements during operations, avoids the use of process chemicals, and eliminates the requirement for a tailings storage facility.
- The Project footprint is confined to the Boggy Creek catchment (only) to limit potential hydrology/water quality impacts to this catchment alone (ie. avoiding potential impacts to the Hospital Creek catchment).
- All excavated materials (waste rock and low grade ore) will be stored upstream of the open pit to ensure that any drainage ultimately reports to the pit.

Three water storages will be constructed to capture and manage site surface runoff and facilitate mine water supply during operations. The three storages are as follows:

- An **Operations Water Storage**, located immediately downstream of the open pit on Tomato Creek, to store drainage from the waste rock dump, temporary low-grade ore stockpile and, open pit, ROM pad and stockyard, and groundwater extracted for pit dewatering.
- A Sediment Control Dam, located downstream of the open pit and MIA on Gap Creek, to hold drainage from Project facilities and allow for settling of suspended sediments.
- A Clean Water Storage, located downstream of the Operations Water Storage and MIA on Tomato Creek, upstream of the confluence with Harris/Gap Creek, to capture clean water to supplement site water resources, and to provide another level of protection for the downstream environment in the unlikely event of failure of the Operations Water Storage.

The Operations Water Storage will be managed as follows during operations:

- The water level in the storage will be managed such that there will be no release of water downstream.
- The water level in the storage will be maintained as low as practical throughout operations.
- The various sources of drainage (as above) from around the mine site will be pumped from sumps at each drainage collection location to the Operations Water Storage.
- Pumping from the distributed sumps will be managed conservatively to ensure that the storage does not exceed capacity.

- Water for operational use will be preferentially abstracted from the Operations Water Storage to keep the water level as low as possible.
- Excess drainage at the sumps upstream of the open pit (upper Tomato Creek and upper Gap creek) will, if necessary, be allowed to discharge into the open pit.
- Seepage from the storage will be collected in a sump and pumped back into the storage.
- Groundwater extracted for pit dewatering, water quality permitting, may be diverted to the Clean Water Storage (to maintain environmental flows and offset upstream capture of surface water) if operations water supply from the Operations Water Storage is sufficient.

The Sediment Control Dam will be managed as follows during operations:

- All Project Facilities will be arranged such that all drainage (excluding the ROM pad) will be directed into Gap Creek upstream of the Sediment Control Dam.
- Water will be abstracted from the Sediment Control Dam for mine water use if the Operations Water Storage is dry.
- Where possible, regular environmental flows will be maintained from the Sediment Control Dam (water quality permitting).

The Clean Water Storage will be managed as follows:

- Water will be abstracted from the Clean Water Storage for mine water use only if the Operations Water Storage and Sediment Control Dam are both dry.
- Where possible, regular environmental flows will be maintained from the Clean Water Storage (water quality permitting).
- As above, groundwater extracted for pit dewatering, water quality permitting, may be diverted to the Glean Water Storage (to maintain environmental flows and offset upstream capture of surface water) if operations water supply from the Operations Water Storage is sufficient.
- A waste water treatment plant will be used to treat sewage, and treated waste water will be recycled for use onsite via the Operations Water Storage.

6.3.4 Post Closure

The objective of the post-closure water management strategy, which forms part of the Project design, is to:

- Minimise potential hydrology, surface water quality and hydrogeology impacts.

These objectives were considered in the development of the post-closure water management strategy, and the Project arrangement has been designed to meet the proposed water management objectives.

Key features of the post-closure water management strategy for the mine are as follows:

- At the end of mine life, potential acid forming waste rock and any remaining low-grade ore (temporarily stockpiled during operation) will be transferred into the base of the open pit and the pit allowed to flood to provide a permanent water cover of greater than 2 m depth. The bulk volume of material backfilled into the open pit is approximately 1,500 Mm^3.
- The pit lake will be designed to provide passive treatment for all inflows through a combination of retention time, sulfate reduction by sulfate reducing bacteria (SRB), and acid neutralisation by alkalinity produced by SRB activity and the dissolution of limestone, and alkalinity brought in by groundwater.
- The catchments upstream of the pit will be rehabilitated to maximise surface water runoff in order to ensure that the pit lake will have a positive long-term water balance and will overflow into Tomato Creek.
- Once pit flooding is achieved, the three water storages will be decommissioned, with the two storages on Tomato Creek rehabilitated as engineered wetlands for passive treatment of pit lake discharge.

Pit Lake

- It is essential that the pit is flooded as rapidly as practical on mine closure. Natural inflows from upstream catchments and groundwater rebound will be augmented by pumping from the three water storages at least until all backfilled material is covered with a minimum 2 m water cover, and ideally until the long-term water level (at overflow into Tomato Creek) is reached.

- The pit lake will be allowed to overflow into Tomato Creek, and upstream catchment inflows maximised to ensure a significant positive long-term water balance for the pit lake.
- The post-closure spill level of the pit is designed to be higher than the pre-mining groundwater level. This means that wallrock material exposed post-closure, once the pit lake reaches the spill level, will not experience a change in geochemical environment as the material is already above the groundwater table with potential exposure to oxidation.

Decommissioning of Water Storages

Once pit flooding is achieved, the three water storages will be decommissioned as follows:

- The Operations Water Storage will be partially decommissioned and the storage area rehabilitated as a wetland to provide passive treatment of ouflows from the pit lake.
- The Sediment Control Dam will be fully decommissioned and the previous water course full restored and rehabilitated unless an alternative community use for the dam is identified.
- The Clean Water Storage will be partially decommissioned and the storage area rehabilitated as a wetland to provide a second stage of passive treatment of outflows from the former Operations Water Storage.

Rehabilitation of Upstream Catchments

- The upper Tomato Creek catchment upstream of the open pit, which during operations hosted the temporary low-grade ore stockpile, will be fully rehabilitated and the original water course restored.
- The Waste Rock Dump in upper Gap Creek will be rehabilitated such that runoff generation on the top surface of the dump is maximised (ie, low permeability, low storage cover), and drainage from the surface is channelled eastward, then diverted into the adjacent Tomato Creek catchment. This will maximise surface water capture into the open pit.

6.4 Management and Monitoring

Aspect	Management Measure	Phase		
		Construction	Operations	Post-Closure
Acidity / Alkalinity, Salinity and Metals	If required, process and wash water from concrete batching during the construction phase will be discharged to a lined pond for reuse, storage or treatment prior to re-use.	✓		
	Water will be allowed to discharge from site via the Sediment Control Dam and Clean Water Storage (if water quality permits). This will ensure a turnover of water on-site and minimise the potential for evaporative concentration to lead to a decrease in water quality.	✓	✓	✓
	A comprehensive water quality (surface and groundwater) monitoring program will be implemented during the construction, operations and post-closure phases in order to determine any potential alkalinity / acidity / metals / salinity effects. This will enable pro-active control and possible treatment strategies to be adopted, if necessary. The feasibility and effectiveness of the proposed post-closure management strategies will be reviewed throughout the operational life of the proposed Project, based on water quality and geochemistry monitoring and sampling.	✓	✓	✓
	A conceptual site water balance has been developed for the Project. This will be refined prior to Project construction to confirm the proposed site water management strategy. Eastern Iron will consider the development of a site solute balance to facilitate the calculation of potential solute loads on-site, and estimate the movement of solutes around site. This will assist with the ongoing assessment of the feasibility	✓	✓	

Aspect	Management Measure	Phase		
		Construction	Operations	Post-Closure
	of proposed water management and treatment strategies, if required.			
	Waste rock and low grade ore material will be monitored regularly throughout the operational life of the mine to determine if there is any change in the geochemical risk associated with the resource.		✓	
	Surface water drainage from potential sources of AMD / salinity (ie. waste rock, open pit, temporary low grade ore stockpile and ROM pad) will be maintained on-site during operations, within the Operations Water Storage for operational use. If required, water from these sources will be treated to permit the use of water around site. In the event that the Operations Water Storage nears capacity, water will be discharged into the open pit.		✓	✓
	Post-closure water discharged from site will be treated (ie. active or passive treatment), if required, to meet applicable water quality standards prior to discharge.			✓
Nutrients	Sewage from the construction workforce will be removed from the Project by vacuum truck and transported to a waste water treatment plant.	✓		
	A wastewater treatment system will be established to treat raw sewage from various sources, including toilets, showers, basins, kitchen and laundry facilities. The wastewater treatment system will need to be effective at reducing phosphorous and nitrogen concentrations from the wastewater to suitable levels that will minimise adverse environmental effects and meet appropriate water quality standards. The waste water treatment plant will be designed to meet the EPA's *Code of Practice for Small Wastewater Treatment Plants* (EPA, 1997). Treated water from the wastewater treatment plant will need to be recycled for use onsite via the Operations Water Storage.		✓	
	Water quality (surface water and groundwater) monitoring will be conducted downstream / down hydraulic gradient of key facilities that may contribute nutrient loads.	✓	✓	✓
	It is proposed that surface water run-off from key facilities (waste rock dump, temporary low grade ore stockpile, open pit and ROM pad) with the potential to contribute nutrient loads to the downstream environment during operations will be retained on-site for operational water use in the Operations Water Storage.		✓	
	Post-closure, potential nutrient loads from the waste rock dump and open pit will be treated in engineered passive wetland systems within the open pit, and decommissioned Operations Water Storage and Clean Water Storage prior to discharge. The feasibility of the use of engineered passive wetland systems to treat potential elevated nutrient concentrations from the waste rock dump and open pit post-closure will be determined through regular water quality monitoring of surface water run-off and seepage from the waste rock dump, low grade ore stockpile and open pit throughout operations. Discharge of water will only be permitted from site post-closure if the applicable water quality standards are achieved.			✓
Pathogens	Sewage from the construction workforce will be removed from the Project by vacuum truck and transported to a waste water treatment plant.	✓		
	A wastewater treatment system to treat raw sewage from various sources, including toilets, showers, basins, kitchen and laundry facilities. The wastewater treatment system will need to be effective at reducing pathogen concentrations (eg. faecal and total coliforms) from the wastewater to suitable levels that will minimise adverse environmental effects and meet appropriate water quality standards. The waste water treatment plant will be designed to meet the EPA's *Code of Practice for Small*		✓	

Aspect	Management Measure	Phase		
		Construction	Operations	Post-Closure
	Wastewater Treatment Plants (EPA, 1997). Treated water from the wastewater treatment plant will need to be recycled for use onsite via the Operations Water Storage.			
	Water quality monitoring will be conducted at regular intervals from the inlet and outlet of the wastewater treatment plant during operations.		✓	
Other Hazardous Materials	The storage of any hazardous reagents / chemicals will need to be in accordance with the relevant Material Safety Data Sheet in purpose-built bunded or special confinement areas. Chemical spills will need to be managed in accordance with the relevant Material Safety Data Sheets.	✓	✓	
	Containers of liquid hazardous materials such as fuels, oils and lubricants need to be located in bunded areas during site construction works. Bunds will be designed and installed in accordance with appropriate guidelines / standards and have sufficient capacity to hold at least 110 % of the maximum volume stored. Temporary shelters will also be constructed, to prevent collection of rainfall within the bunded areas.	✓	✓	
	The management of the refuelling and maintenance of heavy machinery will include: Regular maintenance of vehicles and equipment to prevent hydrocarbon leaks. Vehicle and equipment maintenance and refuelling will be conducted in designated areas where contaminated runoff can be contained. Install oil/grease traps or alternative treatment systems to facilitate hydrocarbon removal from water from vehicle washdown areas and refuelling areas via filtration and/or absorption (eg. small-scale activated carbon units). Vehicles and equipment will be parked on sealed surfaces where contaminated runoff can be contained.	✓	✓	
	The management of spills or leaks of liquid hazardous materials will include: Stockpiles of loose absorbent material, such as saw dust, will be stored on-site at all times during construction. As a precaution, hydrocarbon spill response kits (eg. Sorbex) and absorbent floating booms will also be stored on site in case of spills that occur outside bunded areas. A stockpile of activated carbon may also assist with remediation of hydrocarbon-contaminated water. An *Environmental Emergency Response Plan* will be developed prior to commencing Project construction to ensure that the appropriate procedures for the management of hydrocarbon spills are implemented.	✓	✓	
	Water quality monitoring (surface water and groundwater) will be monitored within the proposed Project area and downstream / down hydraulic gradient of the Proposed Project in order to identify any potential impacts associated with the use of hazardous materials on-site (including hydrocarbons).	✓	✓	✓
Water Resource Use	Prior to Project commencement, appropriate water allocations and licences will need to be obtained in consultation with Southern Rural Water;	✓		
	Develop Water and Waste Management Plans to control impacts of the proposed development on water downstream. These plans will include appropriate handling and storage of hazardous materials;	✓	✓	
	Monitor the waterways draining from the proposed mine site during construction, operations and post-closure of the Project;	✓	✓	✓

Aspect	Management Measure	Phase		
		Construction	Operations	Post-Closure
	Ensure that the water discharged from the proposed mine site is within discharge limits at all times to minimise potential impacts on downstream areas.	✓	✓	✓

6.5 Key Commitments and Actions

Commitment	Actions
Construction Phase: Minimise potentially adverse impacts on hydrology, hydrogeology, and water quality.	Detailed standard operating procedures (SOPs) will be developed relating to water management, wastewater management and water monitoring. Surface water (hydrology and water quality) and groundwater (levels and water quality) within the Project area and downstream of the Project will be monitored to enable pro-active control and possible treatment strategies to be adopted, if necessary. Eastern Iron will develop an Environmental Emergency Response Plan prior to commencing Project construction to ensure that the appropriate procedures for the management of hydrocarbon (and other hazardous materials) spills are implemented.
Operations Phase: Minimise potentially adverse impacts on hydrology, hydrogeology, and water quality.	Detailed SOPs will be developed relating to water management, wastewater management and water monitoring. Ensure nil release of potentially impacted drainage from mine materials during operations through storage of water in the Operations Water Storage and re-use of water on-site. Surface water (hydrology and water quality) and groundwater (levels and water quality) within the Project area and downstream of the Project will be monitored to enable pro-active control and possible treatment strategies to be adopted, if necessary. Eastern Iron will, where required, implement appropriate procedures for the management of hydrocarbon (and other hazardous materials) spills, as specified in the Environmental Emergency Response Plan.
Post-Closure: Minimise potentially long-term adverse impacts on hydrology, hydrogeology, and water quality.	Eastern Iron will develop a detailed Mine Rehabilitation and Closure Plan, which will be reviewed and updated, as required, throughout the operational life of the Project. Eastern Iron will ensure that all potentially acid forming materials will be placed in the open pit on mine closure and the pit allowed to flood to maintain a permanent water cover (minimum of 2 m depth). Eastern Iron will ensure that water draining the Project site (ie. waste rock dump and open pit) is treated (passive and/or active), if required, to meet applicable water quality standards prior to release from site. Surface water (hydrology and water quality) and groundwater (levels and water quality) within the Project area and downstream of the Project will be monitored to enable pro-active control and possible treatment strategies to be adopted, if necessary.

7 EROSION AND SEDIMENT CONTROL

7.1 Objectives and Strategy

Management of erosion and sedimentation for the Project is based on the following objectives:

- Minimise the loss of sediment from areas disturbed by the Project;
- Reduce any requirement to passively or actively treat site runoff containing elevated sed iment levels;
- Minimise impacts on downstream water uses and environmental values due to increased stream sediment loads.

7.2 Context

The Carrabungla and Collins land systems, which encompass the Project area, have been identified as being erosion prone (Aldrick *et al.* 1988). Existing likely sources of erosion surrounding the Project area include forest operations, stock grazing and logging and 4WD tracks. However, with much of the Lake Tyers catchment currently forested, the estuary does not experience the same degree of erosion and sediment deposition as some other Gippsland estuaries. Livestock have access to substantial sections of streams in the Boggy Creek catchment, resulting in stream bank erosion. Logging may result in increased erosion and sediment deposition into water courses.

During the Project Construction phase, substantial volumes of spoil will need to be removed for the development of the pit, haul roads, process plant and water storages During Operations the main sources of erosion and sediment from the Project is likely to be from the pits, haul roads, waste rock dump and process plant area.

7.3 Management and Monitoring

The Sediment Control Dam and Clean Water Storage (refer to Section 6.3) will capture drainage and allow for the settling of suspended sediment from the majority of the Project footprint during construction and operations. The following erosion control and sediment management measures are recommended during the construction and operations phases of the proposed Project:

- Where possible, sequencing of construction activities to allow for capture of sediment laden runoff from construction activities in the Sediment Control Dam and Clean Water Storage.
- Sequencing of construction activities to reduce erosion potential during the high rainfall months (winter to spring) and account for the implementation and deployment of erosion and sediment control measures.
- Vegetation clearance will be minimised, and vegetation will be preserved in areas where construction will occur at a later date.
- Vegetation on steep slopes and riparian corridors will be preserved where possible.
- Grading of the Process Plant and Administration areas to drain towards the Sediment Control Dam to allow for settling of sediment prior to discharge from site. A surface water diversion drain will direct drainage back to the Sediment Control Dam.
- Where practicable, access / haul roads will be graded to drain towards to Sediment Control Dam to allow for settling of sediment prior to discharge from site.
- Consideration will be given to rock armouring of unsealed road surfaces.
- Construction/Installation of surface water management infrastructure (eg. Cut-off/diversion drains, velocity dissipation devices, culverts) where appropriate to minimise and control surface water flow over disturbed areas.
- Locate the WRD and temporary low grade ore stockpile upstream of the open pit and diversion of run-off from these sites to the Operations Water Storage.
- Consideration of the use of geotextiles and natural matting to assist with erosion control on steep slopes (ie. 3:1 or greater) where erosion potential is particularly high.
- Minimisation of dust (eg. water application to unsealed road surfaces).
- Installation of sediment control measures downstream of construction works and

disturbed land areas (eg. silt fences, sediment basins, sediment traps, fibre rolls).

- Progressive revegetation of disturbed land areas, giving priority to high risk erosion areas such as steep slopes and sites close to rivers and creeks

The following strategies, adapted from the *Minesite Water Management Handbook* (MCA, 1997), will be implemented during road construction works:

- Clean surface runoff water will be diverted upstream of work areas.
- Roads will be designed to allow for frequent and safe discharge where runoff is concentrated.
- Roads will be constructed with maximum cross fall (cross-section) slopes of 3%. This will allow water to be cleared from the road surface quickly, but without creating deeply incised scour paths.
- On slopes, up-slope drainage will be diverted and discharge controlled. Drainage will be dissipated from the road surface by outsloping the camber or providing side drains or table drains with protection at the discharge points.
- If side drains are installed to catch surface water from the pavement and runoff from cut bank slopes, the drains will be sized such that the design flow depth is no higher than the underside of the pavement top coarse or base coarse layer.
- Drains will preferably be directly off the road at cut and fill interfaces or otherwise down batter slopes at designated locations via erosion protected chutes.
- Culverts will be installed at road drainage crossings, perpendicular to the road alignment, with attention given to upstream and downstream erosion protection. If possible, culverts will be positioned at the narrowest part of the stream.
- Culverts will be designed with appropriate slopes to facilitate sediment movement without deposition and consequent culvert blockages.
- Drainage over the surface of drainage crossings will have adequate controls to ensure that sediment runoff to the stream is minimised.
- Permanent structures will be designed using an average recurrence interval of 50 years, and temporary structures will be designed using an average recurrence interval of 2 years (6 hour storm duration).

Almost as important as remediation measures for erosion, is an effective monitoring program to identify erosion trends and specific problems. Monitoring will consist of measuring both discharge and turbidity. Continuous monitoring at several sites will provide critical trend data that can be used to assess the general impact of the Project. However, this data will be supported by regular 'snap-shot' sampling of the creeks draining the proposed Project area.

In any monitoring program, it is essential to either have a long period of 'pre-project' data for comparison, or alternatively, a 'reference' catchment that can be used for comparison. Continued monitoring of water quality at the sites identified in this report prior to Project construction is therefore recommended.

Water quality monitoring will be conducted downstream of key potential sources of sediment post-closure until completion criteria are achieved.

7.1 Key Commitments and Actions

Commitment	Actions
Ensure that plans are in place to minimise potential erosion and sediment control issues during construction, operations and post-closure.	Eastern Iron will develop a Standard Operating Procedure for erosion & sediment control. Eastern Iron will develop and implement a Mine Rehabilitation and Closure Plan, incorporating erosion and sediment control.
Ensure that potential erosion and sediment impacts are appropriate monitored.	Eastern Iron will ensure that water quality (including turbidity and total suspended solids) are monitored within the Project area and downstream of the Project during construction, operations and post-closure to enable pro-active control and possible treatment strategies to be adopted, if necessary.

8 TERRESTRIAL BIODIVERSITY AND CONSERVATION MANAGEMENT

8.1 Objectives and Strategy

Management of terrestrial biodiversity and conservation for the Project is based on the following objectives:

- Avoid and minimise adverse impacts on flora and fauna (especially conservation significant species);
- Minimise clearance of native vegetation;
- Minimise potential impact of land clearance on biodiversity;
- Provide a net gain of biodiversity values upon closure.

8.2 Context

The vegetation of the Tara State Forest in which the Project occurs has been degraded by previous logging activities. Harvesting has probably altered the microclimate, hydrology, erosion and the number of weeds and pests. Harvesting would have also led to an increase in vehicular traffic. It is unlikely that the vegetation of the mine site resembles the pre-European (harvesting) habitat. Similarly, fauna biodiversity probably does not resemble the original suite of species.

However, there is still potential for the Project to impact on the remaining (moderate) biodiversity values of the mine site. It is expected that management of potential impacts on biodiversity will be a key issue for the Project.

So far, it has been determined that nationally significant species or communities (i.e. listed under the EPBC Act, e.g. Colquhoun grevillea *Grevillea celata*) do not reside within or the Project area. However, management measures will be designed to conserve and protect all significant species and communities.

8.3 Management and Monitoring

Given the potential for the Project to impact on terrestrial biodiversity values, the development of measures to avoid, minimise, monitor and offset impacts on biodiversity is expected to be a key management focus for the Project.

Management measures to avoid and minimise both direct and indirect impacts of the Project on biodiversity will be implemented. Ongoing monitoring of key species and ecological communities may also be required. As per Victorian Government strategies/guidelines such as the Victoria's Native Vegetation Framework or Permitted clearing of native vegetation – Biodiversity assessment guidelines the Project will adopt a net-gain approach, where impacts to biodiversity and conservation values are compensated through environmental benefits (e.g. biodiversity offsets).

Key management implications related to terrestrial biodiversity include:

8.3.1 Vegetation, Groundwater Dependent Ecosystems and Habitat

- Minimise area required for the mine footprint;
- Optimise use of already disturbed or cleared areas;
- Avoid all areas of ecological significance, where possible;
- Staged removal of vegetation from Gap Creek, to allow species to adapt to the changes in hydrology of mine site;
- No open flames and abiding by local fire restrictions (as issued by the CFA);
- Flammable substances should be kept according to their Material Data Safety sheet;
- Diesel vehicles should be used where possible;
- Implement a vegetation management plan in conjunction and consultation with DEPI and their existing management plans for the area;
- Offset the loss of native vegetation by the protection or improvement/revegetation of native vegetation elsewhere, in consultation with the DEPI (and in accordance with Victorian legislation);
- Develop and implement a rehabilitation and closure plan that allows for the progressive

rehabilitation of disturbed habitat over the Project life;

- Monitor and assess the success of the plan against predefined criteria.

8.3.2 Native Flora and Fauna

In addition to the mitigation and management practices outlined for vegetation above, impacts on native flora and fauna will be reduced by:

- Ensure potential impacts on flora and fauna are taken into account in the layout and design of the various Project components, e.g. components have been sited in areas away from known sightings of owls;
- Staged removal of vegetation to increase potential for fauna to habituate (or somewhat tolerate) to the loss of habitat and provide more opportunity to move elsewhere;
- Encourage species to move out of the area before vegetation removal (e.g. loud noises);
- Translocate/transplant threatened species if they are found during vegetation removal (e.g. if threatened fauna, work in consultation with Zoos Victoria and DEPI);
- Propagate seeds from locally sourced threatened species;
- Plant threatened flora species during rehabilitation of mine site;
- Components have been designed to avoid creeklines, wherever possible;
- Staged removal of creekline habitat so that species in this area can move elsewhere and/or habituate;
- Avoid locating noise, light and vibration emitting infrastructure close by significant areas (e.g. nests) where possible;
- Minimising noise, light and vibration emissions wherever possible, including in frequencies beyond human hearing;
- Managing dust emissions (e.g. water spraying);
- Traffic management program that outlines:
  - » Restricting traffic to main access roads and enforce speed limits (i.e. slower on dirt access roads) to reduce collisions and dust;
  - » Ensure mine site access and haul roads are well maintained to minimise noise and dust;
  - » Ensure vehicles are well maintained.
- Monitor Project impacts on fauna and flora, throughout the life of the Project (e.g. annual surveying);
- If it is determined that animals are attracted to, and be injured by, mining activities, deterrence procedures may involve:
  - » Loud noises;
  - » Provide encouragement to use other areas;
  - » Fences (if applicable).

8.3.3 Specific Management, Monitoring and Protocols

Weed and Introduced Animal Control Protocol

A small booklet with identification keys will be made available to all staff/personnel.

- Implement best practice guidelines according to the Catchment and Land Protection (CALP) Act 1994, "Invasive Plants and Animals Policy Framework";
- Guaranteeing that vehicles and equipment arrive and leave free of vegetation and mud;
- Identification keys of feral animals and noxious weeds (to prevent confusion);
- Cooperate with DEPI regarding weed and introduced animal control measures (e.g. euthanasia procedures);
- Ensure dirt/soils removed from site follow DEPI guidelines (e.g. application of herbicides);
- Discourage introduced animals, e.g. food waste will not be left exposed;
- Please note: the DEPI is developing new Invasive Species Management legislation to replace the noxious weeds and pest animal provisions of the CALP Act 1994

Injured Wildlife Protocol

A small booklet with identification keys will be made available to all staff/personnel.

- Aims to ensure that all personnel working with and for the Project are aware of protocol if they find or injure wildlife;

- Identification keys of native wildlife that may be present within the Project Area (e.g. feral animals to be euthanized in accordance with control procedures above);
- Identification keys to highlight species of conservation concern;
- Contact names and numbers of wildlife carers, veterinarians, ecologists (with wildlife handling experience);
- Immediate first aid procedures (e.g. keep in dark, warm place, outline similar to DrABC);
- Work in consultation and conjunction with Zoos Victoria and DEPI regarding threatened species.

Forest Owl Management

The management and conservation of masked, powerful and sooty owl populations are governed by the DEPI and they have published documents and guidelines regarding owl conservation (e.g. Schedvin et al. 2003, Loyn et al. 2011). Management and mitigation measures enacted by Eastern Iron will be conducted in conjunction and in consultation with DEPI and their published guidelines.

Management actions to be implemented:

- Annual monitoring of these owls' presence and habitat use (in consultation with DEPI);
- Provide all staff with information (e.g. leaflets) detailing identification characteristics of the three species, including vocalisation sound files;
- Actively habituate owls to mining and increased human activity (e.g. this has been used in ecotourism to decrease animal stress and negative human-wildlife interactions);
- It is possible that owls may habituate to the mine regardless of any management actions taken and therefore, if it is determined animals may be in danger of being injured, deterrence procedures will need to be enacted;
- Rehabilitation of vegetation within the mine site to potentially be used as foraging and breeding grounds (by future owl pairs).

Wildlife Encounter Register

To track encounters (i.e. injuries, threatened species) with wildlife, staff will enter the details in a register (e.g. online or booklet). If staff believe that they have seen or heard threatened species, a form with the following information will be forwarded onto a specialist or DEPI for verification:

- Species details, any distinguishing features;
- Location (e.g. GPS data);
- Time and date;
- Weather conditions;
- Photograph if possible.

Some species are particularly difficult to positively identify and therefore further investigation may be required.

Biodiversity Offset Strategy

Where adverse impacts cannot be avoided, mitigated and/or managed (e.g. direct vegetation loss within Project components), a *Biodiversity Offset Strategy* will be developed and implemented to compensate for these direct and indirect impacts on native vegetation and biodiversity. The *Biodiversity Offset Strategy* may involve protecting land, improving land tenure security, scientific research and/or financial investment in biodiversity programs. The *Biodiversity Offset Strategy* should:

- Provide net gain in native vegetation area and biodiversity values;
- Ensure offsets are kept in perpetuity;
- Be enforceable; and
- Involve both on-site and off-site offsets.

Appropriate native vegetation offset sites will be identified and secured prior to Project commencement. Offset management plans will also be required covering each offset site which detail the specific works to be implemented.

Since no EPBC Act listed species have been detected, specific offsets for these species are unlikely to be necessary. Native vegetation to be removed will require offsets to be set aside in accordance with the *Native Vegetation* Framework and/or *Permitted clearing of native vegetation – Biodiversity assessment guidelines*. These offsets will be calculated to take into account:

- Site based:
  - » Area of native vegetation to be removed;
  - » Condition of native vegetation;
  - » Types and conservation status of Ecological Vegetation Classes (EVCs) to be removed; and

  - » Presence of any threatened flora and fauna (of DEPI Rare status and above).
- Landscape level:
  - » Importance of area for Victoria's biodiversity; and
  - » Habitat importance.

This *Biodiversity Offset Strategy* will also include the progressive rehabilitation of the mine site (see Section 22), but will include:

- Planting of locally sourced flora species;
- Increase flora diversity by planting threatened and common species;
- Increase genetic diversity of flora species by sourcing seeds from several local (spatially distant) populations.

8.4 Key Commitments and Actions

To avoid, minimise and manage adverse impacts on ecological communities, flora and fauna, several priority targets and actions will be scheduled, implemented and monitored for their effectiveness and efficiency.

To ensure that these management plans/protocols are followed/adhered to, Eastern Iron will provide copies, or copies will be made available, to all staff. For example, injured wildlife protocols (e.g. a small booklet), can be kept with OHSE manuals.

Eastern Iron will also work in consultation with and in conjunction with DEPI and other relevant wildlife agencies in the management of wildlife within the mine site.

In particular, this will involve monitoring any forest owls using the mine site and may include:

- Annual field survey, site and habitat use;
- Education of staff regarding owls (e.g. leaflets and registers);
- Investigate any records of owls (or other threatened species) forwarded on from the wildlife encounter register.

Phase	Commitment	Actions
Construction	Minimise and manage impacts on native vegetation	Eastern Iron will ensure that only vegetation within the mine footprint will be removed for the development of the mine site and removal follow predetermined guidelines. This may be a staged process.
	Monitor and manage forest owl populations using the mine site	In conjunction with DEPI, monitor forest owl site and habitat use. Distribute, or make available, leaflets detailing owl species characteristics.
	Minimise and monitor impacts on native flora and fauna	Implement and provide and/or make available (easy to read) copies of Weed and Introduced Animal Control Protocol, Injured Wildlife Protocol, Forest Owl Management Guidelines and Wildlife Encounter Register.
	Offset biodiversity values impacted by Project; provide net-gain of native vegetation and other biodiversity values	Develop and implement a site-specific Biodiversity Offset Strategy to compensate for vegetation loss and increase net biodiversity values for the life of the mine and upon closure
Operations	Monitor and manage forest owl populations using the mine site	Continue to monitor forest owl distribution and investigate any species identified in the Wildlife Encounter Register.
	Offset biodiversity values impacted by Project; provide net-gain of native vegetation and other biodiversity values	Eastern Iron will continue to implement a site-specific Biodiversity Offset Strategy to increase net biodiversity values for the life of the mine and upon closure
	Increase effectiveness of Biodiversity Offset Strategy	Eastern Iron will monitor the efficiency and effectiveness of the Biodiversity Offset Strategy
Closure	Increase effectiveness of Biodiversity Offset Strategy	Eastern Iron will improve (if necessary) the Biodiversity Offset Strategy
	Offset and rehabilitate biodiversity values impacted by Project; provide net-gain of native vegetation and other biodiversity values	Eastern Iron will incorporate improvements of Biodiversity Offset Strategy into the Mine Rehabilitation and Closure Plan

9 DOWNSTREAM BIODIVERSITY AND CONSERVATION MANAGEMENT

9.1 Objectives and Strategy

Management of downstream biodiversity and conservation for the Project is based on the following objectives:

- Minimise potential downstream impacts of the Project upon downstream drainages and wetlands of international importance by managing and monitoring water quality and quantity;
- Avoid and minimise adverse impacts on flora and fauna (especially conservation significant species).

9.2 Context

The mine site intersects several small ephemeral creeks within the Tara State Forest. Potential impacts of the Project on the ecological values of the downstream region, if they were to occur, would most likely occur *indirectly* if downstream surface and/or groundwater are affected due to Project activities at the mine site. This may include impacts on downstream water quality and/or hydrology in Boggy Creek. Boggy Creek feeds into Lake Tyers, which is part of the Gippsland Lakes Ramsar Site.

Several threatened flora and fauna have been recorded by previous studies within Lake Tyers but very few have been recorded within or near Boggy Creek. Notably, many of these species have not been recorded in Boggy Creek or Lake Tyers in the last 30 years. In addition, most of these species are unlikely to be impacted by small changes in water quality and/or hydrology caused by the Project as they are terrestrial and/or not reliant on aquatic habitats downstream of the Project.

Eastern Iron will implement management and monitoring of water quality, hydrology and wetland ecology to ensure Boggy Creek (i.e. downstream environments) are protected and avoid impacts. Eastern Iron will also assess and improve the effectiveness and efficiency of management and mitigation measures.

9.3 Management and Monitoring

Boggy Creek and Lake Tyers are monitored and managed by the DEPI (e.g. Gippsland Lakes Ramsar Site Strategic Management Plan). Therefore any management and monitoring programs would need to be in conjunction and consultation with current and future government plans.

Key management and mitigations related to downstream biodiversity includes:

- Surface and ground water levels will be monitored at key locations (particularly Boggy Creek) at regular intervals.
- Monitoring will include up-gradient / upstream and down-gradient / downstream locations (of the mine site) to confirm the extent of impacts to local hydrology and to implement suitable management responses;
- Monitor particulate matter, nutrients, temperature and the presence/abundance of algal species at water sample sites downstream of the Project;
- Ensure all soil piles are adequately protected (from water sources) and walled to prevent sediment transport;
- Minimise the area of soil exposed to air and water (e.g. covering piles with vegetation);
- Ensure that any soil removed and to be returned, is returned to its original location, wherever possible
- Developing and implementing a rehabilitation and closure plan that allows for the progressive rehabilitation of water quality during operation and continuation upon closure.

Flora and fauna

Since adverse indirect impacts on downstream flora and fauna would only occur if hydrology is severely compromised, further mitigation, management and monitoring may only be triggered if changes are detected during water quality monitoring of Boggy Creek and other sites. Subsequently, all surveying, monitoring and species-specific management programs would need to be developed and implemented in consultation with the Commonwealth and Victorian Governments.

9.3.1 Biodiversity Offset Strategy

Where adverse impacts cannot be avoided, mitigated and/or managed (e.g. direct vegetation loss within Project components), a *Biodiversity Offset Strategy* will be developed and implemented to compensate for these direct and indirect impacts on native vegetation and biodiversity.

As there will be no direct vegetation loss or impact on flora and fauna within the downstream catchment, net-gains from the *Biodiversity Offset Strategy* may indirectly benefit downstream biodiversity. The actions undertaken as part of the *Biodiversity Offset Strategy,* particularly rehabilitation of the mine site, may benefit biodiversity values of Boggy Creek and the downstream catchment by (for example):

- Protect catchment vegetation within the mine site upon closure (i.e. currently planned for logging activities);
- Reduce sediment and nutrient load by increased vegetation density upstream;
- Create seed banks by planting threatened flora within the mine site and seeds from these plants can be used in future propagation efforts (i.e. ecosourcing);
- Improving water quality originating from the mine site by creating wetlands (i.e. natural water filters);
- Collaborate with local and government-run surveying and monitoring programs.

9.4 Key Commitments and Actions

To avoid, minimise and manage adverse impacts on ecological communities, flora and fauna, several priority targets and actions will be scheduled, implemented and monitored for their effectiveness and efficiency (Table 9-1). Since Boggy Creek and greater downstream catchment is monitored and managed by the DEPI, priority commitments and actions will also be to participate and support ongoing and future government programs.

To ensure that all management plans/protocols are followed/adhered to, Eastern Iron will provide copies, or copies will be made available, to all staff.

Eastern Iron will also work in consultation with and in conjunction with DEPI and other relevant wildlife agencies (e.g. Zoos Victoria). In particular, this will involve consulting DEPI while monitoring for any changes in Boggy Creek's hydrology resulting from the mine.

Table 9-1. Priority commitments and actions for minimising, managing and monitoring impacts on wetlands, communities, flora and fauna

Phase	Commitment	Actions
All Phases	Collaborate with DEPI regarding the management of Boggy Creek and the downstream catchment	Consult with current and future DEPI Strategic Management Plans
Construction	Minimise and manage impacts on hydrology within Boggy Creek	Surface and ground water levels will be monitored at key locations in Boggy Creek and downstream at regular intervals
	Minimise and monitor impacts on native flora and fauna of Boggy Creek (and downstream)	Monitor particulate matter, nutrients, temperature and the presence/abundance of algal species at water sample sites downstream of the Project
	Offset biodiversity values impacted by Project; provide net-gain of biodiversity values within mine site	Develop and implement a site-specific Biodiversity Offset Strategy to increase net biodiversity values within the mine site for the life of the mine and upon closure
Operations	Minimise and manage impacts on hydrology within Boggy Creek	Continue to monitor surface and ground water levels
	Minimise and monitor impacts on native flora and fauna (and downstream)	Continue to monitor particulate matter, nutrients, temperature and the presence/abundance of algal species at water sample sites downstream of the Project
	Offset biodiversity values impacted by Project; provide net-gain of biodiversity values	Eastern Iron will continue to implement a site-specific Biodiversity Offset Strategy to increase net biodiversity values within the mine site for the life of the mine and upon closure
	Increase effectiveness of Biodiversity Offset Strategy	Eastern Iron will monitor the efficiency and effectiveness of the Biodiversity Offset Strategy
Closure	Increase effectiveness of Biodiversity Offset Strategy	Eastern Iron will improve (if necessary) the Biodiversity Offset Strategy
	Offset and rehabilitate biodiversity values impacted by Project; provide net-gain of native vegetation and other biodiversity values	Eastern Iron will incorporate improvements of Biodiversity Offset Strategy into the Mine Rehabilitation and Closure Plan

10 CULTURAL HERITAGE MANAGEMENT

10.1 Objectives and Strategy

Management of cultural heritage for the Project is based on the following objectives:

- Protect any archaeological and cultural heritage resources from adverse mine impacts and support their preservation;
- Comply with relevant State and Commonwealth legislation.
- Avoid disturbing significant sites, or if unavoidable, minimise any impacts and where appropriate, relocate or salvage any sites; and
- Ensure that any previously unrecorded artefacts uncovered during mine activities are appropriately recorded, documented and submitted to the appropriate authorities.

10.2 Context

10.2.1 Aboriginal Cultural Heritage

The Gunaikurnai Land and Waters Aboriginal Corporation (GLaWAC) is the sole Registered Aboriginal Party (RAP) for the mine site area.

Eastern Iron is currently preparing a Cultural Heritage Management Plan (CHMP) to comply with the *Aboriginal Heritage Act 2006* and its *Aboriginal Heritage Regulations 2007* (CHMP no. 12547). The standard assessment (surface survey) component of the CHMP has been completed and the Cultural Heritage Advisor has completed an interim report entitled ***5 Mile Deposit Area: Aboriginal Cultural Heritage Management Plan Interim Report*** (EES Referral Attachment 10).

Two Aboriginal sites have been identified in the vicinity of the mine site, which will require management as part of the Project. Both are Aboriginal campsites represented by scatters of stone artefacts located on ridgetops in the vicinity of the confluence of Harris, Tomato and Gap creeks. However, only one of these sites is likely to be impacted by the Project due to the mine access road (close to the Bruthen-Buchan Road).

No Aboriginal sites or artefacts have been identified in other surveyed areas of the mine site.

10.2.2 Historic Heritage

Management of European historic sites is not required for the Project as no such sites have been recorded in the vicinity of the mine site or immediate surrounds. No significant direct or indirect impacts on European historic sites are expected from the Project.

10.3 Management and Monitoring

10.3.1 Aboriginal Cultural Heritage

Management of Aboriginal cultural heritage for the Project will be conducted with consideration of the following standards and guidelines:

- *Guide to preparing a Cultural Heritage Management Plan (DPCD 2010).*
- *Standards for Recording Victorian Aboriginal Heritage Places and Objects (DCPD 2008).*
- *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS 1999).*
- *Work Plan Guidelines for a Mining Licence (DPI 2002).*

Management of Aboriginal cultural heritage for the Project will be in accordance with the approved Cultural Heritage Management Plan (CHMP). This Plan is currently in preparation (no. 12547) and will be completed prior to Project commencement in consultation with GLaWAC, as the relevant Registered Aboriginal Party, and the local community.

The strategy for cultural heritage management for the Project will be based on avoidance of harm to archaeological and cultural heritage resources and the minimisation of impacts where complete avoidance is not possible.

The *Work Plan Guidelines for a Mining Licence* (DPI 2002) outline that an Environmental Management Plan will address, where applicable the management of:

Archaeological or heritage sites and relics (to be read in accordance with any requirements under the Aboriginal Heritage Act 2006, including a Cultural Heritage Management Plan)

- Potential issues and impacts;

  - » Describe the distribution of archaeological sites and the potential for disturbance.
- Management and mitigation measures;
  - » Describe control measures for identified archaeological sites or site protocols for any archaeological material found.
- Monitoring program;
  - » Describe any applicable monitoring requirements.

As recommended by the Cultural Heritage Advisor in the *5 Mile Deposit Area: Aboriginal Cultural Heritage Management Plan Interim Report* (refer EES Referral Attachment 10), the following measures will be implemented to ensure cultural heritage values are appropriately protected:

- The CHMP (no. 12547) underway for the Nowa Nowa 5 Mile Deposit Area will proceed to a complex assessment, as determined by the results of the standard assessment and wishes of the GLaWAC.
- Before proceeding to a complex assessment, Eastern Iron will finalize its mine design for the 5 Mile Deposit Area and prepare an activity description for the purposes of the CHMP.
- Complex assessment is required to determine the place extent of Harris Creek 1, assess its Aboriginal and scientific significance and identify culturally-appropriate impact mitigation measures. At this stage, it is too early to plan for site avoidance because the extent of the Aboriginal place is not yet known. Tomato Creek 1 will not require complex assessment as the site landform (a ridge on the west side of Tomato Creek) is not expected to be directly impacted.
- The GLaWAC will be consulted further about any other landforms in the proposed activity area that will be subject to complex assessment. If GLaWAC request additional subsurface testing, it is likely that this will be limited to the ridgeline proposed for the Mine Infrastructure.
- If, at any stage, works associated with development of the mine are proposed that extend outside the currently proposed inter-connected activity areas, these new work areas will be incorporated into the existing CHMP. The GLaWAC must be consulted about any such variation and the CHMP process (desktop and field investigation) repeated, where required. Alternatively, Eastern Iron may elect to undertake additional CHMPs, as appropriate.
- Eastern Iron will maintain its dialogue with the GLaWAC and continue to consult it on all matters pertaining to the management of Aboriginal cultural heritage throughout the course of the project. EIL will invite GLaWAC representatives to any relevant meetings/discussions regarding the project.
- Eastern Iron will also keep the Cultural Heritage Advisor and Earth Systems Pty. Ltd. appraised of developments with the project.

As part of the preparation of the final CHMP, culturally-appropriate mitigation measures for the Aboriginal sites identified in the Project Area will be developed. Consistent with the *Guide to preparing a Cultural Heritage Management Plan* (DPCD 2010) these will include measures covering, where appropriate:

- Avoidance of as much of the Aboriginal cultural heritage as possible, based on the significance of the Aboriginal cultural heritage;
- Developing an appropriate salvage strategy to recover information about Aboriginal cultural heritage if it is not possible to avoid disturbance, based on the significance of the Aboriginal cultural heritage;
- The removal and curation of Aboriginal cultural heritage; and
- Requirements relating to the custody and management of Aboriginal cultural heritage during the course of the activity.

As required by the DPCD guidelines, the CHMP will also include contingency plans to cover unlikely events, such as the unexpected discovery of Aboriginal cultural heritage during works, or Eastern Iron and the RAP unexpectedly disagreeing about the implementation of the Management Plan.

As per Clause 13(1) Schedule 2 of the *Aboriginal Heritage Regulations 2007*, specific contingency plans will be provided for:

a. The matters referred to in Section 61 of the *Aboriginal Heritage Act 2006*;

b. The resolution of any disputes between the sponsor and relevant RAPs in relation to the

implementation of an approved CHMP or the conduct of the activity (if a RAP is evaluating the CHMP);

c. The management of Aboriginal cultural heritage found during the activity;

d. The notification, in accordance with the *Aboriginal Heritage Act 2006*, of the discovery of Aboriginal cultural heritage during the carrying out of the activity; and

e. Reviewing compliance with the CHMP and mechanisms for remedying non-compliance.

10.3.2 Historic Heritage

No sites of historic heritage occur in the vicintiy of the areas potentially disturbed by the Project and therefore no management measures for this aspect are proposed.

10.4 Key Commitments and Actions

Commitments	Actions
Ensure that potential impacts on cultural heritage are properly understood	Eastern Iron will complete the Cultural Heritage Management Plan (CHMP no. 12547), including a 'complex assessment' of Aboriginal sites identified, in consultation with relevant stakeholders.
Ensure appropriate plans are in place to avoid and minimise impacts cultural heritage	Eastern Iron will implement the CHMP, and ensure management and contingency measures outlined in the CHMP are appropriately incorporated into the EMP. Eastern Iron will establish cultural heritage conservation areas and buffer zones where appropriate to assist in conservation of the Aboriginal sites in the vicinity of the mine site. Eastern Iron will provide cultural heritage awareness training to Project personnel and contractors involved in Aboriginal cultural heritage management and ground disturbance activities that could impact Aboriginal sites.
Ensure that potential cultural heritage impacts are appropriately monitored	Eastern Iron will ensure procedures for monitoring potential cultural heritage impacts outlined in the CHMP are included in the EMP and specific site-based EMPs produced. Eastern Iron will conduct ongoing communication and consultation with the Registered Aboriginal Party (GLAWC) in accordance with the Community Engagement and Stakeholder Consultation Plan (EES Referral Attachment 3).

11 TRAFFIC AND TRANSPORT MANAGEMENT

11.1 Objectives and Strategy

Management of traffic and transport impacts for the Project is based on the following objectives:

- Minimise the potential impacts of Project-traffic on local amenity;
- Minimise the potential impacts associated with increased traffic volumes along transportation routes; and
- Minimise the potential health and safety risks and impacts of Project-related transportation on community stakeholders, contractors and Eastern Iron staff.

11.2 Context

Project related traffic and transport is expected to have the greatest impact on the local amenity of Nowa Nowa township. While heavy vehicles are already common in the area from forestry-related traffic and other industry, road transport associated with the Project may include traffic associated with construction activities, transportation of ore to Eden Port (during operations), the provision of supplies, and the movement of the workforce.

It is expected that B-double trucks will be used to transport ore from the mine to the Port, for iron ore product export. The transport route is expected to follow the Bruthen-Buchan Road to join the Bruthen-Nowa Nowa Rd to the north-west of Nowa Nowa. Traffic will then follow the Princes Highway to the SEFE site on the south side of Two Fold Bay, Edrom NSW. Given that the transportation route crosses state borders, NSW legislation pertaining to road transport (e.g. *Roads Act* 1993) will also need to be considered.

Community safety aspects and the potential for an increase in road accidents associated with the Project will be appropriately managed. Local amenity impacts will also be minimised where possible.

Further details are provided in the ***Traffic Impact Assessment*** (EES Referral Attachment 7).

11.3 Management and Monitoring

Management of traffic and transport for the Project have been determined with consideration of the following standards and guidelines:

- *Performance Based Standards Scheme – the Standards and Vehicle Assessment Rules (National Heavy Vehicle Regulator 2008);*
- *Oversize Load Carrying Vehicles –Information Bulletin (Vic Roads 2007).*

Detailed mitigation and management measures have been developed as per the ***Traffic Impact Assessment*** (EES Referral Attachment 7) and include the following:

- Ongoing monitoring of traffic volumes, particularly to assess impacts upon existing traffic and school bus routes.
- Appropriate location and design of mine site access road (Prior to construction).
- Co-operation with relevant road authorities (e.g. VicRoads, RMS or Forestry Corporation of NSW) to ensure road maintenance contribution obligations are met.
- Establishment of a Driver Code of Behaviour, similar to those developed for nearby logging operations to provide guidance to drivers on:
  - » Use of engine brakes in towns,
  - » Dropping of dust,
  - » Load security,
  - » Allowing traffic to pass,
  - » Mass limits,
  - » Travelling through towns and school crossings,
  - » Fatigue management, and
  - » Night-time operations.
- To reduce impact on local amenity and safety, locate the transport depot at Newmerella or similar location.

A framework for monitoring traffic and transport associated with the Project will be developed. Monitoring records will include:

- Incident reports covering both on and off-site activities, including injury (e.g. loss-time injury rate; loss-time injury frequency rate) and near miss data;

- Vehicle safety inspection procedures for inspectors; and
- Fleet maintenance records.

When blasting is occurring at the southern end of the mine pit (within 500 metres of Nowa Nowa-Buchan Road for example), a temporary traffic management plan will be implemented to restrict the use of the road. This could involve a range of measures including temporary road closures, advanced warning signage and the advertisement of planned closures amongst logging contractors and the community.

The Air Quality Management and Noise and Vibration Management Sections of the EMP (Chapters 12 and 13 respectively) further discuss the management and monitoring of traffic and transport impacts.

11.4 Key Commitments and Actions

Commitment	Actions
Construction and Operation Phases: Ensure plans are in place to minimise incidents related to Project transport movements	Eastern Iron will ensure road hierarchy principles are applied and detailed safety measures for the Project's transportation schedule are outlined. Eastern Iron will develop detailed safety and emergency response plans for hauling heavy, large and/or any hazardous loads.
Ensure that potential transport and traffic impacts on and off-site are appropriately monitored	Eastern Iron will ensure procedures for monitoring traffic and transport impacts on community stakeholders (local Nowa Nowa community as well as along transportation routes), contractors and Eastern Iron staff are included in its operation. The monitoring program for air quality is outlined in Section 12.3.1, and in Section 13.3.3 for noise and vibration.

12 AIR QUALITY MANAGEMENT

12.1 Objectives and Strategy

Management of Air Quality for the Project is based on the following objectives:

- Avoidance and control of potential health and safety effects on the surrounding community;
- Avoidance of air quality impacts upon amenity; and
- Avoidance and prevention of negative impacts upon the natural environment.

12.2 Context

Air emissions will occur as a result of exploration, construction and operational activities during the proposed mine site development. Particulate matter (PM10 and PM2.5) from mining, processing and transportation activities is expected to be the primary emission of concern. Air emissions from the proposed mine site will primarily occur during the construction and operational phases. The principal source of dust emissions is likely to be from exposed surfaces.

During construction and operations, the main dust / particulate generating activities from the Project are expected to include:

- Clearing of vegetation and topsoil;
- Drilling;
- Blasting;
- Loading and unloading of topsoil, ore and waste;
- Hauling ore and waste to the plant, waste rock dump and low grade ore stockpile;
- Transportation of workers, materials and supplies to the mine site;
- Transport of product to the Port of Eden for export;
- Use of graders and bulldozers;
- Crushing;
- Wind erosion from exposed areas; and
- Vehicle exhaust emissions.

12.3 Management and Monitoring

Management of air quality for the Project has been determined with consideration of the following vibration standards and guidelines:

- Protocol For Environmental Management State Environment Protection Policy (Air Quality Management) Mining And Extractive Industries (EPA 2007);
- Victoria Environmental Guidelines for Major Construction Sites (EPA 1996);
- The VIC EPA Best Practice Environmental Management document Environmental Guidelines for Major Construction Sites (1996) provides the following recommended measures to prevent or minimise the impact of dust emissions from land clearing, top soil removal, windblown and stockpile-generated dust.

Control measures for dust management will include those outlined in Table 12.1.

The ***Traffic Impact Assessment*** (EES Referral Attachment 7) recommended that a 'truck driver code of behaviour' be developed and implemented for drivers. This code will include the following measures to minimise potential air quality impacts:

- Regular maintenance of vehicles (in accordance with the vehicle manufacturer's instructions);
- Regular review of tyre air pressure; and
- Prohibit vehicles from idling in residential areas and turn off engines when the vehicle is parked near residences, offices or eating areas

12.3.1 Monitoring

This section outlines a proposed monitoring plan for air quality, noise and vibration for the Project. Initial monitoring will need to be implemented prior to the construction phase while the on-going monitoring is carried out over the construction and operations phase. A detailed monitoring plan are expected to be included as part of the final Environmental Management Plans for the Project.

The VIC SEPP recommends air quality and NIRV noise background testing to provide the implementation of an initial and an on-going monitoring plans are required to meet the following objectives:

- To provide a database against which any short or long term environmental impacts of the Project can be determined;
- To provide an early indication of whether any of the environmental control measures or practices fail to achieve the acceptable standards;
- To monitor the performance of the Project and the effectiveness of the mitigation measures; and
- To take remedial action if unexpected problems or unacceptable impacts arise.

Monitoring Stations

A number of monitoring stations will be established to measure impacts upon air quality associated with the Project, detailed in Table 12.2 and Figure 12.1below.

Table 12.1Control procedures for dust.

Source	Control procedures
Areas disturbed by mining	Ensure the area of cleared land is minimised during the drier months of the year when dust generation is greatest. Ensure smooth surfaces are deep ripped and left rough to reduce the wind velocity at the surface Install wind fences wherever appropriate
Stockpiles	Minimise the number and size of stockpiles Locate stockpiles away from drainage lines, at least 10 m away from natural waterways, and to where they are protected from wind erosion. Ensure stockpiles are designed with slopes no more than 2:1 (horizontal/vertical) Suppress dust on stockpiles as circumstances demand
Haul roads	Pave and water haul roads where required. The frequency of watering will be determined by weather conditions and the erodibility of the soil.
Topsoil stockpiling	Keep topsoil separate from underburden when stockpiling soil

Table 12.2 Co-ordinates of the monitoring stations

Code	Latitude	Longitude	Location	Notes
Station 1	37°39'3.89" S	148° 6'7.75" E	Bruthen-Buchan access road to the Mine site	Located at entrance to the Mine site, this station will capture construction of road & mine site, and on-going road transport emissions
Station 2	37° 41' 29"S	148° 10' 3"E	Wairewa Township	As the main closest settlement, this station will be used as a residential baseline for the proposed mine site.
Station 3	37°41'33" S	148° 5' 27" E	Mt Nowa Nowa	Located adjacent to the existing BOM station.
Station 4	37°42'56.64" S	148° 5'44.49" E	Nowa Nowa Township	Nowa Nowa Township is located approximately 7 km south of the proposed mine site, and is also located on the transportation route to the Port of Eden.

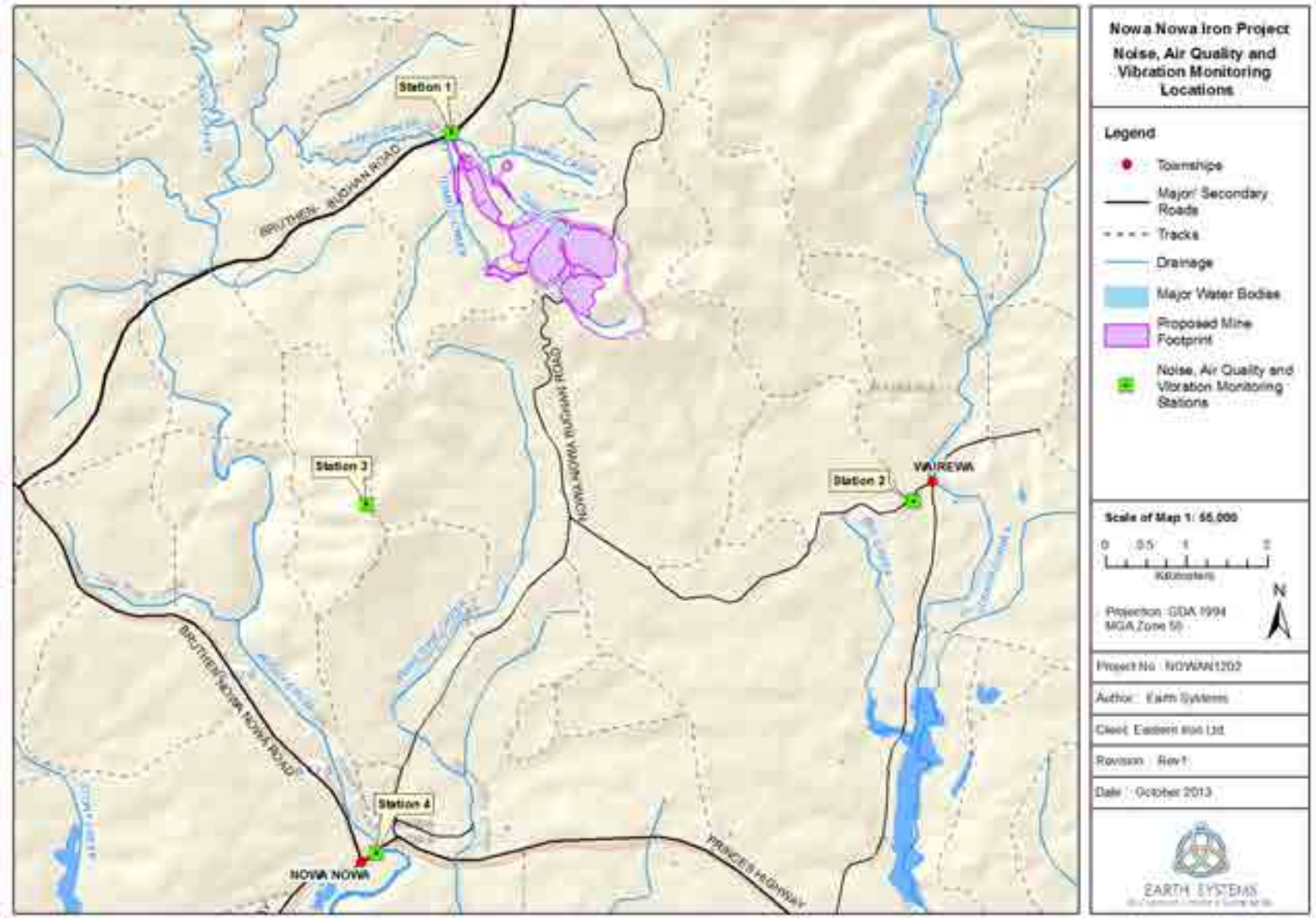

Figure 12.1 Location of Monitoring Stations for Air Quality, Noise and Vibration

Monitoring Parameters and Frequency

The proposed monitoring parameters and frequency is summarised in Table 12.3 below.

In addition to the parameters outlined above implementation of the proposed management and mitigation measures outlined in Chapter 6 will also need to be monitored over the Project life.

Monitoring Standards and Criteria

The air quality monitoring standards and criteria relevant to the Project are outlined in Chapters 3-5 of the Air, Noise and Vibration Assessment. Where any standards or criteria are exceeded at any monitoring station as a result of the Project, management and mitigation measures would need to be adapted accordingly.

Table 12.3 Summary of Proposed Monitoring Program

Type	Target	Equipment	Frequency
Particulates	PM_{10}, $PM_{2.5}$, (TSP), metal & crystalline silica content	Particulate monitor Dust Deposition gauge	24-hours Monthly
Gases	CO, NO_2, SO_2, O_3	Gas monitors	1-hr (NOx & CO), 8-hrs (O_3), 24-hrs (SO_2)

12.4 Key Commitments and Actions

Commitment	Actions
Ensure that EPA and State Environmental Policies are adhered to in the management and monitoring of Air Quality impacts.	Eastern Iron will implement the management and monitoring measures in accordance with EPA requirements including: • Protocol For Environmental Management State Environment Protection Policy (Air Quality Management) Mining And Extractive Industries (EPA 2007); and • Victoria Environmental Guidelines for Major Construction Sites (EPA 1996). Eastern Iron will implement additional measures for management and monitoring as outlined in Section 11.3.
Ensure that potential air quality impacts are appropriately monitored	Eastern Iron will establish a detailed air quality monitoring program developed in accordance with the requirements of the EPA.

13 NOISE AND VIBRATION MANAGEMENT

13.1 Objectives and Strategy

The objective of management of noise and vibration issues for the Project will be to minimise Project impacts of noise and vibration on the Project workforce at the mine site, local communities and communities along transportation routes.

13.2 Context

Noise levels emanating from the proposed mine site activities in excess of background conditions can potentially disturb wildlife and cause nuisance effects for the local community. Noise from early site preparation and construction activities will vary over time depending on the phase of the Project development. During the construction phase a variety of equipment will be utilized and the noise produced is expected to vary widely. Construction noise is likely to be associated with the following activities:

- Clearing of vegetation;
- Spoil removal;
- Leveling and grading;
- Excavation/earthworks;
- Pile driving;
- Building erection/steelworks;
- Mechanical installation;
- Commissioning and startup;
- On-site vehicle/heavy equipment traffic; and
- Transportation of workforce and construction materials.

Operations noise is likely to be associated with the following activities:

- Drilling;
- Blasting;
- Hauling ore and waste to the plant and waste rock dump and low grade ore stockpile;
- Use of graders and bulldozers;
- Crushing and screening in the processing plant;
- Transport of processed ore to the Port of Eden for export; and
- Transportation of workers and supplies to the proposed mine site.

13.3 Management and Monitoring

Management of noise and vibration for the Project has been determined with consideration of the following vibration standards and guidelines:

- EPA Victoria Guidelines for Control of Noise from Industry in Regional Victoria (NIRV) (2011);
- EPA Victoria Environmental Guidelines for Major Construction Sites (1996).

The overall strategy for managing Project – generated noise and vibration incorporates the following sub-components:

- Optimal noise buffering through landform/layout design;
- Work-staging and transport scheduling to minimise noise and vibration impacts; and
- Ongoing maintenance and noise monitoring.
- Management of complaints and feedback.

13.3.1 Noise

Vibration-proofing and noise-reduction measures should will applied for various noise sources, including the recommended measures outlined below.

<u>On-site Measures</u>

Where avoidance is not possible, the preferred method for controlling noise from stationary sources is to implement noise control measures at source. As per the Environmental Guidelines for Major Construction Sites (EPA Victoria 1996), the following measures will be implemented:

- Fit and maintain appropriate mufflers on earth-moving and other vehicles on-site;
- Enclose noise equipment; and
- Provide noise attenuation screens where appropriate.

As per the *Leading Practice Sustainable Development Program for the Mining Industry: Airborne Contaminants, Noise & Vibration* (Australian Government, 2009), the following noise reduction options will also be considered in the implementation of the Project:

- Selecting low noise equipment;
- Applying additional silencing measures for fixed and mobile plant and mine ventilation fans;
- Installing acoustic enclosures around process plant, if required;
- Strategically design bund walls for acoustical screening;
- Using 'smart alarms' to minimise complaints regarding vehicle reversing alarms; and
- Minimising tonal components or impulsive or intermittent characteristics of noise where possible.

Transportation Route Measures

The ***Traffic Impact Assessment*** (EES Referral Attachment 7) recommended that a 'truck driver code of behaviour' be developed and implemented for drivers. This code will include the following measures to minimise potential noise impacts:

- Regular maintenance of vehicles (in accordance with the vehicle manufacturer's instructions);
- Prohibit vehicles from idling in residential areas and turn off engines when the vehicle is parked near residences, offices or eating areas;
- Enforcing vehicle speed limits through residential areas; and
- Prohibit use of air brakes in residential areas.

Eastern Iron will also monitor any noise complaints along the main Project transportation routes.

13.3.2 Blasting and Vibration

Measures to be implemented to control the impacts of airblast will include:

- Reducing the charge mass;
- Optimising the stemming height and ensuring the type of stemming is adequate;
- Eliminating the exposed detonating cord and secondary blasting;
- Orientating blast faces way from potentially sensitive receivers;
- Applying best practice design of the blast initiation sequence and timing delay; and
- Providing optimum buffer zone.
- The Proponent should also monitor any vibration complaints along the main Project transportation routes.

13.3.3 Monitoring

Noise modelling will be used throughout the Project design to ensure noise impacts are minimised and/or mitigated. Monitoring of noise will be required at potential sensitive receptors to record baseline conditions and ensure that noise levels do not exceed the relevant standards.

As per Section 12.3, The VIC SEPP recommends NIRV noise background testing to provide the implementation of an initial and an on-going monitoring plans are required to meet the following objectives:

- To provide a database against which any short or long term environmental impacts of the Project can be determined;
- To provide an early indication of whether any of the environmental control measures or practices fail to achieve the acceptable standards;
- To monitor the performance of the Project and the effectiveness of the mitigation measures; and
- To take remedial action if unexpected problems or unacceptable impacts arise.

The monitoring program is proposed to be conducted at the monitoring stations as follows;

- Noise to be monitored at Stations 1, 2 and 4 (locations of potential sensitive receptors); and
- Vibration to be monitored at Stations 1 and 4 (sites along the proposed transportation route).

The proposed monitoring parameters and frequency of monitoring for each aspect are summarised in Table7-2.

Table 13.1 Summary of Proposed Monitoring Program

Type	Target	Equipment
Noise	LAeq, LA10, LA90	Portable Sound Monitor
Vibration	Peak Particle Velocity and Peak noise level.	Peak reading analogue equipment and a portable sound level meter.

Monitoring locations for noise and vibration will be consistent with those detailed in Section 12.3.1, with additional sites added where required. The frequency of monitoring at each site will be determined in consultation with the EPA.

Monitoring Standards and Criteria

The noise and vibration monitoring standards and criteria relevant to the Project are outlined in Chapters 3-5 of the ***Air, Noise and Vibration Assessment and Monitoring Plan*** (EES Referral Attachment 13). Where any standards or criteria are exceeded at any monitoring station as a result of the Project, management and mitigation measures would need to be adapted accordingly.

13.4 Key Commitments and Actions

Commitment	**Actions**
Ensure plans are in place to minimise impacts on potentially sensitive receptors along transportation routes	In accordance with EPA requirements, Eastern Iron will develop detailed noise reduction measures (e.g. technologies, scheduling) that will be applied to the Project.
Ensure that EPA and State Environmental Policies are adhered to in the management and monitoring of noise and vibration impacts.	Eastern Iron will implement management and monitoring measures for noise and vibration in accordance with the requirements of the EPA. Eastern Iron will implement additional measures for management and monitoring as outlined in Section 11.3.
Ensure that potential noise and vibration impacts are appropriately monitored	Eastern Iron will ensure procedures for monitoring noise and vibration impacts are consistent with the requirements of the EPA.

14 SOCIAL AND COMMUNITY HEALTH MANAGEMENT

14.1 Objectives and Strategy

Eastern Iron recognises that mining activities can potentially impact both positively and negatively on the local and regional communities in which the mine is located. The objectives of the social and community health strategy in the area surrounding the mine site are to:

- Avoid, minimise or mitigate adverse socio-economic, health and safety impacts;
- Maximise socio-economic and health benefits; and
- Ensure that local residents can improve, or at least maintain, their pre-Project standard of living.

14.2 Context

The Project will generate economic benefits in local communities, Lakes Entrance and District, the East Gippsland region and the State of Victoria. The most significant economic benefits are likely to include:

- The provision of up to 120 FTE jobs within the local and regional economy;
- Direct spend of up to $700 Million in the State and regional economy over a 8-10 year period;
- Additional flow on benefits to the local economy in terms of services and employment; and
- Additional taxes and royalties to contribute to State revenue.

More broadly, the Project will contribute significantly to maintaining the viability of the South East Fibre Exports (SEFE) wharf at the Port of Eden, in light of a downturn in the forestry industry. Anecdotal evidence suggests that this may represent long term security for up to 700 direct and indirect jobs in Victoria and New South Wales.

Communities likely to benefit the most from the Project include Nowa Nowa, Wairewa, Lakes Entrance and the town where the transportation depot is located (possibly Orbost or Newmerella). Development of the Project will also promote Victoria's image as mining friendly, thereby encouraging exploration investment in the State.

As currently planned, it is anticipated that the Project will result in an additional 128 light vehicles and 6 heavy vehicles per day on Project access routes (Buchan – Bruthen Road and Princes Highway) during construction and 216 light vehicles and 368 heavy vehicles per day during operations. The Traffic Impact Assessment, however, found that the addition of Project vehicles to current traffic volumes does not exceed the design operational capacity of the roads (EES Referral Attachment 7). The main transportation route also by-passes most residential areas further minimising the impact of the increased traffic volumes. During operations, vehicle trips would be distributed between Victoria and New South Wales.

Tourism is considered an important growth sector in the Project region, and the development of additional tourism infrastructure and services could be an economic driver separate from the Project. Tourism in the study area is dependent on the nature and conservation values in the region particularly around Lake Tyers. As currently designed, the Project is unlikely to have any significant impact on key nature and conservation values in designated recreational and tourist areas.

Potential amenity impacts (air quality, noise, light pollution and visual amenity) associated with the mine site are not expected to be significant as the nearest private residence occurs over 3 km from the proposed mine site.

The most significant potential impact of the Project on amenity is likely to be due to increased traffic volumes along the product transportation route via the Princes Highway to the Port of Eden (potentially resulting in increased noise, air quality and vibration impacts, as well as increased road congestion and increased risk of traffic accidents). However, all roads are currently approved for B-Double use and have, historically, catered for high numbers of heavy vehicles associated with forestry activities.

As part of the social management strategy for the Project, social impact monitoring will be used to identify and quantify the direct and indirect impacts of the Project on the surrounding community. Social monitoring will also ensure that existing management measures are effective, and will identify the need for improved or additional measures.

14.3 Management and Monitoring

Management of social and community health for the Project has been determined with consideration of the following standards and guidelines:

- Community Engagement Guidelines for Mining and Mineral Exploration in Victoria, Department of Primary Industries (2008);
- Leading Practice Sustainable Development Program for the Mining Industry: Community Engagement and Development, Department of Resources, Energy and Tourism (2006);
- Leading Practice Sustainable Development Program for the Mining Industry: Working with Indigenous Communities, Department of Resources, Energy and Tourism (2006).

Key management measures recommended to maximise benefits and / or minimise adverse impacts include:

- Develop and implement a social monitoring program (see Section 14.3.1);
- Develop and implement the Stakeholder Engagement Plan, including engagement with local communities and service providers;
- Provide employment opportunities for local residents including apprenticeships for young people;
- Provide training and skills development for local residents interested in seeking employment with the Project;
- Monitor housing conditions in the local area and aid employees to find suitable accommodation;
- Contribute to community development and social cohesion such as through sponsoring local events and involving the Company in business forums;
- Manage public health and safety risks in accordance with relevant legislation, design and operational procedures;
- Manage traffic in accordance with the measures outlined in the ***Traffic Impact Assessment*** (EES Referral Attachment 7);
- Implement appropriate management and mitigation measures to protect downstream water quality and hydrology; and
- Mine site lighting, vibration, air quality and noise should be managed and monitored as per standard Victorian regulations and guidelines.

14.3.1 Monitoring

As part of the social management strategy for the Project, monitoring will be used to identify and quantify the direct and indirect impacts of the Project on the surrounding community. Social monitoring will also ensure that existing management measures are effective, and will identify the need for improved or additional measures. Social impact monitoring should include the parameters as outlined in Table 6-1. Social monitoring during closure will be detailed as part of the Closure Plan.

A baseline for all social monitoring parameters will be established prior to the Construction Phase. Monitoring will then be conducted on a regular basis (at least every 2 years) and reported against the performance evaluation criteria.

Table 14.1 Social monitoring parameters.

Aspect	Impact Categories	Monitoring Parameters	Performance Evaluation Criteria
Employment / Economic development	Employment	Workforce/income statistics	Number of jobs provided. Proportion of workforce from local communities.
	Employee skills development	Number of staff completing different training / skills development programs.	Training opportunities provided to workforce.
	Local Businesses / Tourism	Attitudes of local business owners	Continued community support for the Project; community complaints and suggestions addressed.

Aspect	Impact Categories	Monitoring Parameters	Performance Evaluation Criteria
Community health and safety	Accidents / injuries	Project related accidents / injuries	Number of incidents
	Air quality/Noise/Vibration	see Air Quality, Noise and Vibration Assessment (EES Referral Attachment 13)	see Air Quality, Noise and Vibration Assessment for assessment criteria
	Water quality	see Surface and Ground Water Baseline and Assessment (EES Referral Attachment 5)	see Surface and Ground Water Baseline and Assessment for assessment criteria
Amenity	Community attitudes	Community attitudes and expectations for Project	Continued community support for the Project; community complaints and suggestions addressed.
	Air quality / odour	No. of complaints / suggestions	
	Noise / Vibration		
	Traffic		
	Visual amenity		
Cultural Heritage	Cultural heritage sites and artefacts	Refer Aboriginal Cultural Heritage Management Plan (EES Referral Attachment 10)	Culturally significant sites and artefacts appropriately managed

14.4 Key Commitments and Actions

Commitment	Actions
Maximise local employment	Eastern Iron will not construct an accommodation camp for the Project workforce.
Monitor the effectiveness of socioeconomic and health management measures	Eastern Iron will implement a Social Monitoring Program as outlined in Section 14.3.1.
Ensure regular stakeholder engagement regarding socioeconomic and health issues	Eastern Iron will implement the *Stakeholder Engagement Plan* (EES Referral Attachment 3)
Ensure public health and safety risks are minimised	Eastern Iron will ensure public health and safety risks will be managed through adherence to relevant legislation, design and operational standards. Eastern Iron will implement traffic safety measures as outlined in Section 11.3.

15 GENERAL WASTE MANAGEMENT

15.1 Objectives and Strategy

Waste management for the Project is based on the following objectives:

- Identify and minimise the production of Project-generated waste;
- Identify and minimise the potential impacts of Project-generated waste on community stakeholders, contractors and Eastern Iron

15.2 Context

During the Construction phase, non-mining waste materials will be generated primarily through construction activities, administration, procurement and general camp maintenance and operation. During Operations, non-mining waste will largely be generated by day-to-day operational activities, including administration, procurement, workshop and maintenance activities. Ablution waste will include waste from toilets and basins. All sewage wastewater will be managed on site using proposed treatment facilities.

General waste management for the Project will require the establishment of a waste management system on site. No tip will be constructed, will all waste being temporarily stored before being transported off site.

15.3 Management and Monitoring

Management and mitigation measures for general waste management have been determined with consideration of the following standards and guidelines:

- *EPA Victoria Industrial Waste Resource Guidelines (2009);*
- *Worksafe Victoria Industry Standard Contaminated Construction Sites: Construction and Utilities (2005).*

To ensure that non-mine waste is well managed over the life of the project, the general waste management strategy will be based on the following resource efficiency hierarchy (Figure 15.1). The preferred approach is to avoid waste, reuse or recycle wherever possible and undertake treatment and responsible disposal of remaining waste streams where there is no alternative.

Figure 15.1 Waste Management Hierarchy; adapted from EPA Victoria 2013)

As per the Waste Management Hierarchy, the first priority for the management of non-mining wastes generated by the Project will be to avoid the generation of waste. Strategies to achieve this include:

- Procuring supplies that produce less waste by virtue of the way they are produced, packaged or consumed.
- Procuring supplies that have been produced from recycled materials, if possible.
- Maximising the efficiency of all on site production processes.

To maximise recycling and reuse, waste will be segregated into different types at the location where they are generated. Solid waste will be segregated into three categories as follows:

- Biodegradable materials – vegetation and food scraps.
- Recyclable materials – processed timber; hard plastic; glass; metal; paper and cardboard; and tyres. (Waste will be further segregated within this category.).
- Non-hazardous residue waste.

Any non-hazardous residue waste that cannot be reused or recycled will be deposited in clearly marked, general litter bins located around the Project site. Eastern Iron will implement a training program for staff, contractors and the local community, to minimise the generation of litter and actively encourage the clean-up of litter within the Project Area and downstream.

Waste unable to be treated or contained will be deposited to landfill.

15.3.1 Monitoring

Regular inspections will be conducted to monitor the success of waste management according to key performance indicators.

Resource efficiency targets will be used throughout Project design and reviewed through Construction and Operation to ensure general waste streams are appropriately managed.

Monitoring records will include:

- Document waste review and reporting protocols;
- Methods, schedules and procedures for the management and responsible disposal of each major waste stream, including volumes and types of waste generated, where waste is sent;
- Methods for monitoring performance against procedures and targets; and
- Documentation on purchasing practices (e.g. proportion of recycled materials, etc).

15.4 Key Commitments and Actions

Commitments	Action
Ensure that plans are in place to minimise general waste production and maximise resource efficiency	Eastern Iron will follow the principles of the Waste Management Hierarchy. Eastern Iron will develop specific Standard Operating Procedures to cover non-mine waste issues for specific Project components
Ensure that Eastern Iron adheres to relevant legislation regarding on site waste management.	Eastern Iron will act in accordance with relevant legislation including: • *EPA Victoria Industrial Waste Resource Guidelines (2009);* • *Worksafe Victoria Industry Standard Contaminated Construction Sites: Construction and Utilities (2005).*
Ensure that potential impacts associated with general waste are appropriately monitored	Eastern Iron will develop procedures for the consistent monitoring of waste streams and waste management strategies.

16 HAZARDOUS MATERIALS MANAGEMENT

16.1 Objectives and Strategy

Management of hazardous materials for the Project is based on the following objectives:

- Identify and minimise the production of Project-generated hazardous materials;
- Identify and minimise the potential safety risks and related impacts of Project-generated hazardous materials on community stakeholders, contractors and Eastern Iron.

16.2 Context

During Construction, waste generated by construction activities and general camp operations that is uncollected or improperly disposed of could have adverse effects on human and environmental health. During Operations, the Project is expected to store hazardous materials on site and is likely to generate hazardous waste. Careful management of wastes and hazardous materials will be required to avoid soil/water contamination and protect downstream water quality. Hazardous materials onsite are likely to include:

- Paint and thinners;
- Explosives;
- Oils and hydrocarbons;
- Pesticides; and
- Medical supplies.

16.3 Management and Monitoring

Management and mitigation measures for Project-generated hazardous materials will be determined with consideration of the following regulations, standards and guidelines:

- *Industry Standard Contaminated Construction Sites: Construction and Utilities (Worksafe Victoria 2005);*
- *Approved Criteria for Classifying Hazardous Substances (National Occupational Health and Safety Commission 2004);*
- *Industrial Waste Resource Guidelines (EPA Victoria 2009);*
- *Leading Practice Sustainable Development Program for the Mining Industry Hazardous Materials Management (DRET 2009).*
- *National Model Regulations for the Control of Workplace Hazardous Substances [NOHSC:1005 (1994)]; and*
- *National Standard for the Storage and Handling of Workplace Dangerous Goods [NOHSC:1015(2001)]*
- *Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition)*
- *The Dangerous Goods Act (1985)*
- *Dangerous Goods (Storage and Handling) Regulations 2012*
- *Dangerous Goods (Explosives) Regulations 2011*
- *Dangerous Goods (High Consequence Dangerous Goods) Regulations 2005*
- *Dangerous Goods (Transport by Road or Rail) Regulations 2008*
- *Other documents referred to in the Dangerous Goods (Storage and Handling) Regulations 2012*
- *Australian Dangerous Goods Code*
- *"Recommendations on the Transport of Dangerous Goods— Manual of Tests and Criteria", 5th Revised Edition*
- *AS 1940:2004 AS/NZS 2106*
- *AS/NZS 60079.10.1: 2009*
- *Hazardous Substances Information System (HSIS) published by Safe Work Australia on its Internet site, as amended from time to time*
- *AS2700S:2011(R13)*
- *AS 2700S:2011 (Y11)*

To ensure that hazardous materials are well managed and risks are minimised over the life of the project, hazardous waste management for the Project will be based on similar waste management principles as outlined in Section 2.10 General Waste Management. The preferred approach is to avoid generating hazardous waste, while the least preferable is the disposal of hazardous waste. Where hazard waste generation is not avoidable, ensuring treatment by reduction at source, recovery, safe storage, or destruction is paramount.

The various OHS Acts require that employers provide information, in the form of an MSDS, to allow workers to handle hazardous substances safely. Even when a product is not classified as a hazardous substance or a dangerous good, it is recommended that Eastern Iron prepare an MSDS for the mine site to enable workers and managers to store and handle the product safely. A similar approach will be taken to waste material that needs to be disposed.

Eastern Iron will provide Materials Safety Data Sheets (MSDS) to guide site-staff on the handling and storage of hazardous materials.

Eastern Iron will develop a Safe Operating Procedure to guide the management of hazardous materials. The Safe Operating Procedure will follow the recommendations outlined in the *Leading Practice Sustainable Development Program for the Mining Industry Hazardous Materials Management (DRET 2009),* which include:

- Development of Safe Operating Procedures for the introduction of new chemicals on site, including the development of an MSDS for each material.
- Hazardous material risk assessments conducted for each material.
- Assessment and development of MSDS' for relevant waste materials.
- Development of a hazardous materials site register, including product name, the MSDS, quantity and location of material use.
- Dangerous goods must be recorded in a site manifest that complies with the dangerous goods legislation

16.3.1 Control of Exposure to Hazardous Materials

Eastern Iron will ensure that worker exposure to hazardous materials is always minimised, and exposure minimisation relies on control regimes.

Control regimes involve a hierarchy of controls:

1. Elimination/substitution;
2. Engineering controls;
3. Administrative controls; and
4. Personal protective equipment (PPE).

Which regime is appropriate depends on the nature of the job. For example, engineering controls are appropriate for normal operations or tasks that continue for long periods. Short-term or intermediate tasks, such as maintenance, rely more on controls at the lower end of the hierarchy.

While PPE is important, action higher up the hierarchy will be considered first. Long-term use of PPE may not be the safest or most cost-effective control.

Elimination/substitution

The definitive way to reduce the risk from a process or substance in the workplace is to completely remove that process or substance. However, more often substitution is used to prevent health problems; for example, by replacing asbestos with safer synthetic substitutes, such as glass foam, rock and glass wool.

In some industrial processes where a less hazardous material cannot be used, the risk in handling hazardous materials can be reduced by changing the process. For example, an operation might:

- use a pelletised form of the hazardous substance, rather than a powdered form;
- vacuum or use an industrial sweeper to clean up concentrate dusts, rather than manually sweeping them up.

Engineering controls

A range of engineering controls is possible, including various types of containment and ventilation systems.

Isolation

If the worker can be isolated completely from the hazard, the risk to health is removed. Isolation may be by a physical or a distance barrier. Time is also a barrier, although time may equally be considered an administrative control. Isolation controls include:

- remote storage of hazardous materials (for example, explosives, fuel tank farms)
- the separation of materials that could create hazards by coming into contact with each other by accident (for example, oxidants and fuels).

Occasionally, it is possible to use timed sequences to conduct hazardous operations when fewer workers are present. For example, if a workplace is to be painted, the painting should obviously be done outside normal working hours to prevent unnecessary exposure to solvent vapours.

Containment

Once dust, fumes or vapours have escaped from the source, they become far more difficult to control. A better strategy is to maximise containment by engineering controls, for example by:

- totally enclosing the whole process and using an exhaust extraction system
- enclosing noisy machinery in sound-proofed structures.

The design of structures to enclose or contain processes must allow for maintenance activities. Poorly designed enclosures can create a safety risk for maintenance workers or put their health at risk from an unpredictable exposure. Care will be taken when locating potentially hazardous storage or operational tasks in remote locations, because that remoteness might cause new risks if there are difficulties or breakdowns.

Potentially hazardous materials or processes will not be located near frequently used thoroughfares and buildings.

Ventilation

Ventilation is the engineering control of contaminants by dilution or local exhaust ventilation. It is one of the main methods of control of airborne chemical hazards, particularly contaminants in underground mines.

Strict regulatory controls on respirable dust and respirable crystalline silica have achieved dramatic reductions in the incidence of pneumoconiosis and silicosis in underground miners.

PPE

PPE is used when other means of exposure control cannot be employed. Use of any PPE places restrictions upon workers; it reduces the flexibility of a worker's operation, may contribute to heat load on the worker's body, and affects the worker's ability to do the task safely.

The selection of PPE is based on the risk assessment for the task, and care is needed to provide the correct level of protection. In some situations, excessive use of PPE can compromise the worker's ability to work safely. For example, a welder doing structural work inside a mine storage shed may be working at heights in a hot environment and trying to protect against welding fumes as well as metal fumes from metal concentrates.

16.3.2 Transport of Hazardous Materials

Eastern Iron will adhere to the *Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition),* which provides procedures and protocols for the transport of dangerous goods. The code provides detailed technical specifications, requirements and recommendations, and includes rules and recommendations covering:

- the definition, classification, packaging, marking and labelling of substances and articles that meet the United Nations classification criteria for dangerous goods or are prescribed as dangerous goods by the competent authority;
- the consigning of dangerous goods for transport, including loading, stowage, load detention and segregation;
- the provision of transport documentation describing the dangerous goods being transported, and appropriate emergency information for those goods;
- the unloading, receipt and transfer of dangerous goods; and
- the transport of dangerous goods, including the use of vehicles, containers and equipment, and the provision of safety equipment.

16.3.3 Monitoring

To ensure that risks associated with hazardous waste are minimised over the life of the Project, a monitoring program will be established based on likely or potentially likely risks.

The monitoring program and associated records will include:

- An inventory of hazardous materials on site;
- Document hazardous waste review, control and reporting protocols;
- Type, location and maintenance records of all spill response equipment;
- Location of machinery servicing areas; and
- Methods for monitoring performance against procedures and targets.

16.4 Key Commitments and Actions

Committment	Action
Ensure that Eastern Iron follows the guidelines provided in relevant legislation.	Eastern Iron will ensure that SOPs are developed and implemented to guide the management of new chemicals / hazardous materials onsite. Eastern Iron will ensure SOPs are developed to control and manage worker exposure to hazardous substances. Eastern Iron will ensure SOPs are developed to control and manage the transport of dangerous goods by road and/or rail. Eastern Iron will ensure dangerous materials that meet CFA's quantity requirements are reported to CFA's Dangerous Goods Unit.
Ensure that employees are appropriately trained in the handling and management of hazardous materials.	Eastern Iron will conduct hazardous materials training for all on-site staff. Eastern Iron will develop an easily accessible MSDS register. Eastern Iron will develop standard SOPs for the handling strategies for hazardous materials.
Ensure that plans are in place to minimise hazardous materials issues	Eastern Iron will develop site-specific EMPs to cover hazardous material issues for specific Project components.
Emergency Response: ensure that potential hazardous materials impacts are appropriately monitored	Eastern Iron will ensure detailed procedures for monitoring of hazardous materials are developed and implemented, including comprehensive training for process operators in emergency response and the handling, storage and use of hazardous materials.

17 ENERGY AND GREENHOUSE GAS MANAGEMENTOBJECTIVES AND STRATEGY

The objectives of energy and greenhouse gas emissions management are to:

- Optimise energy conservation and energy efficiency measures throughout the Project activities within its lifetime; and
- Minimise greenhouse gas (GHG) emissions through implementation of industry best practice management at the Project site.

17.1 Context

Mining and mineral processing are inherently energy-intensive operations. Project activities expected to consume the most energy include transport, blasting, excavation, extraction, grinding, and crushing. Other minor sources of GHG emissions from the Project will include waste management activities, water treatment plant, construction activities, rehabilitation activities, and administration activities.

The Project is expected to produce Scope 1 (direct) GHG emissions from a number of sources during construction and operation. The majority of Scope 1 emissions associated with the Project are likely to occur as a result of land clearing (and vegetation decomposition), fossil fuel usage for transportation and mining activities, such ore transport to Port Eden, onsite usage of haulage truck, mobile equipment and vehicles, and onsite electricity generators (diesel). Other Scope 1 emissions can result from waste disposed in landfill and wastewater treatment. Emissions associated with vegetation loss for the Project is expected to be offset by native vegetation offsets as well as mine site revegetation activities.

No significant Scope 2 emissions are expected to be produced by the Project as all on-site electricity requirements are expected to be met by the generators.

Scope 3 emissions are indirect GHG emissions which occur as a result of sources not owned or controlled by Eastern Iron, for example embodied emissions from concrete and steel use in the Project and emissions from shipping of product.

17.1.1 Estimated Project Greenhouse Gas Emissions

The initial estimated Scope 1 greenhouse gas emissions during Project operations is approximately 26,436 tCO2e per year or 264,363 tCO2e over the mine lifetime (refer to Section 17.1 for a breakdown). In addition, potential emissions due to vegetation clearing are estimated at 72,805 tCO2e, which would occur during construction phase. Some or all of these emissions are expected to be offset by native vegetation offsets as well as mine site revegetation activities.

The methodology used to estimate the emissions above are provided in the following section. The expected energy consumption during the Construction phase is not yet known, and therefore the estimates above represent indicative estimates, and are likely an underestimate of total emissions. While the majority of the Project GHG emissions will occur during operations, further minor emissions will occur during construction particularly due to fuel usage by construction vehicles and equipment. Note that detailed GHG emissions calculations of all Project phases will be carried out prior to the commencement of the Project.

The breakdown of the Scope 1 emission estimates are shown on the table below.

Table 17.1 Breakdown of Scope 1 greenhouse gas emissions estimates.

Activity During Project Operations	Consumption	Unit	Fuel	Emissions pa (tCO_2e/yr)	Emissions over mine life (tCO_2e)
Emissions from truck transportation of ore*	11,577,280	vehicle km/yr	Diesel	10,931	109,306
Emissions from diesel gensets on-site at 1.3 MW capacity ^	2,921	kL/yr	Diesel	7,835	78,351
Fuel consumption on-site (equipment/vehicle)	2,500	kL/yr	Diesel	6,707	67,068
Explosives consumption (ANFO)	359	kL/yr	Diesel	964	9,638
TOTAL SCOPE 1 EMISSIONS (operations only)				26,436	264,363
Vegetation clearing (during construction)#	146				72,805
TOTAL (including vegetation clearing)#					337,168
*Emission factor derived from DEFRA, 2011					
^Emission factor based on: Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (2013)					
#Emissions from vegetation clearing would be one-off (i.e. during construction only) and would most likely be temporary as the mine site rehabilitation would offset some or all the emissions.The emissions are not reportable under the NGER Act 2007 and Clean Energy Act 2011, i.e. only the fuel use associated with land clearing will be reportable.					

17.1.2 Methodology for Estimation of Project Greenhouse Gas Emissions

The expected GHG emissions from the Project have been estimated based on the methods outlined in the following documents:

- The World Resources Institute/World Business Council for Sustainable Development Greenhouse Gas Protocol (WRI/WBCSD, 2004);
- Australian National Greenhouse Accounts – National Greenhouse Accounts Factors (Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education, 2013);
- National Greenhouse and Energy Reporting (NGER) Regulations 2008 (made under the National Greenhouse and Energy Reporting (NGER) Act 2007); and
- Clean Energy Act 2011

The emission estimates are based on the following assumptions:

- All on-site electricity generation will be via diesel generators;
- Emissions from shipping has been excluded due to limited data available;
- Data on diesel generators fuel consumption is based on a typical figure, which will need to be refined once exact generator model and specifications are available;
- Emissions from blasting activity using ANFO is dependent on the fuel oil content in the ANFO chosen. To be conservative, current blasting emission is based on the maximum fuel oil content of a few different ANFO from different suppliers;
- 50% of the biomass in the vegetation cleared is carbon; and
- Area to be cleared is considered open forest.

Further details regarding the methodology used for specific aspects of the emissions calculations are provided below.

Truck Transportation

The calculation of truck transportation is derived from the *Traffic Impact Assessment* report prepared by AECOM (EES Referral Attachment 7). The table below summarises the proposed truck transportation of ore during project operations. The emission factor for B-double (articulated) trucks is based on 2011 UK's Department for Environment, Food and Rural Affairs (DEFRA, 2011).

Table 17.2: Truck transportation route and greenhouse gas emissions during project operations

Route^	Distance (km)	Load per vehicle (t)	Total vehicle km pa	Emissions pa (tCO_2e pa)	Emissions (tCO_2e) over mine life *
Mine to Depot	44	42	1,363,440	1,239	12,392
Depot to Mine	44	0	1,363,440	748	7,482
Depot to Port	185	42	4,425,200	5,210	52,101
Port to Depot	185	0	4,425,200	3,146	31,460
TOTAL			11,577,280	10,931	109,306
* Proposed mine life of 10 years					
^As the depot location is not yet confirmed at this stage, for calculation purposes, the depot is assumed to be at Orbost (note that distance between Orbost and Newmerella is only approximately 7 km). A detailed GHG calculations on truck emissions will be conducted when all the data is confirmed.					

Current calculations indicated energy consumption from diesel fuel of around 0.27 PJ per year.

Note that emissions from light vehicle transportation of site workers going to and from work are not part of Eastern Iron's Scope 1 emissions, unless the light vehicle belongs to Eastern Iron (i.e. Eastern Iron provides fuel for the vehicle). As it is indicated that the workforce is distributed proportionally between Bairnsdale, Lakes Entrance and Orbost based on population and that there is no clear information on the owner of the light vehicle, it assumed that the workers are responsible for their emissions for travel going to and from work. As such, only emissions from truck transportation of ore are included in the greenhouse gas estimation calculations.

Electricity Generation On-Site

It is assumed that all electricity will be supplied from the on-site diesel generators and there is an average electricity requirement of 1.3 MW (Gidman J., personal communication, 30 August 2013). A few different alternatives on electricity generations have been considered, including grid upgrade to enable electricity supply from the grid. However, at this stage, the base case for the Project is to utilise diesel generators.

Typical standard diesel generators at 1.3 MW total capacity would use approximately 333 L/hr of fuel[2]

[2] The fuel consumption figure is based on the use of 2 x 480 kW gensets and 1 x 360 kW genset (PR Power, 2013a; PR Power 2013b).

(PR Power, 2013a; PR Power 2013b). For project operations running 24 hours and 7 days a week, this translates to approximately 11,388 MWh/year, or 2,921 L of diesel per year (energy consumption is approximately 0.11 PJ per year).

Fuel Consumption On-Site

The fuel consumption on-site includes fuel usage for heavy machinery, mining equipment, and on-site vehicle. Yearly consumption at this stage is estimated at 2,500 kL of diesel or 0.10 PJ per year (McCracken M., personal communication, 29 August 2013).

Explosives Consumption (ANFO)

According to "Supplementary Guideline – Reporting blended fuels and other fuel mixes" (CER, 2012), the GHG emissions from the consumption of ANFO must be derived from the fuel oil content of the particular ANFO used. As the exact ANFO MSDS and supplier's data is not yet available, a range of different ANFO from different suppliers has been sought to assist the GHG emissions calculation (Buckley, 2002; Dyno Nobel, 2012; Orica, 2008, Orica, 2010). To be conservative, the maximum fuel oil content found (10%) has been used as the basis of the calculation (Orica, 2010).

Currently, ANFO consumption is estimated at 3,000 tonnes per year (McCracken M., personal communication, 29 August 2013). With an assumed 10% fuel oil content and diesel oil as the fuel oil, yearly diesel consumption is approximately 300 tonnes per year, or 359 kL per year[3] (this equates to approximately 0.01 PJ per year).

Vegetation Clearing

The proposed mine site is classified as open forest in accordance with Australian National Botanic Gardens (2011)[4]. This open forest generally has biomass density of 272 t/ha based on the National Carbon Accounting System Technical Report No. 17 (Snowdon et al, 2000).

Emissions due to vegetation clearance have been based on the area to be cleared and the type of vegetation. An estimated area of 146 ha, vegetation type of open forest, and 50% carbon content of the biomass have been assumed for the emissions calculations (EES Referral Attachment 8).

Therefore, there are 39,712 tonnes of biomass to be cleared or 19,856 tonnes of total carbon. Assuming all the carbon is converted to carbon dioxide through natural decomposition, this equates to approximately 72,805 tCO_2e of emissions release during construction phase.

At the end of the mine life, some or all of the emissions from vegetation clearing would most likely be offset through native revegetation and mine site rehabilitation. The assessment here considers the emissions without considering the effect of revegetation and mine rehabilitation.

Note that emissions from vegetation clearing are not reportable under *NGER Act* and *Clean Energy Act 2011*. Only emissions from fuel usage associated with clearing activities will be reportable.

17.2 Management and Monitoring

Greenhouse gas emissions management and mitigation measures for the Project will be implemented following the guidelines and requirements of:

- *National Greenhouse and Energy Reporting (NGER) Regulations 2008 (made under the National Greenhouse and Energy Reporting (NGER) Act 2007) and Carbon Pricing Mechanism under the Clean Energy Act 2011.*
- *Victorian EPA's Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry (2002).*
- *Federal Government's Energy Efficiency Opportunities (EEO) Act 2006.*

A *Greenhouse Gas Emissions and Energy Saving Plan* meeting the requirements of the above will be prepared as part of the final Construction and Operations Environmental Management Plans (EMPs). These Plans along with the GHG inventory will be in alignment to the reporting requirements under *NGER Act 2007*, *Clean Energy Act 2011*, or other mandatory reporting requirements that may be in place once the Project commences.

[3] Average diesel oil density is used in the calculation (Dieselnet, 2012). This will be further refined once the exact ANFO specifications are available.

[4] The classification indicates that the site constitutes of trees between 10-30 m height with mid-dense (30-70%) foliage cover of tallest plant layer.

The overall strategy for managing reducing greenhouse gas emissions and optimising energy efficiency for the Project will incorporate the following sub-components:

- Conduct an initial evaluation of the potential to use low emissions technologies, alternative fuels or renewable energy for the Project.
- Heavy vehicles and equipment:
  - » Appropriate design of the mine site to reduce haul distance and fuel consumption, i.e. logically plan and design transportation routes to shorten the transportation distance to save fuel consumed by haul trucks.
  - » Select fuel efficient vehicles and equipment where possible.
  - » Training of drivers to be conducted to promote fuel efficient driving skills, for example maintaining constant speed (i.e. use cruise control on highways), avoid rapid acceleration, minimise air conditioning use, etc.
  - » Improvement of fuel efficiency of haul trucks and equipment by undertaking regular maintenance.
- Reducing energy consumption:
  - » Optimisation of energy efficiency during operations using efficient crushing and grinding technologies and other measures to reduce energy consumption at the processing plant.
  - » Optimising dewatering and pumping systems to minimise energy use for water management.
  - » Ensuring that diesel powered plant operate efficiently through ongoing scheduled and preventive maintenance.
- Reducing emissions from land clearing
  - » Progressive revegetation of cleared areas and revegetation after mine closure.
- Measuring, monitoring and reporting:
  - » Establishment of a comprehensive energy use and greenhouse gas emissions inventory.
  - » Registration, measuring, monitoring, and reporting of the site's yearly GHG emissions under the *NGER Act (2007)* provided that the Project emissions are expected to exceed 25 $ktCO_2e$/year.
  - » Conduct energy audits on a regular basis in accordance with AS/NZS 3598:2000. The energy audit will help identify major areas requiring energy efficiency improvement, energy cost saving, and payback period.
  - » Development of greenhouse gas emissions reduction and energy saving targets (i.e. energy audits could be used as the basis on how and what targets will be set).
  - » Participation in the Federal Government's EEO program to identify opportunities for energy and cost savings[5].

17.2.1 Monitoring

Greenhouse gas emissions reduction and energy efficiency targets will be established and monitored throughout the life of the Project. Monitoring records will include (but are not limited too):

- Fossil fuel usage;
- Area of land disturbed;
- Area of land revegetated; and
- Materials disposed of to waste.

Eastern Iron will be required to demonstrate compliance with *Victorian EPA's Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry (2002)* with regards to on-going reporting to EPA on greenhouse gas emissions, reduction measures implemented, and future improvement plans (this involves the conduct of regular relevant energy audits as per AS/NZS 3598:2000).

As the Project is expected to exceed the reporting facility threshold under the *NGER Act 2007* of 25 $ktCO_2e$ per year, Eastern Iron will be required to register, monitor and report greenhouse gas emissions on an annual basis in accordance with the *NGER Act 2007*. Monitoring for the Project will be consistent with the requirement of the Act.

[5] Participation in Energy Efficiency Opportunities program is mandatory for corporations that use more than 0.5 petajoules (PJ) of energy per year, but may also be taken voluntarily by medium energy users.

Eastern Iron will also register, monitor and report energy consumption and energy savings under the *Energy Efficiency Opportunity (EEO) Act 2006* where required.

17.3 Key Commitments and Actions

Commitment	Actions
Minimise greenhouse gas emissions and maximise energy savings	Eastern Iron will develop and implement a *Greenhouse Gas Emissions Management and Energy Saving Plan*, which includes updating greenhouse gas emissions inventory, identifying and implementing measures for reducing greenhouse gas emissions, as well as maximising energy savings in line with Victorian EPA's *Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry* (2002). Consistent with this Plan, site specific measures for greenhouse gas emissions reduction and energy efficiency will be developed for specific Project components and include in the site-based EMPs.
Establish greenhouse gas emissions and energy usage targets, monitoring, reporting, and auditing	Eastern Iron will establish greenhouse gas emissions reduction and energy efficiency targets prior to Project commencement. Eastern Iron will ensure detailed procedures for monitoring and reporting of greenhouse gas emissions and energy usage are included in the EMP in line with relevant legislation and guidelines. In accordance with the Victorian EPA's *Protocol for Environmental Management – Greenhouse Gas Emissions and Energy Efficiency in Industry* (2002), regular energy audits (in accordance with AS/NZS 3598:2000) will be undertaken.

18 ENVIRONMENTAL AWARENESS AND TRAINING

18.1 Objectives and Strategy

Environmental awareness and training for the Project is based on the following objectives:

- Ensure awareness of basic environmental impacts amongst workforce, contractors and consultants;
- Ensure awareness of how actions play a significant role in avoiding, minimising and managing environmental risks.

18.2 Context

The underlying goal of environmental awareness and training is to achieve a work culture of continuous environmental improvement. The workforce and contractors for the Project play a fundamental role in achieving a high standard of environmental performance. Accordingly, training is an essential component of the Project's Environmental Management System. The Project's Environmental Management Plan and associated sub plans cannot be implemented unless appropriate training is given to those undertaking the work to which the management plans apply.This is also consistent with requirements under ISO 14001.

Eastern Iron's environmental policy will guide environmental awareness.

18.3 Management and Monitoring

Environmental awareness and training measures are consistent with the guidance of:

- *Best Practice Environmental Management in Mining: Planning a Workforce Environmental Awareness Training Program (EPA 2002);*
- *A Guide to Leading Practice Sustainable Development in Mining (RET 2007).*

The overall strategy for managing environmental awareness and training on site incorporates the following sub-components:

- Comprehensive inductions for all staff, contractors and consultants;
- Regular toolbox meetings with staff and crews regarding scheduled work and associated environmental / safety aspects;
- Standard Operating Procedures for construction and operational activities;
- Development and implementation of an environmental and social information management system. This will include: monitoring information, results of environmental and social investigations, site materials inventory, incident reporting and response records, legal requirements data base, site water balance, nursery inventory and stakeholder registers;
- In-house environmental training programs and cross-cultural awareness programs; and
- Environmental inspection and auditing programs.

18.3.1 Monitoring

Monitoring of environmental awareness and training will include monitoring effectiveness of performance measures through maintenance of environmental training records.

Training Needs Analyses will be conducted on an annual basis to ensure employee training is up to date.

18.4 Key Commitments and Actions

Commitment	Actions
Ensure that plans are in place to develop and deliver effective environmental awareness and training	Eastern Iron will conduct an initial training needs analysis prior to Project commencement. Eastern Iron will establish a site specific environmental and social information management system (including monitoring database). Eastern Iron will implement an effective site-wide environmental inspection program. Eastern Iron will implement an effective internal audit program. Eastern Iron will implement environmental training programs. Eastern Iron will develop Standard Operating Procedures (SOPs) relative to all significant environmental and social risks. Eastern Iron will conduct risk assessment and develop a formal Risk Register.
Ensure that training is conducted on appropriate time schedules.	Eastern Iron will conduct site induction training on an as needs basis for new site personnel. Eastern Iron will schedule regular refresher training programs to ensure that all staff are up to date with updated management and monitoring strategies. Eastern Iron will schedule specific training programs on an as need or as requested basis to ensure staff feel adequately qualified to undertake certain tasks.
Ensure that environmental training and awareness programs are appropriately monitored	Eastern Iron will ensure detailed procedures for monitoring training and awareness programs are developed, including independent evaluation process.

19 LANDSCAPE AND VISUAL ASSESSMENT

19.1 Objectives and Strategy

The objectives of the Landscape and Visual Assessment Management plan are to:

- Avoid and minimise impacts on visual amenity by thoughtful planning and arrangement of Project layout; and
- Establishing strategies and timelines for revegetation and rehabilitation to reduce long term visual impacts experienced within the viewshed.

19.2 Context

Landscape and visual impacts of the project are expected to be minor as no settlements are located within close proximity to the proposed mine site. The closest settlement areas are at least 4 km away from the site, with the nearest isolated residence being a farmhouse located over 3 km away.

Tourism is a significant economic activity for the Gippsland Lakes Region and has been highlighted as a key area of growth in the Nowa Nowa, Wairewa and Lake Tyers community planning process.[6] As outlined in the ***Land and Water Use Study*** (EES Referral Attachment 11).

While the immediate Project area may be used for recreational purposes including hiking, mountain biking and four-wheel driving, the uniform nature of the habitat is unlikely to attract many people seeking conservation-type nature experiences. There are also no designated recreation areas within the Project area (e.g. picnic, camping, walking tracks). The closest recreational amenities are walking tracks at Lake Tyers and Nowa Nowa.

19.3 Management and Monitoring

Implementation of measures to minimise visual amenity impacts will be important to minimise potential impacts for local community members and tourists. Measures implemented will include:

- Progressive rehabilitation and revegetation of disturbed areas throughout the Project life-cycle.
- The Project will ensure that the night time lighting does not create a disturbance for local residents, utilising only essential lights during night operations.
- Consideration of visual screening (e.g. tree planting) to minimise the impact of Project infrastructure, if required.

Further visual amenity strategies are outlined in the rehabilitation sections of the ***Project Description and Proposed Mine Plan*** (EES Referral Attachment 1) and Section 22.

[6] As identified in the Draft *Nowa Nowa, Wairewa and Lake Tyers Aboriginal Trust Community Plan 2012 -16*

19.4 Key Commitments and Actions

Commitment	Actions
Ensure that visual impacts are minimised throughout the construction and operational phases	Eastern Iron will progressively rehabilitate and re-vegetate disturbed areas; Eastern Iron will install visual screening (ie. planting) to minimise the impact of Project infrastructure if required.
Ensure that upon project completion, landscapes are rehabilitated in line with stakeholder expectations	Eastern Iron will complete rehabilitation and re-vegetation works in accordance with the Mine Rehabilitation and Closure Plan.

20 BUSHFIRE AND FIRE MANAGEMENT

20.1 Objectives and Strategy

The objectives of a Bushfire and Fire Management plan are to:

- Protect life and property and natural values of the local environment in the event of fire;
- Minimise the incidence of preventable fires associated with activities at the Project site; and
- Recommend the establishment and implementation protocols to be enacted in the case of a bushfire within the Project area.

20.2 Context

South-eastern Australia, and Gippsland in particular, is reputedly one of the most fire-prone environments in the world, due to the interactions of climatic conditions, topography, vegetation types and settlement patterns. In Gippsland, devastating wildfires have occurred in many years including 1851, 1908, 1926, 1939, 1952, 1965, 1977, 1983 and 1998. These wildfires have burnt vast areas of native vegetation and have often resulted in loss of life and property.

Typically, the annual 'fire season' extends from mid-October to mid-April, peaking in January and February. The extent and severity of seasons varies enormously from year to year, depending mainly on weather patterns and significant variations from the 'norm' caused by events such as the 'El Niño' phenomenon. Lightning is the major cause of wildfires in the Gippsland Region, causing 43.5% of all fires in the last twenty years.

In recent times, with a greater emphasis on fire prevention, preparedness and education, wildfires have not attained their earlier proportions, although that potential still exists. On average, about 162 unplanned fires per fire season could be expected across the Region, burning an average area of 34 890 hectares.

Prescribed burns are routinely conducted by the Department of Environment and Primary Industries (DEPI). Fuel Management Zones located in Nowa Nowa span 345,014 hectares.

20.3 Management and Monitoring

20.3.1 Prevention of Fires and Bushfires

Prevention of fires and bushfires resulting from exploration and operational activities at the Project site is the core objective of the Bushfire and Fire Management Plan.

Management of bushfires and fires for the Project will be conducted with consideration of the following:

Country Fire Authority Act 1958;

- Victoria State Emergency Service Act 2005;
- The Bushfire Safety Policy Framework (BSPF);
- Emergency Management Act 1986;
- Emergency Management Manual (Victoria);
- Forests Act 1958;
- Occupational Health and Safety Act 2004;
- Nowa Nowa Community Bushfire Information Guide (CFA 2011);
- Gippsland Region Fire Protection Plan;
- Recommendations of the Victorian Bushfire Royal Commission.

In order to prevent the ignition of a fire at the Project site, the following measures will be implemented:

- A site specific Bushfire Prevention SOP will be developed for the Project,
- Work areas will be kept clear of dry or dead vegetation.
- Combustible materials will not be stored near any potential sources of ignition.
- General and hazardous waste, oils and grease will be removed from site.
- Any spillages or leakages of flammable solvents or materials will be cleaned up immediately.
- Electrical appliances and equipment will be regularly serviced and maintained.
- All structures and facilities will be equipped with fire extinguishers, including vehicles and machinery.

- Spark arrestors fitted and operational on all machinery and equipment.

Further to the above recommendations, Eastern Iron will implement the following communication and awareness strategies:

- Communicate daily fire danger levels to site personnel.
- Communicate and adhere to Total Fire Ban status on site.
- Bushfire prevention training will be provided to all site personnel, including understanding of the fire risk levels and requirements associated with Total Fire Ban days.

The Gippsland Fire Protection Plan also complies with fire protection requirements under the Crown Land (Reserves) Act 1978, Lands Act 1958, and the Conservation, Forests and Lands Act 1987 and also complements plans prepared in accordance with the Country Fire Authority Act (1958) for the Country Area of Victoria.

Section 62(2) of the Forests Act 1958 establishes the requirement for the Secretary of the Department 'to carry out proper and sufficient work for the prevention and suppression of fire in every State forest and national park and on all protected public land.' The National Parks Act 1975 requires the Director (National Parks) to ensure that appropriate measures are taken to protect each national park from injury by fire.

20.3.2 Health and Safety in the event of a Fire or Bushfire

Eastern Iron's existing Safe Operating Procedure for implementation in the case of a bushfire will be tailored to meet the needs of the Nowa Nowa site, and extended to include details of site evacuation and emergency alarm systems.

Eastern Iron will communicate their bushfire risk planning with the Nowa Nowa community to ensure that all residents are aware of the actions expected to be taken in the event of a bushfire emergency. Measures will include:

- A site specific Bushfire Survival Plan, inclusive of an emergency evacuation plan will be developed for the site.
- Fire Safety Training will be conducted for all site personnel to ensure familiarity with the 'Managing a Bushfire Emergency – Nowa Nowa' SOP and an understanding of actions to take in the event of a bushfire.
- Provide 'Personal Bushfire Safety Packs' on site including a heavy woollen blanket, water, towels and first aid kit.
- Establish a designated evacuation point and sound warning system.
- Appoint fire/emergency marshals to lead evacuation and/or fire prevention activities.

20.4 Key Commitments and Actions

Commitment	Actions
Ensure that all Eastern Iron employees and contractors are familiar with the Managing a Bushfire Emergency SOP and designated emergency assembly areas.	Eastern Iron will ensure bushfire training is conducted as part of site induction, including fire reporting, fire safety, emergency evacuation and fire suppression techniques. Eastern Iron will appoint on-site fire marshals.
Ensure that risks of fire creation on site are minimised.	Eastern Iron will ensure work areas are kept clear from combustible wastes and dry/dead vegetation. Eastern Iron will ensure electrical appliances and equipment are regularly serviced and maintained.
Ensure that structures and facilities on site area appropriately equipped with fire fighting equipment, including vehicles.	Eastern Iron will ensure all vehicles and equipment carry fire suppression equipment. Eastern Iron will ensure all vehicles and equipment are fitted with a spark arrestor.

Ensure that fire bans and warnings are considered in relation to project activities.	Eastern Iron will observe fire ban rules unless an exemption is sought from the Country Fire Authority (CFA). Eastern Iron will implement hot work permit system to prevent fire creation. Eastern Iron will communicate Total Fire Ban status to personnel on site on relevant days.

21 EMERGENCY PREPAREDNESS AND RESPONSE

21.1 Objectives and Strategy

Site emergency response management for the Project is based on the following objectives:

- Ensure that any emergency response plans consider environmental and community issues in addition to health and safety issues;
- Ensure that personnel are trained and prepared for the unlikely event of an emergency; and
- Ensure that personnel are active in preventing avoidable accidents and emergencies.

21.2 Context

Emergencies are generally considered to be unplanned events or incidents that have the potential to harm people, the environment or assets. Accordingly, an immediate response action is required.

Natural events that could impact operations and lead to environmentally hazardous situations for the Project include:

- Fire Risk, including Bushfires:
  - » Project-related explosives and flammable materials stored on-site will contribute to fire risk. Stockpiled vegetation cleared during construction may also result in a fire risk, particularly in summer. Fire risk and prevention is discussed in Chapter 19.
- Seismic Risk:
  - » While the Nowa Nowa region has a relatively low earthquake hazard risk, a number of earthquakes of a magnitude less than 3 have occurred in the East Gippsland region over the past decade (Geoscience Australia, 2013).
- Floods:
  - » The primary risk of flooding for the Project is associated with transportation routes.

An environmental incident is defined as any incident that impacts or may potentially impact the environment, or any activity or incident that results in license or permit conditions to be exceeded or breached. Subsequent to this definition, an environmental incident will require an appropriate emergency response, as documented herein. The following examples represent environmental incidents:

- All hazardous chemical spills;
- All fuel or oil spills outside workshop areas and pits;
- All spills of fuel or oil within workshop areas and pits greater than 50 litres;
- All non-contained fires within operational areas; and
- All uncontrolled gas emissions.

21.3 Management and Monitoring

Management and mitigation measures for emergency preparedness and response planning have been determined with consideration of the following regulations, standards and guidelines:

- Guidance Note: Emergency planning at a major hazard facility (Worksafe Victoria 2011);
- Leading Practice Sustainable Development Program for the Mining Industry: Evaluating Performance, Monitoring and Auditing (DRET 2009);
- Emergency Management Manual Victoria (Department of Justice's Police and Emergency Management Division 2012).

Emergency response management for the Project will be based on general response management principles, where the protection of life is the main priority when managing emergencies. Eastern Iron will develop an Environmental Emergency Response Plan prior to the commencement of Construction. The determination of whether an environmental incident is classified as an emergency will be based on the risk assessment that will be developed for the Project.

Emergency response to an environmental incident will prioritise the actions to be undertaken according to the following sequence:

- Protection and rescue of human life;

- Minimisation of the area impacted by the incident;
- Protection of the environment, plant and property;
- Rendering the area safe in which the emergency has occurred;
- Restoration of all disrupted services; and
- Decontamination and rehabilitation of the incident scene and surrounding area.

Depending on the severity of an environmental incident, emergency response may also involve using the services of, or notifying the following groups: police, ambulance, site medical practitioner, relevant government agencies and the local community. The strategy for emergency response will include the following sub-components:

- Spill management;
- Fuel and chemical leakage or spills;
- Fire and explosion;
- Flood and storm damage;
- Failure of pit walls / waste rock dumps;
- Failure of water storage dams.

All near-miss environmental incidents will be reported to appropriate mine authorities, as incident feedback is critical to improving management procedures for minimising future risk. A near miss environmental incident is defined as an incident that had the potential to, but did not, adversely impact the environment (i.e. given a slight shift in time or distance, an environmental incident easily could have occurred).

A Safety Case Outline must be submitted to WorkSafe alongside the Draft Emergency Response Plan. The Safety Case outline must include a detailed, time-framed program of activities, including those for finalisation of the emergency plan in compliance with the mine regulations.

21.3.1 Monitoring

Regular environmental risk assessment will be undertaken to review potential environmental emergency situations that may arise. To ensure that risks associated with emergency incidents and events are minimised and appropriate action is taken in the event of a natural hazard over the life of the Project, a monitoring program will be established.

The monitoring program and associated records will include:

- Emergency response training records – including general induction training and comprehensive training for process operators and specific events (i.e. flood, fire);
- Maintenance records for on-site warning and safety devices (i.e. fire alarms, emergency spill kits, etc);
- Incident reports, including injury and near miss data; and
- Methods for monitoring performance against procedures and targets.

21.4 Key Commitments and Actions

Commitments	Actions
Ensure that plans are in place to minimise risks and outline procedures for responding to a natural hazard event, environmental emergency or environmental incident	Eastern Iron will develop site-specific EMPs to cover emergency response procedures for specific Project components during Construction Eastern Iron will revise the EMP, including a detailed Emergency Preparedness and Response Plan as needed.
Ensure that plans are in place to appropriately report and monitor incidents	Eastern Iron will ensure detailed procedures for monitoring environmental incidents/natural hazards are included in the EMP, including comprehensive training for process operators in emergency response and the handling, storage and use of hazardous materials.

Commitments	Actions
Ensure that plans are submitted and approved by WorkSafe	Eastern Iron will submit a draft Emergency Response Plan and Safety Case Outline to Worksafe within 90 days of major hazard facility (MHF) registration.

22 REHABILITATION AND CLOSURE

The aim of this section of the EMP is to provide both an overall framework and an implementation plan for rehabilitation and closure planning and activities for the proposed Project. This section documents strategies to avoid or mitigate potential environmental impacts following site closure. This preliminary plan is based on the principle that planning for mine closure is an integral part of mine development and operations planning and should be initiated during feasibility studies. As mine rehabilitation and closure planning is fundamental to mine development and operations planning, the information is often specific to the various stages of the Project life-cycle.

Mining projects are dynamic operations and closure planning is an ongoing process. Closure planning is initially conceptual and moves progressively towards a detailed approach as the Project proceeds. Uncertainties associated with closure strategies will reduce as final project configuration is realised, rehabilitation techniques are refined, closure investigations are completed and stakeholder expectations are determined. The role of the closure planning process is to manage uncertainty and the attendant risks in the life-cycle of the mine to ensure that closure objectives can be achieved.

The rehabilitation and closure strategies identified in this EMP will provide the framework for the *Mine Rehabilitation and Closure Plan* that will be developed prior to Project construction and will be subjected to periodic review and updating.

The following rehabilitation and closure plan outlines:

- Eastern Iron's rehabilitation and closure objectives and strategies (Section 22.1).
- The overarching principles that will be applied during rehabilitation, decommissioning and closure (Section 22.2).
- Land clearing, soil handling and revegetation strategies (Section 22.3).
- Decommissioning and closure strategies for specific Project facilities (Sections 22.4).
- Post-closure monitoring and reporting framework (Section 22.5).

22.1 Objectives and Strategy

The following objectives will be integral to current and future decommissioning and closure strategies:

- Identify and develop strategies that ensure long-term geotechnical and geochemical stability of landforms in the Project Area and that are compatible with the surrounding environment and post-closure land-use, where applicable.
- Ensure that all materials with the potential to generate acid, metalliferous and / or saline drainage are appropriately managed.
- Protect the environment and public health and safety by using safe and responsible closure practices.
- Identify preliminary strategies for effective stakeholder consultation that considers the comprehensive interests of interested and applicable parties.
- Develop preliminary plans that are technically, economically and socially feasible to ensure the process of closure occurs in a timely manner.
- Ensure adequate financial provision is represented in the proponent's accounts to protect the community from closure liabilities.
- Establish indicators that will demonstrate successful completion of the closure process, including applicable legislation, standards, and preliminary completion criteria.
- Reduce or eliminate environmental or social impacts as quickly as possible following the completion of mine operations.
- Establish a rehabilitation program that utilises progressive rehabilitation to return land to pre-Project conditions as early in the process as is practicable.
- Reduce the need for long-term monitoring and maintenance by establishing physical and chemical stability of disturbed areas.

22.2 General Principles

22.2.1 Stakeholder Involvement

Eastern Iron will undertake early engagement with stakeholders regarding rehabilitation and closure issues to facilitate in identifying risks, understanding stakeholder expectations, and developing strategies to avoid or minimise risks and manage expectations. A stand-alone ***Stakeholder Engagement Plan*** is provided in EES Referral Attachment 3 (refer to Chapter 17).

Stakeholder engagement for the Project will begin formally as part of Project approvals and will continue throughout operations and decommissioning of the Project to ensure that decisions regarding landform design, end land use, and plant species selection are in-line with stakeholder expectations.

Stakeholders of the Project include both internal and external stakeholders who are likely to affect, be affected, or have an interest in mine closure planning, closure criteria, and outcomes. A list of key Project stakeholders that will be consulted regarding end land uses or other aspects of closure planning is provided in the *Stakeholder Engagement Plan*.

The following five principle objectives for the consultation process for Project closure and rehabilitation are adapted from *Strategic Framework for Mine Closure* (ANZMEC/MCA, 2000). The Project will:

- **Identify** relevant stakeholders and interested parties and invite them to join in formal consultation.
- Conduct consultation **throughout the life of the mine**.
- **Develop communication strategies** that reflect the needs of the stakeholder groups and interested parties.
- **Devote adequate resources** to ensure the effectiveness of the consultation process.
- **Work with affected communities** to manage the potential impacts of mine closure, wherever practicable.

22.2.2 Progressive Rehabilitation

The Project will employ a life-of-mine progressive rehabilitation strategy that will help facilitate achievement of designated final land uses that are compliant with completion criteria. Sections of the Project site will be rehabilitated when they become available, within the confines of seasonal climatic restrictions. By actively rehabilitating areas during the operational stages of the Project, rehabilitation methods will be tested in advance of mine closure, allowing for gradual development and improvement of rehabilitation measures.

The objectives of the progressive rehabilitation plan include the following:

- The overall disturbed footprint of the Project will be progressively reduced as early in the life of mine as possible.
- Various rehabilitation options will be trialled, particularly with respect to plant species selection, in advance of decommissioning with demonstrated results utilised for future efforts.
- Reduced surface water quality impairment (via reduced erosion and sediment transport).
- Visual amenity of the Project site will be incrementally improved.
- Provision of commitment to an active mine rehabilitation program.
- Potential reduction in closure costs.
- Potential reduction in the overall risk of rehabilitation failure and ultimate liability.
- Potential reduction of the rehabilitation bond posted with DPI.

A variety of progressive rehabilitation techniques will be employed, and additional methods will be evaluated and included in the *Mine Rehabilitation and Closure Plan*. Some examples of processes that will be implemented or considered are summarised in this section.

Decommissioning of exploration facilities and access tracks: Drill pads, sumps and access tracks scheduled for decommissioning will be rehabilitated immediately following the conclusion of their utility. These disturbed areas will be graded to match the physical contours of adjacent land and will be revegetated according to revegetation principles developed for this Project. Compacted surfaces will be ripped and topsoil applied (where required) during the drier months and native seedlings will be planted or seed will be applied during the first planting season.

Early decommissioning: Sites that required vegetation removal, major earthworks, or other land

disturbing activity that promote erosion during all phases of Project exploration and implementation will be similarly rehabilitated as soon as is practicable following the completion of their utility. Grading and additional earthworks will be conducted during the dry months, with planting / seeding implemented during the first planting season.

Progressive rehabilitation of the low-grade ore stockpile: This scenario, currently being considered, would entail excavation of the northern extent of the 5 Mile Pit first, to its final depth of approximately 60 m. Some or all of the low-grade ore material that would otherwise be stockpiled above ground would instead be stored at the base of the northern portion of the pit, eliminating the need for double handling of this material (refer to Section 22.5).

Establishment of vegetation on outer batter slopes: Where feasible, batter slopes will be vegetated with native grass species (or other native species that establish quickly) during construction and operations phases of Project implementation to reduce soil losses, minimise sediment transport in surface water and eventual downstream sediment deposition.

Revegetation trials: Revegetation trials will be conducted to provide pilot studies for future decommissioning and rehabilitation. Early phase rehabilitation efforts will be monitored for their effectiveness. Results will improve the effectiveness of future rehabilitation through continuously improved protocols and species selection (e.g. plant species' survival, nursery practices, material stockpiling and handling).

Strategic soil stockpiling: The Project will develop a register of topsoil stockpile locations, volumes, source locations, and other relevant data such as soil properties. The stockpile inventory will be continually updated to ensure adequate availability of resources for operations phase rehabilitation requirements. Stockpiling locations will be selected, in part, based on their respective distance to near-term rehabilitation sites. This will be conducted in a manner to ensure the shortest duration of stockpiling (thereby retaining soil characteristics that enhance the chance of revegetation success), reduce mobilisation costs.

Hazards and geotechnical risk: Throughout construction and operations, monitoring will be conducted for geotechnical stability of Project facilities and roads and to identify areas prone to erosion or land-slip. Sites that are deemed geo-technically unstable will be rehabilitated according to engineering best practices and areas exhibiting signs of erosion (e.g. signs of rill formation, cracks on road surface edges, etc.) will have the appropriate erosion and sediment control measures applied as soon as possible following detection.

Plan goals, technical details and costs will be regularly updated as the details of construction and operations and the geophysical nature of the Project area become clearer. The sequence and schedule of closure activities will be progressively identified and clearly defined in later-stage Mine Rehabilitation and Closure Plans.

22.2.3 Completion Criteria

Eastern Iron will establish a performance framework that clearly defines rehabilitation success or failure, facilitates a consistent approach to performance monitoring, and recommends maintenance measures for rehabilitation areas that promotes the achievement of completion criteria.

Eastern Iron will develop clear and measurable completion criteria in consultation with relevant government authorities, local communities and additional relevant stakeholders prior to Project commissioning. However, the development of criteria will be an iterative process. Criteria will be flexible enough to adapt to changing circumstances without compromising the objectives. Criteria will be reviewed, and may be revised accordingly in consultation with stakeholders. Ultimately, completion criteria will form the basis for which responsible authorities determine whether Eastern Iron may relinquish their interest in the decommissioned mine site.

Standards and principles

- Upon closure, the rehabilitated mine site will be compliant with applicable legislative requirements for closure (at a minimum), including relevant sections of the MRSD Act and MRD Regulations.
- Post closure discharge will be compliant with applicable State and Commonwealth legislation, including the *Water Act* (1989), the *Environmental Protection Act* (1970), and Victorian SEPPs.
- Rehabilitation methods will be conducted according to industry best practice, where applicable, including: *Mine Closure and*

Completion (DITR, 2006a), *Mine Rehabilitation* (DITR, 2006b), *Strategic Framework for Mine Closure* (MCA / ANZMEC, 2000), and *Planning for Integrated Mine Closure: Toolkit* (ICMM, 2008).

- Wherever practicable, final land use designations and completion criteria will be consistent with applicable stakeholder expectations.

The criteria will be developed in consultation with relevant stakeholders to ensure that there is broad agreement on the post-closure land use objectives and the basis for measuring the achievement of each objective.

Examples of measureable completion criteria include the following:

- On-site and downstream water quality (e.g. with respect to baseline conditions and applicable discharge guidelines).
- Revegetation success (e.g. vegetative cover (%), species diversity, native vs. non-native plant establishment).
- Geochemical stability of remnant Project domains.
- Geotechnical and landform stability.
- Provisions for public safety.

22.2.4 Rehabilitation and Closure Bond

As per Section 80 of the MRSD Act, Eastern Iron will provide a rehabilitation bond for an amount determined by the Earth Resources Regulation Branch of DEPI.

Eastern Iron will incorporate DEPI requirements regarding the rehabilitation bond, understanding the following components of this obligation:

- Eastern Iron will provide a rehabilitation bond in the form of an unconditional bank guarantee prior to work commencing.
- The Earth Resources Regulation Branch (ERR) of DEPI will set and review the rehabilitation bond for the Project in accordance with the *Mineral Resources (Sustainable Development) Act 1990*.
- Under provisions of the *Mineral Resources Development Regulations 2002*, Eastern Iron is required to submit an annual assessment of the current rehabilitation liability of the Project operation. This self-assessment will be documented in accordance with guidelines specified in DEPI's *Establishment and Management of Rehabilitation Bonds for the Mining and Extractive Industries*.
- Eastern Iron will provide an estimate of rehabilitation liability in annual reports.
- Rehabilitation bonds will be periodically reviewed by the Department during the life of the operation to ensure that the security remains at an appropriate level.
- DEPI will undertake targeted audits of annual rehabilitation self-assessments for quality assurance.

22.3 Sudden or Temporary Closure

22.3.1 Sudden Closure

If unforseen events require unplanned or sudden closure, Eastern Iron will implement an accelerated closure process. This will involve the implementation of the ***Decommissioning Plan***, a component of the *Mine Rehabilitation and Closure Plan*.

The first actions will include implementation of minimum controls for Project closure. These controls include:

- Eastern Iron will notify all relevant authorities including the DEPI.
- Prevention of unauthorised access or entry to the mine. This will include "No Entry" signage in prominent places and application of barriers to access, including fencing around the Five Mile Pit, where necessary.
- Equipment will be removed from site or secured behind locked doors.
- The Project facilities will be adequately locked to prevent access.
- Hazardous substances will be removed from the site and stored at a suitable location or disposed of in a certified landfill.
- Immediate implementation of surveys to assess Project area needs for remediation of contaminated areas, application of erosion and sediment control measures, and grading and revegetation of disturbed areas.

The *Mine Rehabilitation and Closure Plan* would then be revised and updated to *final* status and submitted to DEPI and all relevant authorities within three months of notification of closure.

22.3.2 Temporary Closure (Care and Maintenance)

In the event of temporary closure, initial actions listed above for sudden closure would first apply. ***A Care and Maintenance Plan*** would be developed which will specify Easter Iron's approach to maintenance for a transfer from operations to care and maintenance that avoids or minimises environmental effects on land and water within and adjacent to the Project area.

Eastern Iron's approach to temporary closure and their obligations for environmental and social protection during temporary closure are summarised. These obligations and actions would be further detailed if the Project enters into care and maintenance.

Eastern Iron will:

- Notify all relevant stakeholders including the DEPI;
- Develop a *Care and Maintenance Plan* within three months of notification of temporary closure;
- Prevent unauthorised access or entry to the mine as well as inadvertent access to any facilities. This will include "No Entry" signage in prominent places and application of barriers to access including fencing and barriers road entry points. Buildings that are unused will be adequately locked to prevent unauthorised access;
- Remove all hazardous substances from the site and store them at a suitable location or dispose of them in a certified landfill; and
- Develop a routine monitoring and reporting strategy to assess the integrity of the WRD, water storage facilities and sediment control ponds and the unsealed road network to ensure their structural integrity.

22.4 General Rehabilitation Strategies

22.4.1 Land Clearing

A major tenement of successful closure and rehabilitation will be achieved by optimising Project design to minimise the extent of land clearing activity that will include implementation of controls during clearing activity that facilitate avoidance or minimisation of impacts from vegetation removal and earthworks during Project construction and operations.

- Land clearing will be restricted to the minimum area required for safe operations.
- Land clearing will be conducted progressively, such that land is cleared immediately prior to construction to the extent practicable.
- Vehicle and equipment exclusion zones will be established (with fencing and signage) to protect sensitive vegetation, riparian areas, or native vegetative strips that will not be cleared and exist in close proximity to active areas.
- Cleared vegetation will be beneficially reused where possible. Cleared timber will likely be offered to the Gunaikurnai tribes or to the local community. Individual plants may be transplanted where high value or threatened species will be removed.
- Land clearing will be undertaken during the dry season to minimise soil compaction, erosion and sediment transport.

Land is to be cleared to the limit of clearing which will be indicated on civil earthworks drawings. Land that has been assigned for clearance will be surveyed, marked out and signed off by an appropriate person prior to clearing, in order to ensure no significant areas are inadvertently and unnecessarily disturbed.

Where practicable, the limit of clearing will be less than five metres outside of the edge of earthworks. The exception to this will be due to adhering to provisions under the Bushfire Management Overlay (BMO). It has been determined that clearance of inner and outer zones of 39 and 20 metres respectively will be required to be maintained around buildings. A 50 m buffer has also been allowed around the edge of the pit.

22.4.2 Soil Handling

Soil Salvage

Topsoil from the mine pit and waste rock pile will be progressively stripped and either utilised immediately for Project revegetation activities or stockpiled for later use during site rehabilitation.

If topsoil is stripped, the complete A-horizon of the soil profile (or top 30 cm, if the A horizon is not discernible) will be stockpiled separately from subsoils to maximise seed, nutrient and organic material availability.

Clearing and grubbing of vegetation and topsoil stripping will be delayed until immediately prior to scheduled disturbances (earthworks/construction), to ensure erosion and sediment transport are minimised.

Eastern Iron will conduct soil stripping operations when soils are sufficiently dry to avoid compromising physical properties. Vegetative removal and soil stripping will be scheduled for the dry season and will be rescheduled if substantial off-season precipitation occurs in the dry season.

Soil Stockpiling

In cases where topsoil or subsoil cannot be immediately reused, it will be stockpiled.

Eastern Iron has committed to maintaining a register of soil stockpile locations, stockpile volumes and source locations (refer to Attachment 1, Project Description for proposed stockpile locations). The register will differentiate between topsoil stockpiles and subsoil stockpiles. The stockpile inventory will be continually updated to ensure adequate availability of resources for site rehabilitation requirements.

A Standard Operating Procedure for constructing and maintaining soil stockpiles will be developed for the Project for inclusion in the *Mine Rehabilitation and Closure Plan*. The Plan will specify Project stockpile locations, soil handling procedures and erosion and sediment control measures that will be incorporated.

A summary of the principles that will be developed for these documents will include the following:

- Topsoil and subsoil will be stockpiled separately in strategic locations to minimise hauling distances to rehabilitation sites.
- Stockpiles will be less than 2 m in height for topsoils and less than 6 m in height for subsoils with batter slopes not exceeding a gradient of 1 m vertical to 2 m horizontal.
- Where topsoil from stockpiles will not be used for a time period in excess of 3 months, the stockpile will be seeded or planted to minimise erosion and help maintain soil quality, unless adequate natural stocking occurs.
- Water generated from mining construction, operational activities and natural surface runoff will be diverted around stockpiles to minimise erosion.
- Silt fences or similar structures will be implemented on downhill slopes adjacent the stockpiles to capture sediment from surface water run-off.

For stockpiles greater than 2 metres in height, additional erosion control measures will be implemented such as:

- Paddock dumping to increase infiltration and minimise runoff.
- The use of contour banks or berms to minimise slope lengths and impede down-face water runoff.
- Constructing rock-lined drainage channels, where required, to manage runoff from the stockpile and direct runoff to the pit or sediment basins.

Drainage from all topsoil stockpiles will be controlled and directed along an erosion-resistant drainage flow path to protect downstream water quality.

Soil Application

Topsoil will be applied to rehabilitation areas that were stripped of topsoil prior to construction or where material is deemed unsuitable for sustaining an adequate cover of vegetation (e.g. waste rock). Topsoil applications will occur during the dry season immediately preceding revegetation.

When possible, topsoil stripped from a construction site will be immediately relocated to a rehabilitation site to encourage re-establishment of indigenous plant species via seed in the topsoil, reduce operating costs associated with double-handling and minimise losses of topsoil associated with erosion and sediment transport.

Topsoil stripped from an area dominated by invasive species will not be transferred to an area that was dominated by or is adjacent to predominately native species.

22.4.3 Revegetation Program

The Eastern Iron will incorporate the following concepts and principles into the *Mine Rehabilitation and Closure Plan*:

- Tree and plant species native to the region will be selected for revegetation efforts.
- Species selection criteria will consider compatibility with soil type and character, soil moisture regime, and microclimate.
- Native seed will be sourced either from the Project site or the local region, to the extent possible. If this quantity falls short of Project need or if particular species are required that do not have adequate seed stock on the Project site, the Project will purchase certified weed free seed from a reputable supplier.
- Qualitative monitoring (refer to Section 22.6) will be conducted at least 18 months in advance of the first planting season with revegetation scheduled to allow adequate time for raising tube stock in the nursery.

Site Preparation

Where applicable, the following will be conducted at each rehabilitation site requiring planting:

- Where appropriate, rehabilitation sites will be graded to approximate pre-Project contours to direct surface water to natural (or preferred) drainages and minimise potential erosion.
- Compacted surfaces (former roads / building sites) will be mechanically ripped to an approximate depth of 1 metre prior to topsoil application or planting / seeding to promote surface water infiltration, aeration and root growth.
- Where required (e.g. if topsoil was removed from site during Project construction), topsoil will be applied to the rehabilitation site to a depth of approximately 30 centimetres following grading and ripping.
- Rehabilitation sites located in high traffic areas will be fenced-off or adequately marked to prohibit disturbance from vehicular or foot traffic.
- Non-native invasive species will be mechanically removed or sprayed with herbicide (pending stakeholder consultation) prior to planting or seeding with native species.

Revegetation Trials

Revegetation trials will be conducted at the Project site, with trials planted at least five years before mine decommissioning commences to allow ample time for: (I) assessment of long-term survival prospects and (II) nursery production of the most viable species.

The following criteria will be considered when selecting plants for revegetation trials:

- An adequate number of regionally local tree, shrub and herbaceous species will be trialled to ensure that the species selected for post-closure revegetation will provide multiple layers of cover for optimum habitat.
- Native grass species will be trialled on predominant soil types to identify species that will quickly establish cover for planting areas prone to erosion or upslope of key locations (e.g. steep gradients, riparian or buffer areas).

Sites revegetated before mine closure (i.e. through progressive rehabilitation) will serve as informal revegetation trials. The results from annual monitoring of these sites (as well as stakeholder consultation) will provide the basis for species selection and site preparation techniques during decommissioning and closure.

Rehabilitation trials will be conducted on a portion of the waste rock dump (Section 22.5.2) to determine whether the material will support native vegetation. A suitable area will be selected during the first three years of operations.

22.4.4 Nursery Practices

Species selection

The final species mix will be determined during stakeholder consultation, with due consideration to pre-mining vegetation communities, desired end land uses of relevant stakeholders, and the utility of select species to promote landform stability. Where feasible, vegetation established in rehabilitation areas will be analogous to native vegetation communities in close proximity to the site. Native plant species of local provenance will be used for rehabilitation (unless agriculture or commercial

timber is the desired end land use). A combination of broadcast seeding and seedling planting will be employed.

Nursery production

Eastern Iron may fulfil planting and seeding requirements through one of two management options, or the combination of both:

- Constructing a nursery for the Project with sufficient capacity to sustain its revegetation program; or
- Sourcing from local commercial nurseries.

Whether on-site or through a commercial vendor, the core objectives of the Projects' nursery production system will be to:

- Supply a range of plant species capable of achieving the proposed post closure land uses.
- Produce healthy seedlings in a timely and cost-efficient manner, and in sufficient quantity to meet progressive and final rehabilitation requirements.
- Process and store seed of ample quantity and viability to meet progressive and final rehabilitation requirements.
- Maintain a nursery inventory and a planting schedule that anticipates needs at least 18 months in advance revegetation.
- Develop and maintain a seed collection database identifies collection locations and date of seed harvest.

Seed Management

Seed management for the Project will include the following components:

- Where possible, seed will be collected from native plant species that are slated for removal, prior to clearing and grubbing for Project construction.
- Where possible, native seed will be collected locally, to maximise adaptation and to maintain genetic integrity of local provenances.
- Storage protocols will be established, including a database, to maximise seed viability, shelf life and track revegetation success/failures.

Additional seed will be collected each year by qualified personnel. Seed will be prepared for storage and refrigerated on-site or at a local nursery. If additional seed is required for rehabilitation, seed will be sourced from a local vendor. The local vendor will provide certification of weed free seed and documentation of the location of the parent source plants.

Decommissioning and Closure

Mine decommissioning will require substantially greater quantities of seedlings for rehabilitation than during the average year of mine operations. Long-term planning will be required to ensure that adequate seed and seedling sources are available to fill the acreage to the desired stocking level. Accordingly, the Project may determine that it is cost-effective to work in association with local commercial nurseries to supplement seed or seedlings over the life of the Project.

Working with local commercial nurseries would also contribute to the Project's community and business development programs. Eastern Iron will undertake a feasibility assessment of nursery production options at the project development stage.

22.4.5 Maintenance

Revegetated areas will be appropriately maintained. Revegetated areas will be fenced immediately after planting, if considered necessary, to protect them from grazing or disturbance by animals and to indicate the sensitivity of the site to humans. Additional maintenance requirements may include:

- Replanting failed or unsatisfactory areas.
- Repairing eroded areas.
- Pest and weed control.
- Fertiliser applications.
- Watering plants in drier areas, especially during the establishment phase.
- Applying lime or gypsum to control pH and improve soil structure.

Maintenance inspections will be undertaken following major rainfall events and at the start and completion of each wet season. The need for maintenance will be determined by visual inspection and by review against revegetation and rehabilitation key performance indicators.

The rehabilitated site will also be monitored according to designated timeframes. The need for maintenance will be determined by visual inspection and by review against revegetation and rehabilitation key performance indicators.

22.4.6 Weed Control

Eastern Iron will manage weeds on site, particularly on disturbed areas and revegetated land, by:

- Preventing or minimising the introduction of exotic weeds.
- Minimising the spread of existing weeds.
- Controlling weed infestation.

The first few years following planting are the most important for controlling the spread of invasive species. As pioneer species, weeds tend to out-compete native species on disturbed soils before desired species have had time to set roots and adequately cover a rehabilitated area. During the first three growing seasons, botanical surveys and hand removal of weeds or herbicide applications will be pursued vigorously.

Rehabilitation areas will be checked for weed proliferation during qualitative monitoring of rehabilitated areas. Maximum allowable weed cover targets will be set as a key performance indicator for revegetated areas, with areas not meeting criteria being managed appropriately. Weed control will be conducted for sites that are meeting performance indicators for weed coverage if relative cover of non-native/native species is increasing quarterly.

Preventing or Minimising the Introduction of Exotic Weeds

To prevent or minimise the introduction of exotic weeds:

- Contractors shall be required to wash-down all heavy equipment before mobilisation on site under the standard terms and conditions of their contract.
- A vehicular wash-bay shall be installed adjacent to the process plant to enable routine cleaning of mud and dirt from vehicle tyres and chassis.
- Revegetation trials shall be undertaken before the widespread application of seeds or seedlings purchased off-site, to enable assessment of weed contamination levels.

Minimising the Spread of Existing Weeds

To minimise the spread of existing weeds, a weed identification survey shall be undertaken in the Project Area to determine:

- Appropriate clearing methods.
- The potential for weed infestation when topsoil is respread, and consequently, any potential constraints to respreading the topsoil in new areas.

Appropriate cultivation methods will be implemented to help prevent weed infestation, such as the application of mulch to newly revegetated areas to minimise weed establishment.

Controlling Weed Infestation

Eastern Iron will adopt a proactive role in controlling weed infestation in revegetated areas, particularly during the first few years following establishment. Weed control options may include:

- Mechanical control including hand or tractor mowing.
- Hand weeding for smaller areas.
- Herbicidal treatments, if an appropriate herbicide and application method can be identified that will limit damage to only the target.

22.5 Rehabilitation and Closure of Key Project Facilities

22.5.1 Pit

A concept plan for closure and rehabilitation of the pit is provided in Figure 22.1 and Figure 22.2. The rehabilitation and closure strategy for the 5 Mile Pit is as follows:

- The pit will remain in place post-closure.
- Post-closure, the open pit is designed to flood and overflow regularly into Tomato Creek. The overflow level of the pit lake is approximately 190 mAHD, and the pre-mining peak groundwater level in the pit area is approximately 187 mAHD. The post-closure flood level of the pit is therefore designed to be marginally higher than the pre-mining groundwater level, and will provide a water cover of >100 m over the backfilled materials. The post-closure water balance indicates that

the pit lake will overflow regularly into Tomato Creek in the long term.

- Backfilling of potential acid forming (PAF) waste rock and low-grade ore (if any remains) into the pit is to be conducted in a manner that prevents the backfilled materials from becoming perched on benches above the height of the final waste rock pile. Perched material may not remain permanently under water and has the potential to present a long-term water quality risk.
- A layer of acid-consuming materials and organic material will be laid over the backfilled materials in order to promote the activity of sulfate-reducing bacteria in the base of the pit lake.
- The pit lake is designed to provide passive treatment for all inflows through a combination of retention time, sulfate reduction by sulfate reducing bacteria (SRB), acid neutralisation by alkalinity produced by SRB activity and the dissolution of limestone, and alkalinity brought in by groundwater.
- The post-closure pit will have highwalls of 30–40 m in height (above the pit lake water level) on the western and eastern sides exposing volcanics and/or volcaniclastics (or comparable sedimentary lithology). Some limited sulfide oxidation is expected in these exposed highwalls in the long term, but geochemical assessment shows that no acid drainage will be produced. Based on observations from historical quarries in the area, this oxidation only appears to occur on rock surfaces and is expected to be limited. All drainage from the exposed highwalls reports to the pit for passive treatment.
- As the pit is flooded, any acidity or salinity generated in the groundwater drawdown cone during operations will be flushed into the pit. The chemistry of pit lake water will be monitored throughout the flooding operation to identify whether treatment (e.g. addition of limestone or calcium hydroxide) may be required in this initial flood period.
- To minimise the period that wall rock is exposed to atmospheric oxygen on closure and to dilute potentially mildly saline water inflows, flooding of the pit will be augmented by pumping from the water storages (in addition to natural inflows from groundwater and upstream runoff) prior to decommissioning of those storages.
- During decommissioning, the pit's stability will be considered in line with expected future land uses of the area. It is expected that the designed pit slope angles will remain stable beyond the operating mine life and into closure.
- Main ramp accesses into the pit will remain allowing access to the final water level. This will allow wildlife and/or personnel safe access. The top area of the pit will be protected from general access by a substantial bund formed around the pit perimeter and fencing where necessary. This bund will be vegetated and expected to be a permanent feature post closure. It is not intended to provide any vehicle access to the pit area.

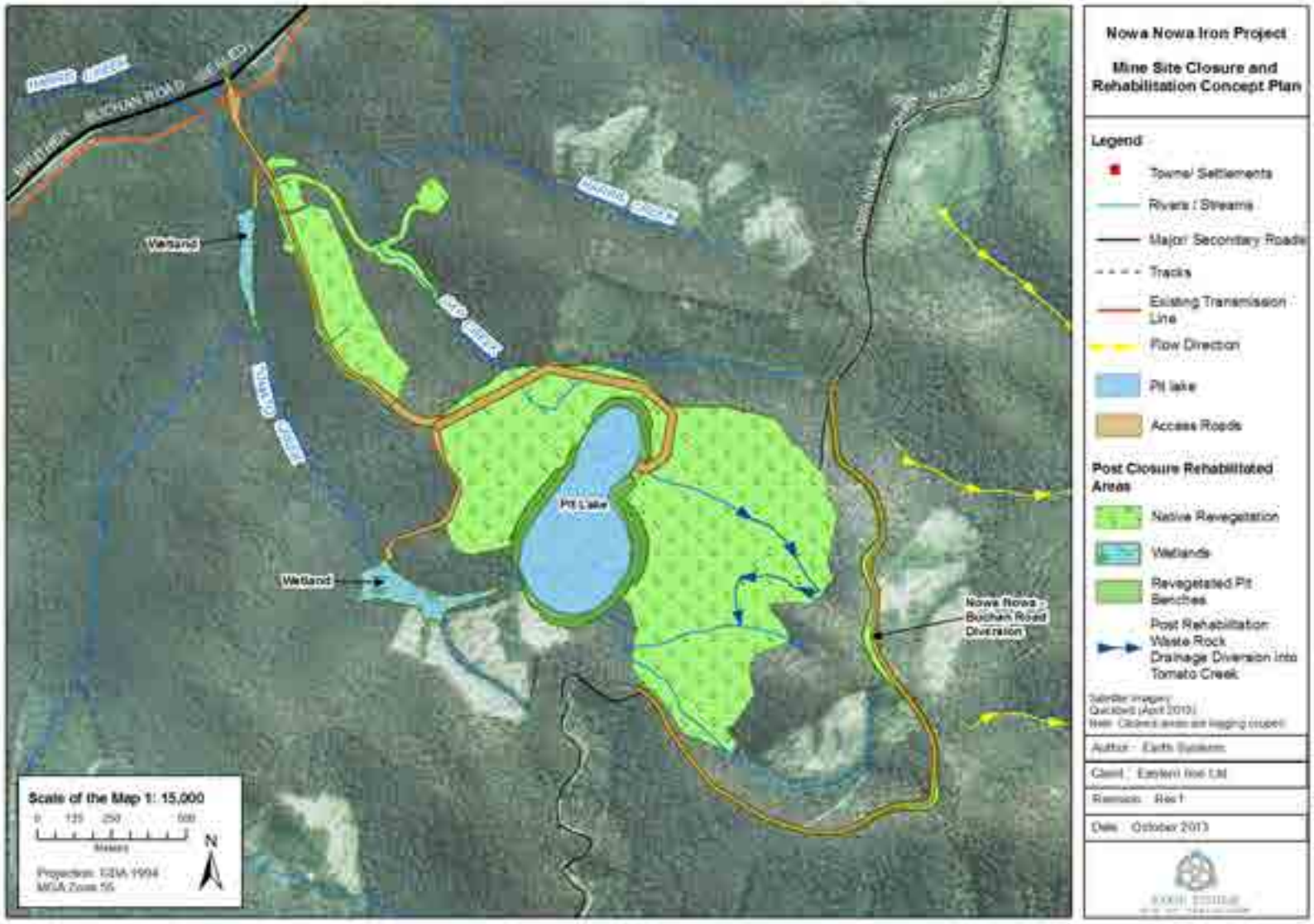

Figure 22.1 Mine Site Closure and Rehabilitation Concept Plan

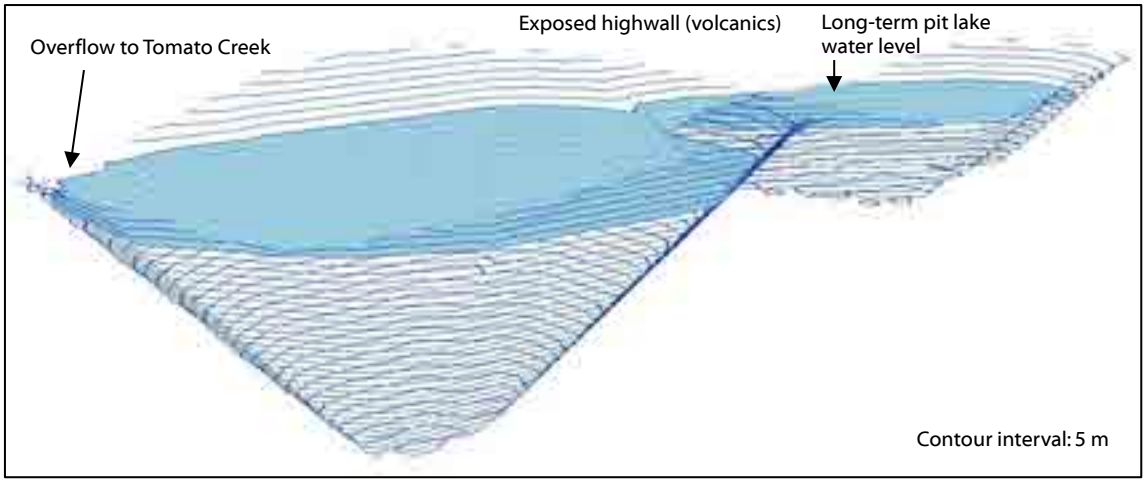

Figure 22.2 Preliminary pit shell showing design long-term pit flood level (approx. 190 mAHD).

22.5.2 Waste Rock Dump

The Waste Rock Dump (WRD) construction methodology, objectives and principles (refer to EES Referral Document, Attachment 1)) form the basis for the rehabilitation and closure strategy for the WRD. The construction principles devised to promote geochemical and geotechnical stability during operations will provide the framework for ensuring long-term stability of the facility post-closure. The primary features of design and construction that will facilitate closure include:

- The WRD will be located immediately upstream of the mine pit and entirely within its catchment to provide for control of seepage and runoff from the facility.
- The WRD will contain only Category A, B and N (non-acid forming, potential acid forming – marginal, and potentially acid consuming, respectively) waste rock, and Category B waste rock will be encapsulated within non-acid forming or potentially acid consuming waste rock to minimise AMD generation.
- The WRD will be constructed in a manner that ensures long-term geotechnical stability post-closure. This will be achieved through diversion of upstream surface water around the WRD, ground-up construction and compaction to inhibit water percolation, progressive rehabilitation with grading and planting of each lift conducted after the completion of each lift, and the ultimate development of a uniform and low-angle slope (<20°).

Upon decommissioning, the following actions will be undertaken to further provide for long-term geochemical and geotechnical stability:

- Downstream seepage from the WRD will report to the mine pit (pit lake).
- The WRD is to be completed with a cover system that minimises the infiltration of water into the dump and maximises runoff generation. This cover system will require an impermeable layer (such as clay) to prevent infiltration and an overlying armour layer (coarse rock) to prevent erosion. Basal clays from the water storages will be available as impermeable materials for the dump cover system once the storages are decommissioned.
- The area of the top surface of the dump is to be maximised and graded to the east to allow all runoff to be captured at the upstream end of Gap Creek and diverted into the adjacent Tomato Creek catchment (using the new topography). The surface should be gently sloping and channelled to maximise runoff capture and minimise erosion.
- Clean catchment water collected from the WRD is to be channelled around the top of dump into the adjacent Tomato Creek catchment to ultimately report to the open pit.
- Drainage from the WRD will report to the pit post-closure for passive treatment. The chemistry of leachate from the WRD is to be monitored throughout operations to confirm

any potential requirement for additional treatment.

- Stockpiled topsoil will be spread along the contour following final WRD shaping and keyed to the WRP surface during the first dry season following decommissioning.
- The WRD will be revegetated according to the methodology described in Section 22.4.3. It is anticipated that native grass species will be seeded for rapid establishment to enhance geotechnical stability and native deciduous tree species will be planted to further enhance stability, promote transpiration, and to provide organic matter (carbon) to the decommissioned open pit (refer to Section 22.3.1).
- The final WRD landform will be engineered so as to minimise erosion potential and infiltration into the dump, while maximising the catchment drainage reporting to the open pit post-closure. A landform with a flat top and relatively gentle slopes (maximum 20°) is likely to satisfy these objectives.

22.5.3 Temporary Low Grade Ore Stockpile

The dry Low Intensity Magnetic Separation process is expected to generate approximately 200,000 tonnes per annum of low- grade ore material. A more accurate volume estimate will be provided upon the completion of metallurgic testwork, pit optimisation and mine scheduling, however the outcomes of this work will not impact on the size of the footprint required. During operations, this material will be stored in a temporary dry stockpile located upstream of the mine pit in upper Tomato Creek. The low-grade ore material may be reprocessed during later stages of the mine life (if financially viable and subject to approval).

PAF waste rock (Category C) will be temporarily stored with the low-grade ore as a retention structure to contain and prevent erosion from the temporary Low Grade Ore Stockpile. PAF waste rock is primarily associated with footwall sediments and is likely to be produced later in the mine life.

Upon Project decommissioning, any remaining low-grade ore and all PAF waste rock will be backfilled into the open pit for disposal under a permanent water cover to prevent sulfide oxidations. Sulfate in the pit lake water will be passively reduced to form stable sulfides. Backfilling is to be conducted in a manner that prevents backfilled material from becoming perched on benches (and thus potential exposed to the atmosphere after the pit is flooded).

Progressive rehabilitation of the Temporary Low Grade Ore Stockpile is being considered. For this scenario, the northern extent of the 5 Mile Pit would be excavated first, to its final depth of approximately 60 m. Some or all of the low-grade ore material that would otherwise be stockpiled above ground would instead be stored at the base of the northern portion of the pit, eliminating the need for double handling of this material. This situation would be possible provided that overall ore production schedules for the Project allow the northern extent of the pit to be sufficiently mined in advance of material placement needs.

22.5.4 Plant Area

Prior to construction of the Processing Plant and ancillary facilities, the surface will be graded to promote surface water drainage to the east, toward Gap Creek and the downstream Sediment Control Dam.

Upon decommissioning, the following activities will be conducted:

- The Plant and ancillary facilities will be dismantled, with material removed from site.
- Materials may be sold for scrap to local merchants, removed off-site for recycling, or transported to an appropriate disposal facility;
- Soil testing will be undertaken to identify soil contamination, if applicable;
- Any building materials, foundations or soil contaminated by metals, hydrocarbons or other contaminants will be remediated and/or removed from site and disposed of in an appropriate dumping facility; and
- All exposed soil will be graded to approximately pre-Project contours, ripped to reduce compaction, spread with topsoil (if necessary) and revegetated with native plant species according to methodologies detailed in the Section 22.2.5.

22.5.5 Water Storage and Sediment Control Facilities

At closure the following actions will be conducted:

- The Operations Water Storage will be decommissioned but the structure retained as a wetland to passively treat overflow from the pit lake.
- The Clean Water Storage downstream of the Operations Water Storage will be decommissioned but the structure retained as an additional wetland to polish water draining from the decommissioned Operations Water Storage.
- The Sediment Control Dam will be decommissioned and the former channel reinstated (if no alternative use for the dam is identified). This will involve reshaping the channel, revegetating with native riparian species.

The post-closure concept plan for the water storages is illustrated in Figure 22.1. Further detail regarding the decommissioning of each dam is provided below.

Prior to decommissioning, the water contained in all storages will be pumped to the open pit to accelerate flooding of the pit to a level of at least 2 m above the level of backfilled mine materials (see Section 22.5.1).

Erosion and sediment controls will be in place during decommissioning (refer to EMP for detailed erosion and sediment control).

22.6 Post-closure Monitoring and Management

Procedures for qualitative and quantitative monitoring will be provided in the *Mine Rehabilitation and Closure Plan*. The Plan will define the monitoring protocol, the methods of data analysis and reporting frequency for post-closure monitoring. The following section provides the basis for which specific protocol will be developed.

Rehabilitation and closure monitoring will include:

- Assessment of rehabilitation sites that were remediated during mine operations to inform Eastern Iron of their effectiveness.
- Quarterly qualitative monitoring conducted to assess maintenance requirements for rehabilitation sites during the Project's operational and post-closure phases.
- Annual quantitative monitoring following mine closure to compare results of monitoring against closure criteria for rehabilitation; and
- Water quality monitoring (Operations, Clean Water and Sediment Control Storages; downstream waters).

22.6.1 Qualitative Monitoring during Operations

Eastern Iron will conduct qualitative monitoring to determine maintenance requirements for sites that have been progressively rehabilitated and to assess the effectiveness of rehabilitation strategies.

Monitoring of sites rehabilitated early in the life of the mine will provide valuable insight (e.g. plant species viability on varying substrate and efficacy of erosion and sediment controls employed on rehabilitated landforms) that will improve rehabilitation methodologies and plant species selection for post-closure rehabilitation.

The output from qualitative monitoring will be comprised of the following:

- Photographs of the site, taken from the same location during every monitoring event to capture changes over time.
- Estimated survival (%) of planted vegetation.
- Estimated relative cover (%) of site by herbaceous, shrub and tree species.
- Assessment of species mix (species present, relative success of establishment for each of the species planted).
- Estimated total cover (%) of native versus non-native species.
- Presence and estimated percentage cover of each invasive plant species present.
- General observations regarding health and vigour of planted species / native stocking.
- Indications of erosion.
- General effectiveness of erosion and sediment transport control measures.
- Indications of disease or insect infestation.

22.6.2 Quantitative Monitoring during Operations

Quantitative monitoring will be undertaken to assess whether sites rehabilitated during operations meet

post-closure success criteria for revegetation and structural stability to provide ample time for maintenance and replanting where results are less than desirable (refer to Section 22.6.5 for summary of methodology).

Water quality of the water holding facilities and downstream receiving waters will be conducted during operations (refer to Section 5.4) to provide ample time to determine the most suitable active or passive water quality treatment that would be employed in the event the water quality will not meet discharge standards.

22.6.3 Monitoring at Decommissioning

Water monitoring and soil sampling and analysis will be conducted upon the cessation of mine activity prior to the implementation of decommissioning and closure activities. In summary, the following will be conducted:

- Soils will be sampled in areas adjacent to the Mine Plant, fuel storage areas, parking facilities and any other areas where hydrocarbons or other contaminants may be introduced to the environment (refer to Section 16.3.3).
- Sampling for field and laboratory water quality parameters will be conducted for Gap and Tomato Creeks and the Operations, Sediment Control and Clean Water Dams prior to pond decommissioning activities and discharge into downstream receiving waters (refer to Sections 5.4 and 6.3).

22.6.4 Post Closure Monitoring

Following the establishment of suitable rehabilitation and mine closure criteria, regular post-closure monitoring will be conducted to determine whether rehabilitation works have been successfully implemented.

Post-closure monitoring will be undertaken for an appropriate and designated time frame.The duration of monitoring will be dependent on the length of time required to reasonably determine the relative success (or failure) of site closure and rehabilitation and will be determined in consultation with applicable regulators.

Key elements of the post-closure monitoring regime will include:

- Clearly defined success criteria and agreement on these criteria from applicable stakeholders. Criteria may include: physical indicators (e.g. stability, resistance to erosion, reestablishment of appropriate drainage channels); biological indicators (plant survival, species richness, plant density, canopy cover, seed production, weed control, productivity); water quality standards for surface water discharge; etc.
- Quantitative monitoring protocol that tests for measurable and statistically significant results for comparison with completion criteria.
- Clear contingency measures for rehabilitation failures (e.g. re-planting if survival drops below a given percentage, repairing eroded areas, etc.).
- Provisions for monitoring and managing rehabilitated areas until vegetation is self-sustaining and meets the closure criteria.
- Facilities and downstream water quality monitoring for applicable parameters (refer to Section 5.4).

Monitoring protocols will include adherence to or documentation of:

- Pre-determined monitoring frequency.
- Specific and measurable success / mine closure criteria;
- Clear methodology for measuring data.
- Qualifications for personnel conducting monitoring (e.g. botanical skills).
- Verification of equipment calibration.
- Reporting requirements, including chain-of-command and responsibilities matrixes.
- Quality assurance / quality control specifications for data.
- Data management and analysis framework.

22.7 Reporting

Reporting requirements will be determined in consultation with DPI (and additional stakeholders, if applicable). It is anticipated that Eastern Iron will submit annual monitoring reports that will include results of progressive rehabilitation during operations (in addition to more frequent reporting for other monitoring conducted during operations, e.g. water quality monitoring results) and annual results pertaining to decommissioning, rehabilitation

and revegetation efforts during decommissioning and closure.

The reporting frequency will be determined in consultation with regulators and will be provided in the *Mine Rehabilitation and Closure Plan*.

22.7.1 Annual Reporting

At the end of each calendar year, the Eastern Iron will report on the progress of rehabilitation efforts, with content including the following:

- Significant changes in structure and / or content of the *Mine Rehabilitation and Closure Plan*.
- Earthworks and drainage works undertaken.
- Hectares and locations rehabilitated.
- Species of vegetation planted / seeded.
- Progress and success of the rehabilitation program (monitoring results).
- Progress and findings of any rehabilitation and mine closure investigations.
- Significant problems encountered.
- Community and government consultation concerning rehabilitation and closure issues.

22.7.2 Post-Closure Reporting

Eastern Iron is committed to reporting on the progress and results of closure activities and post-closure status of the Project footprint to regulatory authorities and other stakeholders.

The post closure monitoring framework will be developed for inclusion in the *Mine Closure and Rehabilitation Plan*. The protocol for ongoing monitoring, reporting and meetings to review the results will be identified.

Success criteria will be reiterated and monitoring results will be analysed with respect to Project commitments for success criteria / mine closure criteria.

22.1 Key Commitments and Actions

Commitment	Actions
Produce a stand-alone Mine Rehabilitation and Closure Plan prior to construction, which will be updated regularly over the Project life.	Eastern Iron will develop the Mine Rehabilitation and Closure Plan prior to the onset of Project Construction. Eastern Iron will update the Plan every three years thereafter to refine techniques (where required), to take advantage of advances in technology, and to take stakeholder expectations into account.
Develop completion criteria for closure objectives	Eastern Iron will develop completion criteria in consultation with applicable stakeholder that provide clearly defined and measureable standards for meeting stakeholder and internal obligations for closure. Completion criteria will be included in the Mine Rehabilitation and Closure Plan.
Determine end land use and select plant species for rehabilitation	Eastern Iron will consult with applicable stakeholder to ensure that prescribed end land uses following Project closure and species selected for rehabilitation are in-line with stakeholder expectations.
Ensure post-closure surface and groundwater discharged from site is compliant with regulatory guidelines	Eastern Iron will regularly monitor treated water to ensure it meets applicable water quality standards prior to discharge. Eastern Iron will incorporate improvements of Water Management Plan into the Mine Rehabilitation and Closure Plan

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