

Licence Renewal

Supporting Documentation

Murrin Murrin Nickel Cobalt Project

March 2021



1. OCCUPIER DETAILS

Murrin Murrin Operations Pty Ltd (MMO) is the occupier and proponent for this proposal. MMO is a wholly owned subsidiary of Minara Resources Ltd. Minara Resources Ltd is a 100% owned subsidiary of Glencore plc.

[REDACTED]

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Premises Address: Murrin Murrin Nickel Cobalt Project

M39/446, M39/820, L39/81, L39/62, L39/83, M39/299, M39/651, M39/300, M39/301, M39/435, M39/436, M39/421, M39/422, M39/423, M39/424, M39/342, M39/343, L39/136, L39/168, M39/314, M39/322, M39/562, M39/637, M39/686, M39/692, M39/714, M39/715, M39/716 and M39/737
Laverton WA 6440

Table 1: Prescribed Premises Categories Applicable to Murrin Murrin.

Category Number	Category description	Production or design capacity	Actual Throughput (2019-2020 annual period)
5	Processing or beneficiation of metallic or non-metallic ore	5 000 000 tonnes per year	4 205 243 dry tonnes
6	Mine dewatering	700 000 tonnes per year	66 811 tonnes
12	Screening etc. of material	1 500 000 tonnes per year	529 633 dry tonnes
31	Chemical manufacturing	1 718 100 tonnes per year	1 353 478 tonnes
44	Metal smelting or refining	55 000 tonnes per year	43 606
52	Electric power generation	87.5 MW in aggregate	87.5 MW
54	Sewage facility	300 m ³ per day	222 m ³ per day
64	Class II or III putrescible landfill site	5000 tonnes per year	3 472 tonnes

2. OVERVIEW

The Murrin Murrin Nickel Cobalt Project (Murrin Murrin) is located approximately 60 km east of Leonora and 680 km northeast of Perth, Western Australia (Figure 1). Murrin Murrin is operated by Murrin Murrin Operations Pty Ltd (MMO), a 100% subsidiary of Minara Resources Pty Ltd (Minara). Minara is a 100% subsidiary of Glencore plc.

The operation uses open-pit mining techniques and processes the ore using High Pressure Acid Leaching (HPAL) to recover nickel and cobalt from laterite ore.

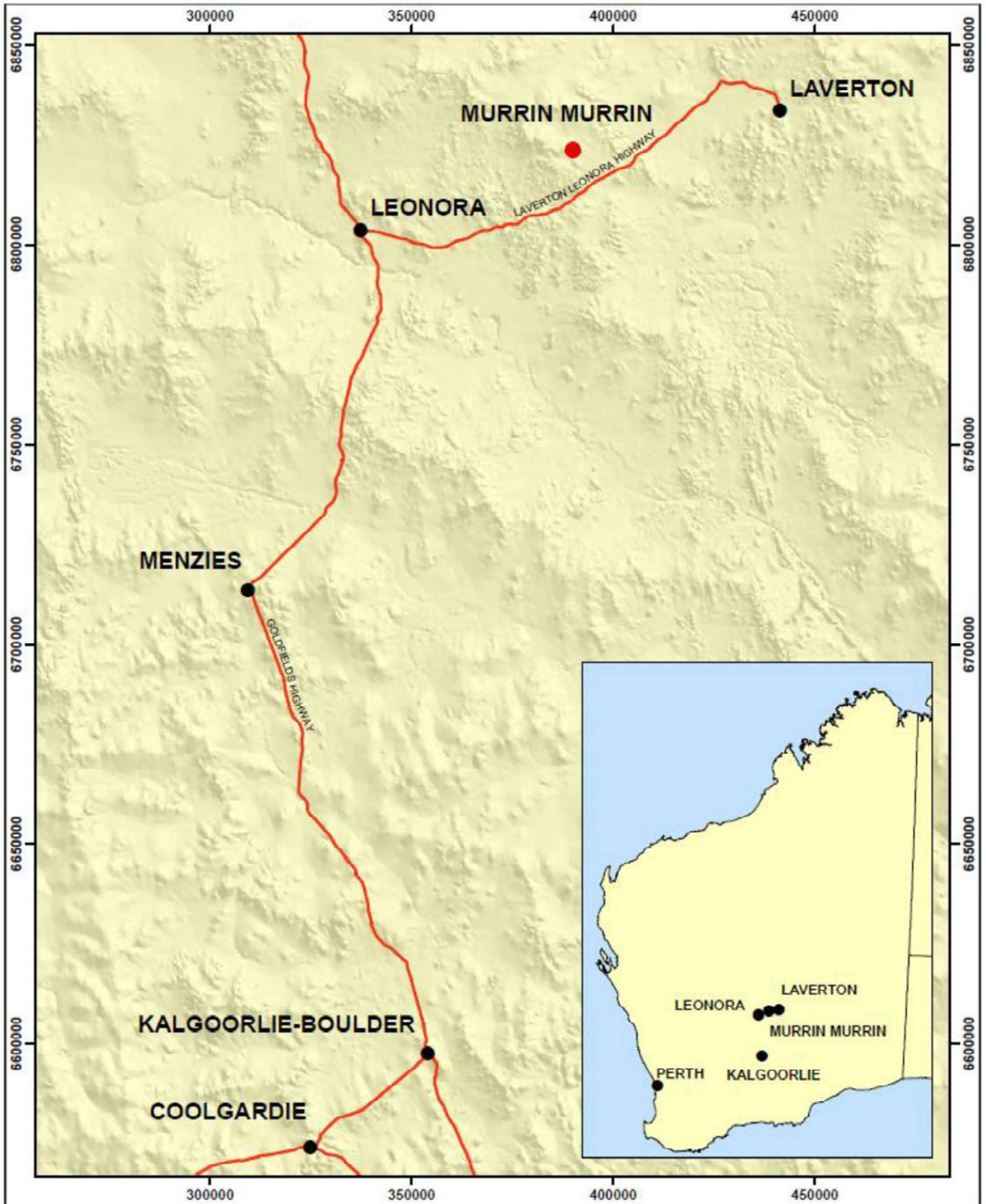
The current operation at Murrin Murrin consists of:

- Open-pit nickel cobalt mining operations at Murrin Murrin North, Murrin Murrin South and Murrin Murrin East
- Calcrete quarrying operations at the Windarra Calcrete Quarry
- Processing plant with associated ancillary plants (e.g. power generation, sulfuric acid plant, hydrogen sulfide plant and water treatment facilities)
- Tailings Storage Facilities (TSFs), including in-pit tailings disposal
- Heap leach facility
- Water supply borefields
- Landfill
- Wastewater treatment plant, and
- Supporting infrastructure such as the accommodation village, airstrip and roads

Murrin Murrin Operations Pty Ltd holds an *Environmental Protection Act 1986* Licence (L7276/1996/11) for the prescribed premises of Murrin Murrin. The Schedule 1 categories of the Environmental Protection Regulations 1987 under which Murrin Murrin is prescribed are:

- 5 Processing or beneficiation of metallic or non-metallic ore
- 6 Mine dewatering
- 12 Screening, etc. of material
- 31 Chemical manufacturing
- 44 Metal smelting or refining
- 52 Electric power generation
- 54 Sewage facility, and
- 64 Class II or III putrescible landfill site

Refer to the Licence (and associated amendments) for all discharge point locations.



Murrin Murrin Operations

Figure 1 - Regional Location Map

DATUM: GDA 1994
PROJECTION : GDA 1994 MGA Zone 51

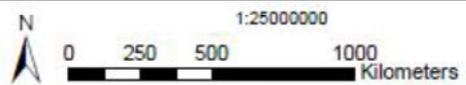


Figure 1 - Regional Location Map	
Department : Environment	Date : 04/09/2011
Drawn By: Luke Vernon	Revision: 1
File : O:\GIS\Maps\Environment\MXD\projects\Regional location map.mxd	

3. EXISTING ENVIRONMENT

3.1 Regional Setting

Murrin Murrin is located within the northeastern Goldfields of Western Australia (Figure 1). The area experiences a semi-arid climate and has an average annual rainfall of approximately 236 mm, with cool dry winters and hot dry summers. Rainfall occurs during summer from thunderstorms and remnants of tropical cyclones and during winter from cold fronts moving inland.

The regional landscape is deeply weathered and generally low-lying, with erosional escarpments (breakaways), low ranges and hills of more erosion-resistant rocks and small to very large playa lakes in the low lying areas (Pringle et al. 1994).

Murrin Murrin is located in the Laverton Sub-region of the Austin Botanical District (Murchison Region) and is part of the Eremaean Botanical Province (Beard 1976). The Eremaean Botanical Province is characterised by plants from the families of Mimosaceae (acacias), Caesalpinaceae (sennas), Myoporaceae (poverty bushes), Chenopodiaceae (samphires, bluebushes), Asteraceae (daisies) and Poaceae (grasses).

The eastern sections of this district are strongly influenced by the Helms Botanical District (Great Victorian Desert) (Hall et al. 1994). The vegetation in these areas is dominated by low Mulga woodlands on plains, with scrub on the hills, with a mixture of understorey species. Minor areas of shrub steppe on sand and succulent steppe on saline soils also occur. The region supports numerous mining projects and has been grazed for over 100 years.

3.2 Regional Hydrogeology

The hydrogeology of the northeastern Goldfields can be divided into the following three main aquifer types:

- Weathered and fractured bedrock, including siliceous caprock,
- Palaeochannels,
- Shallow but widespread alluvial water table aquifers.

In general the hydrogeology of the area is variable and reflects the variety of bedrock types, the structure and the degree of weathering and fracturing. Recharge is relatively low due to the low rainfall, high evaporation, heavy soils and well developed vegetation cover. Most groundwater in the region is brackish or saline, with potable/fresh groundwater occurring in small elevated areas in the upper reaches of the catchment where recharge conditions are favourable.

The major aquifers in the region consist of palaeo-tributary systems, which drain into regional palaeo-drainage structures. The aquifers consist of valley fill deposits infilling old drainage systems incised into Archaean bedrock. Within these deposits the aquifers generally consist of quartz sand overlying granitoid basement. The orientation of these systems is generally consistent with that of present day salt lakes. Regional groundwater flows in the vicinity of Murrin Murrin are generally parallel to present day surface drainage as both present day and palaeo-drainage catchments are controlled by basement outcrop.

Water quality in the regional drainage systems is generally hypersaline, while that of the palaeo-tributary systems can be fresh in the upper reaches with salinities generally increasing down gradient and becoming highly saline in the vicinity of the salt lakes.

3.3 Vegetation and Flora

Murrin Murrin is located in the Laverton sub-region of the Austin Botanical District (Murchison Region) and is part of the Eremaean Botanical Province, as defined by Beard (1976). The Eremaean Botanical Province is characterised by plants from the families of Mimosaceae (acacias), Caesalpinaceae (sennas, formerly cassias), Myoporaceae (poverty bushes), Chenopodiaceae (samphires, bluebushes), Asteraceae (daisies) and Poaceae (grasses).

The eastern sections of this district are strongly influenced by the Helms Botanical District (Great Victorian Desert) (Hall *et al.* 1994). The vegetation in these areas is dominated by low mulga woodlands on plains, with scrub on the hills, with a mixture of understorey species (Beard 1990). Minor areas of shrub steppe on sand and succulent steppe on saline soils also occur.

3.3.3 Murrin Murrin North

Priority flora *Acacia websteri* (Priority 1) *Hybanthus floribundus* (Priority 3) and *Hemigenia exilis* (Priority 4) have been located at MMN during previous vegetation surveys (G&G Environmental 2012 and Phoenix 2019). However, these populations will not be impacted by the Licence renewal and will continue to be managed and monitored according to the Licence.

3.3.2 Murrin Murrin South

Priority flora *Hybanthus floribundus* (Priority 3) and *Hemigenia exilis* (Priority 4) have been located at MMN during previous vegetation surveys (G&G Environmental 2012 and Phoenix 2019). However, these populations will not be impacted by the Licence renewal and will continue to be managed and monitored according to the Licence.

3.3.5 Murrin Murrin East

Priority flora *Eremophila annosocaulis* (Priority 3) and *Tecticornia mellarium* (Priority 1) have been identified around the MME site during previous vegetation surveys (G&G Environmental 2007) (Figure 9). There are no populations of priority flora within the MME development areas. *Eremophila annosocaulis* (Priority 3) was identified is located approximately 1.6 km outside of the western prescribed premises boundary and a population of *Tecticornia mellarium* (Priority 1) located in the east. These populations will not be impacted by the Licence renewal.

3.4 Fauna

Fauna surveys have been conducted across all areas of the project. There have been no species of conservation significance identified around the Murrin Murrin North area, where the processing plant is located. Fauna habitats which exist within the project area are not pristine and have experienced a modification of structure and a loss of plant diversity as a result of grazing by introduced stock and frequent fires.

4. SOCIAL ENVIRONMENT

4.1 European Heritage

The Murrin Murrin project area has been surveyed and no sites of European cultural value exist within the area.

4.2 Aboriginal heritage

A comprehensive program of Aboriginal studies and surveys has been completed across the areas of mine development at Murrin Murrin. The identification and management of Aboriginal heritage sites was incorporated in the approval of the Murrin Murrin Expansion Project Public Environmental Review which was approved under Part IV of the Environmental Protection Act 1986 in 1999.

4.3 Land Use and Community

MMO is located within the Shires of Leonora and Laverton between the Leonora and Laverton town sites. Land use in the surrounding area is predominantly pastoral, with MMN located within the Glenorn and Minara pastoral leases, and MME located within the Yundamindra and Glenorn pastoral leases, which are managed by Minara for cattle production. Mount Margaret Community is located approximately 30 km east of the Murrin Murrin plant site.