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Granny Smith Power Station Upgrade

Works Approval Attachment 3B - Supporting Information

PREPARED FOR:

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Tables

Document history & status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Rev D	05/08/2025	B Miles	L Kirchner	07/08/2025	Draft
Rev 1	27/08/2025	B. Miles	B. Miles	27/08/2025	Final
Rev 2	15/09/2025	B. Miles	H Davies	16/09/2025	Final

Distribution of copies

Version	Date issued	Quantity	Electronic	Issued to
Rev D	07/08/2025	1	1	A. Shelton
Rev 1	27/08/2025	1	1	A. Shelton
Rev 2	16/09/2025	1	1	A. Shelton

Last Saved:	16/09/2025
File Name:	CDM Smith -1002001- Granny Smith Power Station Upgrade Works Approval-Attachment 3B Supporting Document_Rev2
Author:	Riki Deale
Project Manager:	Ben Miles
Client:	Gold Fields Limited
Document Title:	Works Approval Attachment 3B - Supporting Information
Document Version:	Rev 2
Project Number:	1002001

Section 1 – Introduction

GSM Mining Company Pty Ltd (GSM), a wholly owned subsidiary of Gold Fields Australia Ltd (GFA), owns and operates the Granny Smith Gold Mine, located approximately 720 km north-east of Perth and 24 km south of Laverton in Western Australia (Figure 1-1).

A review of the near future and life of mine (LOM) energy demands indicate that the current power generation and cooling capacity of the site will be a limiting factor in the sustainability of the operation. As the mine develops into the deeper ore zones, the energy requirement will need to increase to support infrastructure such as ventilation, cooling and ore extraction. This infrastructure will be critical to ensure the continuation of safe mining at the Wallaby Underground Operations (WUO).

The current system consists of the following, in a hybrid renewable micro-grid:

- Approximately 20 MW of Solar
- 8 MW/4 MW Battery Energy Storage System (BESS)
- 40 MW Gas Fuelled Generators
- 25 MW Diesel (back-up capacity and start-up load)

The proposed expansion to the gas power generation system will include an additional 23 generators to increase capacity to 75 MW of generation, which is projected to meet the immediate and future energy demands as the WUO progresses to deeper ore zones (Figure 1-2).

Expansion of mine to deeper levels will require additional cooling and ventilation requirements to ensure a safe working environment. GSM propose to address this issue by installing a cooling plant that utilises an ammonia refrigeration system which will chill a glycol-water mixture which is distributed underground through insulated piping. Underground heat exchangers transfer cooling from the glycol-water mixture to the mine ventilation air. No native vegetation clearing will be required for the cooling plant and associated infrastructure.

The intent of this Works Approval application is to obtain approval to expand the design capacity of the existing gas power station (Category 52) and to increase the bulk storage of chemicals Category (73).

Figure : 1-1 - Granny Smith Mine Regional Location

LEGEND

Area of Disturbance

- **Cooling plant**
- **Power plant disturbance envelope**
- **Mining tenements**
- **Main Roads (LGATE-195)**
- **Towns**

Scale @A4: 1:300,000
Projection: GDA2020 MGA Zone 51

Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Main Roads (LGATE-195):
World Imagery: Earthstar Geographics

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Figure : 1 - Prescribed Premises Boundary - Power Station Upgrade Area

LEGEND

- Prescribed premises boundary
- Area of Disturbance
- Power plant disturbance envelope
- Proposed power plant schematic

Sensitive Receptors

- Aboriginal Cultural Heritage - Register (DPLH-099)
- Aboriginal Cultural Heritage - Lodged (DPLH-100)
- Minor roads

N

0 25 50
Metres

Scale @A4: 1:1,500
Projection: GDA2020 MGA Zone 51

Client: Gold Fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Aboriginal Cultural Heritage - Lodged (DPLH-100)
World Imagery: Earthstar Geographics
Minor Roads
Aboriginal Cultural Heritage - Register (DPLH-099)
Google Earth Imagery: 15/12/2023

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Table 1-1 Where Information Required for the Works Approval is Addressed

Application form section	New application	Where information is addressed (this Supporting Document or Application Form
Part 1: Application type	•	Application Form
Part 2: Applicant details	•	Attachment 3B- Section 2
Part 3: Premises details	•	Attachment 3B- Section 1
Part 4: Proposed activities	•	Attachment 3B- Section 3
Part 5: Index of Biodiversity Surveys for Assessment and Index of Marine Surveys for Assessment	**If required.**	N/A
Part 6: Other DWER approvals	•	N/A
Part 7: Other approvals and consultation	•	Attachment 5 – Other Approvals and Consultation
Part 8: Applicant history	•	N/A
Part 9: Emissions, discharges, and waste	•	Attachment 3B- Section 5
Part 10: Siting and location	•	Attachment 3B- Section 4
Part 11: Submission of any other relevant information	•	
Part 12: Category checklist(s)	•	N/A
Part 13: Proposed fee calculation	•	Attachment 10
Part 14: Commercially sensitive or confidential information	•	NA
Part 15: Submission of application	•	
Part 16: Declaration and signature	•	
Attachment 1A: Proof of occupier status	•	Attachment 1A
Attachment 1B: ASIC company extract	•	Attachment 1B
Attachment 1C: Authorisation to act as a representative of the occupier	•	Attachment 1C
Attachment 2: Premises map/s	•	Attachment 2
Attachment 3A: Environmental commissioning plan	**If required.**	Attachment 3A
Attachment 3B: Proposed activities	•	Attachment 3B- Section 3
Attachment 3C: Map of area proposed to be cleared (only applicable if clearing is proposed)	•	N/A
Attachment 3D: Additional information for clearing assessment	**If required.**	N/A
Attachment 4: Marine surveys (only applicable if marine surveys included in application)	•	N/A
Attachment 5: Other approvals and consultation documentation	•	Attachment 5
Attachment 6A: Emissions and discharges	**If required.**	Attachment 3B- Section 5
Attachment 6B: Waste acceptance	**If required.**	N/A
Attachment 7: Siting and location	•	Attachment 3B- Section 4
Attachment 8: Additional information submitted	**If required.**	Attachments 8 A - D
Attachment 9: Category-specific checklist(s)	•	N/A
Attachment 10: Proposed fee calculation	•	Attachment 10
Attachment 11: Request for exemption from publication	**If required.**	

Key:
• **Must be completed / submitted.**

Application form section	New application	Where information is addressed (this Supporting Document or Application Form

Δ	To the extent changed / required in relation to the amendment.
N/A	Not required with application, but may be requested subsequently depending on DWER records.
"If required"	Sections for applicants to determine.

Section 2 - Part 2: Applicant Details

GSM a wholly owned subsidiary of GFA is the proponent for this Works Approval application. Table 2-1 details the tenements, ownership and contact details of the proponent regarding the Works Approval.

Table 2-1 Applicant and Tenement Details.

Tenement Details	**Tenement**	**Tenement Holder**
	M38/397 M38/692 L38/144	GSM Mining Company Pty Ltd
Contact Details		
Company Name	GSM Mining Company Pty Ltd	
ACN/ABN	ABN 42 165 235 030 ACN 165 235 030	
Address	Level 4, 235 St Georges Terrace, Perth, WA, 6000	
Postal Address	GPO Box 2731 Cloisters Square PO, Western Australia, 6000	

Section 3 – Part 4: Proposed Activities

To facilitate the proposed expansion to the gas power generation system, an additional 23 generator units will require installation. The construction of a cooling plant will require the bulk storage of the chemical glycol within the premises. A Works Approval for construction of a Prescribed Premises within the Tenement boundaries of the GSM is required under Part V of the EP Act. The proposed power station expansion and cooling plant relates to prescribed premises under the Categories detailed in Schedule 1 Prescribed Premises of the *Environmental Protection Regulations 1987* provided in Table 3-1.

Table 3-1 Prescribed Premises Categories for this Works Approval Application

Category Number	Description of Category	Production or Design Capacity
52	Electric power generation: premises (other than premises within category 53 or an emergency or standby power generating plant) on which electrical power is generated using a fuel.	20 MW or more in aggregate (using natural gas) 10 MW or more in aggregate (using a fuel other than natural gas)
73	Bulk storage of chemicals etc.: premises on which acids, alkalis or chemicals that — a. contain at least one carbon to carbon bond; and b. are liquid at STP (standard temperature and pressure), are stored.	1 000 m^3 in aggregate

3.1 Category 52 – Electric Power Generation

The proposed expansion to the gas system will enhance the power station's capacity from 40 MW to 75 MW by installing 23 Jenbacher generators, each with a capacity of 1.5 MW. GSM propose to install the units in a staged approach with 14 units installed by January 2027 and 9 installed by August 2027.

The proposed disturbance envelope covers an area of 0.8 ha and is located within tenements M38/397 and L38/144. The expansion is limited to a small extent within the proposed disturbance envelope. This allows for flexibility to place the infrastructure in such a way as to minimise the impact to the surrounding environment by avoiding clearance of established vegetation where practicable. It is expected that no more than 0.4 ha of vegetation will require clearing for the expansion.

The proposed disturbance envelope for the Gas Power Station Upgrade Project (the Proposal) is shown in Figure 3-1, showing the proposed emission locations.

The Proposal layout (Figure 1-2) shows the existing hybrid micro-grid power generation infrastructure, the proposed additional generator positioning and the location of the APA Goldfields Gas Pipeline. The positioning of the proposed additional generators is somewhat restrained by design requirements of the high voltage (HV) systems, where proximity to tie in points are a key consideration, whilst maintaining sufficient separation from the BESS fire safety zone.

Label	E_GDA20z51	N_GDA20z51
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2	437352.10	6809226.95
3	437356.81	6809228.48
4	437362.20	6809230.23
5	437366.86	6809231.81
6	437377.29	6809235.20
7	437381.89	6809236.73
8	437386.60	6809238.32
9	437391.31	6809239.86
10	437401.63	6809243.30
11	437406.28	6809244.83
12	437410.99	6809246.42
13	437415.65	6809248.01
14	437425.97	6809251.34
15	437430.73	6809252.87
16	437391.73	6809222.71
17	437396.44	6809224.25
18	437406.26	6809227.50
19	437410.95	6809229.04
20	437416.13	6809230.76
21	437420.89	6809232.34
22	437431.21	6809235.73
23	437435.92	6809237.26

Figure : 3 - Power Station Upgrade Emission Sources

LEGEND

- Prescribed premises boundary
- Power plant disturbance envelope
- Proposed power plant schematic
- Emission source

Sensitive Receptors

- Aboriginal Cultural Heritage - Register (DPLH-099)
- Aboriginal Cultural Heritage - Lodged (DPLH-100)
- Minor roads

N

0 25 50
Metres

Scale @A4: 1:1,500
Projection: GDA2020 MGA Zone 51

Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Aboriginal Cultural Heritage - Lodged (DPLH-100)
World Imagery: Earthstar Geographics
Minor Roads
Aboriginal Cultural Heritage - Register (DPLH-099)
Google Earth Imagery: 12/12/2023

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3.2 Category 73 – Bulk Chemical Storage

The requirement to store bulk quantities of glycol for the cooling plant will be required under Category 73 - bulk chemical storage. Small quantities of up to 40 kL of glycol are currently stored at GSM for use in heavy vehicle applications which does not trigger Category 73. The cooling plant will require a significant increase in the amount of glycol stored with up to 1,000 kL required. Additionally, the construction of a cooling plant is considered new infrastructure for the WUO.

The cooling plant is likely to use a closed-circuit ammonia refrigeration and glycol distribution system. An ammonia refrigeration system is suitable for underground cooling due to its high efficiency in absorbing heat. The system will require four compressor sets units to ensure sufficient cooling is provided. Up to four cylinders of ammonia will be stored in the plant room or mine storage room to top-up the refrigerant as required. Each cylinder will have a capacity of 230kg.

Chiller oil will also be used in the four chiller plant compressors with a total estimated volume of 6,000 L required. Up to eight 210L oil drums will be kept in storage for service top-ups or in the event compressor becomes contaminated. The oil drums will be kept in storage at the chiller plant.

The cooling plant will have systems in place to detect leaks and containment protocols. The glycol distribution system will likely use a glycol-water mixture due to its low freezing point and thermal stability. Insulated pipes will transfer the glycol-water mixture underground where it will be used to chill the ventilation air.

The cooling and ventilation infrastructure area will require reclaiming parts or all of the current laydown yard near the paste plant to be able to drill and line the boreholes. All proposed areas of disturbance for the cooling plant and associated infrastructure are located within tenement M38/692 and will be on previously disturbed land with no clearing of vegetation required.

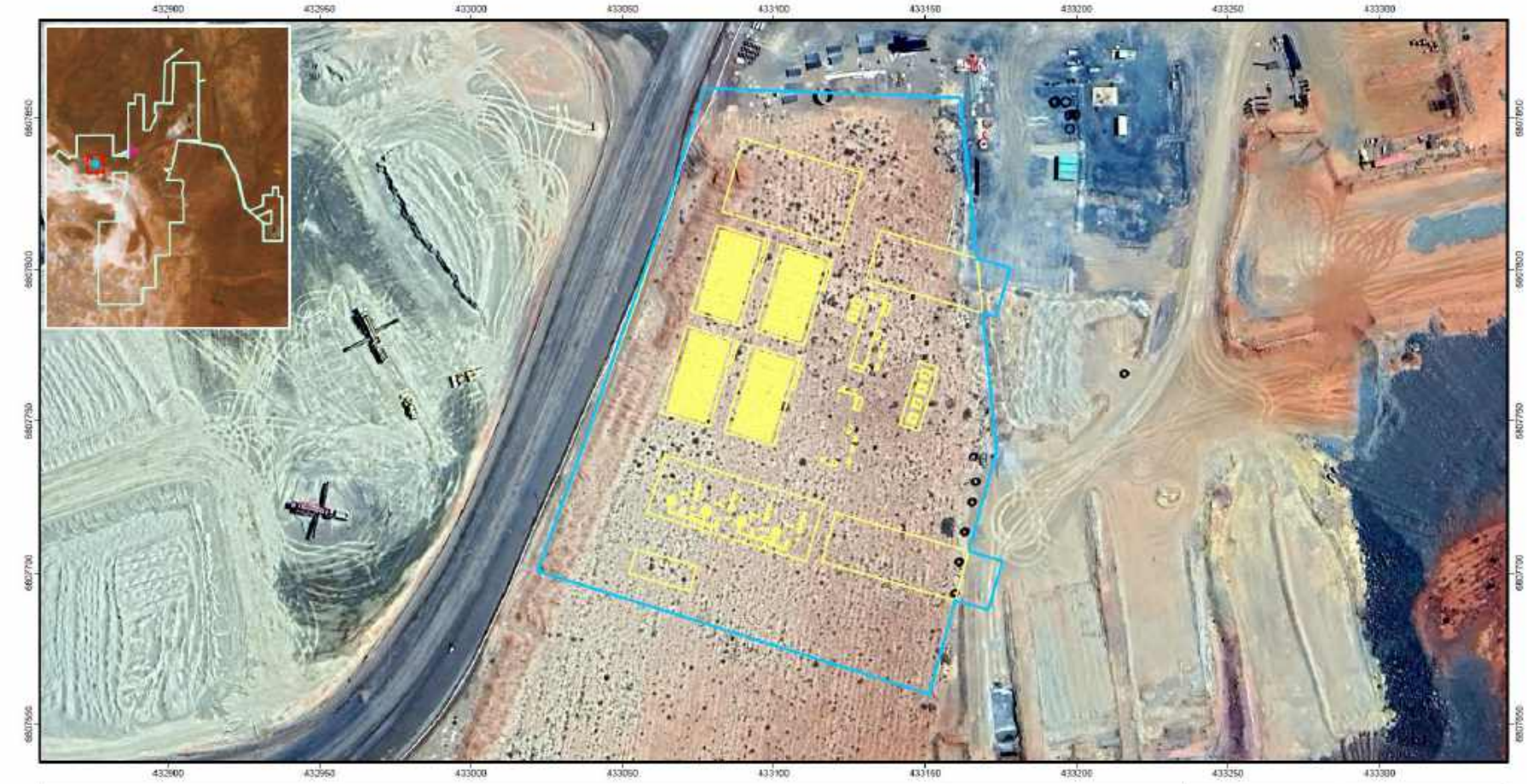

Figure : 2 - Prescribed Premises Boundary - Cooling Plant and Infrastructure

LEGEND

- Prescribed premises boundary

Area of Disturbance

- Cooling plant
- Power plant disturbance envelope
- Proposed cooling plant shematic
- Minor roads

N

0 25 50

Metres

Scale @A4: 1:1,750

Projection: GDA2020 MGA Zone 51

Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Community Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
World Imagery: Earthstar Geographics
Minor Roads
Google Earth Imagery: 12/12/2023

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Section 4 - Part 10: Siting and Location

4.1 Climate

The climate of the Murchison bioregion is characterised as arid with a bimodal rainfall distribution and an annual rainfall of approximately 200 mm. During summer, weather in the region is influenced by anticyclonic systems in the southeast, which result in clear skies and easterly winds. The region borders the southern end of the Intertropical Convergence Zone which generates thunderstorm activity and summer rainfall. Although summer rainfall is a feature of the bioregion, a dry period lasting four to six months is not uncommon most years; typically beginning in October. During winter, weather is directly influenced by anticyclonic systems, which generate westerly winds and rain-bearing frontal systems. Winter rains are typically heaviest in late May through to August and subside during September and October as the anticyclonic conditions stabilise (DCCEEW, 2008).

The closest Bureau of Meteorology station to the GSM is Laverton Aero (station number 012305). Monthly mean maximum temperatures range from 18.6°C in winter (June, July) to 35.6°C in summer (January). Mean monthly rainfall ranges from 6.8 mm in September to 53.4 mm in February. Average annual rainfall recorded at Laverton Aero is 275.9 mm, however, rainfall in the area is unreliable (BoM, 2025) (Figure 4-1).

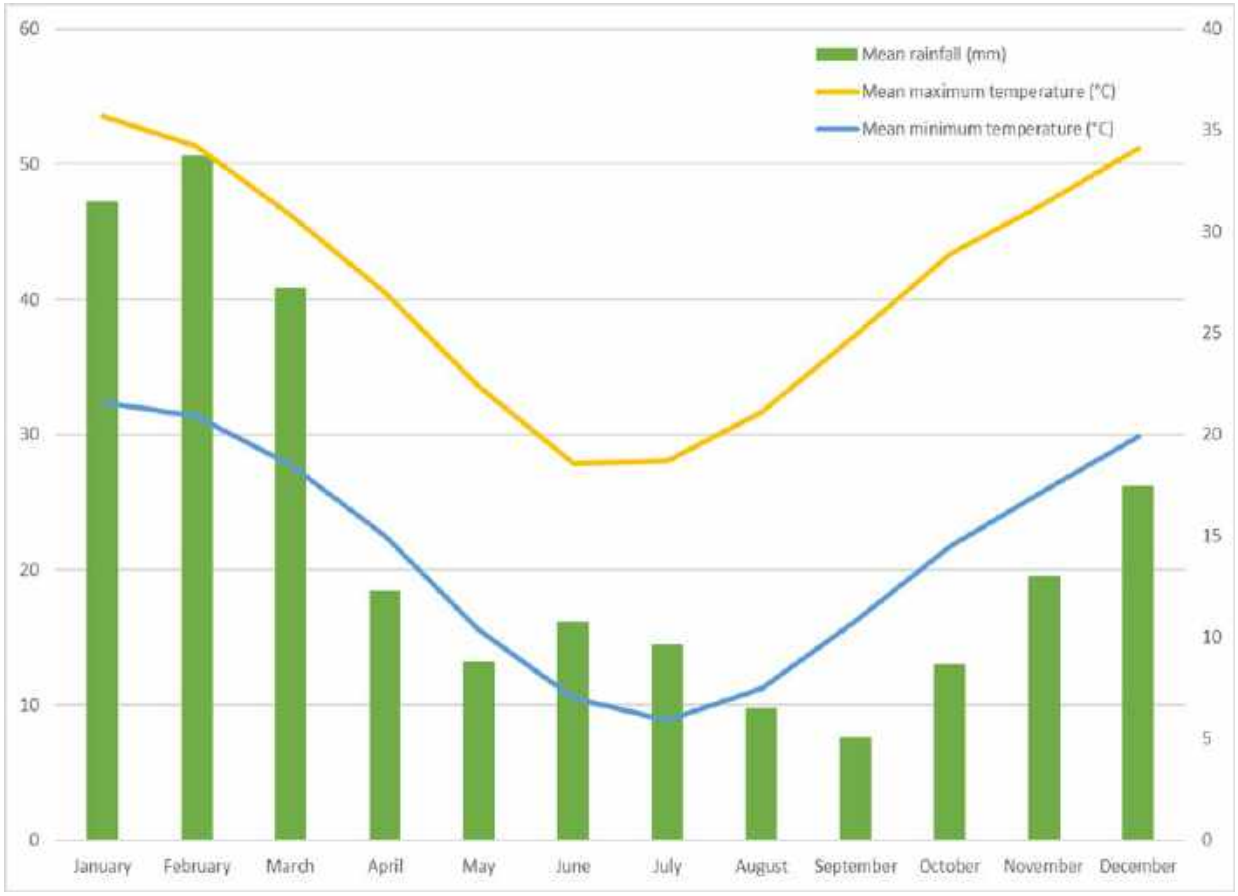

Figure 4-1 Mean Monthly Rainfall (mm) and Temperature (^{0}C) Data Recorded at the Laverton Aero Weather Station (012305)

4.2 Landscape

4.2.1 Bioregion and Land Use

The Interim Biogeographic Regionalisation for Australia (IBRA) is a bioregional framework that divides Australia into 89 biogeographic regions and 419 subregions on the basis of climate, geography, landforms, vegetation and fauna (Thackway and Cresswell 1995). The Proposal lies within the East Murchison (MUR01) IBRA subregion of the Murchison bioregion. The East Murchison subregion encompasses 7.8 million ha in the northern 'Southern Cross' and 'Eastern Goldfields' area of the Yilgarn Craton. The landscape is described as having extensive areas of elevated red desert sandplains with minimal dune development and internal drainage. Other features of the landscape include broad plains of red-brown soils, breakaway complexes, and red sandplains. Salt lakes are associated with the occluded Carey Palaeo river. The vegetation is dominated by Mulga woodlands often rich in ephemerals, as well as hummock grasslands, saltbush shrublands and Tecticornia shrublands (Cowan 2001).

The dominant land use (85%) within the East Murchison subregion is grazing of sheep and cattle on native pastures. Other land uses include Unallocated Crown Land (UCL), Crown reserves, freehold land held by the state of Western Australia, and mining (Cowan 2001).

Mining in the East Murchison subregion is largely comprised of gold and nickel; however, most mining leases, are required to be stocked in accordance with the *Land Administration Act 1997*. Cowan (2001) states that 1.4% of the Murchison bioregion comprises of conservation estates. This attributed to a comprehensive land acquisition program that contributed additional land for conservation purposes, with land vested in conservation reserves increasing to 8% in 2009 (DEC 2010). The Murchison bioregion includes the Goongarrie National Park and the Wanjarri Nature Reserve. There are no known recreational land uses in the immediate area (DCCEEW 2008). It is anticipated that the final land use for GSM tenure will be pastoral, consistent with the current dominant land use.

4.2.2 Land systems and Topography

Land systems are defined as an area or group of areas throughout which there is a recurring pattern of topography, soils, and vegetation. An assessment of land systems provides an indication of the occurrence and distribution of fauna habitats and vegetation within and surrounding the Proposal (Pringle et al., 1994). Land systems across the Murchison bioregion have been mapped by the Natural Resources Assessment Group of the Department of Primary Industries and Regional Development (DPIRD). This mapping provides a comprehensive description of biophysical resources within the area (Pringle et al., 1994).

The Proposal lies in the Murchison (MUR) bioregion within the Eastern Murchison (MUR01) subregion which totals over 7.8 million hectares. The MUR01 subregion is characterised by its internal drainage, and extensive areas of elevated red desert sandplains with minimal dune development. Salt lake systems are associated with the occluded Paleodrainage system and broad plains of red-brown soils and breakaway complexes as well as red sandplains are also common. Vegetation is dominated by Mulga Woodlands often rich in ephemerals; hummock grasslands, saltbush shrublands and Tecticornia shrublands (NVS, 2019). Figure 4-2 shows the land systems.

Figure : 4-2 - Land Systems

LEGEND

Area of Disturbance	Land Systems (DPIRD-027)	
Cooling plant	Bevon Land System	Carnegie Land System
Power plant disturbance envelope	Brooking Land System	Lake Bed Land System
Minor roads	Bullimore Land System	Monitor Land System
		Sunrise Land System

Scale @A4: 1:25,000
Projection: GDA2020 MGA Zone 51

Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
World Imagery: Earthstar Geographics
Minor Roads:

4.3 Biodiversity

The Proposal is located in the Eremaean Botanical Province (Beard et al., 1979). Vegetation mapping of Western Australia was completed on a broad scale (1:1,000,000 and 1:250,000) by Beard *et al.* (1979), classifying vegetation into broad vegetation associations. These vegetation associations were re-assessed by Shepherd et al. (2022) to account for clearing in the intensive land use zone, and to divide some of the larger vegetation units. Shepherd et al. (2022) also developed a series of systems to assist in the removal of some mosaics. Vegetation system associations described by Shepherd et al. (2022) correspond with that of Beard *et al.* (1979). One vegetation association intersects the expansion footprint, the Laverton vegetation association.

The current extent of the Laverton vegetation association remaining is presented in Table 4-1. The significance of clearing a particular vegetation association can be determined by comparing current and pre-European vegetation extents. The required retention threshold of the pre-European extent of a vegetation association is 30% (EPA 2000) Below this threshold, clearing is considered to compromise species diversity at an ecosystem level. The current remaining extent of the Laverton vegetation association exceeds 99% (EPA 2000; Government of Western Australia 2019).

Table 4-1 Vegetation Association and Extent Within the Proposal Study Area

Vegetation Association	Description	Pre-European Extent (ha)	Current Extent (ha)	% Remaining in Class I – IV Reserves
Laverton	Low woodland; Mulga (*Acacia aneura*)	4,308,335.74	4,290,594.35	99.59

4.3.1 Flora and Vegetation

Native Vegetation Solutions (NVS) completed a desktop and reconnaissance flora and vegetation study in 2019 for the original GSM Solar Farm project. The proposed disturbance area for the power station is located within this survey area (Attachment 8C).

From the NVS (2019) survey it was established that the Proposal area had:

- no Commonwealth Reserves
- no priority ecological communities (PECs)
- no threatened ecological communities (TECs)
- no environmentally sensitive areas (ESAs)
- no wetlands which are recorded on the DWER Clearing Permit System Map Viewer
- no priority or threatened flora
- one weed species was recorded in the survey area, *Cenchrus ciliaris* (Buffel-grass) but not within the disturbance area
- the condition of the vegetation determined to be “Highly Disturbed”.

Limited native vegetation clearing of not more than 0.4 ha might be required to allow for flexibility to place infrastructure in such a way to minimise the impact on the surrounding environment. The proposed native vegetation clearing will be in the area mapped as chenopod and mulga shrubland over scattered grasses of varying densities on a stony sandy-clay or sandy-clay substrate. It is classified as ‘highly disturbed’ and is located wholly in mining tenement M38/937. Figure 4-3 shows the vegetation units and priority flora.

Therefore, given the size of the Proposal area and the extent of the vegetation associations elsewhere, the impact on the vegetation and its component flora will not affect the conservation values of either, or create fragmentation or patches of remnant vegetation (NVS, 2019).

Figure : 4-3 - Vegetation Types surrounding the Power Plant

LEGEND

Area of Disturbance
- Power plant disturbance envelope
- Minor roads

Vegetation Type
- Banded Ironstone formation
- Chenopod shrubland
- Disturbed areas
- Mulga woodland over chenopod shrubland
- Mulga woodland over ironstone gravel
- Open Mulga woodland

0 50 100
Metres
Scale @A4: 1:5,000
Projection: GDA2020 MGA Zone 51

Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Minor Roads:
World Imagery: Maxar

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Figure : 4-4 - Vegetation Types surrounding the Cooling Plant

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4.3.2 Terrestrial Fauna

Terrestrial Ecosystems (2018) completed a vertebrate fauna risk assessment for the original GSM Solar Farm project. The Proposal area is located within this survey area (Terrestrial Ecosystems 2018) (Attachment 8D).

The survey identified four broad fauna habitats in the surrounding area:

- open mulga woodland over scattered low shrubs and grasses of varying densities on a stony sandy-clay or sandy-clay substrate
- open chenopod shrubland over grasses of varying densities on a stony sandy-clay or sandy-clay substrate
- chenopod and mulga shrubland over scattered grasses of varying densities on a stony sandy-clay or sandy-clay substrate
- banded ironstone rocky ridgeline with scattered Mulga and shrubs (Terrestrial Ecosystems 2018).

The Proposal area is located within chenopod and mulga shrubland over scattered grasses of varying densities on a stony sandy-clay or sandy-clay substrate.

The surrounding area has been grazed by cattle with many areas showing obvious degradation (i.e. cattle tracks, chewed bushes and shrubs, etc). There was extensive evidence of rabbits and other feral fauna in the area (Terrestrial Ecosystems 2018).

Terrestrial Ecosystems (2018) concluded that no threatened ecological fauna communities were identified within the Proposal area.

Six threatened species of fauna and four migratory/marine species of birds identified under the *EPBC Act 1999* were identified in the survey but not in the Proposal area and the likelihood of occurrence in the Proposal area is very low. Shore birds and waders have been excluded from this list due to a lack of suitable habitat in or near the Proposal area (e.g. *Actitis hypoleucos, Calidris acuminata, Calidris acuminata* and *Tringa nebularia*).

There were ten Schedule species listed under the WA *Biodiversity Conservation Act 2016* (BC Act) and three species listed on the DBCA's Priority Fauna identified in the survey, but these were not recorded in the Proposal area and are highly unlikely to occur.

The following is an assessment of the likelihood of each of the species listed in Table 4-2 being found in the Proposal area.

Table 4-2 Assessment of the Potential Impact on Conservation Significant Fauna That Could Occur in the Proposal Area

Species	DBCA Schedule / Priority	Status Under Commonwealth *EPBC Act 1999*	Comment
Brush-tailed Mulgara *(Dasycercus blythi)*	Priority 4		**Highly unlikely** to be in the Proposal area due to a lack of suitable habitat. The potential for impacting on this species is therefore low.
Southern Whiteface (*Aphelocephala leucopsis*)		Vulnerable	**Likely to be present** in the Proposal area. It is a highly mobile species found in open woodlands and shrublands with an understorey of grasses and low shrubs. The potential impact on this species from the project is considered low., Clearing 0.31 ha of vegetation is unlikely to impact on the species.
Fork-tailed Swift *(Apus pacificus)*	IA	Migratory	**May very infrequently be seen** in the area, however, clearing 0.31 ha vegetation is unlikely to impact on this aerial species.
Giant Desert Skink *(Liopholis kintorei)*	Vulnerable	Vulnerable	**Highly unlikely** to be in the Proposal area due to a lack of suitable habitat. The potential for impacting on this species is therefore low.
Grey Wagtail *(Motacilla cinereal)*	IA	Migratory	**Highly unlikely** to be present in the Proposal area. The potential for impacting on this species is therefore low.

Species	DBCA Schedule / Priority	Status Under Commonwealth *EPBC Act 1999*	Comment
Long-tailed Dunnart *(Sminthopsis longicaudata)*	Priority 4		**Unlikely** in the Proposal area due to no suitable habitat of banded ironstone rock habitat.
Malleefowl *(Leipoa ocellata)*	Vulnerable	Vulnerable	**High unlikely** to be in the Proposal area due to a lack of suitable habitat and high density of feral fauna. The potential for impacting on this species is therefore low.
Night Parrot *(Pezoporus occidentalis)*	Critically Endangered	Endangered	**Highly unlikely** to be in the Proposal area, due to a lack of suitable habitat. The potential for impacting on this species is therefore low.
Oriental Plover *(Charadrius veredus)*	IA	Migratory	**Highly unlikely** to be in the Proposal area due to a lack of suitable habitat. The potential for impacting on this species is therefore low.
Peregrine Falcon *(Falco peregrinus)*	OS		**May infrequently be seen** in the area, however, clearing vegetation is unlikely to impact on this species.
Princess Parrot *(Polytelis alexandrae)*	Priority 4	Vulnerable	**May infrequently be seen** in the area, however, clearing vegetation is unlikely to impact on this species.
Sandhill Dunnart *(Sminthopsis psammophila)*	Endangered	Endangered	**Highly unlikely** to be in the Proposal area due to a lack of suitable habitat. The potential for impacting on this species is therefore low.
Yellow Wagtail *(Motacilla flava)*	IA	Migratory	**Highly unlikely** to be present in the Proposal area. The potential for impacting on this species is therefore low.

Brush-tailed Mulgara (*Dasycercus blythi*) - Priority 4

The reported distribution of the Brush-tailed Mulgara includes much of the inland spinifex covered sandy desert and spinifex vegetated areas in the Pilbara and northern goldfields. Within these areas their distribution is patchy, and it is most frequently confined to mature spinifex dominated habitat. In some areas, their relative abundance is positively associated with rainfall in the previous 12 to 24 months and recent burning of the spinifex does not seem to be sufficient to shift the Brush-tailed Mulgara out of an area.

Fauna habitat in the Proposal area is not suitable for Brush-tailed Mulgara, therefore it is unlikely to be present.

Southern Whiteface (*Aphelocephala leucopsis*)

The Southern Whiteface (*Aphelocephala leucopsis*; Vulnerable), is likely to occur in the area due to the presence of suitable habitat and the identification of the species from other surveys in surrounding areas. The potential impact on this species was determined to be low as Southern Whiteface are very mobile, likely to move if disturbed and are widespread and relatively abundant in adjacent areas.

Fork-tailed Swift (*Apus pacificus*) - Migratory species

This species breeds in the northeast and mid-east Asia and winters in Australia and southern New Guinea. It is a visitor to most parts of Western Australia, beginning to arrive in the Kimberley in late September, in the Pilbara in November and in the southwest land division in mid-December, and leaving by late April. The Fork-tailed Swift is an almost exclusively aerial species, foraging and sleeping on the wing. It rarely comes to earth, usually only for breeding. It is common in the Kimberley, uncommon to moderately common near northwest, west and southeast coasts and rare to scarce elsewhere. It is rarely seen in the Goldfields.

Therefore, the Fork-tailed Swift may infrequently be seen in the Proposal area. However, the Proposal is unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Giant Desert Skink (*Liopholis kintorei*) - Vulnerable

The Giant Desert Skink is a large skink found in the sandy desert regions of Western Australia, Northern Territory and South Australia. It is found on sandflats and clay-based or loamy soils vegetated with spinifex. It lives in a multi-entranced communal burrow system and uses shared defecation sites.

The Giant Desert Skink prefers sandy soils vegetated with spinifex. This habitat is not present in the Proposal area therefore, it is very unlikely be found there.

Grey Wagtail (Motacilla cinerea) - Migratory

The Grey Wagtail is a small yellow breasted bird with a grey back and head. Its preferred habitat in Australia is banks and rocks in fast-running fresh water including rivers, streams and creeks where it feeds on insects. The Atlas of Living Australia records two sightings on the south-coast of Western Australia and none around the Proposal area (Terrestrial Ecosystems 2018).

It is highly unlikely to be seen in the Proposal area due to a lack of suitable habitat.

Long-tailed Dunnart (*Sminthopsis longicaudata*) – Priority 4

The Long-tailed Dunnart's distribution is widely scattered in arid zone where it inhabits rugged rocky areas. Specimens have been recorded in several rocky ranges in the Gibson Desert, West MacDonnell National Park, Murchison, Carnarvon Basin and the Pilbara. All previous capture sites for Long-tailed Dunnarts are within rugged rocky landscapes that support a low open woodland or shrubland of Acacias (especially mulga) with an understorey of spinifex hummocks, and (occasionally) also perennial grasses and cassias.

Three adult Long-tailed Dunnarts were caught in the Granny Smith Level 2 fauna survey and a single individual was caught in the follow up targeted survey (Terrestrial Ecosystems 2018). Subsequently, Long-tailed Dunnarts have been caught at Mt Ida and Bottle Creek, which are about 200 km to the west of the Granny Smith mine. The Dunnart prefers Banded Ironstone rocky habitats that are not located in the Proposal area. The proposed disturbance for the power station will not impact on the Long-tailed Dunnart.

Malleefowl (*Leipoa ocellata*) – Schedule 3 (BC Act); Vulnerable (*EPBC)*

Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Malleefowl are now only found throughout these regions in fragmented patches due to clearing of habitat for agriculture, increased fire frequency, competition with exotic herbivores (sheep, rabbits, cattle, goats) and kangaroos, predation by foxes and cats, inbreeding as a result of fragmentation and possibly hunting for food.

DBCA records show the only recorded observation was near Leonora in 1998. Some very old disused Malleefowl mounds were recorded in other regional surveys, however, the vegetation in the Proposal area is generally too sparse to support Malleefowl. Therefore, it is unlikely to occur in the Proposal area.

Night Parrot (*Pezoporus occidentalis*) – Critically Endangered (BC Act); Endangered (*EPBC)*

The Night Parrot has not been recorded near the Proposal area, and the habitat in the Proposal area is not suitable for nesting and roosting sites, so there is a very low probability that it is present. It is therefore unlikely to be impacted by the Proposal.

Oriental Plover (Charadrius veredus) - Migratory

A migrant species with patchy distribution in Australia, the Oriental Plover is sparsely distributed across arid and semi-arid Australia but avoids truly desert regions. Its preferred habitat is dry plains. It was not recorded in other fauna surveys undertaken near the Proposal area. It has not been recorded in the general area in any of the other regional surveys, therefore, the Oriental Plover is unlikely to be seen in the Proposal area.

Peregrine Falcon (Falco peregrinus) – Schedule 7

The Peregrine Falcon is uncommon, although widespread throughout much of Australia excluding the extremely dry areas and has a wide and patchy distribution. It shows habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. Nesting sites include ledges along cliffs, granite outcrops and quarries, hollow trees near wetlands and old nests of other large bird species. There is no evidence to suggest any change in status in the last 50 years.

The Peregrine Falcon is infrequently seen in the general area. However, the Proposal is unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Princess Parrot (*Polytelis alexandrae*) - Vulnerable (*EPBC)*; Priority 4 (BC Act)

Very little is known about the Princess Parrot, even the exact extent of its geographical distribution. It is thought to be nomadic within the central desert regions of Australia, occupying arid shrub lands, particularly those dominated by Mulga, Desert Oak and spinifex. Due to the paucity of information on the species, accurate estimates of its conservation significance are difficult to make. However, this species is probably threatened by habitat loss to agricultural practices and changes in fire regimes. The Princess Parrot is seen infrequently, so it may be seen in the general area.

The Proposal is unlikely to significantly impact on this species as it will move away to other areas if it is disturbed.

Sandhill Dunnart (*Sminthopsis psammophila*) – Critically Endangered (BC Act); Endangered (*EPBC)*

The Sandhill Dunnart is a small (30-45g) arid adapted dasyurid that is found in the eastern part of the Western Australian section of the Great Victoria Desert and the western and southern parts of South Australia.

The habitat in the Proposal area is not suitable for the Sandhill Dunnart and there are no records of it near the Proposal area in the Atlas of Living Australia. It is highly unlikely that its present in the Proposal area.

Yellow Wagtail (*Motacilla flava*) - Migratory

The Yellow Wagtail is found in the millions in the northern hemisphere and the Atlas of Living Australia records multiple records of this bird in Australia in the coastal areas.

There are no records for this species in inland Western Australia near the Proposal area, therefore it is highly unlikely to be impacted by the Proposal.

Fauna habitats present in the Proposal area are abundant in adjacent areas. It is therefore likely that the fauna assemblage in the Proposal area is similar to the many square kilometres of similar habitat in adjacent areas and the bioregion (Terrestrial Ecosystems 2018).

4.4 Heritage

An Aboriginal heritage survey of the existing solar farm area, which includes the Proposal area, (R. & E. O'Connor Pty Ltd 2018) was completed in September 2018 to inspect the area and confirm the location of registered Aboriginal Sites and Other Heritage Places. Within the area, there is one registered Aboriginal site, a rocky outcrop associated with the Wati Kutjarra Dreaming (WON14-05) and one Other Heritage Place listed as "Hillside Well Arrangement", as listed on the Register of Aboriginal Sites (Department of Planning Lands and Heritage 2018), Identifiers 360099 and 360100). However, during the survey Aboriginal representatives located a second outcrop associated with the Wati Kutjara Dreaming, and according to the representatives the currently registered outcrop, the second outcrop, and the area between them constitute the Aboriginal site and should be included in the Register of Aboriginal Sites. This information was forwarded to the Department of Planning, Lands and Heritage (DPLH); however, in the interim, and pending a change in the Register of Aboriginal Sites, the provisions of the Aboriginal Cultural Heritage Act 2021 will continue to apply to the registered site and Other Heritage Places as currently listed and mapped.

Additional heritage surveys, comprising ethnographic and archaeology components, were undertaken in 2022 with no new sites identified (HeritageWA 2022; Integritat 2022). While the above-mentioned site has not yet been updated in the DPLH dataset, its location lies outside of the Proposal area.


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Figure : 4-5 - Aboriginal Heritage
LEGEND
Area of Disturbance
Cooling plant
Power plant disturbance envelope
Aboriginal Cultural Heritage - Historic (DPLH-098)
Aboriginal Cultural Heritage - Register (DPLH-099)
Aboriginal Cultural Heritage - Lodged (DPLH-100)
Minor roads
N
0
350
700
Metres
Scale @A4: 1:25,000
Projection: GDA2020 MGA Zone 51
Client: Gold fields Australia Pty Ltd
Project and Phase: 1002001
Data: Geoscience Australia
Aboriginal Cultural Heritage - Lodged (DPLH-100):
World Imagery: Earthstar Geographics
Minor Roads:
Aboriginal Cultural Heritage - Historic (DPLH-098):
Aboriginal Cultural Heritage - Register (DPLH-099):
CDM Smith
listen. think. deliver.
DISCLAIMER: CDM Smith has endeavoured to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map. Drawn By: anandagodale 2025-09-12.
\\cdmnc.internal.cdm.com\offices\AUST\Project\1002001 - Glenmy Smith Power Station Upgrade Approvals\7\Work\3GIS\APRX\1002001_GSMSatPSUpgradeWA_Rev0.aprx

Section 5 - Part 9: Emissions, Discharges and Waste

The information in this section is included as Attachment 6A as per the requirement of the Works Approval Application Form.

Through this Works Approval, GSM seek approval for two Schedule 1 category as detailed Table 5-1.

Table 5-1 Prescribed Premises Categories for this Works Approval Application

Category Number	Description of Category	Production or Design Capacity
52	Electric power generation:	**75 MW (using natural gas)** 25 MW (using a fuel other than natural gas)
73	Bulk Storage of Chemicals	4,580 m^3

5.1 Emissions and Waste

The following potential emissions have been identified in relation to the proposed power plant upgrade and cooling plant.

5.1.1 Air Emissions and Dust

The proposed expansion to the gas system will enhance the power station's capacity from 40 MW to 75 MW by installing 23 Jenbacher generators, each with a capacity of 1.5 MW. GSM propose to install the units in a staged approach with 14 units installed in 2026 and 9 installed by 2027.

Emissions from the power station have been estimated using commissioning data of stack emissions from similar Jenbacher generators installed in 2023. Monitoring on eight generators was conducted on by Emission Assessments (2023).

The stack emissions are predicted in Table 5-2 below.

Table 5-2 Exhaust Emissions from Commissioning

Substance	Unit	Range of emissions per generator	Average Emissions per generator	Method
Carbon monoxide	mg/m^3	210 – 360	350	USEPA Method 10
Sulphur dioxide	mg/m^3	<2.9 – 4.8	< 2.9	USEPA Method 6
Oxides of nitrogen (NO and NO_2)	mg/m^3	290 - 340	310	USEPA Method 7E or 7D
Oxygen (O_2)	%	9.7 – 13.4	9.8	
Moisture	%	10.9 – 13.3	11.7	
Volumetric flow rate	m^3/min	85 - 105	98	USEPA Method 2
Particulates	mg/m^3	<0.26 – 1.4	0.29	USEPA Method 5 or 17

It is anticipated that the generators will not operate at full capacity simultaneously and will likely run at 50% to 75% of their maximum output. Diesel will be used as back-up capacity and start-up load.

Dust may also be generated during the upgrade of the power plant from the loading, transport and delivery of construction materials, through construction plant and vehicle movements and through physical earthworks.

Dust generated from disturbing top soil and vehicle traffic can potentially degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas may potentially render habitat unsuitable for fauna. As there is unlikely to be significant vehicle traffic once the Proposal is developed this is likely to only be an issue during construction (Terrestrial Ecosystems 2018).

5.1.2 Hydrocarbons and Other Chemicals

GSM uses hydrocarbons and other chemicals on site to maintain plant equipment, mobile equipment, operations and site activities.

For the power station site, the main chemicals used will be natural gas, diesel and hydraulic oil. The chiller plant will use the chemicals glycol, ammonia gas and compressor oil. Section 5.2.3 outlines GSM's management actions for hydrocarbons and other chemicals.

5.2 Controls for Emissions and Waste

5.2.1 Air Emissions and Dust

GSM will take all reasonable and practicable measures to limit air and dust emissions from all activities conducted at fixed and construction worksites. The potential to generate air emissions needs to be considered at the planning/design stages of any new or modification to a worksite. Any controls will consider the emissions to air hierarchy of control (Aggreko 2024) (Attachment 8A).

The increased emissions resulting from the power station upgrade will be managed using the same effective controls currently in place. Each generator is self-contained within a modified sea container, designed to minimise environmental impact. Emissions are directed through an exhaust outlet positioned on the roof of the container, ensuring that exhaust gases are released vertically. This upward dispersion helps prevent emissions from settling near ground level and reduces the potential impact on adjacent vegetation and surrounding ecosystems.

Dust generated during the proposed upgrade will be managed through several standard practices including regular dust suppression (utilising a water cart) and through good design by limiting the area cleared to the minimum required for the Proposal. No increase in dust is associated with the proposed activities during operations, with minor risk of dust impacts immediately adjacent to clearance areas anticipated.

Additional mitigation measures from the Air Quality Management Plan (Aggreko 2024) are summarised in Table 5-3.

Table 5-3 Summary of the Air Quality Management Plan

Activity	Mitigation Measures
Purchasing, procurement, supply chain, asset management	▪ Consideration to be given to purchasing newest available technology for any new plant and equipment procurement to minimise energy use and avoid air emissions. ▪ Source clean product where possible. ▪ Upgrade/retrofit plant where possible and economically viable to limit emissions.
Inadequate waste disposal (odour and smoke)	▪ No burning of wastes is permitted on site.
Land clearing activities (e.g. site preparation, temporary amenities)	▪ Retention of as much ground cover as possible during clearing activities. ▪ Plan activities to minimise exposure of disturbed soil.
Transportation/driving	▪ Eliminate unnecessary vehicle movements by car-pooling where practicable.
Diesel exhaust emissions	▪ Proper maintenance and tuning of engines to manufacturers' specifications. ▪ Appropriate height of discharge above ground level ▪ Catalytic converters and exhaust filters. ▪ Correct fuel specification. ▪ Avoiding overloading.

Activity	Mitigation Measures
Earthmoving/excavation	▪ Material (sand, soil and aggregate) stockpiled long term (stored >10 days) are to be adequately shaped and covered. ▪ Material (sand, soil and aggregate) stockpiled short term (stored <10 days) are to be shaped, dampened and covered where possible. ▪ Cease or modify operations during high or unfavourable wind conditions. ▪ Use water trucks as required (e.g. during heavy traffic periods, during the drier months of the year, at a specific location). ▪ Disturbed areas to be stabilised as soon as practicable after construction to prevent or minimise wind-blown dust. ▪ Vehicles transporting loose materials to and from the site will have the loads covered to prevent wind-blown dust emissions and spillages. ▪ Water sprays and dust suppression surfactants.
Smoke (engines and motors)	▪ Efficient combustion and proper dispersion.

5.2.2 Noise

There are no identified sensitive receptors within the area of the operation, however, all equipment used on site is to be compliant with industry standards for noise emissions (GSM 2025a). Generators will also be situated within containers or buildings to further minimise noise emissions.

5.2.3 Hydrocarbons and Other Chemicals

GSM has the responsibility to manage and control hydrocarbons and chemicals to ensure the correct procedures for storing handling and spill clean-up are followed. The Hazardous Chemicals and Dangerous Goods Management Plan is used for the power station site and is summarised in Table 5-4 (Aggreko 2025) (Attachment 8B).

The Procedure for Hydrocarbon and Chemical Management at Granny Smith (GSM 2025b) contains further details on legislative and compliance requirements including spill response. GSM has the obligation to responsibly dispose of hydrocarbon and chemical contaminated materials, details can be found in Hydrocarbon Disposal and Bioremediation (GSM 2024). Any spills related to the cooling plant will utilise this management plan.

Table 5-4 Summary of the Hazardous Chemicals and Dangerous Goods Management Plan

Activity	Mitigation Measures
Establish Hazardous Chemicals / Dangerous Goods Registers	Managers ensure a register of all hazardous chemicals and dangerous goods is established for their respective site(s), recorded and maintained.
Safety Data Sheets	Ensure a valid Safety Data Sheet is obtained for all hazardous chemicals and dangerous good within their respective areas. A valid copy of each Safety Data Sheet shall be readily accessible to workers.
Storage Of Hazardous Chemicals and Dangerous Goods	Hazardous chemicals and dangerous goods shall be stored in accordance with risk assessment outcomes and Safety Data Sheets recommendations.
Bunding requirements	All liquid hazardous chemicals and dangerous goods will be stored in a bunded area in accordance with statutory Environmental Protection Authority or other regulatory requirements/guidelines applicable to bunding.
Spill Management	All work areas that involve the use or storage of hazardous chemicals and dangerous goods must have appropriate spill kits available. These kits must be specific and relevant for the nature of the substances that are used within the work area. A spill kit must be clearly labelled, visible and located in an easily accessible position. All workers must be aware of the location and how to use the spill kit. Spill kits contents should be regularly reviewed. If items are used from the spill kit, arrangements should be made for immediate replacement.

Activity	Mitigation Measures
Safe Use and Handling	Safe methods of use and handling shall be appropriately documented (e.g. via Work Instructions; SWMS if the chemical/substance is classified as hazardous) and all workers who interact with chemicals/substances shall be appropriately trained in the safe use and handling methods.
Decanting Of Hazardous Chemicals and Dangerous Goods	Where hazardous chemicals or dangerous goods are decanted/transferred into a second container or mobile tanker for use in the workplace or transport, the following requirements apply: ▪ the second container must be compatible with the substance (e.g. non-reactive) ▪ unless the entire contents are used immediately (and the container thoroughly cleaned), the second container must be labelled with the product name of the substance and the class label and subsidiary risk label.
Transportation	The following shall be implemented for all vehicles and mobile plant used to transport hazardous chemicals or dangerous goods. ▪ a current copy of relevant Safety Data Sheet is stored in the vehicle/plant cabin ▪ the correct PPE is available in the vehicle/plant ▪ a spill kit is stored in the vehicle/plant (or otherwise remains in close proximity to the vehicle/plant at all times) ▪ fire extinguisher(s) of the appropriate class fitted to the vehicle/plant ▪ substance containers shall be appropriately restrained – in the case of four-wheel drives, station wagons and vans, a cargo barrier shall also be fitted ▪ transport of compressed gas cylinders in enclosed vans or vehicles is to be avoided. If unavoidable, the van or vehicle must be sufficiently ventilated to prevent the build-up of gases. Where the quantity transported is above the regulatory Dangerous Goods Code specified limit (e.g. bulk haulage), additional regulatory requirements must be applied. These may apply include: ▪ an up to date register/manifest detailing type and quantity of product being transported ▪ emergency procedure guide for each product carried ▪ a copy of the Fire Ban General Exemption listing ▪ mandatory training and licensing of drivers/operators of vehicles carrying DG are required.
Disposal	The disposal of hazardous chemicals and dangerous goods shall be undertaken in a safe manner that complies with AGK-APAC-HSE-STD-219 Waste Management. Containers used for the storage of discarded hazardous chemicals and dangerous goods must be appropriately labelled. Hazardous chemicals shall be disposed by licensed waste disposal contractors at licensed facilities (obtain written proof), according to Safety Data Sheets and risk assessment findings and to environment and/or operating licence conditions.
Spill Response	In the event of chemical spill, workers are to adopt the following 3 'C' process for spill management: ▪ **control** the source of the spill ▪ **contain** the spill ▪ **clean up** the spill.

Section 6 References

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