Curragh Bord and Pillar Mine Project

Response to DESI Information Request

for Coronado Global Resources Inc

26 July 2024

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DOCUMENT CONTROL

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1 INTRODUCTION

Coronado Global Resources Inc (Coronado) submitted an application to the Department of the Environment, Science and Innovation (DESI) to the amend the Curragh Mine Environmental Authority (EA) on 24 May 2024. The EA amendment application relates to the approval of the Curragh Bord and Pillar Mine Project.

DESI issued an Information Request Notice for the EA Amendment application on 11 July 2024. A copy of the DESI Notice is provided in Appendix A.

This response document provides Coronado's response to the DESI Information Request Notice. It has been prepared by Hansen Environmental Consulting, on behalf of Coronado, with input from:

- Hydrogeologist.com.au in relation groundwater issues;
- Gordon Geotechniques in relation to subsidence; and
- responses from Coronado in relation to groundwater quality triggers and greenhouse gas.

The specific responses to each of the DESI information requests are provided in Section 2. Each of the DESI information requests in Appendix A of the DESI Notice is presented in a grey text box in Section 2 with Coronado's response following in standard text format.

2 RESPONSE TO DESI INFORMATION REQUEST

DESI Information Request No 1

DESI Comment

Section 6.4 of the Appendix B – Groundwater Report, states that drawdown is predicted in the shallow groundwater units along Blackwater Creek. Section 7.6.3 of the application supporting document – Main Report, states that there is limited alluvium present in the Blackwater Creek area. However, the shallow standpipe bores that have been drilled into the weathered Permian along Blackwater Creek have water levels between 10m and 15m below ground level. It is unclear whether the shallower water levels (10 – 15m) in the standpipe bores indicate the presence of groundwater on which vegetation along Blackwater Creek is dependant.

Requested Actions

Provide clarification about why the standpipe bores have shallower water levels and discuss whether GDEs are potentially using water in this area for all or some of their water requirements.

This request raises the following issues:

- The surface geology along Blackwater Creek and the presence of alluvium;
- The potential for groundwater dependent ecosystems (GDEs) to be present along Blackwater Creek due the presence of groundwater 10 to 15 m below ground level; and
- The potential impacts on any GDEs from drawdown on shallow groundwater along Blackwater Creek due to the project underground mining operations.

Responses addressing each of these issues are provided in the following sections.

Blackwater Creek surface geology

Section 4.2 of the EAR Groundwater Report explains that a targeted field investigation of the surface geology was undertaken along the reach of Blackwater Creek at the southern end of the proposed underground mining area. The scope of this investigation included ground-truthing the extent, depth and characteristics of any bed sediments and alluvium associated with Blackwater Creek.

The results of the investigation are presented in Appendix B of the EAR Groundwater Report. In summary, the field investigation found that:

- The surface geology in the Blackwater Creek area comprises a regionally extensive weathered profile comprising clays and clay-bound sediments that exhibit low permeability and form an aquitard (EAR Figure 11); and
- Blackwater Creek does not have an alluvial floodplain and there is no alluvium in the Blackwater Creek channel (contrary to the Queensland government mapping that is not informed by ground-truthed data and incorrectly identifies an alluvial floodplain along this reach of Blackwater Creek).

Potential presence of groundwater dependent vegetation along Blackwater Creek

As discussed above, the groundwater assessment has confirmed that the surface geology along Blackwater Creek at the southern end of the proposed underground mining area is comprised of a regionally extensive weathered profile that is an aquitard. As explained in EAR Section 7.6.3, the Queensland GDE mapping classifies the weathered profile as a "GDE exclusion zone". The Queensland GDE mapping defines a GDE exclusion zone as an area that exhibits low permeability and low groundwater recharge and concludes that "*there is not enough groundwater in exclusion zones to support GDEs"*. This definition is consistent with the ground-truthed hydrogeological characteristics of the surface geology in this reach of Blackwater Creek. Hence, the vegetation along this reach of Blackwater Creek is considered unlikely to be groundwater dependent. The average salinity (based on electrical conductivity) in the monitoring bores in this reach of Blackwater Creek ranges from 13,000 to 50,000 µS/cm and is therefore unlikely to be suitable to support GDEs, adding further weight to the Queensland government's GDE exclusion zone classification.

Drawdown on groundwater levels due to the project

Section 5.10 of the EAR Groundwater Report explains that the groundwater model predicts that future approved open cut mining activities will result in drawdown on the unconfined water table below Blackwater Creek to levels that would not support any potential GDEs in the area. Whilst the project underground mining activities are predicted to result in some additional drawdown on the unconfined water table, the GDE assessment concludes that this would not impact any potential GDEs (EAR Section 7.6.3).

ESI Information Request No 2

DESI Comment

Figure C45 of Appendix B – Groundwater Report demonstrates the predicted depressurisation in the Mammoth coal seam. As shown below, the figure indicates that depressurisation is restricted along the eastern side by the Jellinbah fault, however, in the southeast the predicted depressurisation appears to extend outside of the boundary of ML80110.

It is noted that the only monitoring of groundwater levels in the area where depressurisation is predicted to occur outside the mining lease is via vibrating wire piezometers (VWPs).

The department has noted at varying locations in Queensland that data coming from a number of VWPs often has significantly different trends and absolute water level elevation than that measured in nearby standpipe bores in the same formations. In some instances, the majority of the VWPs are considered to be providing erroneous data. It is therefore recommended that some standpipe bores are drilled into the coal measures in this south-eastern area to provide confidence in the understanding of mining impacts. Data from the standpipe bores can also be used to validate data provided from the existing VWPs.

Requested Actions

Revise the Curragh groundwater monitoring network to include standpipe bores in the southeastern area where depressurisation is predicted outside the mining lease boundaries to better monitor the impacts from mining.

This request raises the following issues:

- Concerns about the potential for groundwater impacts from the project to occur outside the mining lease boundary; and
- A request for the proponent to install additional groundwater monitoring bores in the south-eastern area of predicted depressurisation to monitor 'impacts from mining'.

These issues are addressed below.

As shown in Figure C45 of the EAR Groundwater Report, the majority of the extent of predicted depressurisation of the Mammoth Seam is within the existing Curragh mining leases with a small area of partial depressurisation extending to the east of the southern end of ML 80110. In this off-lease area, the depth of the Mammoth coal seam ranges from approximately 170 m to 280 m below ground level (EAR Groundwater Report Figure 11).

Both the Mammoth Seam and the overlying Permian overburden are classified as aquitards (low permeability units that impede groundwater flow). Due to the low permeability of the strata, the partial depressurisation of the Mammoth Seam in the off-lease area is not predicted to result in any drawdown in the unconfined groundwater table in the overlying Permian overburden.

In addition, there are no aquifers, groundwater users, or groundwater dependent features in the off-lease area. Hence, the partial depressurisation of the Mammoth coal seam aquitard, in itself, is not a significant groundwater effect and there are no aquifers, groundwater users or groundwater dependent features in this area that could potentially be impacted. Consequently, there are no EA groundwater monitoring bores proposed, or necessary, for the project in this area. In addition, an open standpipe monitoring bore screened in the Mammoth coal seam in this area would be impractical due to the difficulty and cost associated with installing, monitoring and maintaining an open standpipe bore at this depth (almost 300 m).

As described in EAR Section 6.5, there are three new EA monitoring bores proposed within the extent of predicted drawdown from the project on the unconfined water table, in the vicinity of Blackwater Creek. The purpose of these monitoring bores is to confirm the actual extent of drawdown on the unconfined groundwater table and to identify any significant departures from the predicted drawdown magnitude and extents.

In response to DESI's issue, Coronado is proposing to include an additional standpipe monitoring bore (HYDRO_08MB) in the EA groundwater monitoring program (refer Figure 1). This bore is located adjacent to Blackwater Creek and near the limit of the predicted Mammoth seam depressurisation to the south-east of the Underground Mining Area. This monitoring bore is ideally located to identify any unexpected changes in the unconfined groundwater table below Blackwater Creek and any associated environmental features.

DESI Information Request No 3

DESI Comment

Section 6.5 of the application supporting document – Main Report, describes the installation of an additional three (3) monitoring bores that will be added to the existing Curragh Mine groundwater monitoring network, within the project underground mining area and the surrounding area, to measure groundwater levels, groundwater quality and hydraulic parameters.

Groundwater levels and proposed trigger levels for the monitoring bores have not been supplied in the supporting information. This information must be supplied to ensure that groundwater monitoring for the underground project is robust and allows for detection of mine related impacts to groundwater. It is noted that the current EA in Table C13 includes a number of 'TBA' values for existing monitoring locations which should be addressed as soon as feasible. For the purpose of assessing this proposed underground expansion, the inclusion of TBA values will not be appropriate.

Additionally, the details provided in Table 5 of the Main Report in relation to the proposed groundwater monitoring bores, are not the full details currently included in Table C12 of the EA in relation to the current monitoring bores. In relation to the new proposed groundwater bores, the screened interval and target formation should be supplied. Ideally, the environmental authority should include a visual representation of the Groundwater Monitoring Network that can be referred to alongside the water schedule to improve interpretation of the conditions.

Requested Actions

Develop and provide groundwater monitoring trigger values and groundwater levels for the new proposed bores. Provide a figure for inclusion in the EA that clearly illustrates the full groundwater monitoring network at Curragh Mine.

This request includes the following specific components:

- A request for a figure showing the EA groundwater monitoring network for inclusion in the EA;
- A request for additional details on the project groundwater monitoring bores for inclusion in EA Table C12;
- A request for groundwater level triggers for the project groundwater monitoring sites for inclusion in EA Table C13; and
- A request for groundwater quality triggers for the project groundwater monitoring sites for inclusion in EA Table C13.

These are addressed below.

EA groundwater monitoring network figure

Figure 1 shows the layout of the Curragh Mine EA groundwater monitoring network including the additional project groundwater monitoring bores.

Project groundwater monitoring bore details

Table B1 of the EAR Groundwater Report provides the project groundwater monitoring bore construction details required for EA Table C12, including the screened interval and target formation.

For ease of reference, EA Table C12 has been reproduced below and updated (in red text) to include the relevant details (extracted from Table B1) for the proposed project groundwater monitoring bores.

TABLE 1 UPDATED ENVIRONMENTAL AUTHORITY TABLE C12

Bore ID	Bore Location Coordinates[1] Easting	Northing	Ground Surface Elevation[2]	Screened Interval (m bgl)[3]	Screened Formation	Monitoring Frequency
BH1	690,092	7,399,431	157.70	18*	Rangal Coal Measures	6 monthly
BH2	689,860	7,401,174	169.82	70*	Rangal Coal Measures	6 monthly
BH3	688,960	7,404,720	176.52	43*	Rangal Coal Measures	6 monthly
BH4	688,374	7,401,328	170.19	33*	Burngrove Formation	6 monthly
1304aMB (MB4A)	691,481	7,398,090	153.35	6 – 9	Alluvium	6 monthly
1309MB (MB7)	689,082	7,423,302	124.43	12 – 18	Alluvium	6 monthly
1410MB (MB8)	688,842	7,423,144	126.05	10 – 18	Alluvium	6 monthly
1411MB (MB9)	688,974	7,423,010	128.23	9 – 20	Alluvium	6 monthly
1418MB (FF2)	688,428	7,400,647	175.56	1.2 – 16	Burngrove Formation	6 monthly
1420MB (FF4)	693,004	7,418,881	138.43	1.2 – 15	Alluvium	6 monthly
1426MB (SMB2)	691,085	7,419,864	128.79	12 – 26	Alluvium	6 monthly
1529MB (PMB07)	691,161	7,417,211	123.81	33 – 39	Rangal Coal Measures	6 monthly
1533MB (PMB03)	689,529	7,421,689	132.36	21 – 27	Alluvium	6 monthly
HYDRO23_12[4]	692,897	7,416,176	131.38	Not applicable	Permian overburden	High frequency[5]
HYDRO23_02MB	691,540	7,414,006	118.95	7 – 10	Fresh Permian bedrock	High frequency[5]
HYDRO23_06MB	691,421	7,414,674	119.86	11.5 – 14.5	Fresh Permian bedrock	High frequency[5]

Bore ID	Bore Location Coordinates[1] Easting	Northing	Ground Surface Elevation[2]	Screened Interval (m bgl)[3]	Screened Formation	Monitoring Frequency
HYDRO23_07MB	692,406	7,413,541	127.02	13 - 16	Weathered profile	High frequency[5]
HYDRO23_08MB	694,604	7,413,222	123.76	7 – 10	Weathered profile	High frequency[5]

**: No data on screened interval available; terminal depth of bore shown (based on published drill logs)*

1: Coordinates presented in GDA/MGA94, Zone 55

2: Elevation presented in metres above Australian Height Datum (mAHD)

3: Depth of bore screened interval presented in metres below ground level (mbgl)

4: HYDRO23_12 shall be decommissioned 12 months after cessation of gas drainage undertaken as part of the Curragh Pilot Gas Drainage Program

5: 'High frequency' monitoring means automatic recording of groundwater levels at pre-set intervals (nominally 6-hourly) using a datalogger

Groundwater level triggers for project groundwater monitoring bores

Groundwater level triggers have been developed for the project groundwater monitoring bores based on the project groundwater model.

The groundwater level trigger calculation was undertaken using the following methodology:

- Establishing an appropriate starting groundwater level – For the purposes of the proposed groundwater level triggers, the maximum (highest) observed groundwater elevation was adopted as the starting groundwater level for each bore. This approach yields the highest groundwater level trigger value (after the application of drawdown) and is therefore conservative.
- Applying the predicted groundwater effects (i.e. drawdown magnitude) to the starting groundwater level – The predicted groundwater effects were taken to be the maximum predicted drawdown in the screened formation at each monitoring location.
- Correcting the result for inherent model error (i.e. the difference between observed and predicted levels at the location each trigger is to be applied) – The correction method is based on the maximum predicted 'residual' (i.e. the maximum difference between observed and predicted groundwater levels at any time in the modelled timeframe). Using the modelled residual avoids the need for additional subjective interpretation of the model results that could lead to interpretation bias. The maximum residual is the largest modelled error that has occurred, but has not been exceeded, during modelling. Application of a larger correction factor is unsupported by the modelling, while application of a smaller residual value (e.g. median residual or minimum residual) is likely to lead to groundwater trigger exceedances that are a function of model error rather than a result of unexpected groundwater effects. On this basis, the use of the maximum modelled residual is considered the most appropriate approach.

This methodology has been used recently for calculating model-based groundwater level triggers in consultation with DESI.

Table 2 shows the calculated groundwater level trigger values proposed for the project groundwater monitoring bores.

TABLE 2 PROPOSED GROUNDWATER LEVEL TRIGGERS

Bore ID	Starting Groundwater Level (mAHD)	Maximum Predicted Drawdown (m)	Maximum Modelled Residual (m)	Proposed Trigger Elevation (mAHD)
HYDRO23_02MB	112.67	32.43	0.61	79.63
HYDRO23_06MB	109.86	11.05	1.97	96.83
HYDRO23_07MB	112.25	13.80	0.85	97.60
HYDRO23_08MB	114.86	25.37	2.06	87.43

Groundwater quality triggers for project groundwater monitoring bores

Coronado has identified the relevant groundwater quality parameters and developed interim groundwater quality guideline values and triggers for each parameter.

The relevant parameters are based on mine waste geochemistry and include key indicators that can identify whether the project is influencing groundwater quality.

The interim groundwater quality guideline values have been developed, as follows:

- Interim site-specific guideline values have been calculated for pH, electrical conductivity, sulfate, dissolved iron, and dissolved arsenic in HYDRO23_06MB. The proposed interim values are presented as an upper threshold based on the 95th percentile of the available data for each bore.
- Default guideline values have been adopted for molybdenum, dissolved arsenic in HYDRO23_02MB, 07MB and 08MB, and total recoverable hydrocarbons (C_{6-10} and C_{10-40} fractions).
- Selenium is present at levels below the limit of detection in all samples. Hence, the limit of detection has been proposed as an interim guideline value.

The proposed interim quality trigger values are shown in Table 3.

The proposed trigger compliance approach is based on comparing a number of consecutive monitoring results to the trigger values. An exceedance of the trigger occurs when three consecutive groundwater quality results are above the interim guideline value (or, for pH, are outside the guideline value range).

TABLE 3 PROPOSED GROUNDWATER QUALITY TRIGGERS

Location	pH Range pH units	Electrical Conductivity Maximum µS/cm	Sulfate Maximum mg/L	Iron Maximum mg/L	Arsenic Maximum mg/L	Molybdenum Maximum mg/L	Selenium Maximum mg/L	TRH C6-C10 Maximum µg/L	TRH C10-40 Maximum µg/L	Major Ions Interpretation only mg/L
HYDRO23_02MB	6.4 – 6.5[D]	33,284[C]	1,233[C]	0.997^[C]	0.013^[B]	0.034^[A]	0.01^	≤20[B]	≤100[B]	Bicarbonate, sodium, carbonate, calcium, chloride, potassium and magnesium
HYDRO23_06MB	6.6 – 6.9[D]	13,229[C]	792[C]	0.164^[C]	0.497^[C]	0.034^[A]	0.01^	≤20 [B]	≤100[B]	
HYDRO23_07MB	6.1 – 6.4[D]	54,406[C]	1,947[C]	0.06^[C]	0.013^[B]	0.034^[A]	0.01^	≤20 [B]	≤100[B]	
HYDRO23_08MB	6.3 – 6.6[D]	17,606[C]	246[C]	16.81^[C]	0.013^[B]	0.034^[A]	0.01^	≤20 [B]	≤100[B]	

**: TRH: Total Recoverable Hydrocarbons*

^: Limits are for dissolved component

A: ANZG

B: Model mining limit

C: Site-specific 95th percentile

D: Range based on site-specific 5th and 95th percentiles

DESI Information Request No 4

DESI Comment

Spatial data was not provided to support the amendment application.

Spatial data is required to assist the department's understanding of the areas of approved and proposed disturbance.

Requested Actions

Provide spatial data that includes polygons of:

- The existing disturbance area
- The currently approved disturbance area
- The total proposed underground bord and pillar mining area.

The requested spatial data polygons have been provided to DESI in electronic format.

DESI Information Request No 5

DESI Comment

The current EA, in Figure 4, demonstrates the extent of approved mining activities associated with ML700006, ML700007, ML700008 and ML700009. It is understood that the underground project will occur beneath section s of ML700007 and ML700008, thus Figure 4 is required to be updated to appropriately condition the environmental authority. The department requires an updated Figure which demonstrates the proposed changes to disturbance areas or the extent of the proposed underground Bord and Pillar project. Additionally, it is considered necessary and desirable for Figure 4 to demonstrate the full extent of approved mining activities across all mining leases.

Requested Actions

Provide an updated Figure that includes all mining leases and up to date disturbance and mine activity areas. It would be preferable if the Figure was supplied as an image file to ensure quality and readability of the image when included in the environmental authority.

An updated image file of the disturbance area figure for the project mining leases has been provided to DESI in electronic format.

DESI Information Request No 6

DESI Comment

Section 3.3.3 of the application supporting document states that underground mine access is proposed from two locations in the Pit S highwall and there will be 4 access portals at each mine entrance location for the transport of personnel and equipment, the ROM coal conveyor and ventilation and section 3.3.9 states that the underground mine access portals in the highwall will be sealed with concrete plugs. Limited information

has been provided regarding the type and rating of mine seals and whether the seals used will be required to have a qualified engineer rating certificate.

Information has not been provided regarding subsidence monitoring and the management and rehabilitation of potential unplanned surface subsidence of the surface area above underground mining areas.

Requested Actions

Provide further information regarding the method of sealing underground openings including ventilation shafts.

Provide further information regarding the rehabilitation and management strategy, should unplanned surface subsidence and unplanned ground collapse such as sinkholes and pot holing occur.

Provide further information on the monitoring regime that will be developed to monitor potential subsidence.

Method of sealing underground openings

The mine entries for the underground mine are limited to four (4) in-seam roadways from the portals at each of the two (2) mine access locations in the Pit S highwall. There are no ventilation shafts proposed in the project.

The permanent portal seals to be installed at mine closure will be designed and certified by a suitably qualified engineer. The seal designs will be in accordance with the relevant guidelines and Department of Resources requirements, applicable at the time of closure (e.g. the NSW Government Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams). Based on current standards, the entry roadway seals will not be less than 20 m from the highwall portals and will be designed to be explosion proof and rated at 40 kPa. The portal entrance will also be backfilled with spoil from the roadway seal to the highwall.

Surface subsidence monitoring

As described in the EAR Subsidence Report, the maximum surface subsidence from the project underground bord and pillar mining operations is predicted to be less than 50 mm. These low levels of subsidence would not be distinguishable from natural ground movements that can occur due to seasonal variations in surface soil moisture. It should also be noted that significant surface subsidence effects, such as the creation runoff ponding areas and surface cracking, are not likely to occur unless surface subsidence levels approach 300 mm.

Monitoring of the surface areas above the underground mining operations will be conducted in order to confirm the actual subsidence levels. The proposed subsidence monitoring program is as follows:

- Permanent survey points will be established at the surface above each panel, prior to the commencement of mining in the panel. The surveys points will be established along the centreline of each panel and at cross-sections at sufficient spacings to provide coverage over the length of each panel (panels vary in length from approximately 450 m to 2.2 km and cross-sections would be established at approximately 150 m to 300 m spacings).
- Ground surface levels along the panel centrelines and cross-sections will be surveyed before and after mining in each panel, using a high accuracy GPS survey unit.
- The pre and post mining surface levels will be compared to confirm the actual level of ground surface movement. This will enable a comparison of the actual surface movement with the 50 mm maximum subsidence prediction and the 300 mm threshold for the potential commencement of surface subsidence effects.

Management and rehabilitation of unplanned subsidence

As explained in the EAR Subsidence Report, the project underground mine has been designed with appropriate factors of safety to ensure long term stability. Hence subsidence due ground collapse such as sinkholes or potholes is unlikely to occur.

In the unlikely event that a sinkhole or pothole failure was to occur in the underground workings, an investigation would be conducted by a suitably qualified geotechnical engineer. The scope of the investigation would include determining the cause of the unexpected failure and designing appropriate rectification and rehabilitation works for area affected by the failure. The specific rehabilitation works required could vary depending on the location of the failure and the surface features affected. However, in general terms, the rehabilitation works would involve backfilling of the sinkhole or pothole with spoil from the adjacent open cut open mine overburden emplacements and revegetation of the backfilled surface area by applying topsoil and seeding. Erosion control works would also be applied to the rehabilitation area, as necessary, during the revegetation phase.

DESI Information Request No 7

DESI Comment

Section 4.2 of Appendix D – Curragh Bord and Pillar Mine Project GHG Report identifies the project as a medium to high emission category and acknowledges a GHG abatement plan is required in accordance with the departmental Greenhouse Gas Emissions Guideline (ESR/2024/6819) (GHG Guideline). One of the requirements for a GHG abatement plan listed in Appendix A Part A is to provide a GHG emission reduction program that includes the detailed information stated in Part B of the GHG guideline. The projects GHG abatement plan in compliance with the guideline is provided in Table 6, with the GHG emission reduction program provided in part (e).

Table 6 (e) of Appendix D – Curragh Bord and Pillar Mine Project GHG Report provides an overview of further work to be completed and states "an assessment of abatement scenarios has been completed and Coronado are currently finalising assessments on the most cost-effective forms of abatement to go forwards to feasibility studies and potential trials'. The information supplied in Table 6 (e) does not comprise an adequate GHG emission reduction program as it does not satisfy the detailed requirements in Part B of the GHG guideline.

Requested Actions

Provide a GHG abatement plan for the project that complies with Appendix A of the Greenhouse Gas Emissions Guideline (ESR/2024/6819).

Provide a specific emissions reduction program that includes the information stated in Part B of the Greenhouse Gas Emissions Guideline (ESR/2024/6819).

The GHG abatement plan has been updated to more explicitly align with the Greenhouse gas emissions guideline (ESR/2024/6819) information requirements.

More specifically, Table 6(e) of the Curragh Bord and Pillar Mine Project GHG report has been revised to incorporate a project-specific emissions reduction program. This program details immediate actions to reduce emissions both before and during operations. The preferred immediate measures are based on best practice Marginal Abatement Cost Curve (MACC) analysis. As this project is captured by the Commonwealth Safeguard Mechanism as part of a larger facility, the emission reduction targets are determined by the Safeguard Mechanism. Coronado is committed to ongoing investigation and implementation of opportunities for continuous improvement in our decarbonisation performance. These opportunities have also been included in the updated emissions reduction program provided in Table 6(e). A copy of the revised GHG report is included in Appendix B.

FIGURES

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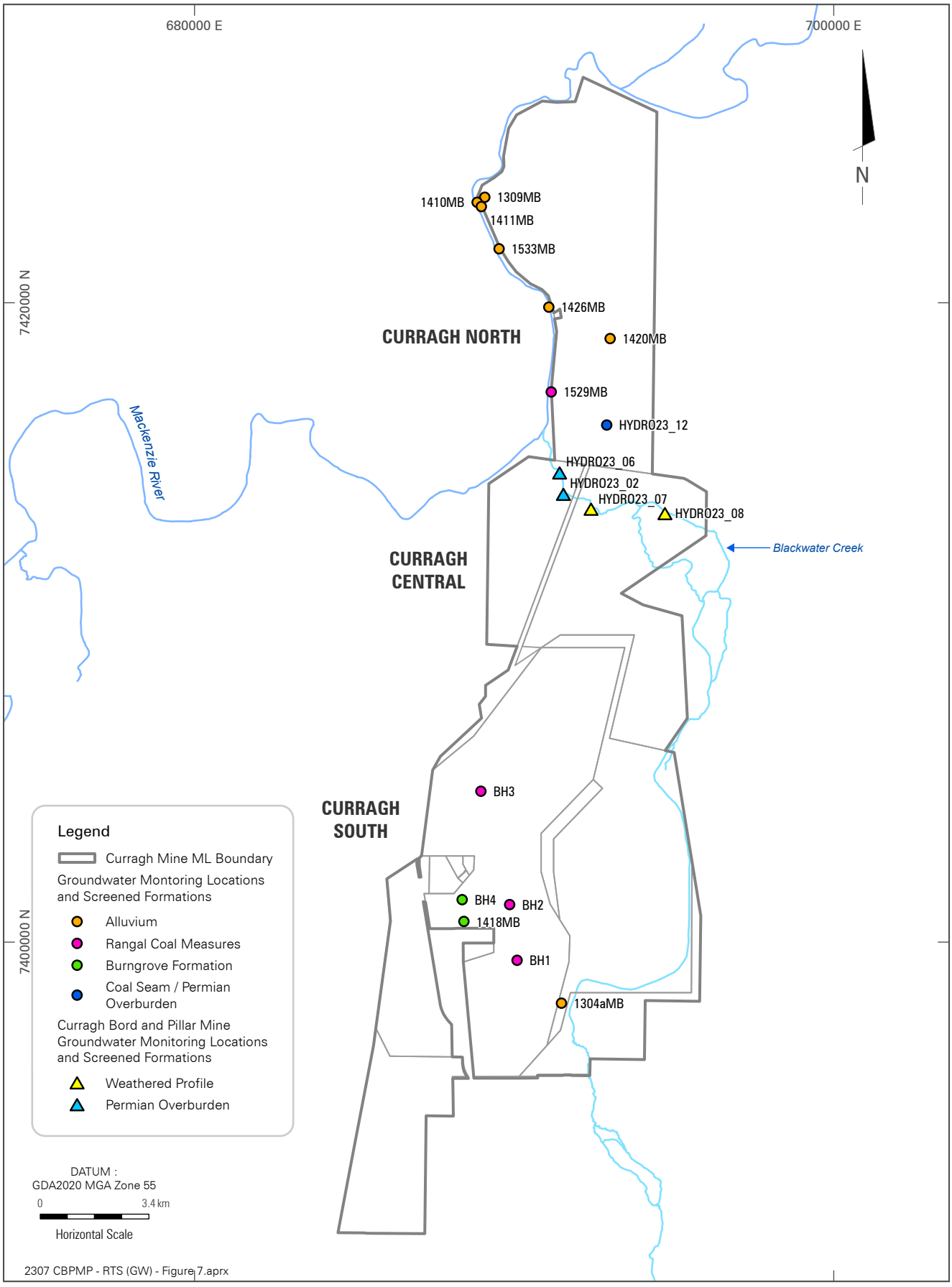

CURRAGH MINE

Groundwater Monitoring Locations

FIGURE 1

APPENDIX A

DESI Information Request Notice

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Notice

Environmental Protection Act 1994

Information request

This information request is issued by the administering authority under section 140 of the Environmental Protection Act 1994 *to request further information needed to assess an amendment application for a site-specific environmental authority*

To: Coronado Curragh Pty Ltd
Level 33, Central Plaza One
345 Queen Street
Brisbane City QLD 4000
By email transmission only

ATTN: Scott Weatherall, Anthony De Domenico
Email: sweatherall@coronadoglobal.com , adedomenico@coronadoglobal.com

Our reference: EPML00643713

Further information is required to assess an amendment application for environmental authority

1. Application details

The amendment application for a site-specific environmental authority EPML00643713 was received by the administering authority on 24 May 2024.

The application reference number is: A-EA-AMD-100656558

Land description: ML1878, ML1990, ML700006, ML700007, ML700008, ML700009, ML80010, ML80011, ML80012, ML80086, ML80110, ML80112, ML80123, ML8017.

2. Information request

The administering authority has considered the abovementioned application and is writing to inform you that further information is required to assess the application (an information request).

The information requested is provided in **Appendix A – Information requested.**

3. Actions

The abovementioned application will lapse unless you respond by giving the administering authority -

(a) all of the information requested; or
(b) part of the information requested together with a written notice asking the authority to proceed with the assessment of the application; or
(c) a written notice –
    i. stating that you do not intend to supply any of the information requested; and
    ii. asking the administering authority to proceed with the assessment of the application.

A response to the information requested must be provided by **13 January 2025** (the information response period). If you wish to extend the information response period, a request to extend the period must be made at least 10 business days before the last day of the information response period.

The response to this information request or a request to extend the information response period can be submitted to the administering authority by email to CRMining@des.qld.gov.au.

If the information provided in response to this information request is still not adequate for the administering authority to make a decision, your application may be refused as a result of section 176 of the *Environmental Protection Act 1994,* where the administering authority must have regard to any response given for an information request.

4. Human rights

A human rights assessment was carried out in relation to this decision and it was determined that no human rights are engaged by the decision.

5. Review and appeal rights

You may apply to the administering authority for a review of this decision within 10 business days after receiving this notice. Information about your review rights is attached to this notice or search 'DESI Internal review and appeals' at business.qld.gov.au. This information is guidance only and you may have other legal rights and obligations.

If you require more information, please contact the department on the telephone number listed below.

Signature

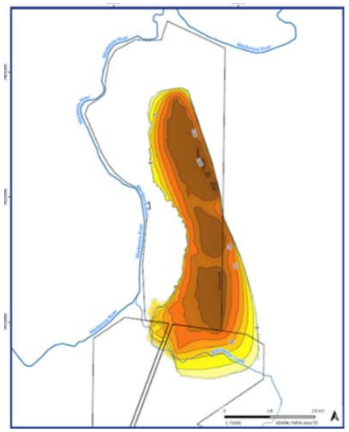
11/07/2024

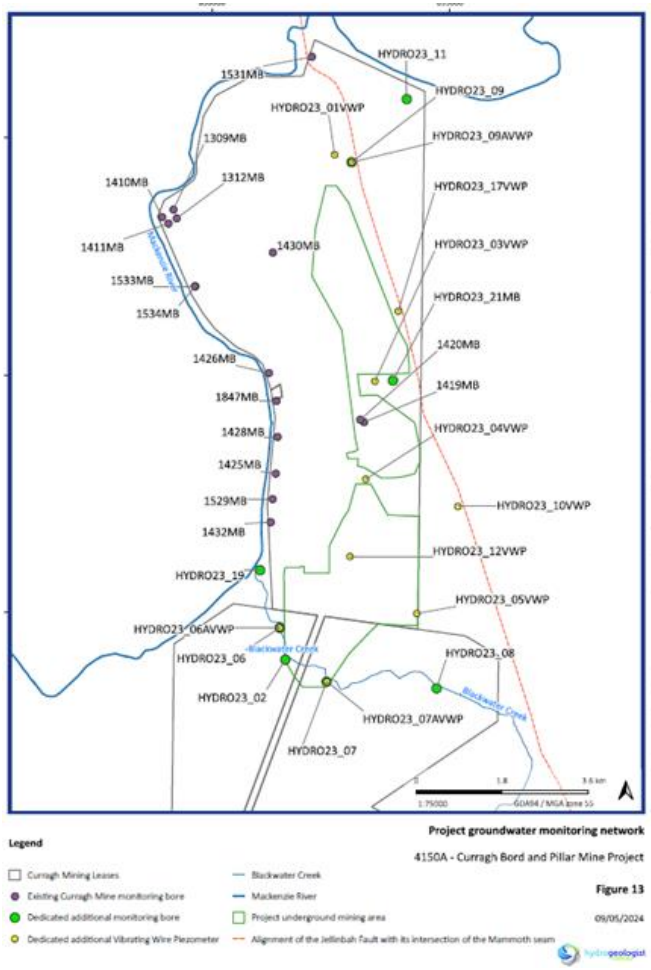
Date

Cate Puschmann
Department of Environment, Science and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Business Centre Coal
PO Box 3028, Emerald QLD 4720
Phone: (07) 4987 9320
Email: CRMining@des.qld.gov.au

Appendix A – Information requested

No.	Matter of Interest	DESI Comment	Requested Action/s
1.	Groundwater Drawdown Section 6.4 – Appendix B, Groundwater Report Section 7.6.3 – Application Supporting Document, Main Report	Section 6.4 of the Appendix B – *Groundwater Report*, states that drawdown is predicted in the shallow groundwater units along Blackwater Creek. Section 7.6.3 of the application supporting document – *Main Report*, states that there is limited alluvium present in the Blackwater Creek area. However, the shallow standpipe bores that have been drilled into the weathered Permian along Blackwater Creek have water levels between 10m and 15m below ground level. It is unclear whether the shallower water levels (10 – 15m) in the standpipe bores indicate the presence of groundwater on which vegetation along Blackwater Creek is dependant.	Provide clarification about why the standpipe bores have shallower water levels and discuss whether GDEs are potentially using water in this area for all or some of their water requirements.
2.	Groundwater Monitoring Network Figure C45 – Appendix B, Groundwater Report	Figure C45 of Appendix B – *Groundwater Report* demonstrates the predicted depressurisation in the Mammoth coal seam. As shown below, the figure indicates that depressurisation is restricted along the eastern side by the Jellinbah fault, however, in the southeast the predicted depressurisation appears to extend outside of the boundary of ML80110.  Figure C45 of Appendix B	Revise the Curragh groundwater monitoring network to include stand-pipe bores in the south-eastern area where depressurisation is predicted outside the mining lease boundaries to better monitor the impacts from mining.

		It is noted that the only monitoring of groundwater levels in the area where depressurisation is predicted to occur outside the mining lease is via vibrating wire piezometers (VWPs).  Project Groundwater Monitoring Network	

		The department has noted at varying locations in Queensland that data coming from a number of VWPs often has significantly different trends and absolute water level elevation than that measured in nearby standpipe bores in the same formations. In some instances, the majority of the VWPs are considered to be providing erroneous data. It is therefore recommended that some standpipe bores are drilled into the coal measures in this south-eastern area to provide confidence in the understanding of mining impacts. Data from the standpipe bores can also be used to validate data provided from the existing VWPs.	
3.	Groundwater Monitoring Network Section 6.5 – application supporting document Main Report	Section 6.5 of the application supporting document – *Main Report*, describes the installation of an additional three (3) monitoring bores that will be added to the existing Curragh Mine groundwater monitoring network, within the project underground mining area and the surrounding area, to measure groundwater levels, groundwater quality and hydraulic parameters. Groundwater levels and proposed trigger levels for the monitoring bores have not been supplied in the supporting information. This information must be supplied to ensure that groundwater monitoring for the underground project is robust and allows for detection of mine related impacts to groundwater. It is noted that the current EA in Table C13 includes a number of 'TBA' values for existing monitoring locations which should be addressed as soon as feasible. For the purpose of assessing this proposed underground expansion, the inclusion of TBA values will not be appropriate. Additionally, the details provided in Table 5 of the Main Report in relation to the proposed groundwater monitoring bores, are not the full details currently included in Table C12 of the EA in relation to the current monitoring bores. In relation to the new proposed groundwater bores, the screened interval and target formation should be supplied. Ideally, the environmental authority should include a visual representation of the Groundwater Monitoring Network that can be referred to alongside the water schedule to improve interpretation of the conditions.	Develop and provide groundwater monitoring trigger values and groundwater levels for the new proposed bores. Provide a figure for inclusion in the EA that clearly illustrates the full groundwater monitoring network at Curragh Mine.

4.	Spatial Data	Spatial data was not provided to support the amendment application. Spatial data is required to assist the department's understanding of the areas of approved and proposed disturbance.	Provide spatial data that includes polygons of: - The existing disturbance area - The currently approved disturbance area - The total proposed underground bord and pillar mining area
5.	Environmental Authority EPML00643713 – Figure 4.	The current EA, in Figure 4, demonstrates the extent of approved mining activities associated with ML700006, ML700007, ML700008 and ML700009. It is understood that the underground project will occur beneath section s of ML700007 and ML700008, thus Figure 4 is required to be updated to appropriately condition the environmental authority. The department requires an updated Figure which demonstrates the proposed changes to disturbance areas or the extent of the proposed underground Bord and Pillar project. Additionally, it is considered necessary and desirable for Figure 4 to demonstrate the full extent of approved mining activities across all mining leases.	Provide an updated Figure that includes all mining leases and up to date disturbance and mine activity areas. It would be preferable if the Figure was supplied as an image file to ensure quality and readability of the image when included in the environmental authority.
6.	Rehabilitation of underground workings Section 3.3.3 – application supporting document, Main Report Section 3.3.9 – application supporting document, Main Report	Section 3.3.3 of the application supporting document states that underground mine access is proposed from two locations in the Pit S highwall and there will be 4 access portals at each mine entrance location for the transport of personnel and equipment, the ROM coal conveyor and ventilation and section 3.3.9 states that the underground mine access portals in the highwall will be sealed with concrete plugs. Limited information has been provided regarding the type and rating of mine seals and whether the seals used will be required to have a qualified engineer rating certificate.	Provide further information regarding the method of sealing underground openings including ventilation shafts. Provide further information regarding the rehabilitation and management strategy, should unplanned surface subsidence and unplanned

		Information has not been provided regarding subsidence monitoring and the management and rehabilitation of potential unplanned surface subsidence of the surface area above underground mining areas.	ground collapse such as sinkholes and pot holing occur. Provide further information on the monitoring regime that will be developed to monitor potential subsidence.
7.	GHG abatement plan Section 4.2 of Appendix D – Curragh Bord and Pillar Mine Project GHG Report Table 6 (e) of Appendix D – Curragh Bord and Pillar Mine Project GHG Report Section 4.2 of Appendix D – Curragh Bord and Pillar Mine Project GHG Report	Section 4.2 of Appendix D – *Curragh Bord and Pillar Mine Project GHG Report* identifies the project as a medium to high emission category and acknowledges a GHG abatement plan is required in accordance with the departmental Greenhouse Gas Emissions Guideline (ESR/2024/6819) (GHG Guideline). One of the requirements for a GHG abatement plan listed in Appendix A Part A is to provide a GHG emission reduction program that includes the detailed information stated in Part B of the GHG guideline. The projects GHG abatement plan in compliance with the guideline is provided in Table 6, with the GHG emission reduction program provided in part (e). Table 6 (e) of Appendix D – *Curragh Bord and Pillar Mine Project GHG Report* provides an overview of further work to be completed and states "*an assessment of abatement scenarios has been completed and Coronado are currently finalising assessments on the most cost-effective forms of abatement to go forwards to feasibility studies and potential trials'*. The information supplied in Table 6 (e) does not comprise an adequate GHG emission reduction program as it does not satisfy the detailed requirements in Part B of the GHG guideline.	Provide a GHG abatement plan for the project that complies with Appendix A of the Greenhouse Gas Emissions Guideline (ESR/2024/6819). Provide a specific emissions reduction program that includes the information stated in Part B of the Greenhouse Gas Emissions Guideline (ESR/2024/6819).

APPENDIX B

Revised Greenhouse Gas Report

HANSEN
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CURRAGH BORD AND PILLAR MINE PROJECT

REVISED GHG REPORT

Coronado Global Resources

PROJECT NO: A024-1647 **ISSUED**: 26/07/2024

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Disclaimer

The opinions expressed in this report have been based on information provided to Talisman Technical Pty Ltd (Talisman) by the client. The information supplied by the client is, to the best of their knowledge and understanding, complete, accurate, and true. While Talisman has taken all due care in compiling this report, the accuracy of the results and conclusions of this report are dependent on the accuracy and completeness of the supplied data. Talisman does not accept responsibility for any errors or omissions in the provided information and does not accept subsequent liability arising from commercial decisions or actions resulting from any such errors or omissions.

VERSION	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1.0		Draft report	S Byrom	I Budd	J Joubert

1. Introduction

Talisman Technical Pty. Ltd. was commissioned by Coronado Global Resources Inc (Coronado), to prepare a greenhouse gas (GHG) report as part of the Environmental Assessment Report (EAR) for the Curragh Bord and Pillar Mine Project (the project). The report addresses the GHG information requirements for Environmental Authority (EA) amendment applications specified in the Department of Environment, Science, and Innovation (DESI) *Guideline: Greenhouse gas emissions* (ESR/2024/6819, Version 1, 15 May 2024) (DESI GHG Guideline).

Curragh Mine is a large-scale open cut coal mine located approximately 6 km north of Blackwater township in Central Queensland (Figure 1). The mine has been operating since 1983 and produces export metallurgical and thermal coal. The mine has an approved production rate of up to 18 Mtpa of Run-of-Mine (ROM) coal and utilises dragline and truck and shovel mining methods.

CURRAGH BORD AND PILLAR MINE PROJECT

HANSEN ENVIRONMENTAL CONSULTING

Location Plan

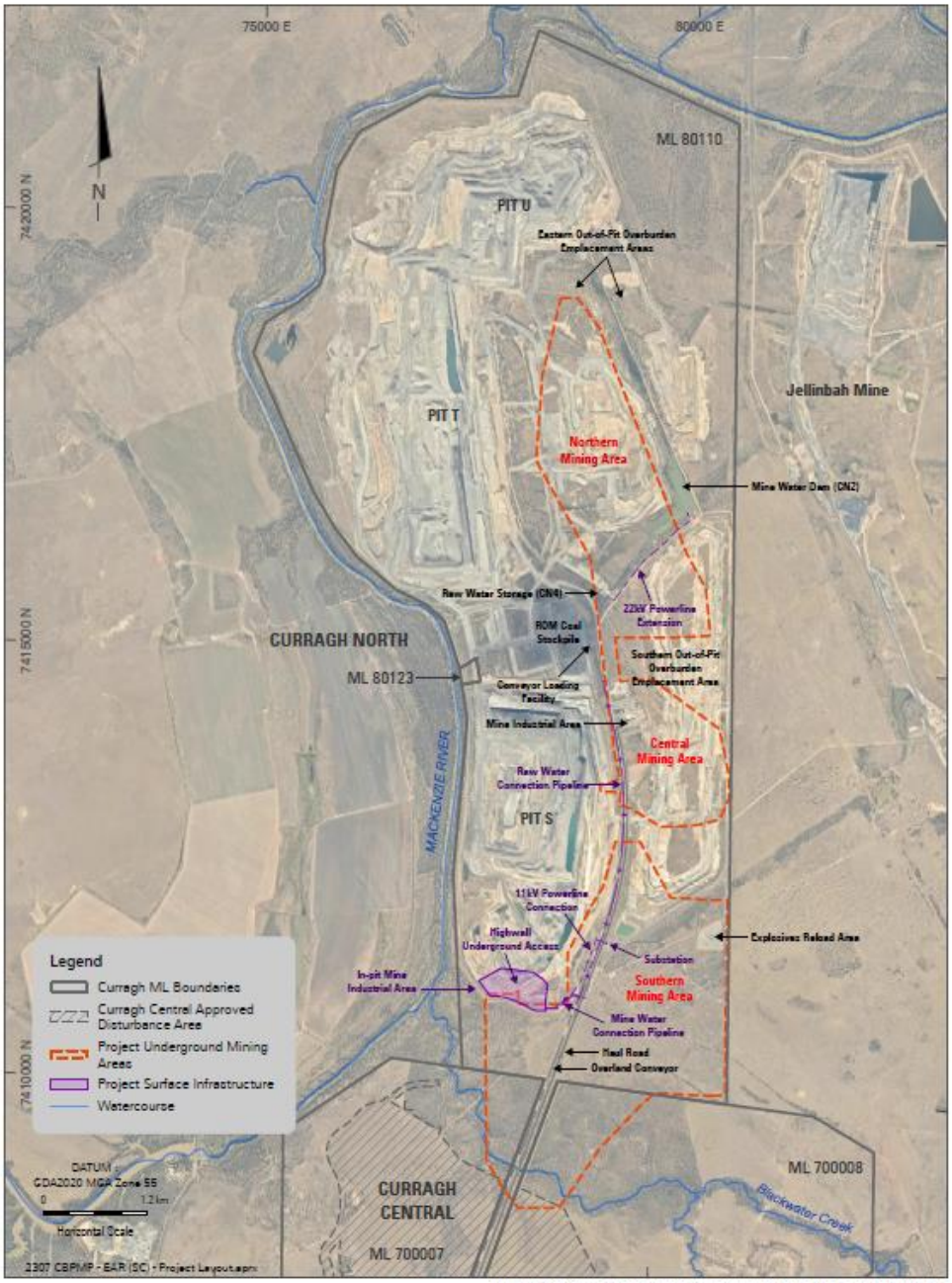
FIGURE 1

Curragh Mine currently has two main operational areas, Curragh South and Curragh North. Curragh South is the original mining area and contains key mine infrastructure including the Coal Handling and Preparation Plant (CHPP), rail loop and train loading facility and Mine Industrial Area (MIA).

Curragh North is located at the northern end of Curragh Mine and commenced operations in 2006. Curragh North includes three open cut pits (Pit S, Pit T and Pit U) and large in-pit and out-of-pit overburden emplacement areas

(Figure 2). There is a transport corridor from Curragh North to Curragh South that includes an overland conveyor and haul road. ROM coal from Curragh North is transported to the CHPP at Curragh South via the overland conveyor. Mine infrastructure at Curragh North includes:

- MIA including a workshop, vehicle servicing facilities, store and administration buildings;
- ROM coal stockpile area and conveyor loading facility; and
- Mine water management infrastructure including raw water supply, mine water dams, flood protection levees, pumps and pipelines.



CURRAGH BORD AND PILLAR MINE PROJECT

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Project Layout

FIGURE 2

The Curragh Central area adjoins the southern end of Curragh North. There are approved open cut mining areas in the Curragh Central area that have not been developed to date. The northern limit of the approved Curragh Central mine disturbance area is shown in Figure 2.

The project involves the development of an underground bord and pillar mine in the Mammoth coal seam accessed from the highwall of Pit S (Figure 2). The proposed underground mining areas are within the existing Curragh North and Curragh Central mining leases. The underground mine will have a mine life of approximately 10 years and a peak production rate of approximately 3.2 Mtpa of ROM coal. The project does not involve an increase in the approved Curragh Mine peak production rate.

The project will utilise existing Curragh Mine infrastructure including:

- Curragh North haul roads and access roads, ROM coal stockpile area, overland conveyor and conveyor loading facility, and power, raw water and mine water supplies.
- Curragh South CHPP, rail loop and train loading facilities, and tailings and rejects storage areas.

New surface infrastructure required for the project will be limited to a MIA located on the pit floor at the southern end of Pit S adjacent to the underground mine portals, and surface connections to existing Curragh North infrastructure for raw water supply, mine water supply and power (Figure 2). The underground mining operations will involve coal seam gas drainage to ensure a safe underground environment. Minor temporary surface gas drainage infrastructure will include gas drainage boreholes and flares.

To address the DESI GHG Guideline requirements for medium to high emitting projects, the report covers the following:

Table 1: DESI GHG Guideline Requirements

GUIDELINE REQUIREMENT	REPORT SECTION
GHG emissions inventory (Scope 1, 2 and 3)	3. Project Emissions
GHG emission mitigation and management practices (including Scope 3 where possible)	4.2. GHG Mitigation and Management
GHG abatement plan	4.3. Project GHG Abatement Plan
A risk assessment that outlines the scale of expected GHG emissions from the activity and how they are expected to contribute to climate change impacts on Queensland's environmental values	5.2. Risk Assessment

2. Regulatory setting

Australia has committed to reducing its greenhouse gas emissions by 43% below 2005 levels by 2030. This target was an update from a previous goal of a 26-28% reduction, aligning more closely with the objectives of the Paris Agreement. Additionally, Australia has set a goal of reaching net-zero emissions by 2050. This long-term target is part of the global effort to limit global warming to well below 2 degrees Celsius, and ideally to 1.5 degrees Celsius, compared to pre-industrial levels. These targets are part of Australia's commitment under international agreements like the Paris Agreement. Queensland has aligned with the target to achieve net zero emissions by 2050, and an interim target of a 30% reduction by 2030.

The National Greenhouse and Energy Reporting Scheme (NGERS) plays a crucial role in Australia's strategy to meet its greenhouse gas emissions reduction targets. Under NGERS, corporations that meet certain thresholds for greenhouse gas emissions, energy production, or energy consumption must report their emissions, energy production, and energy consumption to the Clean Energy Regulator (CER) annually. The thresholds typically include emitting 50kt CO_2-e or more, producing or consuming 200 terajoules or more of energy, or a

combination of both. NGERS provides a framework for the systematic collection, calculation, and reporting of greenhouse gas emissions, energy production, and energy consumption data from Australian corporations. This data is essential for understanding the country's overall emissions profile and tracking progress towards its reduction targets.

The Safeguard Mechanism applies to facilities emitting more than 100,000tCO_2-e greenhouse gases per year. These facilities are required to keep their net emissions within a declining baseline set by the government. If a facility's emissions exceed their baseline, they must take steps to reduce their emissions or offset the excess by purchasing and surrendering eligible emissions units, like Australian carbon credit units (ACCUs). The initial Safeguard period extends to 2030, with a review in 2027 to assess the effectiveness of the structure and set the structure for the proceeding period.

Both these measures are part of Australia's strategy to reduce greenhouse gas emissions and meet its international obligations. The NGERS provides a framework for measuring and reporting emissions, which is critical for understanding the scale of emissions and tracking progress, while the Safeguard Mechanism is designed to ensure that large emitters take responsibility for their emissions and contribute to national emissions reduction efforts. For further information on Curragh Mine's compliance with these two requirements can be found in Section 4.1.

3. Project Emissions

This Project identifies as a medium to high emission category as the GHG emissions are greater than 25,000tCO_2e per year. Potential sources of GHG emissions related to the project have been identified as follows.

Scope 1 Emissions:

- Fossil fuel combustion: Emissions of carbon dioxide (CO_2), nitrous dioxide (N_2O) and methane (CH_4) from the combustion of diesel by stationary and mobile plant and equipment at the mine during construction and operation, and during closure/remediation.
- Fugitive emissions: Emissions from the release of coal bed methane.

Scope 2 Emissions:

- Electricity use: Indirect emissions from the generation of purchased electricity by the mine during construction and operation.

Scope 3 Emissions:

- Coal transport: Transport of product coal to market: consumption of fossil fuels and electricity are required to deliver the product from the mine to the end user.
- Coal combustion: Combustion of coal by end users. The primary intended end users of the product will be based in Asia-Pacific, the Americas and Europe with the coal used for the purposes of steelmaking.
- Production/supply of diesel consumed.
- Electricity transmission losses.

Emission estimation methods and emission factors have been sourced from the following resources:

- **Scope 1 and 2**: from *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (Cth)[1]
- **Scope 3**: the latest National Greenhouse Accounts Factors Workbook[2], applying guidance from the latest Climate Active technical guidance manual to determine which Scope 3 emissions sources must be included on the basis that they are assessed as relevant against the relevance test[3]. Additional methods include the *GHG Protocol Corporate Value Chain.*[4] The accuracy of these estimates is based on material emissions sources associated with the downstream of the coal mining industry. The accuracy of these estimates is based on the following emissions factors. Further assessment is required to provide a more detailed estimation.

The emission factors used in this estimation are as follows:

Table 2: Emissions factors

EMISSION SOURCE	EMISSION FACTOR	UNITS	SOURCE
SCOPE 1			
Diesel combustion – stationary energy	70.20	kg CO_2-e/GJ	National Greenhouse Accounts Factors Workbook 2023
Fugitive gas	-	-	Sourced from gas model
Post mining	0.019	tCO2e/ROMt	NGER Measurement Determination 2008
SCOPE 2			
Consumption of purchased electricity	0.73	kg CO_2-e/kWh	National Greenhouse Accounts Factors Workbook 2023
SCOPE 3			
Production/supply of diesel consumed	17.3	kg CO_2-e/GJ	National Greenhouse Accounts Factors Workbook 2023
Electricity transmission losses	0.15	kg CO_2-e/kWh	National Greenhouse Accounts Factors Workbook 2023
Transport of product coal	-	-	See note ^
Combustion of product (metallurgical)	92.03	kg CO_2-e/GJ	National Greenhouse Accounts Factors Workbook 2023
^ Downstream Scope 3 emissions from the transport of product coal by rail and ship were calculated using the *Mobile Combustion Greenhouse Gas Protocol Transport Calculation Tool*, version 2.6. There are no emission factors available in the NGA Factors for these activities.			

[1] National Greenhouse and Energy Reporting (Measurement) Determination 2008, https://www.legislation.gov.au/Series/F2008L02309

[2] National Greenhouse Accounts Factors (https://www.dcceew.gov.au/climate-change/publications/national-greenhouse-accounts-factors

[3] Climate Active, Technical Guidance Manual, https://www.climateactive.org.au/be-climate-active/tools-and-resources/technical-guidance-manual

[4] GHG Protocol, Corporate Value Chain (Scope 3) Standard, https://ghgprotocol.org/standards/scope-3-standard

The LOM emissions estimate for the Project over the underground mine life are as follows:

Table 3: LOM emissions estimate (tCO_2e)

EMISSION SOURCE	LOM EMISSIONS
SCOPE 1	
Diesel combustion – stationary energy	41,042 tCO_2e
Fugitive gas	2,266,924 tCO_2e*
Post mining	400,924 tCO_2e
SCOPE 1 LOM TOTAL	**2,708,890 tCO_2e**
SCOPE 2	
Consumption of purchased electricity	260,236 tCO_2e
SCOPE 2 LOM TOTAL	**260,236 tCO_2e**
SCOPE 1 AND 2 LOM TOTAL	**2,969,126 tCO_2e**
SCOPE 3	
Production/supply of diesel consumed	10,086 tCO_2e
Electricity transmission losses	53,473 tCO_2e
Transport of product coal (rail)	92,177 tCO_2e
Transport of product coal (shipping)	4,445,592 tCO_2e
Combustion of product (metallurgical)	42,997,911 tCO_2e
SCOPE 3 LOM TOTAL	**47,599,238 tCO_2e**
PROJECT LOM TOTAL	**50,568,364 tCO_2e**

* Assumes gas volumes from pre-drainage have been flared. Without flaring, fugitive emissions are approximately 7MtCO_2e across LOM.

Scope 3 emissions represent approximately 94% of total LOM emissions. These emissions are sourced from outside of Australia. The majority of these Scope 3 emissions are:

- Shipping: 8.8%
- Combustion of product (metallurgical): 85%

The average annual emissions across LOM are shown below for the construction phase and the operational phase:

Table 4: Construction phase emissions estimate (tCO_2e)

EMISSION SOURCE	EMISSIONS
CONSTRUCTION	
SCOPE 1	
Diesel combustion – stationary energy	84 tCO_2e
Fugitive gas	295 tCO_2e
Post mining	0 tCO_2e
SCOPE 1 CONSTRUCTION TOTAL	**379 tCO_2e**
SCOPE 2	
Consumption of purchased electricity	808 tCO_2e
SCOPE 2 CONSTRUCTION TOTAL	**808 tCO_2e**
SCOPE 1 AND 2 CONSTRUCTION TOTAL	**1,187 tCO_2e**
SCOPE 3	
Production/supply of diesel consumed	21 tCO_2e
Electricity transmission losses	166 tCO_2e
SCOPE 3 CONSTRUCTION TOTAL	**187 tCO_2e**
CONSTRUCTION TOTAL	**1,374 tCO_2e**

Table 5: Operational annual average emissions estimate (tCO_2e)

EMISSION SOURCE	EMISSIONS
OPERATIONS - ANNUAL AVERAGE	
SCOPE 1	
Diesel combustion – stationary energy	4,551 tCO_2e
Fugitive gas	251,848 tCO_2e
Post mining	44,547 tCO_2e
SCOPE 1 OPERATIONS - ANNUAL AVERAGE TOTAL	**300,946 tCO_2e**
SCOPE 2	
Consumption of purchased electricity	28,825 tCO_2e
SCOPE 2 OPERATIONS - ANNUAL AVERAGE TOTAL	**28,825 tCO_2e**

EMISSION SOURCE	EMISSIONS
SCOPE 1 AND 2 OPERATIONS - ANNUAL AVERAGE TOTAL	**329,771 tCO_2e**
SCOPE 3	
Production/supply of diesel consumed	1,118 tCO_2e
Electricity transmission losses	5,923 tCO_2e
Transport of product coal (rail)	10,242 tCO_2e
Transport of product coal (shipping)	493,955 tCO_2e
Combustion of product (metallurgical)	4,777,546 tCO_2e
SCOPE 3 OPERATIONS - ANNUAL AVERAGE TOTAL	**5,288,783 tCO_2e**
OPERATIONS - ANNUAL AVERAGE TOTAL	**5,618,554 tCO_2e**

4. GHG Management and Reporting

4.1 Reporting

NGERS

Coronado Australia Holdings (CAH) Pty Ltd is the parent entity and has operational control over the Curragh Mine, for the purpose of reporting against the National Greenhouse and Energy Report Scheme (NGERS).

CAH submits a NGERS report each year as the operation is above the facility threshold. Curragh Mine reports their Scope 1 and Scope 2 emissions and energy production and consumption data to the Clean Energy Regulator (CER) under section 19 of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). CAH reports the emissions and energy for the Curragh Mine through the Emissions and Energy Reporting System (EERS).

Records are maintained by CAH to enable the CER to ascertain whether the corporation has complied with obligations under the NGER Act. This includes information that can be used to verify the relevance, completeness, consistency, transparency, and accuracy of reported data during an external audit.

For the period 1 July 2022 to 30 June 2023, the "Energy and Emissions Report", in compliance with Section 19 of the NGER Act was subject to reasonable assurance through an independent external auditor.

The project will be incorporated into the established Curragh Mine reporting, record keeping and external assurance processes.

Safeguard Mechanism

The Safeguard Mechanism applies to facilities who report through NGERs more than 100,000 tCO_2e each year. CAH is the responsible emitter with operational control over the Curragh Mine facility for the purpose of reporting against the Safeguard Mechanism.

Following the Safeguard Mechanism reform in 2023, new obligations and reporting requirements now apply to Curragh Mine as a Safeguard facility from 1 July 2023.

The Safeguard Mechanism is aimed at reducing greenhouse gas emissions from large industrial facilities through setting limits, or baselines, on the quantity of annual emissions these facilities can produce.

The reformed Safeguard Mechanism means the Curragh Mine Safeguard baseline will adjust with annual production (Run-of-Mine Coal Production Variable) and be subject to a decline rate of 4.9% each year to 2030.

As per the previous Safeguard Mechanism set-up, if a facility is above the baseline, there are several options to manage this, including pre-existing options such as the purchase and surrender of Australian Carbon Credit Units (ACCUs) or entering multi-year monitoring periods. New options also include purchasing and surrendering Safeguard Mechanism Credits (SMCs) or applying to borrow baseline from the previous year. At the close of 2023, Coronado established accounts with several brokers and financial institutions, for purchasing small volumes of ACCUs as part of project readiness.

The modified Safeguard Mechanism has continued to be considered in the Curragh Mine emissions reduction approach.

4.2 GHG Mitigation and Management

For medium to high emission category projects, a GHG Abatement Plan is required. This plan must identify and report against the GHG emission reduction measures that will be implemented to achieve emission reductions required by the Commonwealth Safeguard Mechanism and associated baseline, and be consistent with the Queensland emission reduction targets.

The requirement to develop a GHG Abatement Plan is a relatively new concept which requires the appropriate analysis and study to progress. There are a number of studies currently underway across the broader Curragh Mine facility, including a trial of CNG trucks at the Curragh Open Cut Mine. While these studies are progressing, flaring will be utilised as an emissions reduction methodology to ensure best practice emissions reduction. This commitment has been included as part of the EA Amendment supporting information. As the Curragh Mine is a Safeguard facility which includes both the underground and open cut mines, the studies process that is currently underway is a holistic process to ensure the most cost-effective abatement is achieved across the facility. The detail of the ongoing studies related directly to the underground project can be seen in Table 6 below.

To mitigate and manage the GHG emissions associated with the Project, the following practices have been assessed:

- Gas Drainage with flaring
- Gas drainage with power generation
- Gas drainage with compressed natural gas (CNG) conversion for use in retrofit haul trucks
- Gas drainage with liquified natural gas (LNG) conversion for offtake
- Optimised gas drainage with CNG conversion for use in retrofit haul trucks
- Optimised sealing of underground areas

Proposed management practices need to demonstrate that all reasonable and practical measures have been applied to manage GHG emissions through best practice design, process, technology, and management following the GHG abatement hierarchy (Figure 1).

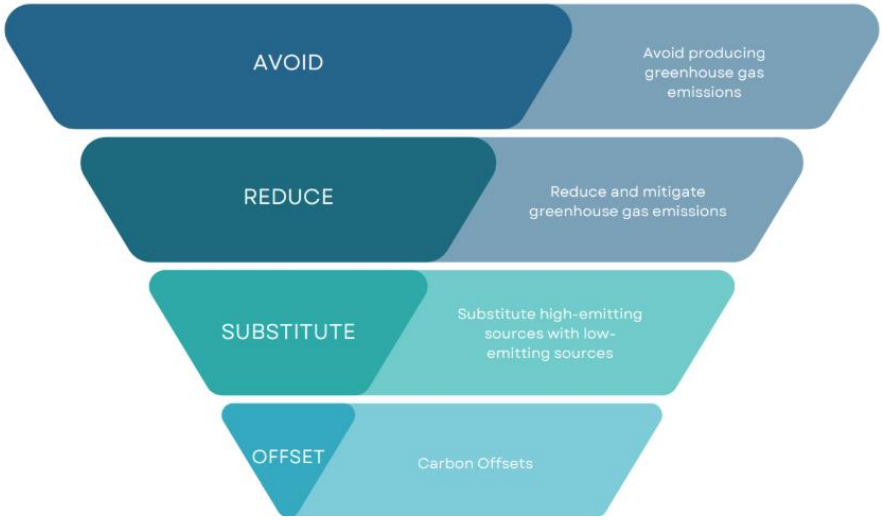


Figure 1: GHG abatement hierarchy

The mitigation and management practices explored for the Project can be categorised as a reduction methodology according to the GHG abatement hierarchy, as well as incorporating the necessary ACCUs (offsets) to meet any potential gap in Safeguard compliance. The majority of scope 1 and 2 emissions for the Project are sourced from fugitive emissions, as coal seams naturally contain methane which is released during or after the mining process. Fugitive emissions are emitted via three sources – pre-drainage, which in this scenario are flared as a base case, from the ventilation stack, and from post mining sources. As fugitive emissions are an inherent part of the coal mining process, it is not reasonable or practical to avoid or substitute these emissions.

To influence the reduction of Scope 3 emissions, CAH is a member of LETA, the industry body for the coal mining sector. Since 2006, Australia's black coal producers have committed $550 million through LETA to identify, research, and develop technologies that can reduce emissions associated with coal-fired power generation and steel production, including carbon capture and storage, and advanced coal-fired power generation technologies. LETA also focus attention on reducing emissions from black coal operations, including ventilation air methane abatement.

4.3 Project GHG Abatement Plan

Emissions from fugitive sources represent approximately 98% of Scope 1 emissions across LOM (Safeguard-covered emissions), and approximately 91% of emissions from Scope 1 and 2 across LOM. As a result, emissions reductions from fugitive sources represent the biggest opportunity to decarbonise the Project.

To develop the GHG abatement plan, scenarios for emission reduction were developed (see Table 6). While there are multiple scenarios assessed for fugitive emissions reduction, it is important to note that they are all utilising the same gas, i.e., only one abatement practice can be progressed. By redirecting the drained gas from flares to another technology, the emissions reductions do not increase. However, by utilising the gas as a resource, there is an offset in emissions from another source, such as electricity.

To address the DESI GHG Guideline requirements for medium to high emitting projects, a project specific GHG abatement plan can be seen in Table 6.

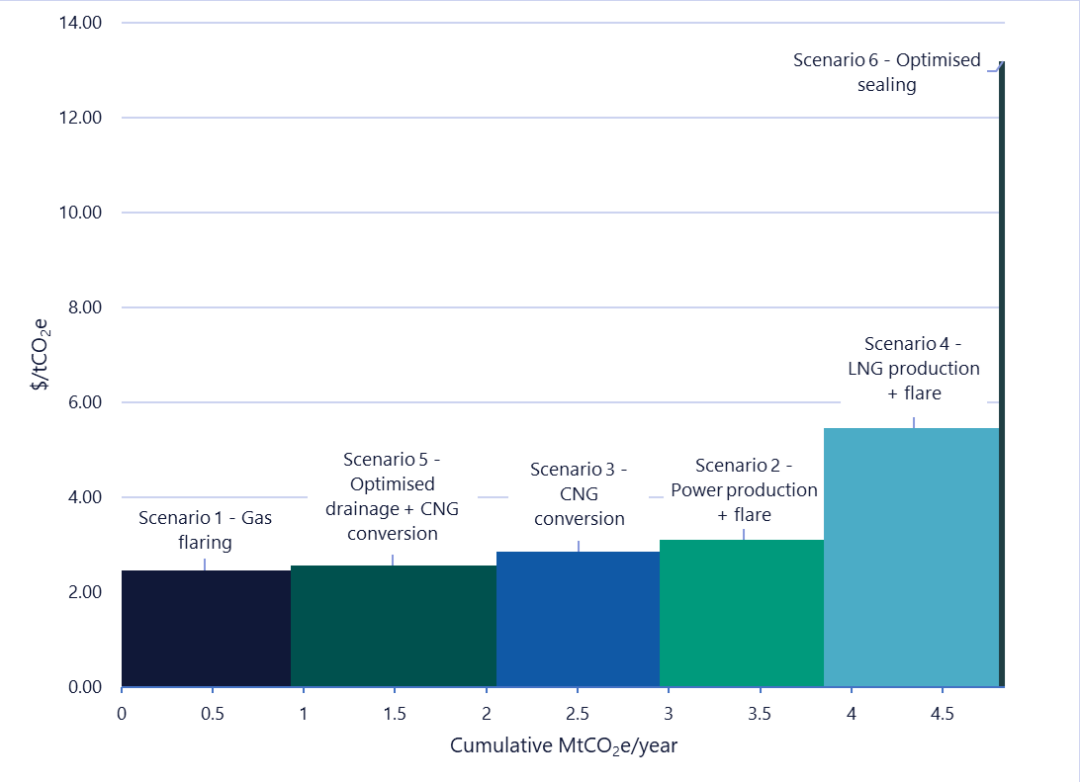
The current process to develop the Curragh Mine abatement plan follows a technical studies pathway. A concept level study has been completed that resulted in marginal abatement cost curves, a prioritisation tool that assesses

emission reduction measures based on total abatement achieve on a per tCO_2e basis. This process has been completed for both open cut and underground mines. The next step is to develop a cohesive decarbonisation pathway across the whole facility.

Table 6: Project GHG Abatement Plan

Requirement	Description
a) Project details	Curragh Bord and Pillar Mine Project
b) Emissions projections and commencing abatement measures	See Table 3, Table 4, and Table 5 for emissions projections for the project. This abatement plan is still at the concept level and require further study to determine the pathway forward. Understanding the abatement measures is difficult to quantify until a strategic direction for the fugitive gas utilisation can be determined. During the concept level assessment, the following scenarios were assessed: **Gas drainage + flare** Flaring gas drainage is proposed as an immediate emissions reduction measure. This will reduce emissions from fugitives by approximately 90% as committed to in our EA amendment application. This is informed by the MACC presented below as the preferred form of abatement available to the project **Gas drainage + power generation + flare** The power solution modelled in this scenario is the Jenbacher containerised "ready-to-use" power plants. The gas engine has a power output of up to 3,360 kW and electrical efficiency up to 45.9% when utilising coal mine methane. Each engine requires a gas flow rate of 207 l/s. Five Jenbacher engines have been used to model this scenario at a total of 16.8 MW installed capacity. The average power generation from these units 123GWh per year. Electricity consumption accounts for approximately 8% of overall LOM emissions. **Gas drainage + CNG conversion** Compressed natural gas (CNG) is currently being assessed in the Queensland coal mining industry as an option to reduce diesel emissions. The CNG truck conversion technology is currently provided by Mine Energy Solutions, who provide retrofits to all major original equipment manufacturer (OEMs). Haul trucks can be retrofitted with the CNG dual fuel technology and engine technology to enable the dual injection of CNG and diesel. Coronado are currently undertaking a trial of CNG trucks at the Curragh Open Cut Mine. This scenario produces CNG to feed into this truck trial, which could displace diesel emissions for the Curragh Open Cut Mine. **Gas drainage + LNG conversion** The conversion of coal mine methane to LNG via a micro-LNG plant involves several steps. Once methane is captured through pre-drainage, it is then purified. Gas purification removes impurities such as carbon dioxide, nitrogen, and water vapor from the captured methane to meet LNG specifications. In the liquefaction process, purified

	methane gas is cooled to approximately -162°C to convert it into liquid form (LNG), using cryogenic cooling techniques. The LNG is then stored in cryogenic tanks preparing it for transportation, leveraging the reduced volume for efficient distribution. This scenario is converting the coal mine methane to LNG for offtake. **Optimised gas drainage + CNG conversion** This scenario is built on the assumption that gas drainage can be increased to recover 93.1% across LOM of fugitive gas volumes. This is based on draining the underground workings to $2m^3/t$ – beyond the safety threshold. This allows us to gain 11.5% more gas from the underground, increasing the overall emissions reduction potential of this scenario. **Optimised sealing** Following gas drainage, the remaining emissions from underground coal mines are in the form of ventilation air methane (VAM). These emissions tend to be in low methane concentrations. As mines progress and more areas are sealed, increased proportions and volumes of the gas reporting to the vent stack are sourced from sealed areas. To mitigate this, pressure balancing of seals to reduce the volume of gas that can escape around a seal through the strata is required. Sealed emissions account for approximately 5% of overall LOM emissions.
c) GHG emissions reference point	As this project is captured by the Commonwealth Safeguard Mechanism as part of a larger facility, the reference point is determined by the Safeguard Mechanism.
d) Emission reduction targets	As this project is captured by the Commonwealth Safeguard Mechanism as part of a larger facility, the emission reduction targets are determined by the Safeguard Mechanism. These targets are reported in the Coronado Sustainability Report.
e) GHG emission reduction program	As the project is a part of a larger facility under the Safeguard Mechanism, the emissions reduction program for the underground needs to be incorporated into the overall facility to determine the optimal pathway for reducing emissions across the entire operation. To date, both the open cut operations and underground project have completed an assessment of abatement scenarios and developed marginal abatement cost curves (MACC) (see the MACC below). The next step is to bring together the marginal abatement cost curves for the open cut operation and underground project to determine the facility-level abatement plan. Coronado is currently finalising assessments on the most cost-effective forms of abatement to go forwards to feasibility studies and potential trials. **Emission Reduction Measures for Implementation** Implementation details including timeframes for implementation and estimated reduction of emissions expected; • **Immediate** ○ Flaring as an immediate emissions reduction measure. This will reduce emissions from fugitives by approximately 90% as committed to in our application. This is informed by the MACC presented below as the preferred form of abatement available to the project

	○ Emissions reductions will be in line with the Safeguard Mechanism • **Continuous improvement** ○ Coronado has committed to continuous improvement to decarbonisation. We have highlighted the opportunities to explore in the MACC below. **Risk Assessment** See Section 5.2 for further detail. **Justification for Each Measure and Estimates of Abatement** A Marginal Abatement Cost curve (MACC) is a tool used to display various emission reduction scenarios in terms of their cost-effectiveness. It ranks scenarios by $/tCO$_2$e, helping decision-makers identify the most economically efficient ways to reduce their carbon footprint. Utilising a MACC is essential in planning a decarbonisation pathway as it provides a clear visual guide for prioritising actions based on their cost and impact on reducing GHG emissions. This tool was used to assess and prioritise the abatement opportunities analysed for the underground project, with flaring presenting as the first opportunity to implement. As a result, this has formed part of our project.  *MACC for emission reduction scenarios* **Ongoing monitoring** Ongoing monitoring of the flare option will be undertaken in accordance with the National Greenhouse Gas and Energy Reporting Act.
f) Advancing technologies and opportunities	As part of the Curragh Mine GHG abatement plan that is under development, provisions for regularly reviewing new technologies to identify opportunities to further reduce emissions and energy efficiency will be incorporated.

g) Monitoring and auditing	The program for monitoring GHG emissions and auditing against GHG emission reduction targets will be incorporated into the established Curragh Mine NGERs monitoring and external assurance processes.
h) Reporting	The program for monitoring GHG emissions and auditing against GHG emission reduction targets will be incorporated into the established Curragh Mine NGERs reporting processes.

5. Potential Impacts of GHG Emissions on Environmental Values

The GHG emissions intensity of the Project, assuming that pre-drained gas will be flared at a minimum, results in a LOM emissions intensity of 0.17tCO_2e/ROMt. The industry average emissions intensity as defined in the Safeguard Mechanism by the Clean Energy Regulator is 0.0653tCO_2e/ROMt. However, when analysing publicly available Safeguard facility data, the industry average emissions intensity is 0.116 tCO_2e/ROMt and the industry median is 0.06tCO_2e/ROMt. Underground coal mines typically have higher GHG emissions intensities than open cut mines as the gas content of coal generally increases with depth. The industry average of Safeguard-covered underground coal mine facilities is approximately 0.28tCO_2e/ROMt. While the Project is higher than the industry average for all coal mines, it is lower than the industry average for underground coal mines (see Figure 2). Figure 2 includes both thermal and metallurgical coal mines.

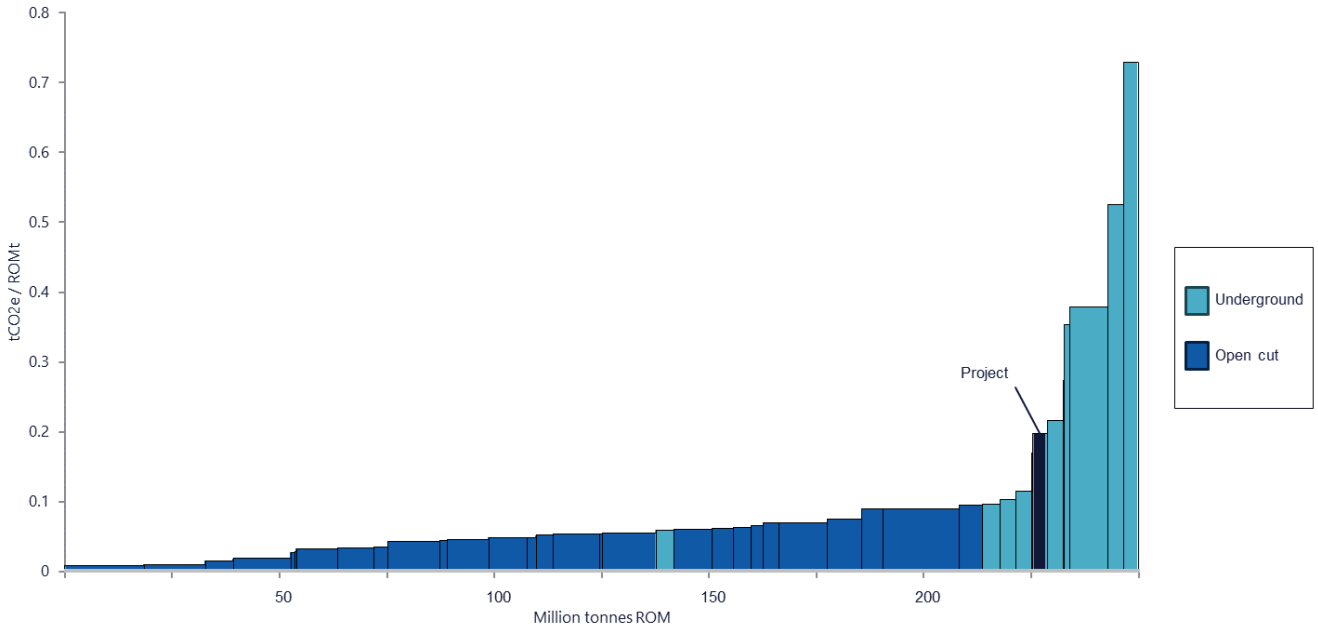


Figure 2: Emissions intensity curve of Safeguard facilities (tCO_2e/ROMt)

The Project will produce metallurgical coal, an essential product in steel production. Global demand for steel has been increasing in recent years due to population and economic growth, and it is expected to continue rising, particularly due to economic expansion in India and other ASEAN countries.[5]

[5] International Energy Agency, Steel, https://www.iea.org/energy-system/industry/steel

The Queensland Treasury states that metallurgical coal has a "critical role in producing the steel for the renewable technologies we need to decarbonise our state".[6] Wind turbines, solar farms, and hydroelectric dams are all steel-intensive infrastructure that underpin renewable energy generation. It is also 100 percent recyclable, making it a uniquely sustainable material. CAH produces a variety of high quality low-ash metallurgical coal products which are exported globally to a diverse customer base of leading steelmakers.

CAH exports the majority of its metallurgical coal to steel producers in Japan and India. The export and combustion of metallurgical coal represents the majority of material Scope 3 emissions, and approximately 94% of total LOM emissions. While it is difficult to control, and therefore mitigate, emissions associated with Scope 3, each of the export countries have Nationally Determined Contributions in place under the Paris Agreement. Japan aims to reduce its greenhouse gas emissions by 46% in 2030 from 2013 levels, setting an ambitious target which is aligned with the long-term goal of achieving net-zero by 2050.[7] As India is a developing country, there are different responsibilities under the Paris Agreement that apply. India has committed to an emissions intensity target as opposed to an absolute target, aiming to reduce the emissions intensity of its GDP by 45% by 2030 from 2005 levels, among other sustainability targets.[8]

5.1 Comparison of Estimated Project Emissions

Australia's net GHG emissions estimates for the inventory used to track Australia's progress towards its Paris Agreement targets in 2021-22 totalled 432.6 $MtCO_2e$.[9] The reported 2021 total GHG emissions in Queensland of 124.09 $MtCO_2e$ accounted for 30% of national GHG emissions.

The contributions of the predicted annual Scope 1, 2 and 3 emissions resulting from the Project within Australia are provided in Table 7. This comparison indicates that the annual average emissions are an insignificant proportion of both the Australian and Queensland total emissions, accounting for 0.08% and approximately 0.28% of these, respectively.

Table 7: Project annual average emissions compared with annual emissions for Australia and Queensland (Scope 1, 2 and 3 within Australia)

	Australia	QLD	Project (Within Australia)
2021-22 ($MtCO_2e$)	432.6	124.09	**0.35 $MtCO_2e$**
Project - Annual Average	0.08%	0.28%	

The annual global GHG emissions in 2020 emissions totalled 47,513 $MtCO_2e$ according to the United Nations Environment Programme[10].

[6] Queensland Treasury, Low Emissions Investment Partnership, https://www.treasury.qld.gov.au/investment/investment-programs-and-support/low-emissions-investment-partnerships/

[7] Climate Watch, Japan - Summary of Updated First Nationally Determined Contribution, https://www.climatewatchdata.org/ndcs/country/JPN?document=revised_first_ndc

[8] Climate Watch, India - Summary of Updated First Nationally Determined Contribution, https://www.climatewatchdata.org/ndcs/country/IND?document=revised_first_ndc

[9] DCCEEW, National Inventory Report 2022, https://www.dcceew.gov.au/climate-change/publications/national-inventory-report-2022

[10] ENEP, Emissions Gap Report 2023, https://www.unep.org/interactives/emissions-gap-report/2023/#section_0

The contributions of the predicted annual Scope 1, 2 and 3 emissions resulting from the Project within and outside of Australia are provided in Table 8. This comparison indicates that the Project would account for approximately 0.0097% of the annual global emissions.

Table 8: Project annual average emissions compared with annual global emissions (Scope 1, 2 and 3 worldwide)

	World	Project (Global)
2022 ($MtCO_2e$)	57,400	**5.56 $MtCO_2e$**
Project - Annual Average	0.0097%	

5.2 Risk Assessment

The IPCC has identified that human-induced climate change is already affecting weather and climate extremes across the globe and that "continued emission of GHGs will cause further warming and long-lasting changes in all components of the climate system. Increasing the likelihood of severe, pervasive, and irreversible impacts for people and ecosystems".[11] In Queensland, average temperatures across the state are currently 1°C higher than they were 100 years ago. While it is difficult to determine the likelihood and magnitude of impacts to environmental values from an individual project's GHG emissions, it is recognised that any increases in net GHG emissions may also increase the risks, and the larger the relative scale of net GHG emissions, the more significant the contribution may be.

As seen in Table 7, the contribution of emissions from the project when compared with Queensland's emissions profile represents 0.28%. While this is an insignificant proportion of Queensland's total emissions, it is noted that CAH, as a Safeguard covered facility, will reduce emissions in line with the legislation. As per the Queensland Regional Climate Change Impact Studies,[12] the Bowen Basin region is likely to see higher temperatures, hotter and more frequent hot days, more intense downpours, less frequent but more intense tropical cyclones, rising sea level more frequent sea-level extremes, and warmer and more acidic seas.

The project emissions represent 0.28% of Queensland's emissions and 0.08% of Australia's emissions. This increase is statically insignificant. Hence from a risk perspective, the project's GHG emissions will not increase the likelihood and magnitude of impacts to environmental values, nor increase the risk of climate change-related events. As outlined in Section 5 above, on a global perspective, the customers of this metallurgical coal have NDCs in place to decarbonise their own jurisdictions. The need for steel to decarbonise other sectors, such as the renewable energy sector, along with the Safeguard-led decarbonisation of the Curragh Mine, will further contribute to limiting the effect of the project emissions on climate change. The risk rating is therefore D1, insignificant consequence, unlikely likelihood, as per the Coronado Risk Matrix (Figure 3).

[11] ICPP, Climate Change 2014 Synthesis Report Fifth Assessment Report, https://ar5-syr.ipcc.ch/topic_futurechanges.php

[12] Department of Energy and Climate, Climate Change in the Whitsunday, Hinterland and Mackay region 2024, https://www.qld.gov.au/__data/assets/pdf_file/0026/68561/mackay-whitsunday-climate-change-impact-summary.pdf

6. RISK MATRIX - SMS-001A Risk Management Levels & Guidelines

	CONSEQUENCE				
Loss Type	**1 Insignificant**	**2 Minor**	**3 Moderate**	**4 Major**	**5 Catastrophic**
People (STAR, JSA and above)	Low-level short-term subjective inconvenience or symptoms. Includes First Aid Cases.	Objective but reversible impairment. Includes Medical Treatment Cases.	Moderate irreversible disability or impairment to one or one or more persons. Includes Lost Time Injury.	Permanent total disabilities or impairment. Single fatality.	Short- or long-term health effects leading to multiple fatalities, or irreversible human health effects to multiple persons.
Environmental and Cultural Heritage (STAR, JSA and above)	No lasting effect. Rectified by immediate corrective action. Technical non-compliance. Low level social or cultural impacts.	Minor incident, no significant impact. Monitoring result not in compliance, community complaint. Minor medium-term social impacts on social population.	Significant environmental incident, large spill, off-site discharge. Ongoing social issues. Significant damage or infringement to structures or items of cultural significance.	Major impact to surrounding environment. Ongoing serious social issues. Significant damage or infringement to structures or items of cultural significance. Disregard of cultural heritage.	Very serious widespread environmental / social impacts. Irreparable damage to highly valued structures / items or cultural significance. Highly offensive infringement of cultural heritage.
Reputation (WRAC and above)	Public concern restricted to local complaints. Ongoing scrutiny from regulator.	Minor, adverse local public or media attention and complaints. Significant hardship from Regulator.	Attention from media and or heightened concern by local community. Significant difficulties in gaining approvals. Environment credentials moderately affected.	Significant adverse national media or public attention. May lose license to operate or not gain approval.	Serious public or media outcry (international coverage). License to operate threatened. Reputation severely tarnished.
Materials, Assets and Business Operations (WRAC and above)	Slight damage. <$999 No disruption to operation	Minor damage. $1,000 - $24,999. Brief disruption to operation.	Local damage. $25,000 - $99,000. Partial shutdown.	Major damage. $100,000 - $5M Partial loss of operation.	Extreme damage. >$5M. Substantial or total loss of operation.

LIKELIHOOD	**(use only as guide)**	**Risk Rating**				
A - Almost Certain	The event is expected to occur in most circumstances	Medium	High	High	Very High	Very High
B - Likely	The event will probably occur in most circumstances	Medium	Medium	High	High	Very High
C - Possible	The event should occur at some time	Low	Medium	High	High	High
D - Unlikely	The event could occur at some time	Low	Low	Medium	High	High
E - Rare	The event may occur in exceptional circumstances	Low	Low	Medium	Medium	High

Risk Level	**Risk Tolerability Criteria and Action Requirements**		
Very High	SSE		The activity must be stopped immediately until action to reduce the level of risk is undertaken or authority to continue is received.
High	Risk must be managed in line with the ALARA Principles	Superintendent or above	The activity must be stopped immediately until action to reduce the level of risk is undertaken or authority to continue is received.
Medium		Supervisor or above	Take action to reduce the level of risk if possible or can authorise tolerations.
Low	Supervisor or above		Tolerable risk unless circumstances change.

Figure 3: Coronado Risk Matrix