

Current View

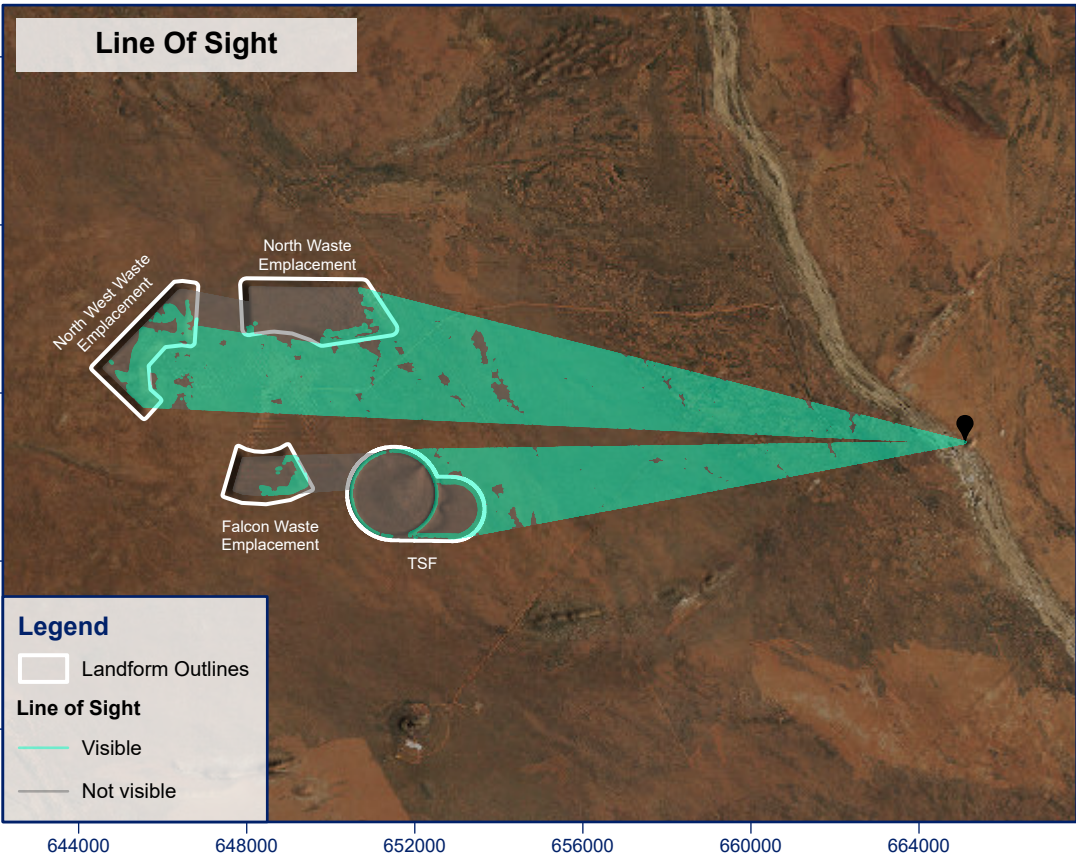


Indicative Final View

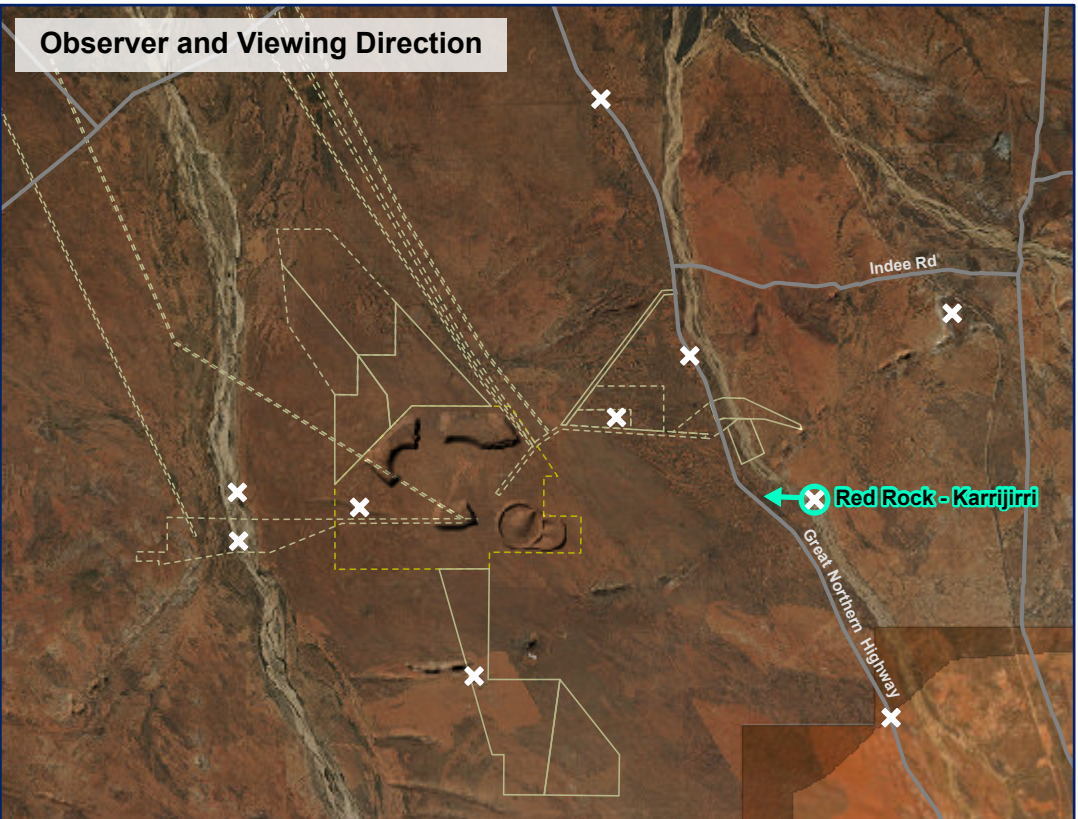


Negligible Change

Line Of Sight



Observer and Viewing Direction

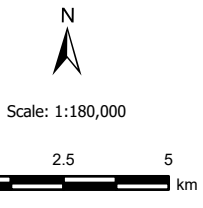


**Projection:** GDA2020 MGA Zone 50

**Aerial:** May 2021 / Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL

**RPMGLOBAL**



PROJECT		CLIENT
November 2024	Hemi Gold Project - Referral Supporting Document	
Figure 12-16		
ADV-AU-00673	Line of Sight Assessment - Red Rock - Karrijirri	

### *12.5.3 Access to Country*

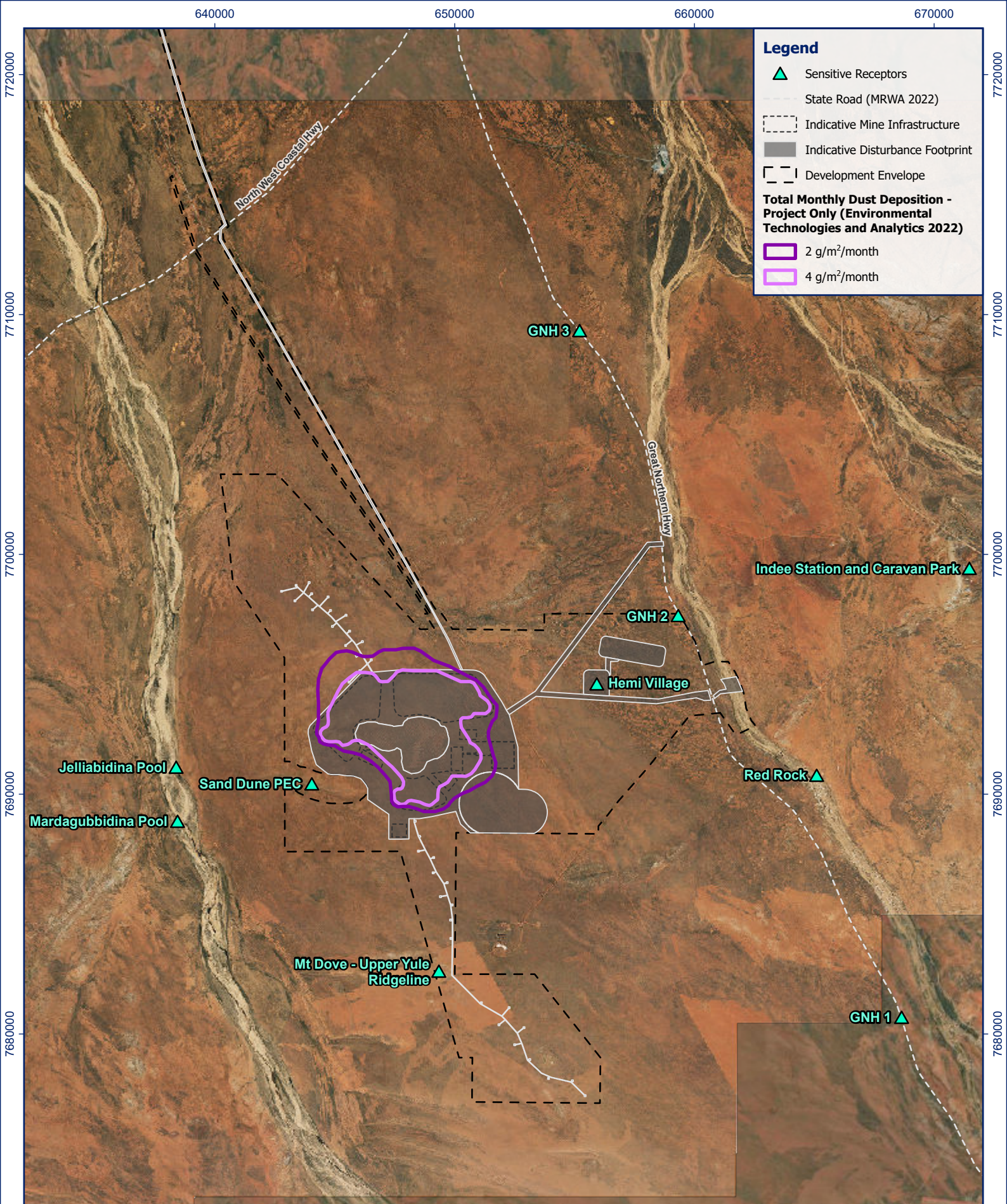
The implementation of the Proposal may impact Traditional Owners' access to culturally significant sites and their ability to engage in traditional practices, especially in areas near active mining and related infrastructure within the Development Envelope. The Native Title Mining Agreement ensures access to Country will not be impeded, with health and safety considerations taken into account. Native Title Holders will continue to retain their right to access their cultural land, with De Grey actively facilitating this access to recognise cultural heritage values.

Access, use, and enjoyment of Country will be maintained through safe access measures. Safe access to Country will allow for use and enjoyment and maintenance of amenities in ways that contribute to the quality of life and expression of Kariyarra People's cultural heritage. This recognises the holistic view of place and the importance of the ability to exercise their Native Title rights and interests and pursue cultural activities. Special places that are not known heritage sites will be discussed with the Kariyarra people during consultation.

### *12.5.4 Dust*

The construction and operation of the Proposal has the potential to generate dust emissions from activities. When dust is emitted into the air, it may subsequently deposit on surfaces including vegetation, with dust deposition decreasing with increasing distance from the source. Dust deposition has the potential to degrade Aboriginal social, cultural and heritage values including the condition of native vegetation including plants that may be used for cultural practices. Figure 12-17 shows the modelled dustfall, sensitive receptors are not predicted to encounter impacts due to the Proposal.

Further discussion of dust implications are discussed in Section 14.



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Scale: 1:200,000

0 1.25 2.5 5 km

Projection: GDA2020 MGA Zone 50

Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Created/Reviewed By: KM/EL

<b>PROJECT</b>		<b>CLIENT</b>
<b>Hemi Gold Project - Referral Supporting Document</b>		
<b>Modelled Dustfall and Sensitive Receptors</b>		
Figure 12-17	ADV-AU-00673	November 2024

## *12.5.5 Alteration of Water*

No permanent or semi-permanent pools are recorded within the Development Envelope, however these are found outside of the Development Envelope within the Yule and Turner River. De Grey has consulted with the Kariyarra People on the importance of these, particularly in the Yule River. Environmental outcomes in Section 8.5 will ensure there will be no impact to culturally significant pools within the Yule River from dewatering associated with the Proposal.

De Grey has also consulted with the Kariyarra People on the cultural importance of the Turner River, particularly surrounding the surplus water discharge outfall and the wetting front. De Grey continues to work with the Kariyarra People on the design of the outfall in order to ensure the outfall does not cause sedimentation or erosion of the river and is amenable to the Kariyarra People.

## *12.5.6 Aboriginal Cultural Heritage Values*

De Grey has executed a Native Title Mining Agreement with the Kariyarra People. The De Grey/Kariyarra Mining Agreement includes the development of an ACHMP that will address many of the issues identified in Table 12-1, together with matters concerning social surroundings, amenity, environmental values, and access. The implementation of this ACHMP will provide a comprehensive framework for the management of issues of concern to the Kariyarra People and will sit alongside the *Aboriginal Heritage Act 1972* processes.

The ACHMP forms part of the De Grey/Kariyarra Mining Agreement and is hence not publicly available; however, if required, De Grey will be able to provide evidence of the enactment of the agreement. It is De Grey's view that the proposed ACHMP will provide the best mechanism for the management impacts to the social surroundings of the Kariyarra People. Any further plans, such as a Social and Cultural Heritage Management Plan (SCHMP), would cause unhelpful duplication and not add value to the relationship between De Grey and the Kariyarra People, and importantly is not something the Kariyarra People are seeking.

De Grey has completed multiple heritage surveys to ensure the identification of any previously unknown sites within the disturbance areas. Surveys are ongoing. Once a site has been identified, De Grey's first commitment is to minimise any harm and plan around the site where reasonably practicable. Ongoing management of each site will be agreed with Kariyarra Traditional Owners. Where disturbance of a site is required, De Grey will consult and seek agreement with the KAC and obtain all the necessary legal approvals in accordance with the *Aboriginal Heritage Act 1972*.

Potential impacts to social surroundings and mitigation measures are detailed in Table 12-6.

Table 12-6: Assessment of Impacts to Social Surroundings

Potential Impacts	Interconnected Factors for Holistic Assessment	Mitigation Measure	Other Decision-Making Process Relevant?	Effectiveness of the Control
<b>Direct Impacts</b>				
Damage or disturbance to Aboriginal heritage sites.	• N/A	<ul style="list-style-type: none"> <li>The Sand Dune, which is of cultural significance has been excluded from the Development Envelope and a 300 m buffer applied.</li> <li>De Grey will engage with the Kariyarra Traditional Owners to prioritise avoidance of impacts to those areas identified as significant heritage sites through archaeological, ethnographic or Social Surroundings surveys.</li> <li>There will be no unauthorised disturbance, damage or removal of any Aboriginal heritage sites as part of the Proposal.</li> <li>Places identified as significant will be included in the GIS system as heritage places and avoidance will be prioritised where this is determined to be necessary in consultation with the Kariyarra People.</li> <li>Implementation of Proposal in accordance with an agreed ACHMP.</li> <li>Implementation of an internal permitting system to ensure clearing only in approved ground disturbance areas.</li> <li>Using previously disturbed areas to the extent reasonably practicable.</li> <li>Annual review of clearing areas.</li> <li>Work to stop if a previously unknown site is identified during clearing.</li> <li>Where disturbance of Aboriginal cultural heritage is required, traditional owners will be consulted, and the required approval obtained.</li> <li>Site induction to include maps identifying no-access areas, cultural heritage training and details of required access permissions</li> <li>Traditional owners have the inherent rights to access and collect/salvage traditional resources from areas prior to clearing or construction.</li> <li>Monitoring will be undertaken of ground disturbance permits</li> </ul>	• DPLH AH Act – Section 16 and 18 Applications	<ul style="list-style-type: none"> <li>Avoidance is the first and preferred step in the mitigation hierarchy and therefore is consistent with the EPA Statement of environmental principles, factors, objectives and aims of EIA. The Development Envelope has been optimised where reasonably practicable with significant cultural sites such as the Sand Dune being excluded from the Development Envelope. The complete avoidance of an impact is considered a highly effective control.</li> <li>The utilisation of existing disturbed areas for the construction of Proposal elements minimises the amount of disturbance to culturally significant sites.</li> <li>Salvage of cultural material is considered the most effective mechanism for mitigation when a cultural heritage site is impacted</li> </ul>
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>	<b>Mechanism for Limit</b>	
		No limits proposed - managed through standard industry practices and the AH Act.	Section 16 and Section 18 AH Act Applications	
Loss of access	• N/A	<ul style="list-style-type: none"> <li>Access to the Proposal to be maintained to extent reasonably practicable without compromising the safety of operations in consultation with traditional owners.</li> <li>Provide access for Traditional Owners to Aboriginal cultural heritage sites within the Development Envelope when requested.</li> <li>Maintenance of access to the Sand Dune for the Kariyarra Traditional Owners</li> <li>Ongoing engagement and agreement with Karriyarra peoples regarding access to Country.</li> <li>Access protocols included in the agreed ACHMP.</li> <li>Rehabilitation and closure of the Proposal will be undertaken to meet land use outcomes negotiated in consultation with Kariyarra Traditional Owners and other Stakeholders and the objectives of the MCP, as required under the Mining Act</li> </ul>	<ul style="list-style-type: none"> <li>DEMIRS Mining Act – Mining Proposal and Mine Closure Plan.</li> <li>DEMIRS Mine Safety and Inspection Act</li> </ul>	• These controls are considered effective in minimising the loss of access to country for the Kariyarra Traditional Owners.
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>	<b>Mechanism for Limit</b>	
		No limits proposed - managed through standard industry practices, Mining Act and ACHMP.	Mining Act and Mine Closure Plan	
Impacts to water	<ul style="list-style-type: none"> <li>Inland Waters</li> <li>Subterranean Fauna</li> </ul>	<ul style="list-style-type: none"> <li>The Development Envelope has avoided the Yule River which is known to have cultural significance.</li> <li>De Grey will work in collaboration with KAC to prioritise avoidance of impacts to culturally significant water values identified through consultation, surveys and the Social Surroundings baseline assessment process.</li> </ul>	No	• Avoidance is the most effective mechanism for reducing direct impacts to culturally significant water values.
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>	<b>Mechanism for Limit</b>	
		No limits proposed - managed through standard industry practices, Mining Act and ACHMP.	Mining Act and Mine Closure Plan	
<b>Indirect Impacts</b>				
Noise impacts above assigned levels at sensitive receptors.	• N/A	<ul style="list-style-type: none"> <li>Independent noise modelling has been completed to identify sources and concentrations of noise prior to commencement of construction.</li> <li>Infrastructure is located a significant distance from the nearest sensitive receptor and no impact is predicted.</li> <li>Equipment design would be specified to be within Australian standard noise limits</li> <li>De Grey will investigate any noise complaints and take appropriate action.</li> </ul>	• No	• These controls are considered effective based upon baseline findings. Should complaints be received De Grey will investigate the complaint and implement addition management measures should these be required

Potential Impacts	Interconnected Factors for Holistic Assessment	Mitigation Measure	Other Decision-Making Process Relevant?	Effectiveness of the Control
		<ul style="list-style-type: none"> <li>De Grey will maintain a complaints register and investigate any noise complaints received from the public.</li> </ul>		
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>		<b>Mechanism for Limit</b>
		No limits proposed - managed through standard industry practices.		N/A
Inappropriate waste management causing nuisance odours.	<ul style="list-style-type: none"> <li>Inland Waters</li> <li>Terrestrial Fauna</li> </ul>	<ul style="list-style-type: none"> <li>Implementing best practice waste management measures.</li> <li>Irrigation areas sized appropriately with regular wet-dry cycling to limit saturation and infiltration.</li> <li>Only authorised wastes to be disposed of in site landfill.</li> <li>Putrescible waste in landfill will be progressively covered.</li> <li>Landfill and wastewater treatment plant operated in accordance with Environmental Licence.</li> <li>Nutrient levels in wastewater discharge within licenced limits.</li> <li>Rehabilitation and closure of the Proposal will be undertaken to meet land use outcomes negotiated in consultation with Kariyarra Traditional Owners and other Stakeholders and the objectives of the MCP, as required under the Mining Act</li> </ul>	<ul style="list-style-type: none"> <li>DWER Part V EP Act Operating Licence for landfill</li> <li>DEMIRS Mining Act – Mining Proposal and Mine Closure Plan.</li> </ul>	<ul style="list-style-type: none"> <li>These measures align with current industry standards for managing nuisance odours.</li> <li>These management strategies have been implemented across mining operations in the Pilbara and are regarded as having a high level of certainty.</li> </ul>
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>		<b>Mechanism for Limit</b>
		No limits proposed – managed through standard industry practises		N/A
Light spill impacting amenity.	N/A	<ul style="list-style-type: none"> <li>Permanent lighting will be installed only where required, mainly in-pit and operational areas</li> <li>Permanent lighting and temporary lighting will be shielded to minimise light spill</li> <li>Lighting kept to minimum required for safe operation.</li> <li>Lighting designed to not project outwards from lit areas.</li> <li>Install lighting only where required.</li> <li>Temporary lighting may be required to provide safe working environments for short periods of time, where practicable and while still providing a safe working environment, these will be positioned to minimise direct light spill to sensitive areas.</li> </ul>	No	<ul style="list-style-type: none"> <li>These measures align with current industry standards for managing light spill.</li> <li>These management strategies have been implemented across mining operations in the Pilbara and are regarded as having a high level of certainty.</li> </ul>
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>		<b>Mechanism for Limit</b>
		No limits proposed – managed through standard industry practises		N/A
Loss of heritage value at Aboriginal heritage sites due to dust deposition.	Air Quality	<ul style="list-style-type: none"> <li>Independent dust modelling has been completed to identify sources and concentrations of dust prior to commencement of construction</li> <li>Implementation of dust suppression techniques such as sprayers on crushers and water trucks is expected to help minimise dust generation during construction and operation.</li> <li>During high winds, topsoil and overburden stripping and other high generating dust activities would be restricted if risk-based assessment measures determine dust cannot be adequately controlled.</li> <li>Implement speed limits for mine vehicles on unsealed roads and tracks within the Development Envelope based on a risk assessment that considers environmental values (in addition to safety/other required legislation).</li> <li>Limiting the amount of disturbed land to as small as reasonable reducing the amount of dust producing surfaces.</li> <li>Implementation of Proposal in accordance with an agreed ACHMP.</li> </ul>	No	<ul style="list-style-type: none"> <li>These measures have been developed to meet the current industry standards for managing dust suppression. The management strategy will minimise the amount of dust generated within the Development Envelope as a result of the Proposal.</li> <li>These management strategies have been implemented at other projects across the Pilbara and are regarded as having a high level of certainty.</li> </ul>
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>		<b>Mechanism for Limit</b>
		No limits proposed – managed through standard industry practises		N/A
Visual amenity affected due to constructed landforms.	N/A	<ul style="list-style-type: none"> <li>Design final landforms, including heights and slope angles to be sympathetic with the aesthetic values of the surrounding landscape and in consultation with Traditional Owners and other Stakeholders.</li> <li>Implementation of Project in accordance with MP and MCP.</li> <li>Undertake progressive rehabilitation where feasible.</li> <li>Rehabilitation and closure of the Proposal will be undertaken to meet land use outcomes negotiated in consultation with Kariyarra Traditional Owners and other Stakeholders and the objectives of the MCP, as required under the Mining Act</li> </ul>	DEMIRS Mining Act – Mining Proposal and Mine Closure Plan.	
		<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>		<b>Mechanism for Limit</b>
		No limits proposed – managed through standard industry practises and Mining Act.		Mining Act Mining Proposal and Mine Closure Plan.

## 12.6 Social Surroundings Outcomes

Environmental outcomes, in the context of this Proposal, refer to the predicted state of the environment after the Proposal is implemented. De Grey outcomes for Social Surroundings seek to:

- Be specific and measurable, clearly describing quantifiable environmental conditions.
- Have a defined spatial and temporal extent.
- Aim to achieve the EPA's objectives for Social Surroundings.

In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the predicted environmental outcomes that apply to Social Surroundings are set out below:

- No disturbance to Aboriginal cultural heritage sites unless consent is granted to disturb that site under the *Aboriginal Heritage Act 1972* and has involved reasonable steps to consult with the Kariyarra People.
- Subject to reasonable health and safety requirements, De Grey will facilitate the Kariyarra People ongoing access and connection to country within the Development Envelope.

In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the predicted environmental objectives that apply to Social Surroundings are set out below:

- Avoid, where reasonably practicable, and otherwise minimise adverse impacts to Aboriginal cultural heritage within and surrounding the Development Envelope.
- Ongoing consultation and engagement with the Kariyarra People.

## 12.7 Conclusion

With development of the Proposal, De Grey is committed to:

- Protecting all known and unknown Aboriginal cultural heritage sites and surrounding values from potential direct and indirect impacts from Proposal activities.
- Continued engagement with the Kariyarra People to grow traditional knowledge and provide open communication.
- Maintenance of a complaints register and investigating complaints from the public for excess noise, odours and dust.
- Designing landforms and infrastructure to minimise the impact to visual amenity from Proposal activities.

Consultation and negotiations between De Grey and KAC have culminated in a Native Title Mining Agreement, referred to as the De Grey / Kariyarra Mining Agreement (the Agreement), which was executed on 15 December 2022. De Grey believes the Agreement will deliver positive outcomes for KAC and the broader community.

When all the potential impacts in Table 12-6 are considered individually and cumulatively, significant harm to social surroundings is not predicted. De Grey considers that the proposed management measures will ensure that the EPA's Social Surroundings factor objective is met.

## 13. ENVIRONMENTAL FACTOR – GREENHOUSE GAS EMISSIONS

### 13.1 EPA Objective

The EPA's objective for GHG emissions is “*To minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable.*” (EPA, 2023b)

### 13.2 Policy and Guidance

The following policy guidance is applicable to this factor:

- *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA, 2023b)
- *Western Australian Climate Policy – A plan to position Western Australia for a prosperous resilient low-carbon future* (DWER, 2020d).
- *Technical Guidance – Mitigating Greenhouse Gas Emissions* (EPA, 2019).
- *National Greenhouse and Energy Reporting Act 2007.*
- *National Greenhouse and Energy Reporting Determination 2008.*

### 13.3 Greenhouse Gases

EPA guidance considers the six categories of GHGs in the *United Nations Framework Convention on Climate Change (UNFCCC) Reporting Guidelines on Annual Inventories*. In Australia, large emitters are required to measure and report these in accordance with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). These gases are:

- Carbon Dioxide (CO<sub>2</sub>).
- Methane (CH<sub>4</sub>).
- Nitrous oxide (N<sub>2</sub>O).
- Sulfur hexafluoride (SF<sub>6</sub>).
- Hydrofluorocarbons (HFCs).
- Perfluorocarbons (PFCs).

### 13.4 Mitigation Measures and Predicted Outcomes

Measures to mitigate greenhouse emissions have been considered throughout the Proposal design. These include:

- [REDACTED]
- Optimisation of haulage distances for waste and ore.
- Selection of a processing method that requires less limestone dosing and electricity than alternative oxidation methods.

After mitigation measures, both scope 1 and scope 2 emissions are projected to exceed 100,000 tonnes CO<sub>2</sub>e/annum. De Grey has identified additional measures to be implemented over the life of the Proposal as part of the low carbon scenario (LCS), including:

- Decarbonisation of dieselpowered plant and equipment (such as diesel generators, mobile plant, etc) through electrification or alternative fuels (development of this technology is still progressing).
- Supporting the increase in low-emissions power generation on a grid-connected arrangement such as the NWIS through the building of a high-efficiency gas-fired power station ready for the start of processing, augmented with the potential construction of solar within the first few years through a PPA.

Proposed mitigation measures are summarised in Table 13-1 taken from the Greenhouse Gas Environmental Management Plan (GHG EMP, Appendix 27).

**Table 13-1: Chronology of Proposed Mitigation Measures**

Period	Activity	Influence
2027	Solar augmentation through a power purchase agreement (PPA) with the electricity provider.	[REDACTED]
2027 - 2030	Transition to electric light and medium vehicles.	Introduce electric vehicles where they are available, including light vehicles and buses.
2027 - 2032	Transition to electric dewatering borefield pumps.	Where reasonably practicable, electric borefield pumps will replace diesel-powered pumps resulting in a reduction in greenhouse gas emissions.
2030-2037	Electrification of mining fleet.	De Grey are looking to partner with mining contractors who will look to introduce electric haul trucks as they become commercially available and fit for purpose.
2030 - 2034	Transition of other mobile equipment to renewable power sources.	Reduction in other mobile equipment as fossil fuel reduction technology becomes commercially available.
2033	Expansion of renewable energy and storage.	A further increase in effective renewable electricity through the introduction of wind power and Battery Energy Storage System to store excess renewable.

### 13.4.1 Scenarios

Scopes 1, 2, and 3 emissions have been estimated for a Base Case Scenario and Low Carbon Scenario. These being:

- Base case scenario consisting of diesel mine fleet; diesel water bores; and electrical power sourced from the NWIS grid, whose scope 2 emission factor was considered to reduce from 2027 onwards.

- A low carbon scenario (LCS) focused on the electrification of diesel plant and equipment along with arrangements through a PPA to introduce renewable energy into the NWIS to lower the Proposal's scope 2 factor more aggressively than would otherwise have occurred from the NWIS.

The Base Case Scenario was developed around the most secure and cost-effective method of providing the energy required to mine and process the ore, considering the location of the deposit, ore characteristics, available technologies, support for those technologies and potential impact on the environment.

### 13.4.2 Scope 1 Emissions

Proposed mitigation of scope 1 emissions is focussed on diesel fuel reduction through electrification and lowering of emissions associated increase in electricity consumption through a power purchase agreement (PPA) with a grid connected arrangement such as the NWIS power provider to reduce scope 2 emission factor. However, diesel only accounts for approximately half the scope 1 emissions at commencement of production. The remainder of the emissions are predominately direct process emissions from carbonate material inherent in the ore body and limestone added for neutralisation. While there is no current commercially available technology for mitigating these direct processing emissions, active investigation is continuing into reducing direct process emissions.

The linear trajectory to net zero by 2050 and the five yearly targets are presented in Chart 13-1 Table 13-2 with forecast Base Case Scenario in grey and the Low Carbon Scenario in orange. The yearly scope 1 emissions are forecast to be exceeded in 2032 and 2033. However, over the 5-year block from 2032 to 2036, the average emissions are below the 5 yearly targets.

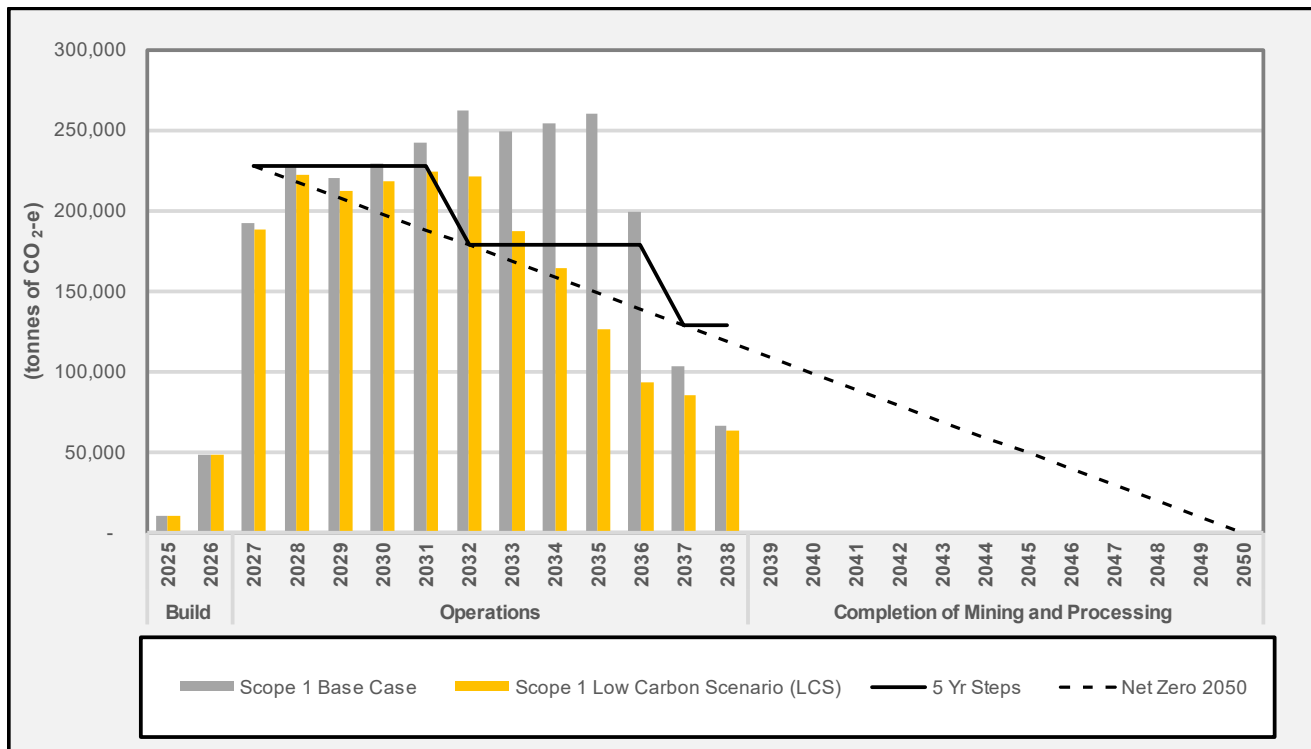


Chart 13-1: Scope 1 Emissions Trajectory and Targets

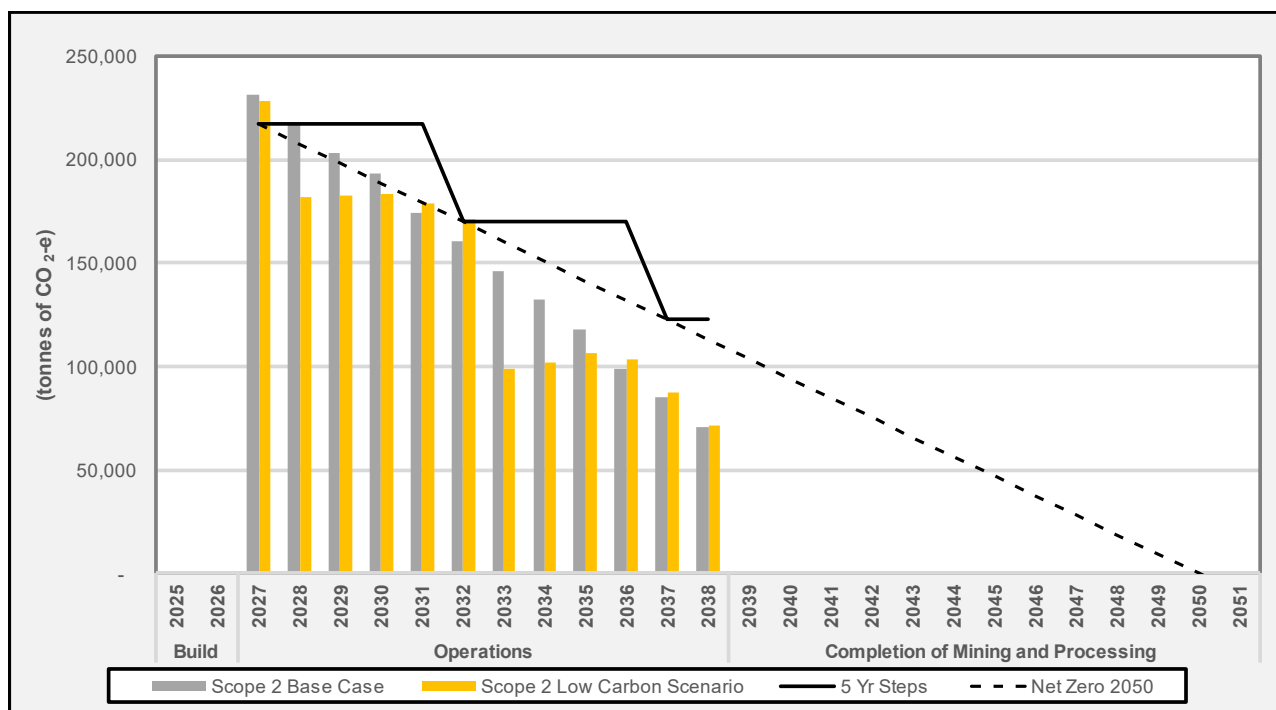
**Table 13-2: Scope 1 Emission Targets (ktCO<sub>2</sub>-e)**

Operational Years	Emissions Target	Base Case Scenario	Low Carbon Scenario
2027 - 2031	1,139	1,112	1,066
2032 - 2036	891	1,224	792
2037 - 2038	257	170	149
<b>Total</b>	<b>2,287</b>	<b>2,506</b>	<b>2,007</b>

### 13.4.3 Scope 2 Emissions

The proposed Low Carbon Scenario is focussed on reducing scope 2 emissions from the beginning of the processing production phase. To meet demand and guarantee a stable and reliable supply of electricity, [REDACTED]

The trend for the Base Case Scenario over the LOM presented in Chart 13-2 showing linear reduction in emissions over the LOM.



**Chart 13-2: Scope 2 Emissions Trajectory and Targets**

The 5 yearly emissions trajectories and targets for the Base Case and Low Carbon scenarios are provided in Table 13-3.

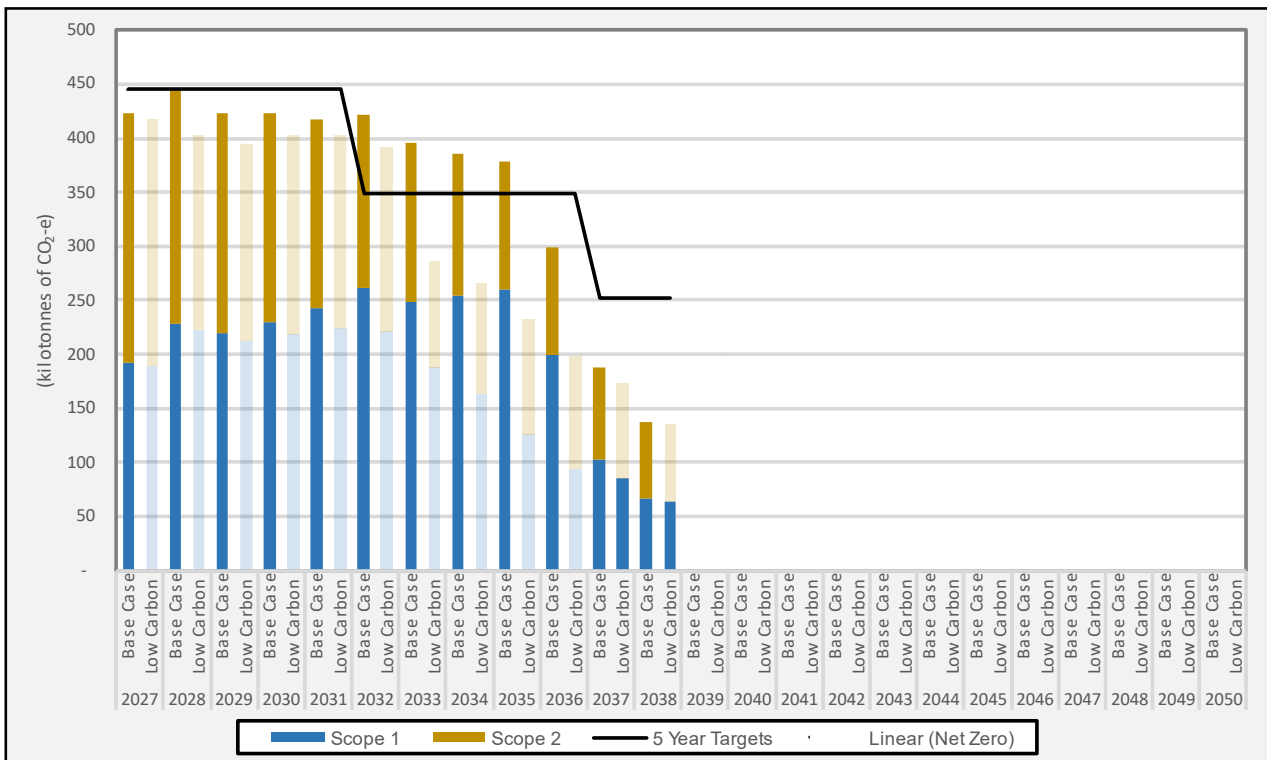
**Table 13-3: Scope 2 Emission Targets (ktCO<sub>2</sub>-e)**

Operational Years	Emissions Target	Base Case Scenario	Low Carbon Scenario
2027 - 2031	1,085	1,019	955
2032 - 2036	849	656	583
2037 - 2038	245	156	160
<b>Total</b>	<b>2,180</b>	<b>1,831</b>	<b>1,697</b>

### 13.4.4 Scope 1 + 2 Emissions

The reduction in scope 1 emission through the electrification of diesel-powered equipment is only effective if there is a timely reduction in the scope 2 emissions factor due to the increased demand for electricity to take the place of diesel energy. It is important, therefore, to consider scope 1 and 2 emissions together. The 5 yearly emissions trajectories and targets for the Base Case Scenario and Low Carbon Scenario are presented in Chart 13-3 and Table 13-4.

The Base Case Scenario and Low Carbon Scenario achieve the annual target set from 2027 for the first five years until 2031, where the target is reduced to meet the linear 2050 trajectory, where in 2032, both scenarios exceed the yearly target. Following 2032, the Base Case Scenario continues to exceed the target, while the Low Carbon Scenario shows a sustained reduction in emissions. This reduction is achieved by continued electrification of the mining fleet, reducing scope 1 emissions with only a comparatively small increase in scope 2 emissions as the NWIS rapidly decarbonises.



**Chart 13-3: Scope 1 and 2 Base Case and Low Carbon Scenario Emission Trajectory and Targets**

**Table 13-4: Scope 1 and Scope 2 Emission Targets and Forecasts**

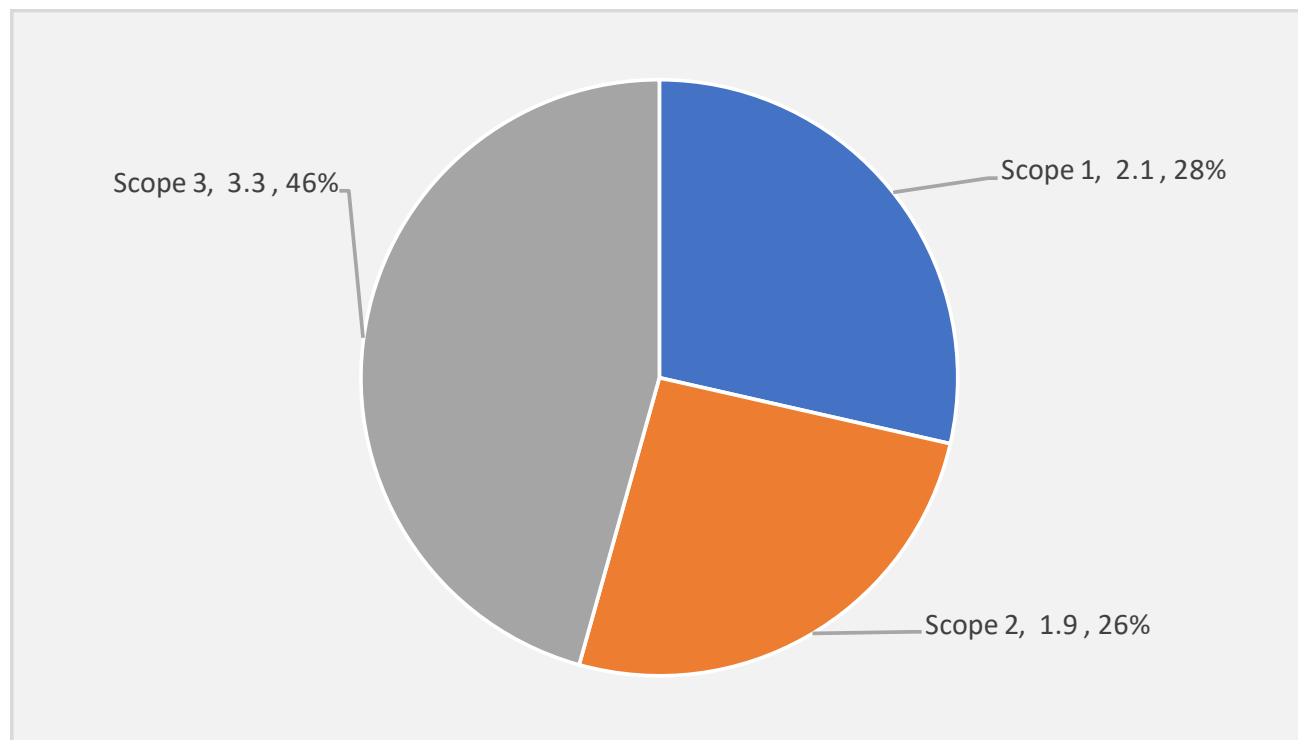
Years	Emissions Target	Base Case Scenario	Low Carbon Scenario
2027 - 2031	2,224	2,131	2,021
2032 - 2036	1,741	1,880	1,374
2037 – 2038	503	326	309
<b>Total</b>	<b>4,468</b>	<b>4,337</b>	<b>3,704</b>

*13.4.5 Scope 3 Emissions*

The Scope 3 emissions identified make up a significant portion of the total greenhouse gas emissions over the LOM at 46% (Chart 13-4). Scope 3 emissions are similar between the two scenarios. As the proposal progresses, there will be more definitive quantities of information about high-emission sources such as concrete and steel for construction. This increased detail will allow De Grey to refine emission estimates and mitigation opportunities for the Proposal.

Having carbonates in the ore requires less use of natural resources (limestone) and less diesel required to mine and cart the limestone to site producing less scope 3 emissions.

As scope 1 and 2 gross emissions decline through De Grey’s low carbon scenario, scope 3 will become more material unless upstream suppliers are also committed to reducing their emissions. De Grey will be working with these stakeholders to influence the reduction in these scope 3 emissions, ensuring embedded emissions from suppliers are part of the selection criteria.



**Chart 13-4: Scope 1, 2, 3 Emissions (MtCO<sub>2</sub>-e) over the LOM under the Low Carbon Scenario.**

### 13.5 Emissions Intensity Benchmarking

To understand the position of the Proposal in an Australian and global context Wood Australia Pty Ltd was engaged to compare the greenhouse gas emissions of refractory ore processing and how these compare to gold operations that utilise POx processing (Wood, 2023). The combined findings of benchmarking are summarised in Table 13-5 and a snapshot of peer company emission intensities are presented in Chart 13-6.

**Table 13-5: Benchmark Review of Carbon Intensity**

Description	Year	tCO <sub>2</sub> -e/ozAu	Source
Global Average	2020	0.8	World Gold Council
Average of open pit mines	2020	0.79	World Gold Council
Australian average	2020	0.73	World Gold Council
Australian average	2021/2022	0.68	Wood (15 mines)*
Canadian and US average	2021/2022	0.62	Wood (11 mines)*
Other regions average	2021/2022	0.59	Wood (6 mines)*
Mines with POx processing plants	2021/2022	0.70	Wood (4 mines)*

\* Wood Australia (2023). De Grey Hemi Gold Refinery Decarbonisation Project – Carbon Intensity Benchmarking. February 2023.

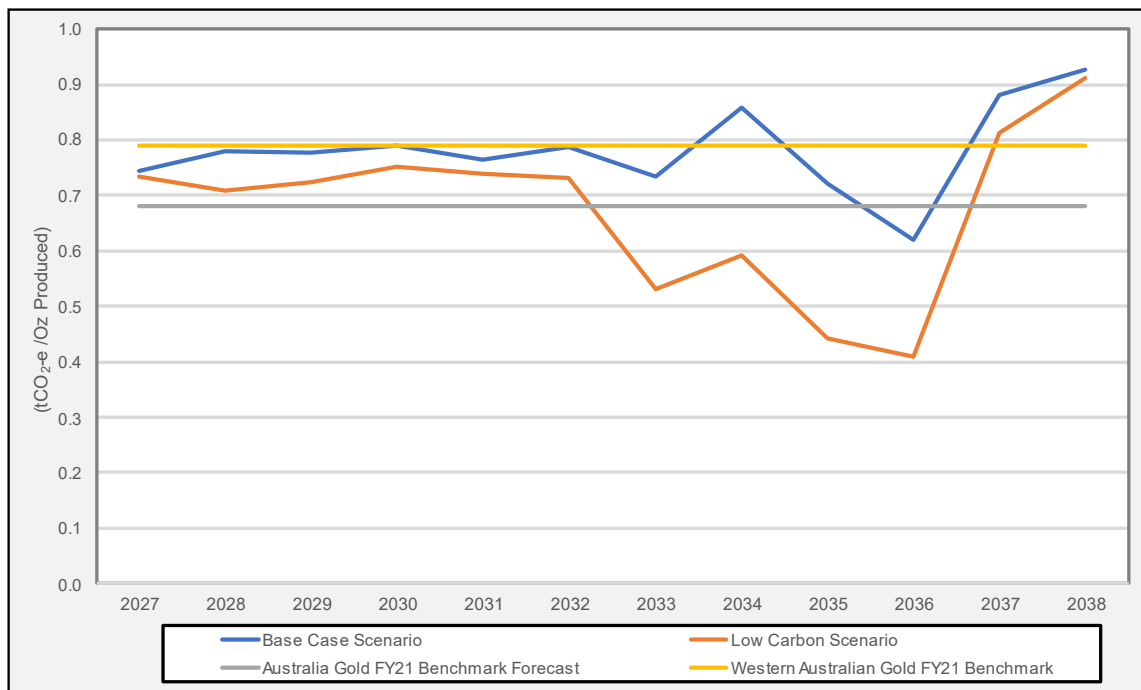
These findings were used to evaluate the decarbonisation plan described in the Greenhouse Gas Environmental Management Plan (GHG EMP) for the Proposal (De Grey, 2023), which is attached in Appendix 27. This GHG EMP details and compares two scenarios:

Under the POx process, neutralisation is required to maintain the correct pH during the leaching process. It is difficult to benchmark the Proposal as other POx processing operations use the addition of lime to achieve neutralisation, which does not directly emit carbon dioxide from the process when consumed. Instead, the greenhouse gas emissions generated during the production of the lime from mined limestone outside the facility boundary are considered scope 3 emissions for these benchmarked operations. These lime production emissions are not included in benchmarking studies that generally compare only scope 1 and 2 emissions. In contrast, the emissions from the use of limestone for neutralisation are included as scope 1 emissions for this Proposal, skewing the Proposal’s emissions intensity higher.

The ore has inherent naturally occurring carbonates, which will provide much of the neutralisation requirement, with the remaining coming from the addition of locally sourced limestone. Together, this creates significant additional scope 1 emissions through the direct release of carbon dioxide from the neutralisation of both the carbonates and the limestone.

The naturally occurring carbonates in the ore act to conserve limestone resources required for neutralisation, reducing diesel use and greenhouse gas emissions required for mining and delivery to the site. Perversely, it makes it more difficult for the Proposal to reduce scope 1 emissions, which, along with scope 2 emissions, are the focus of the EPA’s Environmental Factor Guideline.

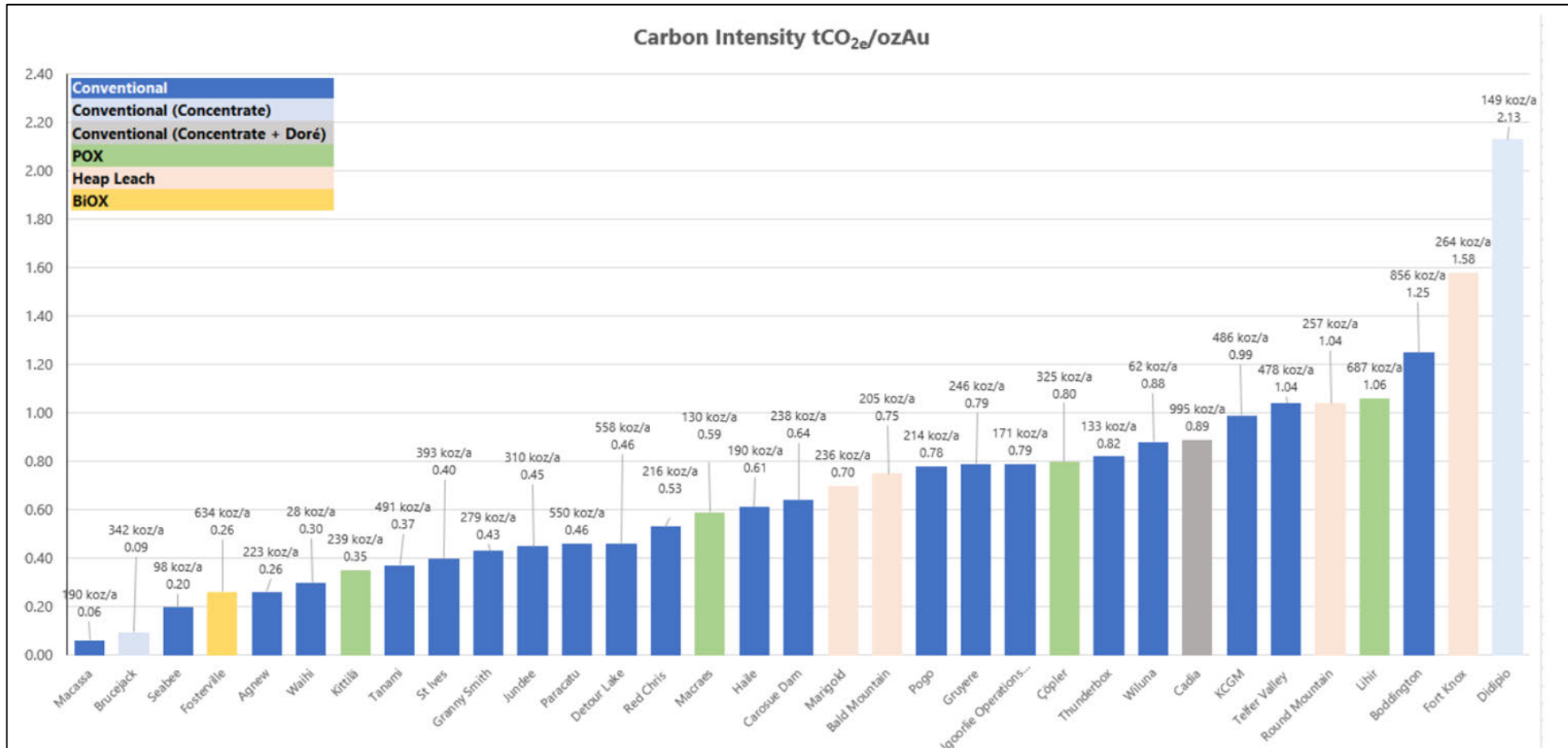
The emissions intensity over the life of the Proposal demonstrates that the Proposal has a similar emission intensity to the Western Australian benchmark (Chart 13-5) until 2033 when it drops below both the Australian and Western Australian current benchmark.



**Chart 13-5: Emissions for Gold Production (tCO<sub>2</sub>-e/Ounce)**

The 2027 baseline scenario emission intensity with carbonates included is 0.74 tCO<sub>2</sub>-e/Oz, which is below Gruyere, and by 2033, the emissions intensity sits between 0.5 to 0.6 tCO<sub>2</sub>-e/Oz, being below the Carouse Dam’s emissions intensity.

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**Chart 13-6: Emissions Intensity of Global Gold Operations**

## 13.6 Environmental Outcomes

Environmental outcomes, in the context of this Proposal, refer to the predicted state of the environment after the Proposal is implemented. De Grey outcomes for Greenhouse Gas seek to:

- Be specific and measurable, clearly describing quantifiable environmental conditions.
- Have a defined spatial and temporal extent.
- Aim to achieve the Environmental Protection Authority's (EPA) objectives for Greenhouse Gas.

In consideration of the proposed avoidance and management measures and likely residual impacts associated with the Proposal, the predicted environmental outcomes and objectives that apply to Greenhouse Gas set out below:

- The Proponent shall take measures to reduce in a linear trajectory (based on five-yearly targets) to net zero GHG emissions by 2050.
- The Proponent shall take measures to ensure that net GHG emissions for scope 1 and scope 2 associated with the Proposal do not exceed:
  - 2,224,000 t CO<sub>2</sub>-e for the period between 1 January 2027 and 31 December 2031.
  - 1,741,000 t CO<sub>2</sub>-e for the period between 1 January 2032 and 31 December 2036.
  - 503,000 t CO<sub>2</sub>-e for the period between 1 January 2037 and 31 December 2038.

## 13.7 Conclusion

De Grey has considered the impact of GHG emissions on the environment throughout the design of the Proposal. De Grey considers that compliance with the Safeguard Mechanism will result in De Grey achieving required emission reduction targets as presented in this Chapter.

## **14. ENVIRONMENTAL FACTOR – AIR QUALITY**

### **14.1 EPA Objective**

The EPA objective for air quality is “to maintain air quality and minimise emissions so that environmental values are protected” (EPA, 2020a).

### **14.2 Policy and Guidance**

The following guidance is relevant to this factor:

- *Environmental Factor Guideline – Air Quality* (EPA, 2020a).
- *National Environment Protection (Ambient Air Quality) Measure* (NEPC, 2021a)
- *Air Quality Modelling Guidance Notes (DoE (Department of Environment), 2006)*
- *Guideline – Air Emissions (Draft) (DWER, 2019)*
- *Draft Guidelines - Dust Emissions* (DWER, 2021)
- *Guidance Statement No. 3: Separation Distances between Industrial and Sensitive Land Uses* (EPA, 2005)

### **14.3 Receiving Environment**

#### *14.3.1 Air Quality Assessment Study*

An air quality assessment for the Proposal was undertaken by Environmental Technologies and Analytics (ETA, 2022). A copy of ETA’s report is included as Appendix 29. Unless otherwise referenced, the text in this section of the document is drawn from ETA’s report, with detailed modelling results available in the report.

The potential air quality impacts of the Proposal were determined through a dispersion modelling study, which incorporated prognostic meteorological data, and emission information estimates for the Proposal based on operating tonnage supplied by De Grey (ETA, 2022). The scope of the modelling assessment is summarised in Table 14-1.

**Table 14-1: ETA Air Quality Assessment Scope**

<b>Topic</b>	<b>Assessment Scope</b>
Model Selection	WRF/CALMET/CALPUFF model suite
Key Pollutants	Particulate Matter (PM) - including Total Suspended Particulates (TSP), PM <sub>10</sub> and PM <sub>2.5</sub> size fractions, and dust deposition
Meteorological Data	Three-dimensional prognostic meteorological data developed using the Weather Research and Forecasting (WRF) model.
Background Air Quality	Published air quality monitoring data for the Pilbara has been reviewed and used as a suitable proxy of existing (baseline) concentrations for key pollutants.
Project Emissions	Emissions from the Proposal under maximum material handling assumptions formed the basis of the modelling assessment.
Sensitive Receptors	Discrete receptor locations were nominated to represent:

Topic	Assessment Scope
	<ul style="list-style-type: none"> <li>• Accommodation village and camp;</li> <li>• Heritage sites.</li> <li>• Riverine Pools.</li> </ul>
Model Scenarios	The model scenarios consider the Project in isolation, as well as cumulatively (with background), for particulates (TSP, PM <sub>10</sub> , PM <sub>2.5</sub> and deposition).

### 14.3.2 Receptors

The Proposal is located 85 km south of Port Hedland in a sparsely populated region. The location of specific receptors of interest identified for this Proposal is presented in Figure 14-1 and include:

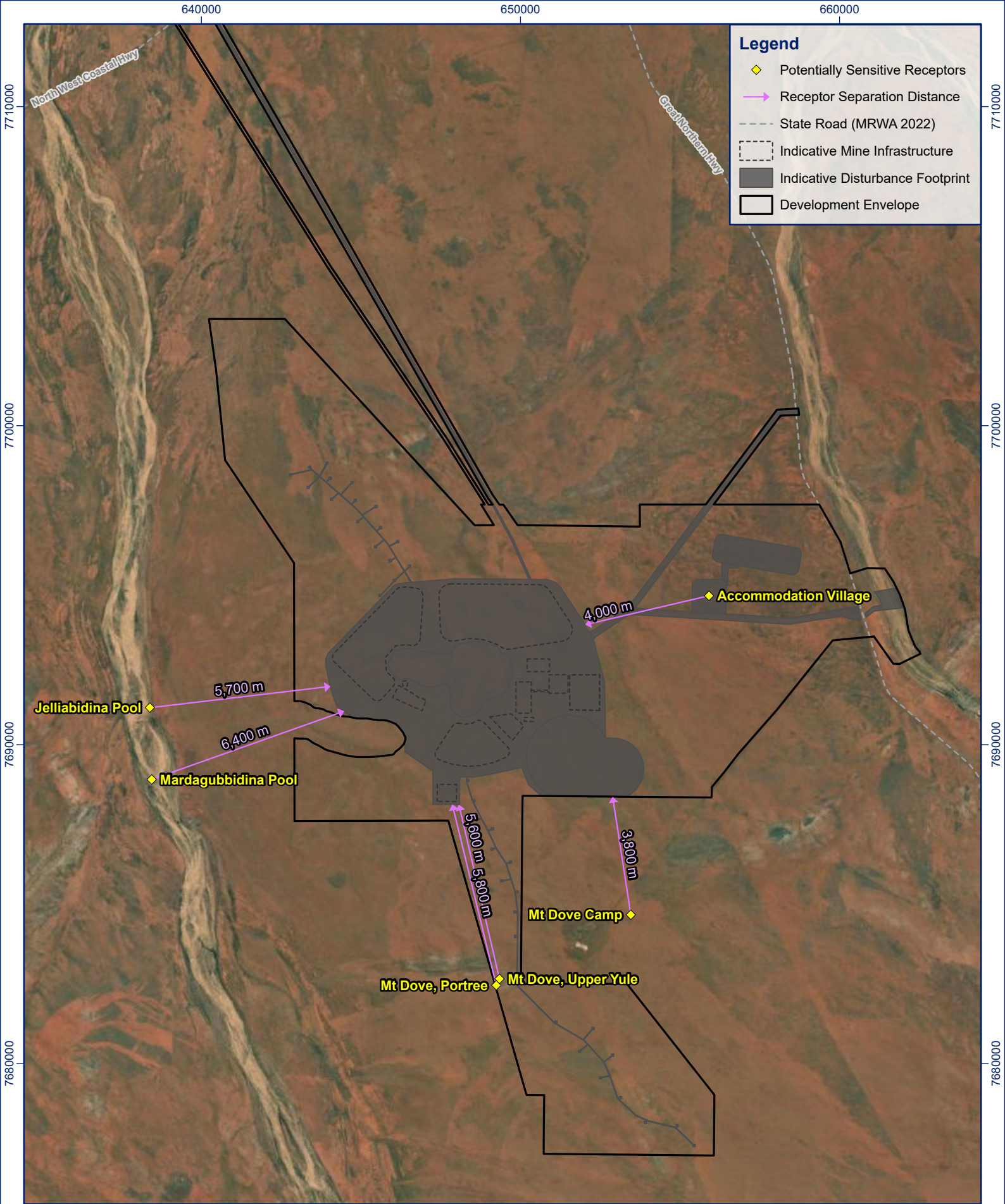
- Human habitation sites.
  - Mount Dove Camp approximately 3.8 km south of the indicative disturbance area (outside the Development Envelope). Atlas Iron owns the Mt Dove Camp. De Grey have entered into a lease agreement with Atlas Iron to use the camp.
  - Hemi Accommodation Village approximately 4 km from the boundary of the indicative disturbance area (within the Development Envelope).
- Heritage sites
  - Mt Dove Portree (Place ID 11585) located approximately 5.8 kilometres south of the indicative disturbance area, but within Development Envelope.
  - Mt Dove Upper Yule (Place ID 11638) located approximately 5.6 kilometres south of the indicative disturbance area, but within Development Envelope.
- Specific ecological and social receptors
  - Jelliabidina Pool located approximately 5.7 kilometres west of the indicative disturbance area (outside the Development Envelope).
  - Mardagubbidina Pool located approximately 6.4 kilometres west of the indicative disturbance area (outside the Development Envelope).

The potential impacts from particulates on Flora and Vegetation and Social Surroundings are discussed in Section 9 and Section 12 respectively.

The separation of receptors and the potential emission sources are known as separation distances, which are defined in the 'Guidance Statement No. 3: Separation Distances between Industrial and Sensitive Land Uses' as the "shortest distance between the boundary of the area that may potentially be used by an industrial land use, and the boundary of the area that may be used by a sensitive land use" (EPA, 2005). De Grey considered the following two activities to be the main land uses that would result in an emission source as defined by the EPA's Guidance Statement No. 3:

- Open cut mining (other than coal). This activity requires a buffer distance of 1,500-3,000 m.
- Gold ore processing. This activity which includes grinding, milling, sieving and other related activities require a buffer of 1,000-2,000 m.

The separation distances to all identified sensitive receptors all exceed 3,000 m.



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<p>Scale: 1:150,000</p> <p>0 2.5 5 km</p> <p>Projection: GDA2020 MGA Zone 50 Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community Created/Reviewed by KM/KS</p> <p><b>RPMGLOBAL</b></p>	<b>PROJECT</b>		<b>CLIENT</b>	
	<p><b>Hemi Gold Project - Referral Supporting Document</b></p>			
	<p><b>Receptor Locations and Separation Distances</b></p>			
Figure 14-1	ADV-AU-00673	November 2024		

### 14.3.3 Pollutants of Interest

Based upon the activities associated with the Proposal/land use the key pollutants of interest were determined to be:

- **PM<sub>10</sub>** – Particulate matter with an equivalent aerodynamic diameter of 10 µm or less. PM<sub>10</sub> particles may be inhaled into the upper airways and lungs.
- **PM<sub>2.5</sub>** – Particulate matter with an equivalent aerodynamic diameter of 2.5 µm or less. PM<sub>2.5</sub> may be inhaled more deeply into the lungs than PM<sub>10</sub>.
- **Total Suspended Particulates (TSP)** – TSP is the total amount of PM suspended in air, typically up to 50 µm, including the PM<sub>10</sub> and PM<sub>2.5</sub> fractions. These larger particles are primarily associated with amenity or visibility issues and are likely to be removed by gravitational settling within a short time of being emitted (i.e. they settle to the ground or other surfaces fairly quickly).
- **Dust Deposition** – a measure of the dust that falls out of suspension.

De Grey used PM<sub>10</sub> and PM<sub>2.5</sub> to assess human health impacts and dust deposition for amenity and nuisance according to the guideline values outlined in Table 14-2. An assessment of the potential impacts on the identified sensitive receptors against the guideline values is outlined in Table 14-3. There are currently no established criteria for assessing the impacts of dust on ecological receptors.

**Table 14-2: Guideline Values for Air Quality at 25 Degrees**

Protected Value	Pollutant	Concentration	Averaging Period	Reference
Human Health	PM <sub>10</sub>	46 µg/m <sup>3</sup> at 25°C	24-hour	DWER (2019a), consistent with NEPC (2021b)
		23 µg/m <sup>3</sup> at 25°C	Annual	
	PM <sub>2.5</sub>	23 µg/m <sup>3</sup> at 25°C	24-hour	
		8 µg/m <sup>3</sup> at 25°C	Annual	
Amenity	Dust Deposition	2 g/m <sup>2</sup> /30 days	30-days (above background)	DWER (2021) referencing NSW EPA (2016) and NZ MfE (2016)
		4 g/m <sup>2</sup> /30 days	30-days (maximum)	

It should be noted that in their current draft form, the DWER (2019) guidelines for TSP, PM<sub>10</sub> and PM<sub>2.5</sub> require the criteria to “generally” be met at all existing and future offsite sensitive receptors in the modelling domain’. DWER (2021) draft guidelines address the settling or deposition of dust, noting that at time of this assessment the guideline is draft and subject to public consultation.

**Table 14-3: Receptor Air Quality Measures Assessed.**

Receptor	Separation Distance (m)	Criteria	Air Quality Assessed		
			PM <sub>10</sub>	PM <sub>2.5</sub>	Dust Deposition
Mount Dove Camp	3,800	Human Health	✓	✓	✗
		Amenity   Nuisance	✗	✗	✓
Accommodation Village	4,000	Human Health	✓	✓	✗
		Amenity   Nuisance	✗	✗	✓
Jelliabidina Pool	5,700	Amenity   Nuisance	✗	✗	✓
Mardagubbidina Pool	6,400		✗	✗	✓
Mt Dove, Portree	5,800		✗	✗	✓
Mt Dove, Upper Yule	5,600		✗	✗	✓

### 14.3.4 Background Air Quality

Background air quality levels for the Project were modelled using assumed natural background concentrations of air quality in the Pilbara:

- PM<sub>10</sub>: 18 µg/m<sup>3</sup> (24-hour average) derived from the BHP Pilbara Strategic Proposal (BHP, 2016)
- PM<sub>2.5</sub>: 3 µg/m<sup>3</sup> (24-hour average; taken as 15% of the PM<sub>10</sub> background)

Background levels for depositional dust could not be derived from the studies reviewed.

Existing ambient monitoring programs in this region have shown that dust levels in the Pilbara naturally exceed the NEPM ambient dust level criteria on occasion.

### 14.3.5 Air Quality Modelling

The air quality modelling completed by ETA was used to predict ground-level concentrations across the model domain, with potential air quality impacts resulting from the Proposal. No modelling was completed for a permanent power station on-site as power will be supplied from a grid connected arrangement such as the grid through the NWIS.

Air modelling considered potential generation from the following activities during a year with the highest production, including drilling, blasting, loading and dumping of ore and waste, earthworks, crushing, screening, stacking, haulage, and wind erosion. The use of standard dust suppression methods was also assumed, and climatic conditions were taken into consideration (ETA, 2022)(ETA, 2022)(ETA, 2022).

Proposal emissions were estimated using methodologies outlined in the National Pollutant Inventory (NPI) Emissions Estimation Technique Manual (EETM) for Mining and input into the CALPUFF dispersion model as volume sources to simulate mining and haulage emissions and area sources to simulate wind-blown dust emissions.

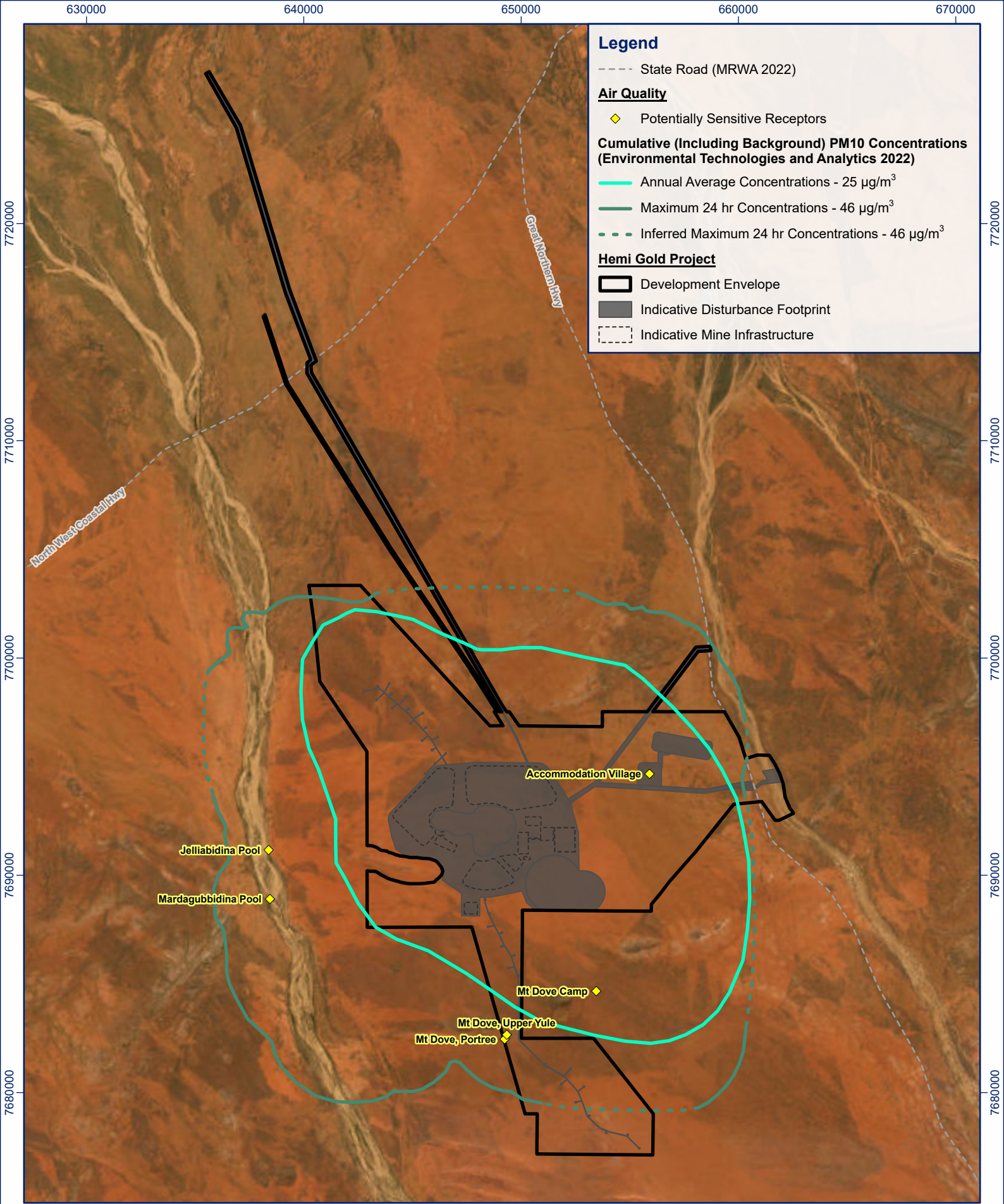
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The CALMET/CALPUFF modelling suite was used to determine predicted ground level concentrations from a worst-case Proposal scenario and cumulatively with the background air quality. In the absence of weather station data, meteorological fields in the Proposal area and surroundings were created from 3-dimensional data generated by the WRF prognostic meteorological model. Fine-resolution terrain elevation data (SRTM) with 90 m resolution was used in conjunction with CGLOPS-1 land-use data to characterise the geophysical environment.

The results from the modelling are presented as contours inclusive of relevant guideline levels from Table 14-2 for;  $PM_{10}$  in Figure 14-2;  $PM_{2.5}$  in Figure 14-3 and dust deposition in Figure 14-4.



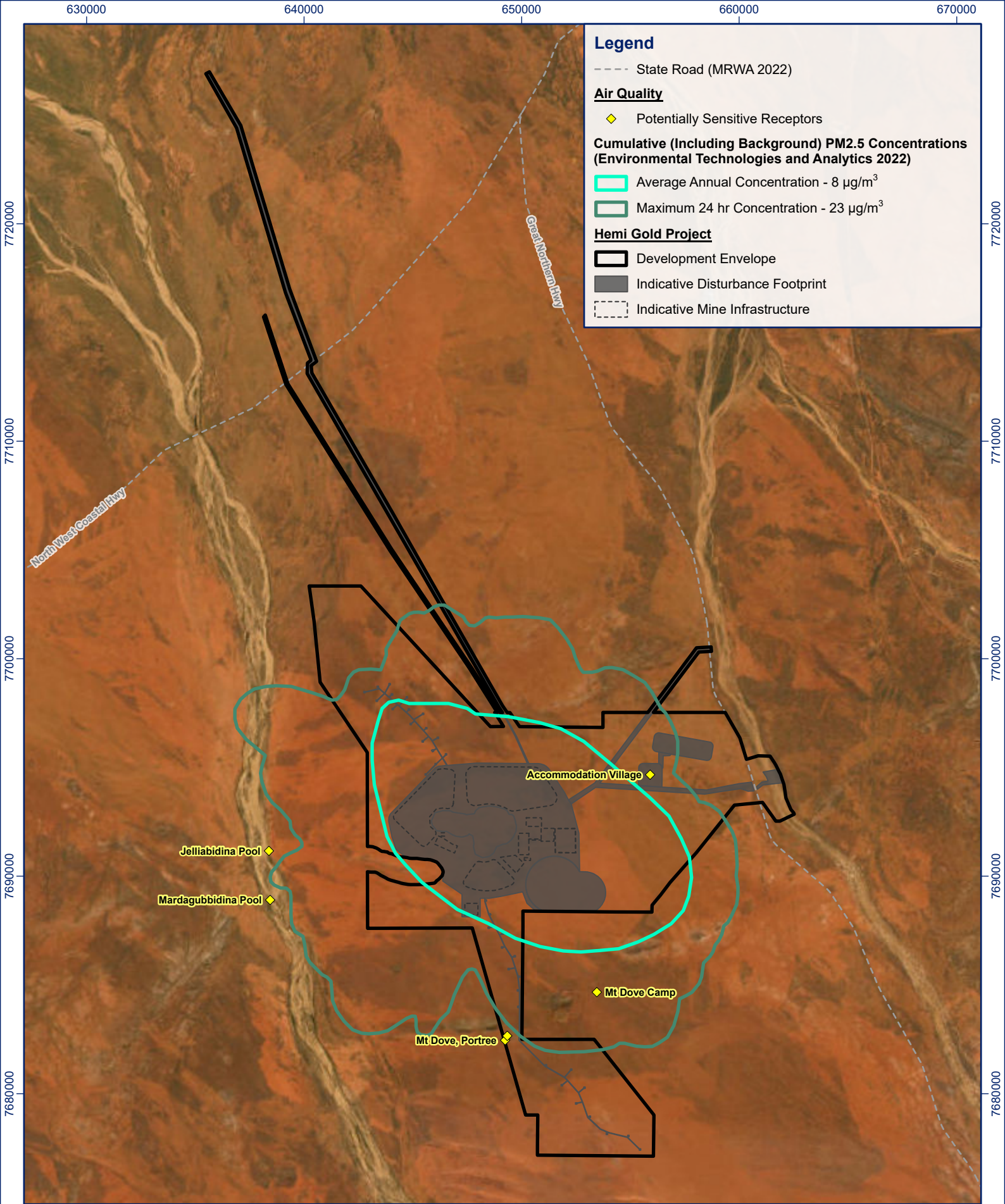
© 2022 Environmental Technologies and Analytics, © 2022 Main Roads Western Australia

Scale: 1:220,000


0 2.5 5 km

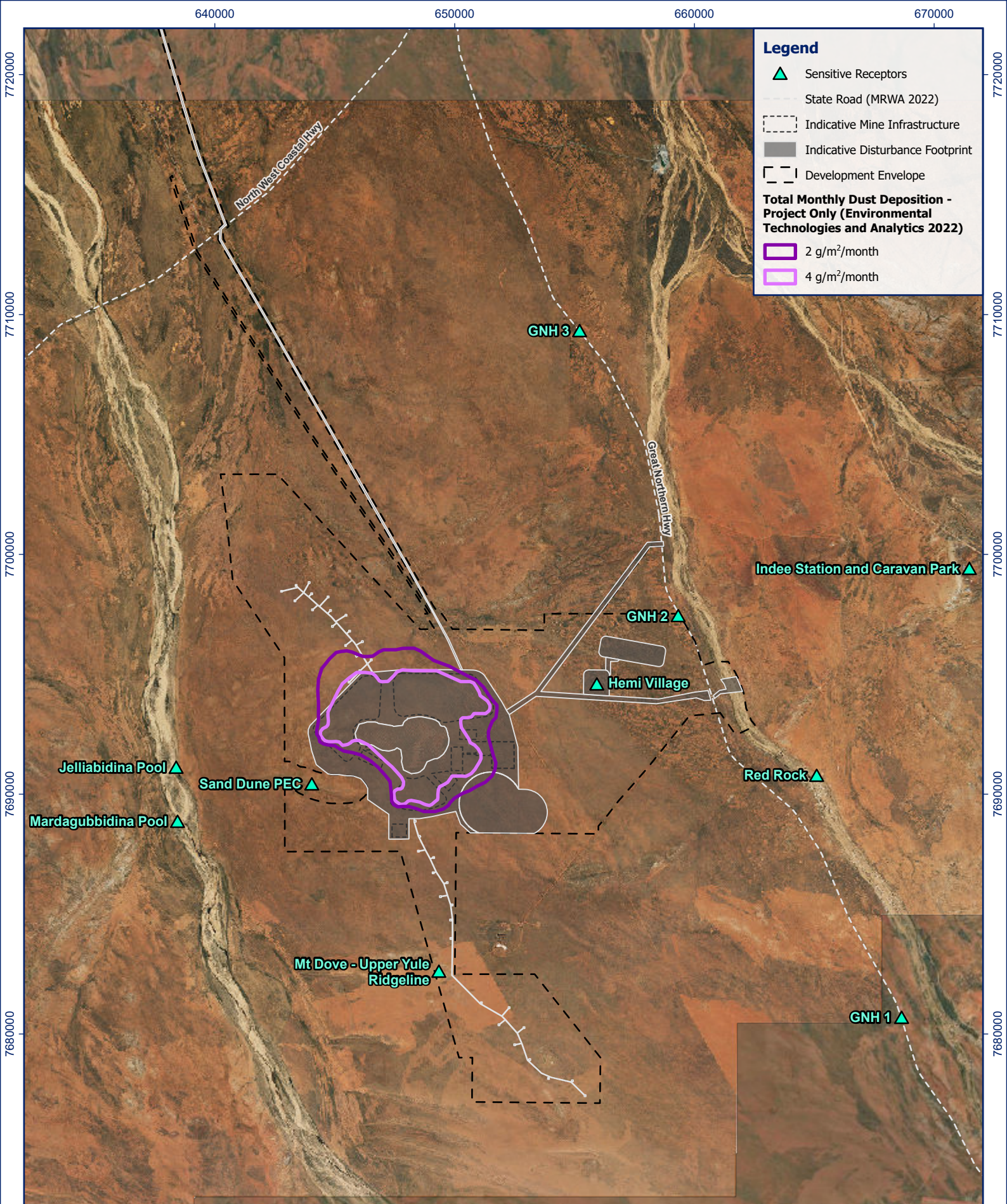
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**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
**Updated/Reviewed by:** KM/EL

PROJECT		CLIENT
Hemi Gold Project - Referral Supporting Document		
Modelled PM10 Concentrations		
Figure 14-2	ADV-AU-00673	



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<p>Scale: 1:220,000</p> <p>0 2.5 5 km</p> <p>Projection: GDA2020 MGA Zone 50  Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  Updated/Reviewed by: KM/EL</p> <p><b>RPMGLOBAL</b></p>	<b>PROJECT</b>		<b>CLIENT</b>	
	<b>Hemi Gold Project - Referral Supporting Document</b>			
	<b>Modelled PM2.5 Concentrations</b>			
<b>Figure 14-3</b>	<b>ADV-AU-00673</b>	<b>November 2024</b>		



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Scale: 1:200,000  
 0 1.25 2.5 5 km

Projection: GDA2020 MGA Zone 50  
 Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
 Created/Reviewed By: KM/EL

<b>PROJECT</b>		<b>CLIENT</b>
<b>Hemi Gold Project - Referral Supporting Document</b>		
<b>Modelled Dustfall</b>		
Figure 14-4	ADV-AU-00673	November 2024

## 14.4 Potential Impact and Mitigation Measures

Potential impacts and mitigation measures are provided in Table 14-4. Additional information on certain impacts is also provided under the relevant subheadings below.

The assessment compared the predicted ground-level composition of particulates  $PM_{10}$  and  $PM_{2.5}$  and dust deposition at the receptors with relevant air quality assessment criteria as outlined in Table 14-3. It is important to note that an exceedance of a guideline value through modelling is not an indicator of unacceptable impact but of potential health risk. A summary of the assessment outcomes is provided below.

### *14.4.1 Receptors Affected by Human Health Particulates $PM_{10}$ and $PM_{2.5}$ .*

The accommodation village and Mount Dove Camp were assessed for potential impacts on human health, amenity and nuisance (based on criteria provided in Table 14-2):

- The modelling results indicate that  $PM_{10}$  values at the accommodation village are above the assessment criteria on 18 occasions in isolation and up to 48 times with background concentration included.
- For the accommodation village, the predicted annual average  $PM_{10}$  concentration is below the assessment criterion in isolation but is above the criterion when background concentration is included.
- The predicted 24-hour average for  $PM_{2.5}$  at both the accommodation village and Mount Dove Camp is above the relevant criterion with and without the inclusion of background concentration.
- Annual average  $PM_{2.5}$  concentrations in isolation and cumulatively are largely limited to the mine area and do not reach Mount Dove Camp, nor the accommodation village.

### *14.4.2 Receptors Affected by Dust Deposition*

All receptors were assessed for amenity and nuisance as outlined in Table 14-3.

Dust deposition guideline values are not exceeded for the 30-day increase above background levels for any sensitive receptors. Amenity and nuisance from depositional dust are not predicted.

### *14.4.3 Ecological Receptors*

There are currently no established criteria for assessing the impacts of dust on ecological receptors. The dust deposition guideline values for amenity were not exceeded in the modelling results. These are discussed further in Section 9 for Flora and Vegetation and Section 12 for Social Surroundings.

De Grey recognises that there is the potential for exceedances at receptors during certain meteorological and operational conditions. De Grey will implement standard mitigation strategies outlined Section 14.4, to address identified risk areas.

To minimise dust generation from open areas, vehicle movement, construction, and operational activities, De Grey may implement the following measures as required:

- Progressive rehabilitation of disturbed areas.

- Implement an internal ground disturbance permit and pre-clearance procedure to ensure all potential dust generation hazards are identified.
- Standard dust suppression activities on haulage and access roads
- Implement speed limits for mine vehicles within the Development Envelope based on a risk assessment that considers all environmental values.
- Monitor weather conditions and implement appropriate dust controls for adverse weather.
- Dust suppression measures will be undertaken such as water sprays and material drop heights into ore preparation and process design for activities such as loading, grinding, crushing, milling, and stockpile management.
- Dust suppression measures are included in operational procedures (drilling, blasting, loading materials, etc).

In order to drive continuous improvement in dust management and support De Grey's adaptive management approach, there will be:

- Raising of mine site personnel awareness of the importance of air quality management.
- Management review of incident, hazard, audit and inspection reports identify areas of high dust generation.
- Monitoring of mobile equipment speeds to encourage personnel compliance.
- Engaging stakeholders that may be affected by dust to ensure their concerns are addressed and encourage ad-hoc communication of concerns.

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Table 14-4: Application of the Mitigation Hierarchy for Air Quality

Potential Impacts	Interconnected Factors for Holistic Assessment	Mitigation Measure	Other Decision-Making Process Relevant?	Effectiveness of the Control
<b>Direct Impacts</b>				
Project emissions result in increased PM <sub>10</sub> and PM <sub>2.5</sub> emissions above guidance levels.	<ul style="list-style-type: none"> <li>Social Surroundings</li> </ul>	<ul style="list-style-type: none"> <li>Minimise clearing as far as practicable.</li> <li>Using dust suppressants or watering down roads, working surfaces and stockpiles as required</li> <li>Standard dust suppression measures.</li> <li>Use dust collection systems and enclosed screenhouses.</li> <li>Restrict vehicles to designated roads and tracks.</li> <li>The implementation of speed limits on unsealed roads and tracks to reduce dust creation based upon a risk assessment that considers environmental values (in addition to safety/other required legislation).</li> <li>Additional suppression measures to be implemented as required.</li> <li>Areas that are no longer in use will be rehabilitated as soon as practicable to reduce wind erosion on exposed surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>DWER Part V EP Act – Operating Licence</li> </ul>	Proposed measures to minimise PM <sub>10</sub> and PM <sub>2.5</sub> emissions are consistent with industry standards and will minimise emissions to as low as reasonably practicable.
<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>				<b>Mechanism for Limit</b>
No limits proposed – managed through standard industry practices and Part V EP Act.				N/A
<b>Indirect Impacts</b>				
Excessive dustfall impacts amenity at sensitive receptors.	<ul style="list-style-type: none"> <li>Social Surroundings</li> </ul>	<ul style="list-style-type: none"> <li>Minimise clearing as far as practicable.</li> <li>Using dust suppressants or watering down roads, working surfaces and stockpiles as required</li> <li>Standard dust suppression measures.</li> <li>Use dust collection systems and enclosed screenhouses.</li> <li>Restrict vehicles to designated roads and tracks.</li> <li>The implementation of speed limits on unsealed roads and tracks to reduce dust creation based upon a risk assessment that considers environmental values (in addition to safety/other required legislation).</li> <li>Additional suppression measures to be implemented as required.</li> <li>Areas that are no longer in use will be rehabilitated as soon as practicable to reduce wind erosion on exposed surfaces.</li> <li>Ongoing consultation with Traditional Owners.</li> </ul>	<ul style="list-style-type: none"> <li>DWER Part V EP Act – Operating Licence</li> </ul>	Proposed measures to minimise dust emissions are consistent with industry standards and will minimise emissions to as low as reasonably practicable.
<b>Proposed Limit on Impact to Ensure Environmental Outcome</b>				<b>Mechanism for Limit</b>
No limits proposed – managed through standard industry practices and Part V EP Act.				N/A

# REFERRAL SUPPORTING DOCUMENT

## HEMI GOLD PROJECT

### 14.5 Predicted Outcome

A summary of impacts and predicted outcomes is provided in Table 14-4. Use of dust suppression techniques combined with meteorological and air quality monitoring will ensure that air quality is maintained, and emissions are minimised. De Grey considers that the proposed management measures and regulation under Part V of the EP Act will ensure that the EPA's Air Quality factor objective is met.

### 14.6 Conclusion

The air quality assessment commissioned by De Grey concludes:

- Dust deposition guidelines are not exceeded at any identified sensitive receptor.
- Aesthetic and environmental impacts from dust deposition are not predicted.
- Heritage sites are not predicted to be impacted by dust deposition, however, will be monitored and raised at stakeholder engagements.
- Standard dust suppression measures proposed to be implemented can be managed through a EP Act Part V Environmental Licence.
- Air quality throughout the life of the Project can be monitored and reported through EP Act Part V Environmental Licence conditions.

De Grey considers that the proposed management measures and regulation under Part V of the EP Act will ensure that the EPA's Air Quality factor objective is met.

## **15. PROPOSED ENVIRONMENTAL OFFSETS**

### **15.1 EPA Objective**

Environmental offsets are designed to counterbalance the significant residual impacts to biodiversity values of Proposals and clearing regulated under the EP Act. Offsets are part of the broader approach by the WA Government to the environment and are to be used as a last resort after the application of avoidance and mitigation measures by proponents of a Proposal.

The assessment and decision making of the use of offsets are guided by the following principles:

- Environmental offsets will only be considered after avoidance and mitigation options have been pursued.
- Environmental offsets are not appropriate for all projects.
- Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.
- Environmental offsets will be based on sound environmental information and knowledge.
- Environmental offsets will be applied within a framework of adaptive management.
- Environmental offsets will be focussed on longer term strategic outcomes.

### **15.2 Policy and Guidance**

The following policies and guidance are relevant to this section:

- *WA Environmental Offsets Policy (The Government of Western Australia, 2011)(The Government of Western Australia, 2011)(The Government of Western Australia, 2011).*
- *WA Environmental Offset Guidelines (Environmental Protection Authority (EPA), 2014)(Environmental Protection Authority (EPA), 2014)(Environmental Protection Authority (EPA), 2014)*
- *Public Advice: Considering Environmental Offsets at a Regional Scale (EPA, 2024)(EPA, 2024)(EPA, 2024).*
- *EPBC Act Environmental Offsets Policy (Commonwealth of Australia, 2012)(Commonwealth of Australia, 2012)(Commonwealth of Australia, 2012).*

### **15.3 Proposed Offsets**

The Pilbara Environmental Offset Fund (PEOF) will serve as the primary offset mechanism for the Proposal. The fund aims to deliver environmental offsets in the Pilbara through a strategic landscape-scale approach. The PEOF aims to build on regional programs so environmental offset outcomes are greater than the sum of individual offset contributions. Funds are combined from offset payments required under Part IV of the EP Act and Part 9 or 10 of the EPBC Act.

Offsets have been proposed for disturbance of critical habitat of Northern Quoll and Greater Bilby as part of the approval under the EPBC Act. In addition, De Grey propose to offset a further 33 ha of native vegetation in very good to excellent condition that has not been captured as critical habitat for a Threatened species.

Table 15-1 summarises the environmental values that will require biodiversity offsets due to a significant residual impact from Proposal activities. The offset rate per hectare for each Interim Biogeographic Regionalisation for Australia (IBRA) subregion has been sourced from the PEOF and is subject to an annual adjustment to the Consumer Price Index (CPI).

**Table 15-1: Environmental Values that require offsets**

Environmental Value	IBRA subregion	Offset Rate (\$/ha)
Clearing of no more than 10* ha of Major River habitat, considered critical habitat to the Northern Quoll ( <i>Dasyurus hallucatus</i> ).	Not applicable	**
Clearing of no more than 5,100* ha of Spinifex Sandplain habitats, considered critical habitat of the Greater Bilby ( <i>Macrotis lagotis</i> )	Not applicable	**
Clearing of no more than 800 ha of Sandplain Drainage habitats, considered critical habitat of the Greater Bilby ( <i>Macrotis lagotis</i> )	Not applicable	**
Clearing of 15* ha of native vegetation in very good to excellent condition.	Chichester	932
Clearing of 18* ha of native vegetation in very good to excellent condition.	Roebourne	986

\* Rounded up to the nearest whole number

\*\* Offset rate provided by DCCEEW for the assessment of the Proposed Action under the EPBC Act will be applied.

The total offset liability is calculated by multiplying the area of each impacted value by the corresponding offset rate set by the PEOF for the relevant IBRA region. This process is further detailed in the Impact Reconciliation Procedure (IRP) (DEG-EN-RP-0006) provided in Appendix 31.

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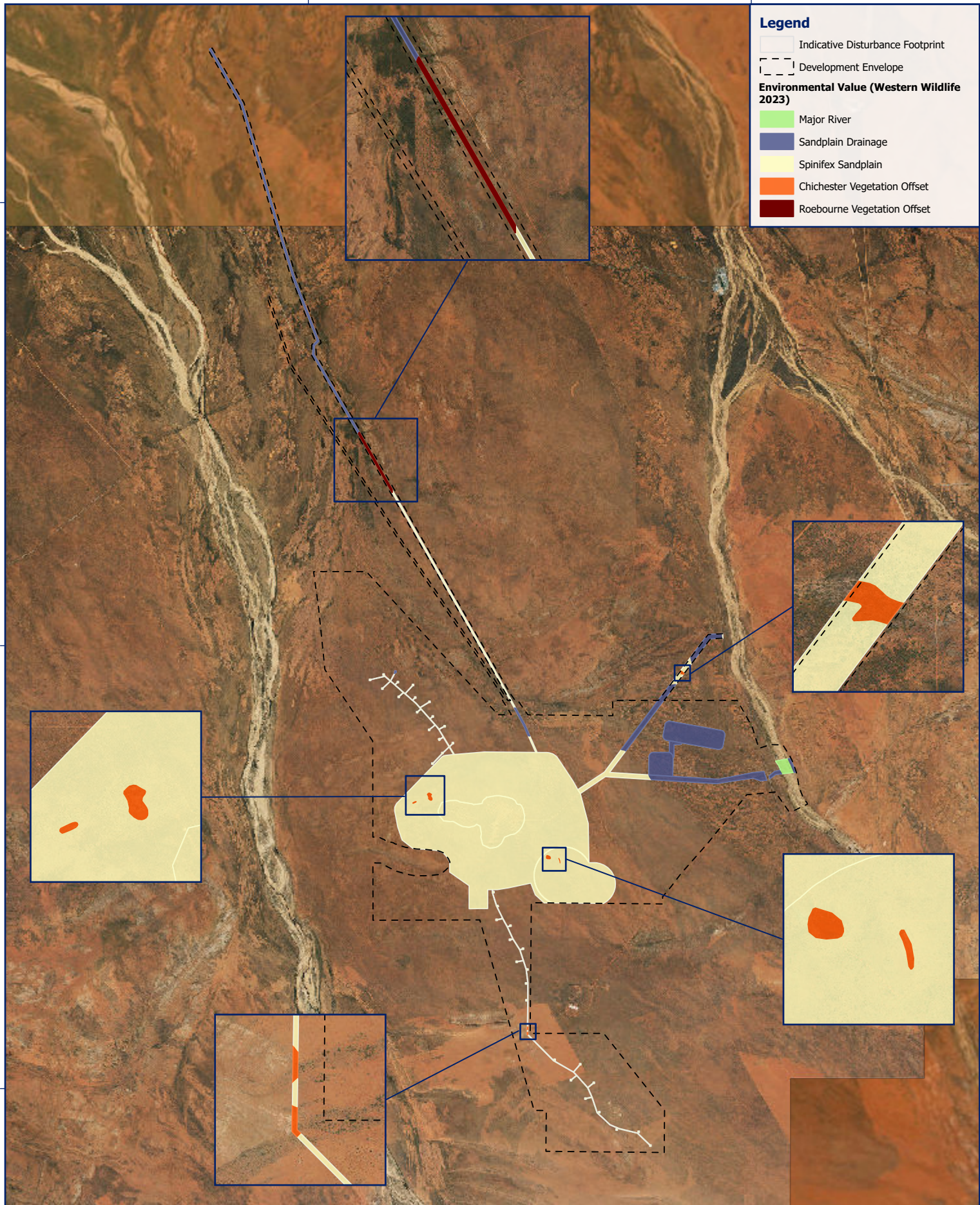
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**Legend**


- Indicative Disturbance Footprint
- Development Envelope
- Environmental Value (Western Wildlife 2023)**
- Major River
- Sandplain Drainage
- Spinifex Sandplain
- Chichester Vegetation Offset
- Roebourne Vegetation Offset

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Scale: 1:220,000  
 0 1.25 2.5 5 km

**Projection:** GDA2020 MGA Zone 50  
**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
**Created/Reviewed By:** KM/EL

**RPMGLOBAL**

<b>PROJECT</b>		<b>CLIENT</b>	
<b>Hemi Gold Project - Referral Supporting Document</b>			
<b>Proposed Environmental Offsets Requiring Offsets Under the EP Act</b>			
Figure 15-1	ADV-AU-00673	November 2024	

## 16. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

This section has been written to be consistent with the EPBC Act. Therefore, the Proposal is referred to as the Proposed Action and Matters of National Environmental Significance (MNES) are defined as under the EPBC Act.

The Proposed Action was referred to DCCEEW under the EPBC Act on 15 May 2023. On 15 November 2023, De Grey received formal notification from a delegate of the Minister for the Environment and Water that the proposed action is a Controlled Action, to be assessed by Preliminary Documentation for the following controlling provisions:

- Listed Threatened species and communities (sections 18 and 18A of the EPBC Act).
- Listed migratory species (sections 20 and 20A of the EPBC Act).

De Grey did not request for the referrals to be assessed under an Accredited Assessment by the EPA, therefore DCCEEW are undertaking an independent assessment of the Proposed Action. The Preliminary Documentation and supporting studies and plans was submitted to DCCEEW on 6 August 2024. This section provides an overview of the information provided to DCCEEW for their assessment.

### 16.1 Relevant Policy and Guidance

De Grey has considered relevant policy and guidance in the design of the Proposed Action and assessment of environmental impacts. Relevant key policies and guidance include:

- Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (Commonwealth of Australia (CoA), 2013)(Commonwealth of Australia (CoA), 2013)(Commonwealth of Australia (CoA), 2013).
- Various guidelines for EPBC Act listed species, and associated Species Profile and Threats (SPRAT).
- Approved conservation advice and/or recovery plans, where available, for each relevant MNES.

### 16.2 Summary of Existing Environmental Values Relevant to MNES

A summary of the information provided to DCCEEW in the Preliminary Documentation assessment on the related MNES, potential impacts from the Proposed Action and measures to avoidance and mitigation are provided in Table 16-1.

**Table 16-1: MNES Summary**

MNES	Discussion
<b>Fringed Fire-Bush</b> <i>Seringia exastia</i>	<ul style="list-style-type: none"> <li>• Current status under EPBC Act – Critically Endangered.</li> <li>• Recently synonymised with <i>Seringia elliptica</i> after a taxonomic review.</li> <li>• Delisted under Western Australian BC Act, waiting for delisting under EPBC Act.</li> <li>• Species was assigned <i>Seringia exastia</i> name due to taxonomic nomenclature rules stating the oldest existing name is to be used (Appendix 17).</li> <li>• Species is common and widespread, ranging over 2.6 million km<sup>2</sup> in northern and central Western Australia, South Australia and Northern Territory.</li> <li>• Two populations were recorded within the Development Envelope.</li> <li>• No specific avoidance or mitigation measures are proposed as the Proposed Action will not have a significant impact on the species.</li> </ul>

MNES	Discussion
<p><b>Northern Quoll</b> <i>Dasyurus hallucatus</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Endangered.</li> <li>• Major River habitat identified as critical habitat, of which a maximum of 10 ha is proposed for low-impact clearing for the mine surplus water discharge outfall.</li> <li>• Northern Quoll recorded with camera traps in Yule and Turner Rivers.</li> <li>• Yule River and supporting Major River habitat excluded from Development Envelope.</li> <li>• Rocky Outcrop habitat excluded from Development Envelope.</li> <li>• Quality of mine surplus water discharge to meet specific approved criteria prior to discharge.</li> <li>• De Grey to implement feral species (foxes and cats) monitoring and control program as required.</li> <li>• Management provisions are detailed within a Fauna Management Plan (specific to the assessment under the EPBC Act).</li> <li>• De Grey proposed to offset 10 ha of Major River habitat through a contribution to the PEOF.</li> </ul>
<p><b>Night Parrot</b> <i>Pezoporus occidentalis</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Endangered.</li> <li>• No Night Parrot recordings during field surveys through deployment of Song Meters (SM4s).</li> <li>• Spinifex habitat is located within the Development Envelope, however consistent fires over the past 25 years have reduced its suitability for roosting and breeding for the Night Parrot.</li> <li>• De Grey to implement feral species (foxes and cats) monitoring and control program as required.</li> <li>• De Grey will implement pre-clearance surveys prior to land disturbance for the Greater Bilby which is likely to identify any Night Parrots should they occur.</li> <li>• A residual significant impact is considered unlikely to the Night Parrot; therefore, no offsets are proposed.</li> </ul>
<p><b>Greater Bilby</b> <i>Macrotis lagotis</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Vulnerable.</li> <li>• 5,759 ha of the indicative disturbance footprint is considered critical habitat for the Greater Bilby.</li> <li>• Spinifex Sandplain and Sandplain Drainage identified as critical habitat of which a maximum of 5,100 and 800 ha is proposed to be cleared.</li> <li>• Secondary signs of Greater Bilby were recorded during field surveys with no active burrows recorded within the Development Envelope.</li> <li>• Greater Bilby habitat is widespread and common throughout the Pilbara bioregion.</li> <li>• The proposed Development Envelope covers 0.16% of Greater Bilby habitat within Pilbara bioregion.</li> <li>• The proposed indicative disturbance footprint impacts 0.04% of Greater Bilby habitat within Pilbara bioregion.</li> <li>• Clearing will be limited to minimum extent required for the Proposed Action.</li> <li>• De Grey to implement feral species (foxes and cats) monitoring and control program as required.</li> <li>• De Grey will implement pre-clearance surveys prior to land disturbance, relocating Greater Bilby individuals by qualified personnel if required.</li> <li>• Management provisions are detailed within the Fauna Management Plan (specific to the assessment under the EPBC Act).</li> <li>• De Grey propose to offset 5,759 ha through a contribution to the PEOF.</li> </ul>
<p><b>Grey Falcon</b> <i>Falco hypoleucos</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Vulnerable.</li> <li>• No nests or individuals were recorded during field surveys.</li> <li>• Major River habitat identified as critical habitat, of which 10 ha is proposed for low-impact clearing for the mine surplus water discharge outfall.</li> <li>• Trees suitable for nesting will be avoided where reasonably practicable from clearing within the Major River habitat.</li> <li>• De Grey to implement feral species (cats) monitoring and control program as required.</li> <li>• A residual significant impact is considered unlikely for the Grey Falcon therefore no environmental offset is proposed.</li> </ul>

MNES	Discussion
<p><b>Pilbara Leaf-nosed Bat</b> <i>Rhinonicteris aurantia</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Vulnerable.</li> <li>• No roosts were recorded within the Development Envelope, with the closest known roost 17 km south of Development Envelope.</li> <li>• Recordings across Development Envelope from echolocation recorders (AnaBat) in Priority 5 foraging habitat.</li> <li>• No Priority 1 or 2 foraging habitat identified within the Development Envelope.</li> <li>• Priority 3 foraging habitat is avoided, 10 ha of disturbance to Priority 4 foraging habitat and the remaining Project disturbance is to Priority 5 foraging habitat.</li> <li>• A residual significant impact is not predicted for the Pilbara Leaf-nosed bat therefore no environmental offsets are proposed.</li> </ul>
<p><b>Ghost Bat</b> <i>Macroderma gigas</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Vulnerable.</li> <li>• No roosts were recorded within the Development Envelope, with the closest known roost 35 km south of the Proposed Action.</li> <li>• No habitat suitable to provide caves, rocky shelters or mine adits is located within the Development Envelope.</li> <li>• Foraging habitat that supports a roosting colony is unlikely to occur within the Development Envelope as the closest known roost is 35 km south of the Proposed Action (Ghosts Bat foraging habitat within 12 km of a diurnal roost).</li> <li>• No specific avoidance or mitigation measures specific to Ghost Bat are proposed, with measures overlapping with other species.</li> <li>• A residual significant impact is considered unlikely from the Proposed Action; therefore, no environmental offsets are proposed for the Ghost Bat.</li> </ul>
<p><b>Pilbara Olive Python</b> <i>Liasis olivaceus barroni</i></p>	<ul style="list-style-type: none"> <li>• Current status under the EPBC Act – Vulnerable.</li> <li>• No recordings from field surveys or eDNA analysis.</li> <li>• Major River habitat identified as potential critical habitat, of which a maximum of 10 ha is proposed for low-impact clearing for the mine surplus water discharge outfall.</li> <li>• Rocky Outcrop habitat identified as potential critical habitat is excluded from Development Envelope.</li> <li>• De Grey to implement feral species (foxes and cats) monitoring and control program as required.</li> <li>• A residual significant impact is not predicted for the Pilbara Olive Python therefore no offset is proposed.</li> </ul>
<p><b>Migratory Birds</b></p>	<ul style="list-style-type: none"> <li>• One recording of Fork-tailed Swift in fauna study area, however outside of Development Envelope.</li> <li>• No important populations or important wetlands recorded within the Development Envelope.</li> <li>• De Grey to implement feral species (foxes and cats) monitoring and control program as required.</li> <li>• A residual significant impact is considered unlikely from the Proposed Action on Migratory species; therefore, no environmental offsets are proposed.</li> </ul>

## **17. HOLISTIC ASSESSMENT**

In addition to consideration of impacts to individual environmental factors, EPA guidance for environmental impact assessment requires proponents to consider the impact of their proposal on the environment as a whole (EPA, 2021b)(EPA, 2021b)(EPA, 2021b). The environment is a complex dynamic of connections and interactions, and while an effect on a particular factor(s) may be minor in isolation, its impact across these interconnections may result in a significant impact.

De Grey have sought to understand the environment as a whole, informed by a detailed understanding of environmental and social values and processes and the holistic views raised through consultation with various stakeholders, including the Kariyarra People. The inputs and perspectives of the Kariyarra People continues to be vital in growing this understanding of the whole environment and the balance between its many interconnected elements.

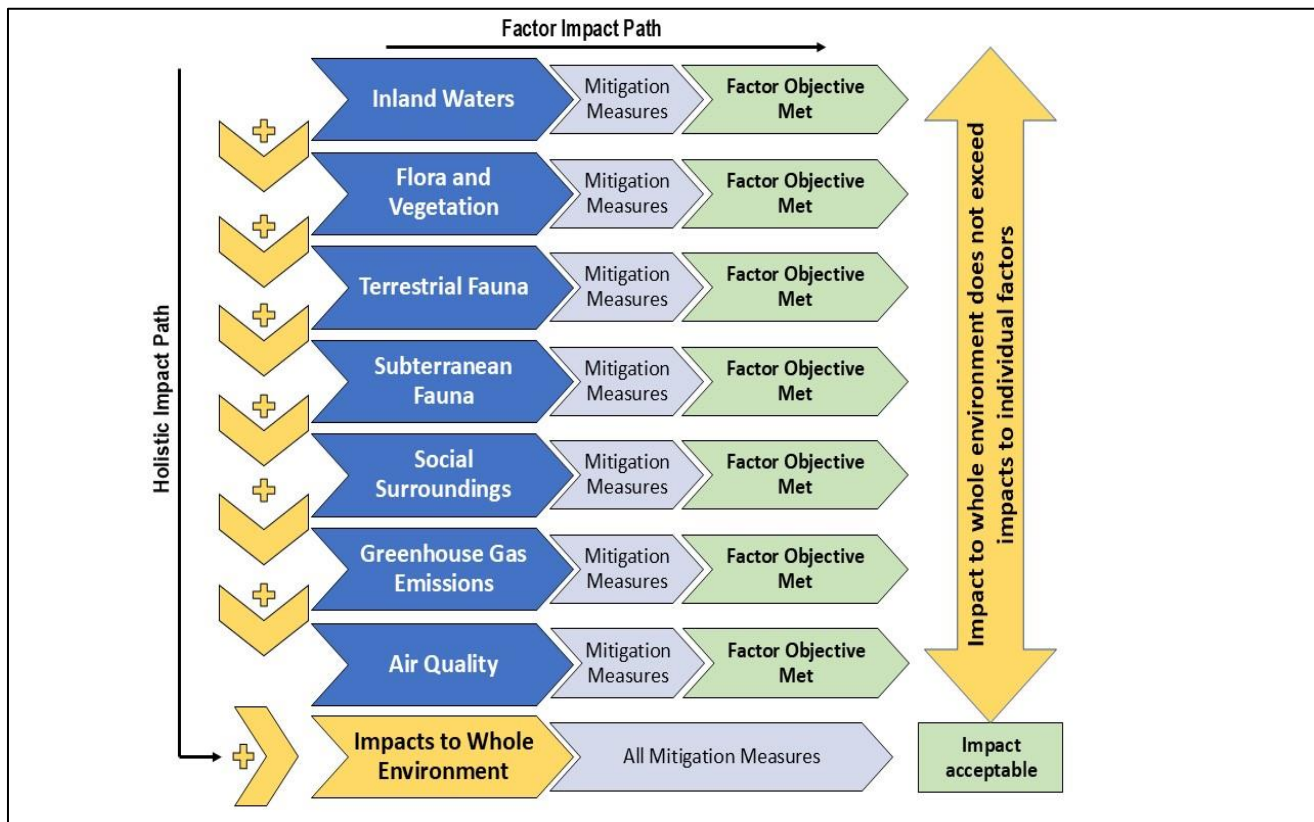
### **17.1 Connections and Interactions Between Environmental Factors**

The extensive environmental and social surveys and studies undertaken for the Proposal have evaluated potential impacts at both a local and regional scale. The findings of these surveys and studies have shaped and informed the impact assessment and mitigation strategies for the Proposal. While the Proposal's predicted outcomes have been considered independently in relation to the EPA's environmental principles and objectives for each preliminary environmental factor, De Grey recognises the complex linkages between Inland Waters, Flora and Vegetation, Terrestrial Fauna and Social Surroundings.

In the Pilbara, significant cultural values often align with elements of the landscape with high visual amenity, botanical diversity and fauna habitat values; therefore, additional combined environmental effects may become significant and require additional mitigation. The high level of connectivity between the environmental factors of Inland Waters, Flora and Vegetation, Terrestrial Fauna and Social Surroundings is illustrated in Figure 17-1.

The key impacts that have little interaction across factors, when viewed at the timescale of the life of the mine, are Greenhouse Gas, Air Quality and the loss of subterranean fauna habitat associated with the Proposal. These impacts are assessed in detail in the factor assessments and require no further holistic considerations.

**Figure 17-1: Holistic Impact of the Project**



## 17.2 Considerations of Holistic Effects

Holistic impact assessment considers interconnectedness between environmental factors and identifies whether multiple impacts that are minor when considered in isolation may be unacceptable when considered in aggregate. For example, meeting the factor objective for Terrestrial Fauna requires consideration of potential impacts to Inland Waters and Flora and Vegetation.

Where there is interconnectedness between environmental factors, De Grey has identified all potential impacts regardless of the most relevant factor and considered the environment as a whole when determining whether each environmental factor objective has been met.

As discussed in Section 6, the Proposal addresses principles of the EP Act, including:

- **Precautionary approach:** The Proposal has been appropriately planned and subject to technical studies that demonstrates that the Proposal will not cause significant impacts to the environment.
- **Conservation of biological diversity and ecological integrity:** The Proposal has been planned and will be designed and constructed in a manner that avoids and minimises impacts such that biological diversity and ecological integrity are maintained.
- **Intergenerational equity:** The Proposal will maintain land and soil quality, its reduce greenhouse gas emissions, and protect Aboriginal cultural heritage, all of which will contribute to maintaining environmental quality for the benefit of future generations.

The ultimate questions for holistic impact assessment are:

- Whether any impact to the whole environment is potentially greater than the sum of the impacts to each environmental factor considered in isolation?

- Is there an impact that requires additional investigation and/or management measures that may result in a better environmental outcome than the measures proposed to meet the individual factor objectives?

Due to the approach taken where impacts to the whole environment were considered in the assessment of each factor objective, De Grey considers that the potential impacts have been adequately investigated and management measures defined where required. De Grey recognises that the impacts of climate change are wide ranging and have the potential to impact all environmental factors either directly or indirectly, and that the Proposal's GHG emissions will contribute cumulatively to climate change. The Proposal will be subject to the Federal Safeguard Mechanism which requires large facilities to reduce their emissions in line with Australia's emissions reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. Further as a new facility, the Proposal is required to meet the relevant best practice emissions intensity benchmark, well below the average emissions across existing similar facilities.

### **17.3 Combined Environmental Effects Already Assessed**

Particular landscape features such as rocky landforms, sand dunes, major rivers and pools, are known to support higher biodiversity and are culturally important. The tendency for these key values to co-occur in landscape features in the Pilbara means that mitigation measures are often relevant for multiple factors.

The Proposal has been developed with the protection of these features, particularly Rocky Outcrop, Sand Dune and the Yule River and the minimisation of impact to the Turner River as the priorities for the application of the mitigation hierarchy. Therefore, the assessment of the potential environmental effect of the Proposal as a whole does not require different or additional mitigation to that applied when the factors were assessed in isolation. The synergies between landscape features and the location of various environmental values and the mitigation already applied are shown in Figure 17-2.

Interconnectedness is shown in the impact assessment tables in each section. A summary of interconnectedness of environmental factors is shown in Table 17-1.

**Major Rivers and Pools (Excluded and Minimised)**

Major creeks and pools are important for multiple factors and can support the following values:

- Cultural and heritage significance.
- Groundwater dependent ecosystems.
- Higher density vegetation provides increased shelter and foraging habitat.
- Aquatic fauna and water resource for fauna including Pilbara Olive Python.
- Visual amenity.
- Hydrological processes.
- Ecological linkages.

To minimise impact to these overlapping values, the Proposal has been designed to:

- Avoids the Yule River, which is considered to have greater social and ecological value by excluding from the Development Envelope.
- Clearing minimised in the Turner River to outfall only (upper limit of clearing limited to 45 ha).
- Discharge predicted to be in the low flow channel and extend a maximum of 50 km.
- No drawdown predicted to impact either the Yule or Turner River.

**Rocky Outcrop and Sand Dune (Excluded)**

Rocky Outcrops and Sand Dunes are uncommon in the region, limited in extent in the wider region, important for multiple factors and can support the following values:

- Cultural and heritage significance and visual amenity.
- Niche habitats for significant fauna species.
- Caves that have heritage and/or habitat value.
- High value habitat.

To minimise impact to these overlapping values, the Proposal has been designed to:

- Avoid direct impacts to these features by excluding them from the Development Envelope.
- Avoid indirect impacts to these features, particularly the Sand Dune through application of a 300 m buffer from the Development Envelope.



**Legend**

- Development Envelope
- Indicative Disturbance Footprint

**Fauna Habitats (Western Wildlife 2023)**

- Rocky Outcrops
- Sand Dune
- Sandplain Drainage
- Spinifex Sandplain
- Stony Hills
- Major River and Pools



**Holistic Conclusion**

- Proposal design has avoided or minimised disturbance to important environmental and social values.
- Management controls to be implemented to ensure impacts are not greater than predicted.
- The combined effects on the environment when considered as a whole are not greater or different than effects on individual factors and have been minimised through application of the mitigation hierarchy.

**Spinifex Sandplain and Sandplain Drainage (Minimised)**

Spinifex Sandplain and Sandplain Drainage still support ecological and cultural values but are widespread and less unique.

To minimise impact to these overlapping values, the Proposal has been designed to include:

- Upper limits of clearing have been applied to these areas to ensure impacts are not greater than predicted.
- Pre-clearance surveys will occur in these areas, targeting the Greater Billyby.
- Infrastructure is preferentially located in these areas to minimise impacts on key landscape features.

Scale: 1:250,000  
0 1.25 2.5 5 km

Projection: GDA2020 MGA Zone 50  
Aerial: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
Created/Reviewed By: KM/EL

<b>PROJECT</b>		<b>CLIENT</b>
<b>Hemi Gold Project - Referral Supporting Document</b>		
<b>Holistic Impact Assessment</b>		
Figure 17-2	ADV-AU-00673	November 2024

**Table 17-1: Holistic Impact Assessment of Interconnecting Key Environmental Factors**

Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
<b>Clearing of native vegetation</b>					
<ul style="list-style-type: none"> <li>• Fauna habitat loss and fragmentation.</li> <li>• Introduction of new invasive plant species or spread of existing invasive species.</li> <li>• Loss of significant flora and fauna</li> <li>• Fragmentation of regionally significant vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>• Altered surface water flow and quality</li> </ul>	<ul style="list-style-type: none"> <li>• Dust emission from exposed surfaces and clearing activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Impact to social cultural heritage sites and values.</li> </ul>	<ul style="list-style-type: none"> <li>• Limiting clearing to the minimum required.</li> <li>• Using previously disturbed areas to the extent reasonably practicable.</li> <li>• No unauthorised off-road driving.</li> <li>• Implementation of an internal permitting system for clearing.</li> <li>• Site inductions program to provide information on vegetation protection and internal permitting system.</li> <li>• Stripping and stockpiling of topsoil for subsequent rehabilitation to preserve seed bank.</li> <li>• Annual review of clearing areas.</li> <li>• Weed control measures if required.</li> <li>• Avoiding known locations of Priority species to extent reasonably practicable.</li> <li>• The Development Envelope and indicative disturbance footprint have been modified during the design phase to avoid direct impacts to high significance vertebrate fauna habitat where practicable. This includes the avoidance of Rocky Outcrop and Sand Dune habitat types which have been removed from the Development Envelope.</li> <li>• The Development Envelope and indicative disturbance footprint have been designed to minimise where practicable disturbance of Spinifex Sandplain, Sandplain Drainage and Major River habitats which are considered critical habitat for significant species.</li> <li>• Clearing of critical habitat will be restricted through authorised extents.</li> </ul>	<ul style="list-style-type: none"> <li>• Clearing will be limited to no more than 5,830 ha within a Development Envelope of 22,194 ha.</li> <li>• No impact to regionally significant vegetation (Gregory Land System PEC).</li> <li>• No clearing of vegetation outside approved areas.</li> <li>• Clearing of Priority flora species minimised to extent practicable.</li> <li>• Clearing will be limited to no more than 5,100 ha of Spinifex Sandplain habitat.</li> <li>• Clearing will be limited to no more than 800 ha of Sandplain Drainage habitat.</li> <li>• Clearing will be limited to no more than 10 ha of Major River habitat.</li> <li>• No direct disturbances to heritage sites without Traditional Owner consultation and the required approvals.</li> </ul>

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Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
				<ul style="list-style-type: none"> <li>• Preclearance surveys for the Greater Bilby to be undertaken in accordance with the EMP.</li> <li>• Progressive clearing to allow fauna to migrate away from clearing activities or machinery movements.</li> <li>• Clearing will commence, where reasonably practicable, from a disturbed vegetation edge to an undisturbed area (to encourage mobile fauna to relocate to adjacent areas naturally).</li> <li>• Diversions designed to return surface water to natural flows paths where reasonably practicable.</li> <li>• Implementation of Proposal in accordance with an agreed ACHMP.</li> </ul>	
<b>Dewatering of groundwater aquifers for pit development and use in processing</b>					
<ul style="list-style-type: none"> <li>• Dewatering drawdown impacting GDVs and Pools along the Yule and Turner riverbeds and banks.</li> <li>• Loss of or change to stygofauna habitat.</li> </ul>	<ul style="list-style-type: none"> <li>• Altered (drawdown) groundwater levels.</li> <li>• Potential for altered groundwater quality.</li> <li>• Reduction in water levels of identified permanent pools.</li> </ul>	<ul style="list-style-type: none"> <li>• Not applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Impact to social cultural heritage sites and values.</li> <li>• Inability to use pastoral and mining bores.</li> </ul>	<ul style="list-style-type: none"> <li>• All operational water demand will be supplied from mine dewatering in the first instance (where feasible) reducing the requirement for water supply volumes.</li> <li>• The water management strategy includes the reinjection of surplus water to reduce the extent of drawdown.</li> <li>• Groundwater will be abstracted according to programs that have been modelled to ensure dewatering volumes are minimised while ensuring safe access to below water table mine pits. Ongoing groundwater level monitoring will be used to review and calibrate the groundwater models and adjust dewatering programs as required.</li> <li>• Dewatering to be undertaken in accordance with the RIWI Act Licence to take groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>• No impact to GDVs and pools along the Yule and Turner riverbeds and banks attributable to dewatering from the Proposal.</li> <li>• No significant impacts to fauna habitat.</li> <li>• No significant impact to stygofauna community.</li> <li>• Surface and groundwater quality will be maintained.</li> </ul>

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Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
				<ul style="list-style-type: none"> <li>Implement groundwater level monitoring for the Yule River, with early response, trigger and threshold criteria to ensure the Yule River is not impacted.</li> <li>Preliminary modelling indicates that the post-closure groundwater drawdown will not adversely affect the Yule or Turner Rivers.</li> <li>Updating/recalibration the groundwater model at least annually for the first three years reducing to tri-annual thereafter.</li> <li>Groundwater bores will be decommissioned in accordance with relevant guidelines, once no longer required.</li> </ul>	
<b>Discharge of surplus mine water into the Turner River or reinjection into groundwater aquifers</b>					
<ul style="list-style-type: none"> <li>Loss or decline of GDVs/riparian vegetation due to increased water availability followed by a reduction.</li> <li>Loss or decline of terrestrial fauna habitat due to discharge.</li> <li>Groundwater mounding in reinjection borefields.</li> </ul>	<ul style="list-style-type: none"> <li>Surplus water discharge causing erosion of riverbanks and changes to geomorphology.</li> <li>Discharge of surplus water of unsuitable quality into the Turner River impacting aquatic ecology.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable.</li> </ul>	<ul style="list-style-type: none"> <li>Impact to social cultural heritage sites and values.</li> </ul>	<ul style="list-style-type: none"> <li>Discharge to the Turner River will be minimised by reinjection of groundwater within the aquifer.</li> <li>Surplus water discharge will be managed such that the wetting front does not extend beyond 50 km downstream of the outfall.</li> <li>Discharge modelling shows wetting front is confined to main channel of river.</li> <li>Abstracted groundwater will be used on-site for operational, environmental and management purposes to minimise discharge as far as practicable.</li> <li>Reinjection rates limited such that mounding remains &gt;2 m below ground level (bgl).</li> <li>Use of multiple reinjection bores sufficiently spaced to control mounding to an acceptable level.</li> <li>Third-party offtake options to be considered.</li> </ul>	<ul style="list-style-type: none"> <li>No discharge of surplus mine water to the Yule River.</li> <li>Erosional effects of discharge insignificant in the context of geomorphological change caused by seasonal flooding.</li> <li>Discharge of surplus mine water to the Turner River will not cause significant long-term impact to the Turner River riparian vegetation health.</li> </ul>

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Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
	<ul style="list-style-type: none"> <li>Discharge of sediment-laden surplus water into Turner River, causing excessive turbidity and impacting aquatic ecology.</li> </ul>			<ul style="list-style-type: none"> <li>All discharge of surplus water and monitoring to be undertaken in accordance with a Part V Environmental Licence to ensure it is within approved water quality parameter.</li> <li>Implement water quality monitoring prior to discharge to the Turner River, with early response, trigger and threshold criteria.</li> <li>Surplus water will be passed through a settling pond(s) to reduce suspended solids before discharge.</li> <li>Implement a regular maintenance program for settling ponds to ensure efficient sediment removal throughout the Proposal life.</li> </ul>	<ul style="list-style-type: none"> <li>During periods of no natural flow, the discharge "wetting front" (affected area) in the Turner River will not extend more than 50 km downstream of the discharge point for the first three years, followed by a reduction.</li> </ul>
<b>Construction of infrastructure and operation of mine activities e.g. blasting, haulage, processing</b>					
<ul style="list-style-type: none"> <li>Unmanaged fire and changes to the fire regime impacting vegetation and habitat.</li> <li>Injury or mortality of terrestrial fauna individuals</li> <li>Decline in vegetation health from dust deposition.</li> </ul>	<ul style="list-style-type: none"> <li>Altered surface water flows.</li> </ul>	<ul style="list-style-type: none"> <li>Dust emissions from active mining and handling / transport.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of heritage value at Aboriginal heritage sites without direct disturbance</li> <li>Altered visual amenity.</li> <li>Indirect impacts of noise/vibration</li> </ul>	<ul style="list-style-type: none"> <li>Clearing activities not to be undertaken when fire danger ratings are catastrophic.</li> <li>Using a permit system for hot work.</li> <li>Installation of fire breaks around critical infrastructure.</li> <li>Effective maintenance of vehicles.</li> <li>Provision of fire extinguishers in all vehicles.</li> <li>Emergency response as required.</li> <li>Conducting any controlled burns in consultation with relevant stakeholders.</li> <li>Including fire education in the site induction.</li> <li>Weed control.</li> <li>Pre-clearance surveys for the Greater Bilby to be undertaken in accordance with the EMP.</li> <li>Progressive clearing to allow fauna to migrate away from clearing activities or machinery movements.</li> </ul>	<ul style="list-style-type: none"> <li>Changes to existing fire regimes will be reduced through standard business practice.</li> <li>Pre-clearance surveys for the Greater Bilby will reduce the risk of impacts to significant terrestrial fauna species</li> <li>Cultural heritage will be maintained.</li> <li>Surface water flow paths will be maintained where reasonably practicable.</li> <li>Noise does not exceed assigned levels at sensitive receptors and is not predicted to have a significant impact.</li> <li>Odour will be localised.</li> </ul>

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Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
				<ul style="list-style-type: none"> <li>• Clearing will commence, where reasonably practicable, from a disturbed vegetation edge to an undisturbed area (to encourage mobile fauna to relocate to adjacent areas naturally).</li> <li>• Avoiding the creation of artificial water sources to the extent practicable.</li> <li>• Diversions designed to return surface water to natural flows paths where reasonably practicable.</li> <li>• Fire management and emergency procedures.</li> <li>• Implementation of ACHMP.</li> <li>• Infrastructure access restricted by construction of bunds and gates as required.</li> <li>• Infrastructure to be operated in accordance with Environmental Licence.</li> <li>• Management of noise, visual, odour and other amenity impacts.</li> <li>• Not use barbed wire where practicable.</li> <li>• If barbed wire fencing is required (due to legislative, safety or pastoral requirements), the top strands will be plain wire, and 10 cm disc bat reflectors to be used.</li> <li>• Rehabilitation measures implemented where practicable.</li> <li>• Site inductions for personnel including fire education, speed limits, identification of conservation significant species and areas.</li> <li>• Implementation of dust suppression techniques such as sprayers on crushers and water trucks is expected to help minimise dust generation during construction and operation.</li> <li>• Limiting the amount of disturbed land to as little as reasonably practicable reducing the amount of dust producing surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>• Visual amenity maintained, where reasonably practicable.</li> <li>• Landforms constructed in accordance with approved design.</li> <li>• Dust deposition is not predicted to have a significant impact on amenity.</li> </ul>

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## HEMI GOLD PROJECT



Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
<b>Leaching or seepage of contaminants into surrounding environment from mine facilities i.e. TSF, landfill site, WRLs.</b>					
<ul style="list-style-type: none"> <li>Overtopping of TSF during operations causing soil contamination.</li> <li>Leaching of nutrients and wastewater from landfills or wastewater treatment affecting subterranean fauna.</li> <li>Land contamination due to inappropriate domestic waste management.</li> <li>Land contamination due to inadequate storage and handling of hazardous substances, including oil/diesel spills, tailings/return water pipeline breaches, and chemical spills.</li> </ul>	<ul style="list-style-type: none"> <li>Seepage from mine facilities impacting groundwater quality</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable.</li> </ul>	<ul style="list-style-type: none"> <li>Contaminated land unsuitable for use by stakeholders i.e. Traditional Owners, Pastoralist.</li> </ul>	<ul style="list-style-type: none"> <li>Project to be implemented in accordance with an Environmental Licence.</li> <li>De Grey will comply with Dangerous Goods Licencing requirements.</li> <li>Chemicals and hydrocarbons to be stored in accordance with Australian Standards and Dangerous Goods Legislation.</li> <li>Nutrient levels in wastewater discharge within licenced limits.</li> <li>Any potentially problematic waste rock will not be stored on the outer surfaces of constructed landforms; and will be appropriately encapsulated.</li> <li>Concrete bunds will be constructed around liquid and slurry tanks in the processing plant.</li> <li>Installation of telemetry along transfer pipelines where required.</li> <li>Irrigation areas sized appropriately with regular wet-dry cycling to limit saturation and infiltration.</li> <li>Pipeline corridors to be bunded with catchpits installed at regular intervals, suitably sized.</li> <li>Stormwater and surface water run-off will be diverted around operational areas and directed to process water pond.</li> <li>Toe drains and/or bunds will be installed where required to capture run-off to ensure any effects are localised.</li> </ul>	<ul style="list-style-type: none"> <li>Managed through standard industry practices and regulated by other DMAs e.g. Mine Closure Plan.</li> </ul>

# REFERRAL SUPPORTING DOCUMENT

## HEMI GOLD PROJECT



Land	Water	Air	People	Mitigation Measures	Predicted Outcomes
Flora and Vegetation Terrestrial Fauna	Inland Waters	Air Quality	Social Surroundings		
<ul style="list-style-type: none"> <li>AMD, NMD, or saline mine drainage impacting soils.</li> </ul>					
<b>Mine closure</b>					
<ul style="list-style-type: none"> <li>Post closure mine voids creating water source in arid area, increasing feral predator numbers.</li> <li>Residual contamination at processing plant and TSF at closure.</li> <li>Loss of soil biota due to inappropriate stockpiling of harvested topsoil.</li> <li>Insufficient topsoil for rehabilitation at closure.</li> </ul>	<ul style="list-style-type: none"> <li>Poor water quality in pit lakes post closure.</li> <li>Dewatering drawdown post closure.</li> <li>Poor water quality post closure</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable.</li> </ul>	<ul style="list-style-type: none"> <li>Post-mining land use not suitable for relevant stakeholders i.e. Traditional Owners, Pastoralist.</li> </ul>	<ul style="list-style-type: none"> <li>De Grey will construct abandonment bunds around mine voids which will limit access.</li> <li>Where practicable infrastructure will be disassembled once decommissioned and all materials removed.</li> <li>Project to be closed in accordance with approved MCP.</li> <li>Contaminated sites assessment to be completed prior to relinquishment of tenement.</li> <li>Progressive rehabilitation where practicable to minimise stockpiling time.</li> <li>Topsoil will be stripped from cleared areas prior to earthworks.</li> <li>Topsoil will not be used for purposes other than rehabilitation.</li> <li>Topsoil register will be maintained.</li> <li>Regular survey pick-up of stockpiles as required.</li> <li>Implementation of trials to determine the optimal mix of topsoil and gravels in rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>Pit lakes are unlikely to contribute to significant increases in feral predator populations.</li> <li>Any residual contamination will be appropriately managed and remediated at closure in accordance with contemporary standards, e.g. ASC NEPM.</li> <li>Stockpiled topsoil remains suitable for rehabilitation.</li> <li>Sufficient topsoil available for closure.</li> </ul>

## 18. CUMULATIVE IMPACT ASSESSMENT

The *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2021a)(EPA, 2021a)(EPA, 2021a) provides guidance for assessing cumulative impacts from the Proposal.

Cumulative environmental impacts are defined as *the successive, incremental and interactive impacts on the environment of a proposal with one or more, past, present and reasonably foreseeable future activities.*

This section:

- Identifies the potential environmental values which require cumulative impact assessment.
- Describes the cumulative impact assessment methodology and the screening approach used to identify potential cumulative impacts.
- Determines whether the Proposal could contribute to a cumulative significant effect on an environmental factor.

### 18.1 Environmental Factors Considered

The environmental factors considered relevant for the cumulative impact assessment are:

- Flora and Vegetation – soil landscape systems; pre-European vegetation communities, threatened flora and TECs.
- Terrestrial Fauna – Threatened species.
- Social Surroundings – land access.
- Inland Waters – surface water areas; groundwater.

### 18.2 Cumulative Impact Assessment Geographical Scope

De Grey has considered potential cumulative impacts at a local and/or regional scale based on the nature of each impact and the availability of publicly available data.

At the local scale, a 2,353,861 ha Local Impact Area was based on a 100 km circular buffer from the centre of the mining lease (M47/1628) (Figure 18-1). As the Proposal does not impact the coast or the coastal foreshore, areas within 10 km of the coast (including the urban centre of Port Hedland) were excluded.

Environmental factor specific local impact areas were considered more appropriate for the following potential cumulative impacts:

- The Kariyarra Native Title Determination Area (Section 12.3) was used for cumulative impacts to Social Surroundings.
- DWER regional catchments (Section 18.8.1) were used for cumulative impacts to surface water.
- Groundwater regions and relevant aquifers (Section 18.8.2) were used for cumulative impacts to groundwater.

Where these areas are employed, it is stated in the relevant subsection.

The Regional Impact Area is 17,142,439 ha and is the Pilbara IBRA region excluding offshore islands, the coast or coastal foreshore, and areas within 10 km of the coast.

## 18.3 Projects Considered in the Local Impact Area

The EPA (2021a)(2021a)(2021a) defines a reasonably foreseeable future activity as: “*Third party (or Proponent) activities which are already approved, are in a government approvals process, or are otherwise reasonably likely to proceed:*

- *For proposals assessed at the level of environmental review – at the time an Environmental Review Document for a proposal is accepted.*
- *For proposals assessed at the level of assessment on referral information - at the time the final referral or required additional information is accepted.*
- *Existing activities that are reasonably expected to be ongoing.”*

Due to data availability constraints, projects considered in the Local Impact Area were limited to clearing associated with EP Act approvals:

- Mining and exploration projects assessed under Part IV of the EP Act.
- Clearing Permits issued under Part V of the EP Act, with revoked, surrendered and withdrawn Clearing Permits excluded.

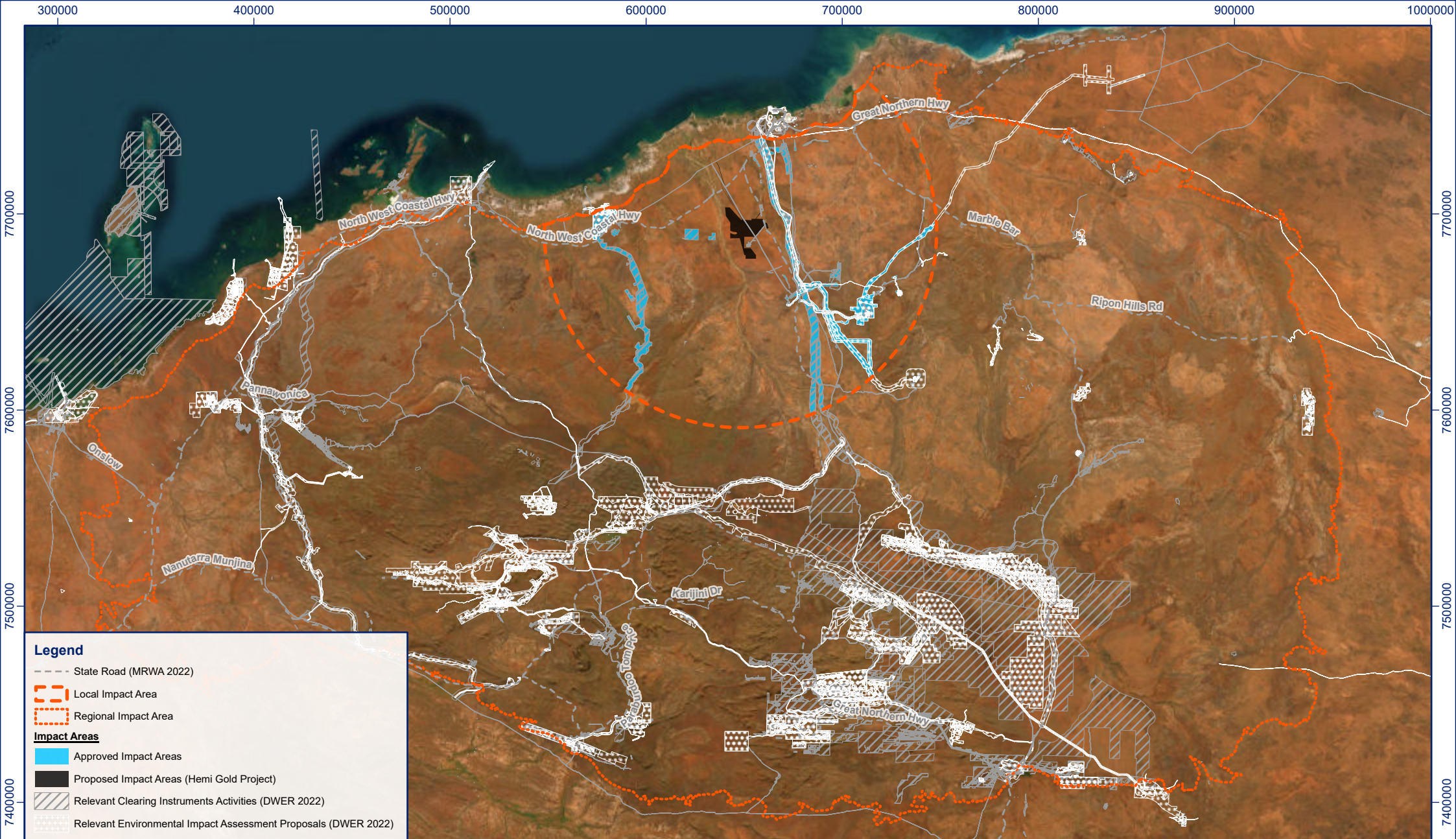
The Part IV Development Envelopes and Part V Purpose Permit boundaries for these projects are shown in Figure 18-1. Part IV proposals in the Local Impact Area include:

- Balla Balla Magnetite Project.
- Balla Balla Rail Conveyor Project.
- Miralaga Creek DSO Project.
- North Star Magnetite Project.
- North Star Hematite Project<sup>6</sup>.
- Pardoo Direct Shipping Ore Project.
- Sulphur Springs Zinc-Copper Project.
- Telfer Project (Gold mine extension – infrastructure corridor).
- Turner River Hub Project Linear Infrastructure.

Existing and proposed disturbances not associated with EP Act approvals could not be considered in a consistent and robust manner as no spatial data is publicly available.

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<sup>6</sup> North Star Hematite Project Development Envelope (total area of 13,810 ha) partly overlaps with the North Star Magnetite Project Development Envelope (total area of 46,351 ha). The overlap area totals 10,161 ha and has not been double counted in the calculations of the cumulative impact assessment.



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**Projection:** GDA2020 MGA Zone 50

**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL

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Scale: 1:2,500,000

PROJECT		CLIENT
November 2024	Hemi Gold Project - Referral Supporting Document	
Figure 18-1		
ADV-AU-00673	Projects in the Local and Regional Impact Areas	

## 18.4 Identification of Cumulative Impacts

Cumulative impacts are quantified based on potential disturbances in the relevant impact area. As disturbance approved under the EP Act is within a Development Envelope or Purpose Permit boundary, this introduces two constraints:

- Spatial data is not publicly available for actual disturbances, which could potentially occur anywhere within the approved boundary.
- Although approved disturbances may not have occurred, they are reasonably foreseeable and must be considered.

Due to these constraints, a conservative approach to cumulative impact assessment is used that considers the Development Envelope/Purpose Permit boundaries rather than approved or proposed disturbance areas. This approach incorporates the following impact areas:

- **The Approved Impact Area** is assumed to be the areas of the Development Envelopes or Purpose Permit boundaries approved or under assessment in the Project's Local Impact Area. These comprise 158 Purpose Permits and nine Development Envelopes.
- **The Proposed Impact Area** is the additional disturbance due to the Proposal. This is assumed to be the entire Project Development Envelope excluding areas already in the Approved Impact Area. The Proposed Impact Area is 21,957 ha (i.e., the Development Envelope of 22,194 ha minus approved impact areas of 237 ha). This is approximately 3.7 times greater than the 5,830 ha of actual disturbance proposed.

This approach, which reflects the publicly available spatial data, overestimates the proposed and existing disturbance areas. However, this is considered to counterbalance to a significant degree, the necessary exclusion of existing and proposed disturbances not associated with the EP Act. De Grey considers that this approach uses the available data to give the most reasonable, highly conservative estimation of cumulative impacts in the Local Impact Area.

The approach is based on the spatial overlay of the Approved and Proposed Impact Areas onto publicly available spatial datasets to identify potential cumulative impacts. The outcomes of this approach represent impact screening, since the approved and proposed disturbances in the Local Impact Area are overestimated. Any potentially significant cumulative impacts identified through this screening approach are subject to additional investigation to determine if they are actual significant cumulative impacts.

A similar approach for the Regional Impact Area was considered; however, a visual inspection of preliminary spatial results indicated that the likely errors associated with overestimation of EP Act disturbance and exclusion of other disturbance would be magnified at a regional scale, such that any conclusions would likely be inaccurate. Therefore, the regional assessment is limited to the identification of the Proposal's contribution to existing disturbance, with a view that this data will be of use to future proponents when undertaking cumulative impacts assessment at a time when additional public data is available.

Approved and Proposed Impact Areas for the purpose of this cumulative impact assessment are shown in Figure 18-1 and provided in Table 18-1. The Approved Impact Area is 8% of the Local Impact Area and the Proposed Impact Area contributes an additional percentage point.

For certain impacts (e.g., groundwater abstraction), other methods are more appropriate for cumulative impact assessment. Where other methods are used, these are described in the text.

**Table 18-1: Approved and Proposed Areas in the Local Impact Area**

Description	Area	
	Ha	%
Approved Impact Area	180,345	8%
Proposed Impact Area	21,957	1%
Balance	2,151,559	91%
<b>Total</b>	<b>2,353,861</b>	<b>100%</b>

## 18.5 Flora and Vegetation

### 18.5.1 Soil Landscape Systems

Soil and landscape patterns are important for the persistence of vegetation and biodiversity and have been mapped in Western Australia by the Department of Primary Industries and Regional Development (DPIRD, 2021)(DPIRD, 2021)(DPIRD, 2021). There are 35 Soil landscape systems in the Local Impact Area, four of which are inside the Proposed Impact Area (Figure 18-2). Potential cumulative impacts to these Soil Landscape Systems are assessed in Table 18-2 for the Local and Regional Impact Areas. None of these four land systems were identified as threatened in the EPA’s report on the *cumulative environmental impacts of development in the Pilbara region* (EPA, 2014)(EPA, 2014)(EPA, 2014).

Based on this analysis, the Proposal is unlikely to contribute to a significant cumulative impact to any soil landscape system.

**Table 18-2: Cumulative Soil Landscape Systems**

Soil Landscape System	Approved Impact Area (ha)	Proposed Impact Area (ha)	Local Impact Area		Regional Impact Area	
			Total Mapped Area (ha)	Proposed Impact Area Contribution (%)	Total Mapped Area (ha)	Proposed Impact Area Contribution (%)
Ruth System	4,682	91	66,526	0.1%	145,829	0.1%
River System	10,164	271	155,648	0.2%	483,331	0.1%
Mallina System	12,687	3,667	176,792	2.1%	325,191	1.1%
Uaroo System	41,223	17,930	529,177	3.4%	930,893	1.9%

**Legend**

- State Road (MRWA 2022)
- Cumulative Impact Areas**
  - Approved Impact Areas
  - Proposed Impact Areas
  - Local Impact Area
  - Regional Impact Area
- Soil Landscape Systems (DPIRD 2019)**
  - Adrian System
  - Anna System
  - Ashburton System
  - Augustus System
  - Balfour System
  - Billygoat System
  - Black System
  - Bonney System
  - Bootaloo System
  - Boolgeeda System
  - Brockman System
  - Buckshot System
  - Cadgie System
  - Calcrete System
  - Callawa System
  - Cane System
  - Capricorn System
  - Charley System
  - Cheela System
  - Cheerawarra System
  - Christmas System
  - Collier System
  - Coolibah System
  - Coongimah System
  - Cowra System
  - Divide System
  - Dollar System
  - Dune System
  - Edward System
  - Egerton System
  - Elimunna System
  - Ethel System
  - Fan System
  - Fortescue System
  - Giralia System
  - Globe System
  - Granitic System
  - Gregory System
  - Hooley System
  - Horseflat System
  - Houndsstooth System
  - Jamindie System
  - Jigalong System
  - Jurrawarrina System
  - Kanjenjie System
  - Kooline System
  - Kumina System
  - Kunderong System
  - Laterite System
  - Little Sandy System
  - Littoral System
  - Lochinvar System
  - Macroy System
  - Mallina System**
  - Marandoo System
  - Marillana System
  - Marsh System
  - McKay System
  - Mosquito System
  - Nanutarra System
  - Narbung System
  - Newman System
  - Nirran System
  - Nita System
  - Nooingnin System
  - Oakover System
  - Onslow System
  - Paraburdoo System
  - Paradise System
  - Paterson System
  - Peedamulla System
  - Pindering System
  - Platform System
  - Prairie System
  - Pullgarah System
  - Pyramid System
  - River System**
  - Robe System
  - Robertson System
  - Rocklea System
  - Rous System
  - Ruth System**
  - Satirist System
  - Sherlock System
  - Spearhole System
  - Stuart System
  - Sylvania System
  - Table System
  - Talawana System
  - Talga System
  - Tanpool System
  - Taylor System
  - Turee System
  - Uaroo System**
  - Urandy System
  - Wannamunna System
  - Warri System
  - Washplain System
  - White Springs System
  - Wona System
  - Yamerina System
  - Yankagee System
  - Zebra System



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**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL

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Scale: 1:3,300,000

0 25 50 100 km

PROJECT		CLIENT
November 2024	Hemi Gold Project - Referral Supporting Document	
Figure 18-2		
ADV-AU-00673	Cumulative Impact Assessment - Soil Landscape Systems	

*18.5.2 Vegetation*

Native vegetation will be cleared for the Proposal and De Grey has considered the cumulative impact to Pre-European Vegetation associations (Beard et al., 2013)(Beard et al., 2013)(Beard et al., 2013), while recognising that this dataset is mapped at a broader scale than the Proposal’s vegetation mapping.

There are 21 pre-European vegetation associations in the Local Impact Area, four of which are inside the Proposed Impact Area (Figure 18-3). Cumulative disturbance to these vegetation associations is assessed in Table 18-3.

In the Local Impact Area, total potential disturbance to the Abydos Plain Shrub-steppe vegetation unit will increase by 0.8 percentage points to 11.2% and total disturbance to other associations will remain below 10%. The Proposal’s potential contribution to the Regional Impact Area is 0.5 percentage points or less for all vegetation associations. Based on this analysis, the Proposal is unlikely to contribute to a significant cumulative impact for any vegetation unit.

**Table 18-3: Cumulative Pre-European Vegetation Disturbance**

Pre-European Vegetation Unit	Approved Impact Area (ha)	Proposed Impact Area (ha)	Local Impact Area			Regional Impact Area	
			Total Mapped Area (ha)	Proposed Impact Area Contribution	Total Cumulative Impact	Regional (Total) Mapped area (ha)	Proposed Impact Area Contribution
Abydos Plain - Chichester - Shrub-steppe	112,718	19,873	1,344,646	1.5%	9.9%	3,737,454	0.5%
Abydos Plain - Chichester - Woodland other	4,719	168	52,980	0.3%	9.2%	90,891	0.2%
Abydos Plain - Short bunch-grass savanna / Grass-steppe	8,081	624	215,933	0.3%	4.0%	448,963	0.1%
Abydos Plain - Shrub-steppe	17,600	1,293	168,358	0.8%	11.2%	568,979	0.2%

*18.5.3 Priority Ecological Communities*

The Gregory Land System PEC has been identified on the De Grey tenements, however it has been specifically excluded from the Development Envelope and no other conservation significant vegetation has been recorded during flora surveys. No cumulative impacts to PECs are predicted.

*18.5.4 Threatened Species and Threatened Ecological Communities*

No BC Act listed Threatened flora or TECs have been identified in the Development Envelope and no cumulative impacts are predicted.

## Legend

----- State Road (MRWA 2022)

### Impact Areas

Local Impact Area

Regional Impact Area

### Cumulative Impact Areas

Approved Impact Areas

Proposed Impact Areas

### Pre-European Vegetation (DPIRD 2019)

System Associations

### Structural Description

Dwarf scrub or open low shrub

Grass-steppe

Grasslands, short bunch-grass savanna

Low tree-steppe

Low woodland or open low woodland

Low woodland, open low woodland or sparse woodland

Pindan with low trees

Riverine sedgeland/grassland with trees

Samphire

Scrub or very open scrub / Grass-steppe

Scrub, open scrub or sparse scrub

Short bunch-grass savanna / Grass-steppe

Shrub-steppe

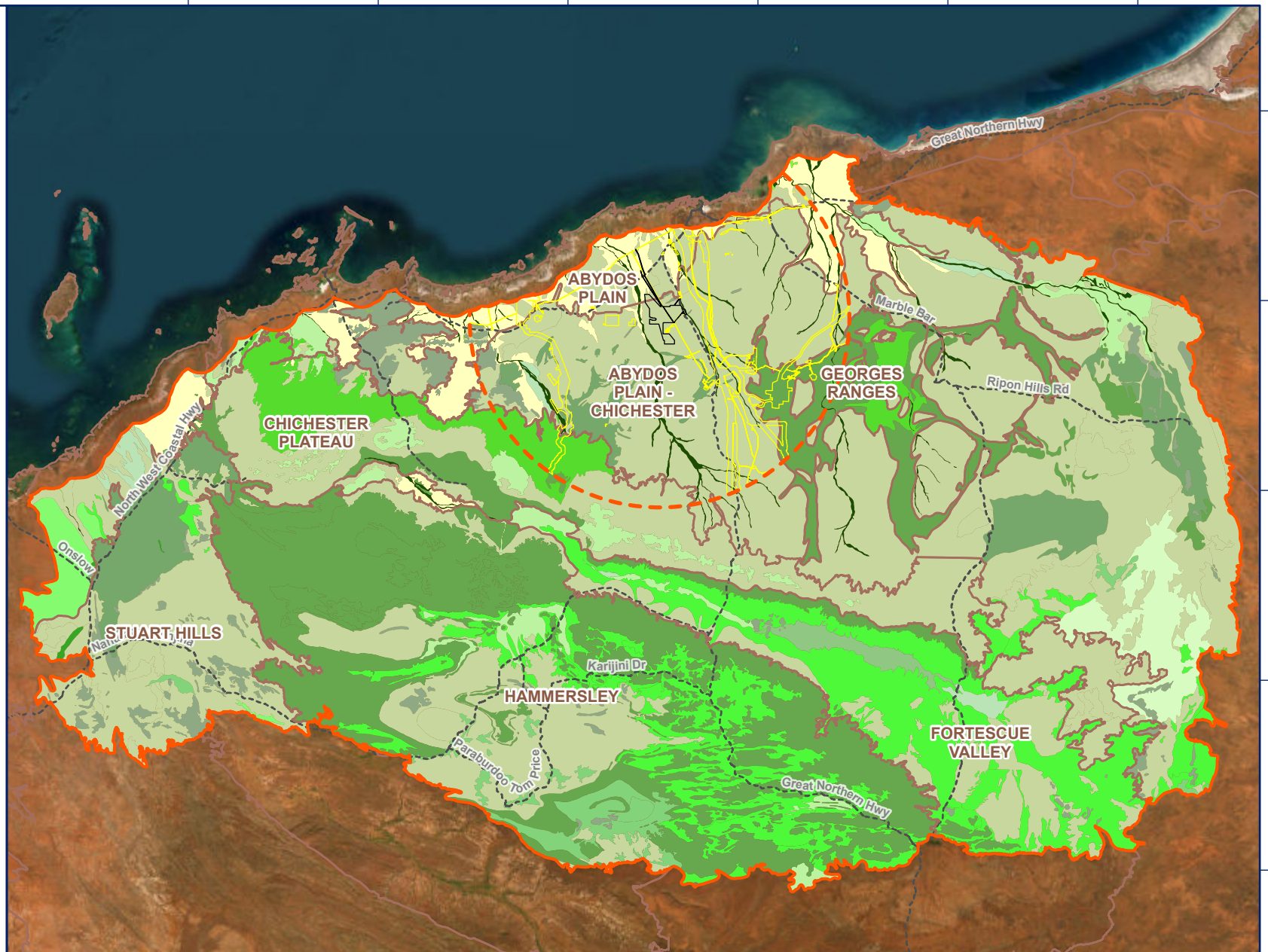
Sparse low tree-steppe / Sparse shrub-steppe

Sparse shrub-steppe

Tidal mud flat

Tree-and-shrub-steppe

Woodland other



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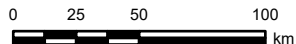
**Projection:** GDA2020 MGA Zone 50

**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL



Scale: 1:3,000,000



## PROJECT

November 2024

Figure 18-3

ADV-AU-00673

## CLIENT

**Hemi Gold Project - Referral Supporting Document**

**Cumulative Impact Assessment - Pre-European Vegetation**



**RPMGLOBAL**

## 18.6 Terrestrial Fauna

### 18.6.1 Cumulative Impacts to Conservation Significant Fauna

Seven Threatened fauna species have been predicted to potentially occur in the Project's Development Envelope (See Section 10.3.1). Three of these species have been excluded from the Cumulative Impact Assessment:

- Night Parrot – No individuals recorded. Critical habitat is old-growth, long-unburnt, dense spinifex clumps. Most habitats present in the Development Envelope lack the large spinifex clumps required for breeding habitat, at least in part due to regular fires by the pastoralist. Clumps are present in very small patches at a scale far finer than habitat mapping, in areas naturally protected from fire. Therefore, meaningful assessment based on mapped critical habitat type is not possible. Likewise, although Spinifex is common across the Pilbara, the existence of suitable Night Parrot habitat will depend on local conditions, the fire regime, and the amount of grazing disturbance. Therefore, it is not possible to quantify its location within the available data.
- Ghost Bat – cumulative impacts are not predicted as there is no critical habitat present at the Project, and no individuals were recorded in the Proposed Impact Area.
- Pilbara Leaf-nosed Bat – cumulative impacts are not predicted as there is no critical habitat present in the Proposed Impact Area.

For the four Threatened species assessed (Northern Quoll, Greater Bilby, Pilbara Olive Python and Grey Falcon), potential cumulative impacts were identified through a review of approved Environmental Review Documents, where available, to identify predicted impacts to one or more of these species. The considered projects in the Local Impact Area are shown on Figure 18-4 and listed in Table 18-4. The results of the review and whether these projects potentially impact any of the four species are shown in Table 18-4.

This is a highlevel screening assessment that does not consider the magnitude of the impact of each project, though it assumed that appropriate offsets will have been applied to any significant residual impacts to provide an overall acceptable outcome for each project. Assessing the effectiveness of the PEOF, or any other offset measures, in addressing potential cumulative impacts is beyond the scope of this document; nevertheless, their ongoing government support is taken to imply their suitability.

**Table 18-4: Identified Potential Impacts to Threatened Fauna Species**

Species	Conservation Status (EPBC & BC Acts)	Hemi Gold Project	Balla Balla Magnetite Project & Rail Conveyor Project	North Star Magnetite Project	Pardoo Direct Shipping Ore Project	Miralaga Creek DSO Project	Telfer Project (Goldmine Extension)	Sulphur Springs Zinc-Copper Project
Northern Quoll	En	x	x	x	x	x	--	x
Greater Bilby	Vu	x	--	--	x	--	x	--
Pilbara Olive Python	Vu	x	--	x	x	x	--	x
Grey Falcon	Vu	x	x	--	x	--	x	x
<b>Project Status</b>		<b>Referred</b>	<b>Approved</b>	<b>Approved</b>	<b>Approved</b>	<b>Approved</b>	<b>Approved</b>	<b>Approved</b>
<b>Location</b>		<b>The Project</b>	<b>55 km west</b>	<b>10 km east</b>	<b>33 km northeast</b>	<b>70 km east</b>	<b>30 km northeast</b>	<b>68 km southeast</b>

X = Potential impacts identified in Environmental Review Documents



**Legend**

- State Road (MRWA 2022)
- ▣ Hemi Gold Project Development Envelope
- - - Local Impact Area
- - - Regional Impact Area

**EPA Referral Project Proposals**

- Balla Balla Magnetite and Infrastructure Rail and Conveyor Projects
- Miralga Creek Direct Shipping Ore DSO Project
- North Star Hematite and Magnetite Projects
- Pardoo Iron Ore Mine and Direct Shipping from Port Hedland
- Sulphur Springs Zinc-Copper Project
- Telfer Project

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**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL

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Scale: 1:1,500,000

PROJECT		CLIENT
November 2024	Hemi Gold Project - Referral Supporting Document	
Figure 18-4		
ADV-AU-00673	Projects Reviewed for Potential Impacts to Threatened Fauna	

## 18.6.2 Cumulative Impacts on Critical Fauna Habitat

Regional habitat mapping for each species is not available at the same scale as the habitat assessment undertaken in the Proposal's fauna studies. Due to this constraint, descriptions in regional datasets were approximately matched to critical habitat identified from descriptions in relevant conservation documents and the Proposal's fauna report (see Table 18-5). The datasets used and regional mapping units identified are shown in Table 18-6.

**Table 18-5: Conservation Advice for Threatened Fauna Species**

Species	Documents
Northern Quoll	<ul style="list-style-type: none"> <li>National Recovery Plan for the Northern Quoll (Hill B &amp; Ward S, 2010)(Hill B &amp; Ward S, 2010)(Hill B &amp; Ward S, 2010).</li> <li>EPBC Act referral guideline for the Endangered Northern Quoll <i>Dasyurus hallucatus</i> (DoE, 2016)(DoE, 2016)(DoE, 2016).</li> </ul>
Greater Bilby	<ul style="list-style-type: none"> <li>National Recovery Plan for the Greater Bilby <i>Macrotis lagotis</i> Pavey (Pavey, 2006).</li> <li>Recovery Plan for the Greater Bilby (<i>Macrotis lagotis</i>) (DCCEEW, 2023)</li> </ul>
Pilbara Olive Python	<ul style="list-style-type: none"> <li>Survey guidelines for Australia's Threatened Reptiles (DSEWPC, 2011).</li> <li>Unravelling the mysteries of Pilbara Olive Python ecology (Tutt et al., 2004).</li> <li>Giant Pythons of the Pilbara (Pearson, 2003).</li> <li>Approved Conservation Advice for <i>Liasis olivaceus barroni</i> (Olive Python – Pilbara subspecies) (DEWHA, 2008).</li> </ul>
Grey Falcon*	<ul style="list-style-type: none"> <li>Hemi Gold Project: Detailed Vertebrate Fauna Survey 2021 – 2024 (Western Wildlife, 2024)</li> </ul>
* Critical habitat is not defined in the conservation advice (Threatened Species Scientific Committee (TSSC), 2020) or SPRAT profile (Department of Climate Change Energy the Environment and Water (DCCEEW), 2022).	

Critical habitat identified for each species in the Proposed Impact Area, Local Impact Area and Pilbara IBRA Region is shown in Table 18-7 and presented in Figure 18-5 to Figure 18-8. The Proposal's contribution to habitat loss is one percentage point or less for each species in the Local Impact Area and less than 0.2 percentage points in the Pilbara IBRA Region. Significant cumulative impacts are not predicted.

# REFERRAL SUPPORTING DOCUMENT

## HEMI GOLD PROJECT



**Table 18-6: Critical Habitat Identification**

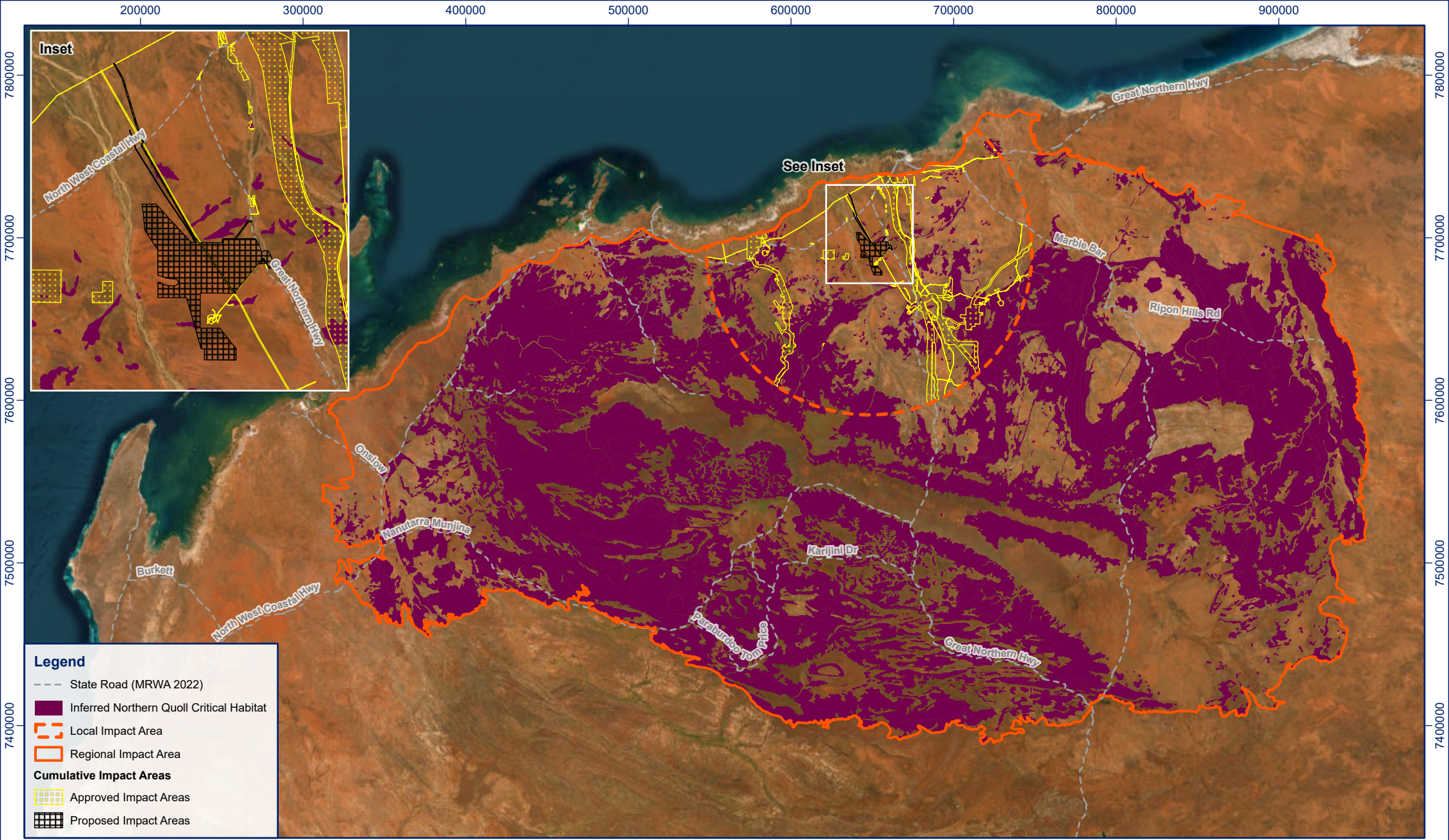
Species	Datasets and Method	Critical Habitats	Figure
Northern Quoll	<p>Mapping units corresponding to habitat definitions in:</p> <ul style="list-style-type: none"> <li>Soil Landscape Mapping – Rangelands (DPIRD, 2022).</li> </ul> <p>Assessment limited to Pilbara IBRA Region.</p>	<ul style="list-style-type: none"> <li>Hills and ranges; Acacia shrublands.</li> <li>Hills and ranges; Spinifex grasslands.</li> <li>Lake, river channel, bare lake bed or claypan; No vegetation (lake or river).</li> <li>Mesas, breakaways and stony plains; Acacia or eucalypt woodlands and halophytic shrublands.</li> <li>Mesas, breakaways and stony plains; Spinifex grasslands.</li> </ul>	Figure 18-5
Greater Bilby	<p>Assessment limited to Pilbara IBRA Region.</p>	<ul style="list-style-type: none"> <li>Alluvial and sandy plains; Soft spinifex grasslands.</li> <li>Alluvial plains; Grassy woodlands and tussock grasslands.</li> <li>Calcrete plains and platforms; Spinifex grasslands.</li> <li>Hills and ranges; Spinifex grasslands.</li> <li>Lake, river channel, bare lake bed or claypan; No vegetation (lake or river).</li> <li>Sandplains and dunes; Acacia shrublands and spinifex.</li> <li>Sandplains and occasional dunes; Spinifex grasslands.</li> <li>Stony plains; Spinifex grasslands.</li> <li>Wash plains and sandy banks on hardpan; Mulga shrublands and wanderrie grasses or spinifex.</li> </ul>	Figure 18-6
Pilbara Olive Python		<ul style="list-style-type: none"> <li>Lake, river channel, bare lake bed or claypan; No vegetation (lake or river).</li> <li>Mesas, breakaways and stony plains; Acacia or eucalypt woodlands and halophytic shrublands.</li> <li>Mesas, breakaways and stony plains; Spinifex grasslands.</li> <li>Watercourse Areas - 250K Australian Topographic Features.</li> </ul>	Figure 18-7
Grey Falcon	<p>Intersection of:</p> <ul style="list-style-type: none"> <li>Pre-European Vegetation (Beard et al., 2013).</li> <li>Watercourse Areas (Geoscience Australia, 2006).</li> </ul> <p>Followed by manual subselection of structural vegetation units with tall trees.</p> <p>Assessment limited to Pilbara IBRA Region.</p>	<ul style="list-style-type: none"> <li>Woodland Other.</li> <li>Watercourse Areas - 250K Australian Topographic Features.</li> </ul>	Figure 18-8

# REFERRAL SUPPORTING DOCUMENT HEMI GOLD PROJECT



**Table 18-7: Cumulative Impact to Conservation Significant Fauna Habitat**

Species	Approved Impact Area (ha)	PIA (ha)	Local Impact Area			Regional Impact Area (Pilbara IBRA Region)		
			Total Area (ha)	Existing Impact (%)	PIA (%)	Total Cumulative Impact (%)	Total Area (ha)	PIA (%)
<b>Northern Quoll</b>	50,883	91	698,682	7.3%	0.02%	7.3%	8,362,412	0.001%
<b>Bilby</b>	173,407	21,957	2,263,343	7.7%	1.0%	8.7%	14,054,517	0.16%
<b>Pilbara Olive Python</b>	4,800	164	46,971	10.2%	0.4%	10.6%	870,324	0.02%
<b>Grey Falcon</b>	5,477	168	74,090	7.4%	0.3%	7.7%	144,978	0.12%



**Legend**

- State Road (MRWA 2022)
- Inferred Northern Quoll Critical Habitat
- - - Local Impact Area
- ▭ Regional Impact Area

**Cumulative Impact Areas**

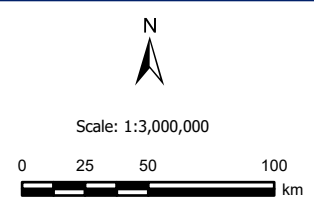
- ▨ Approved Impact Areas
- ▩ Proposed Impact Areas

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**Projection:** GDA2020 MGA Zone 50

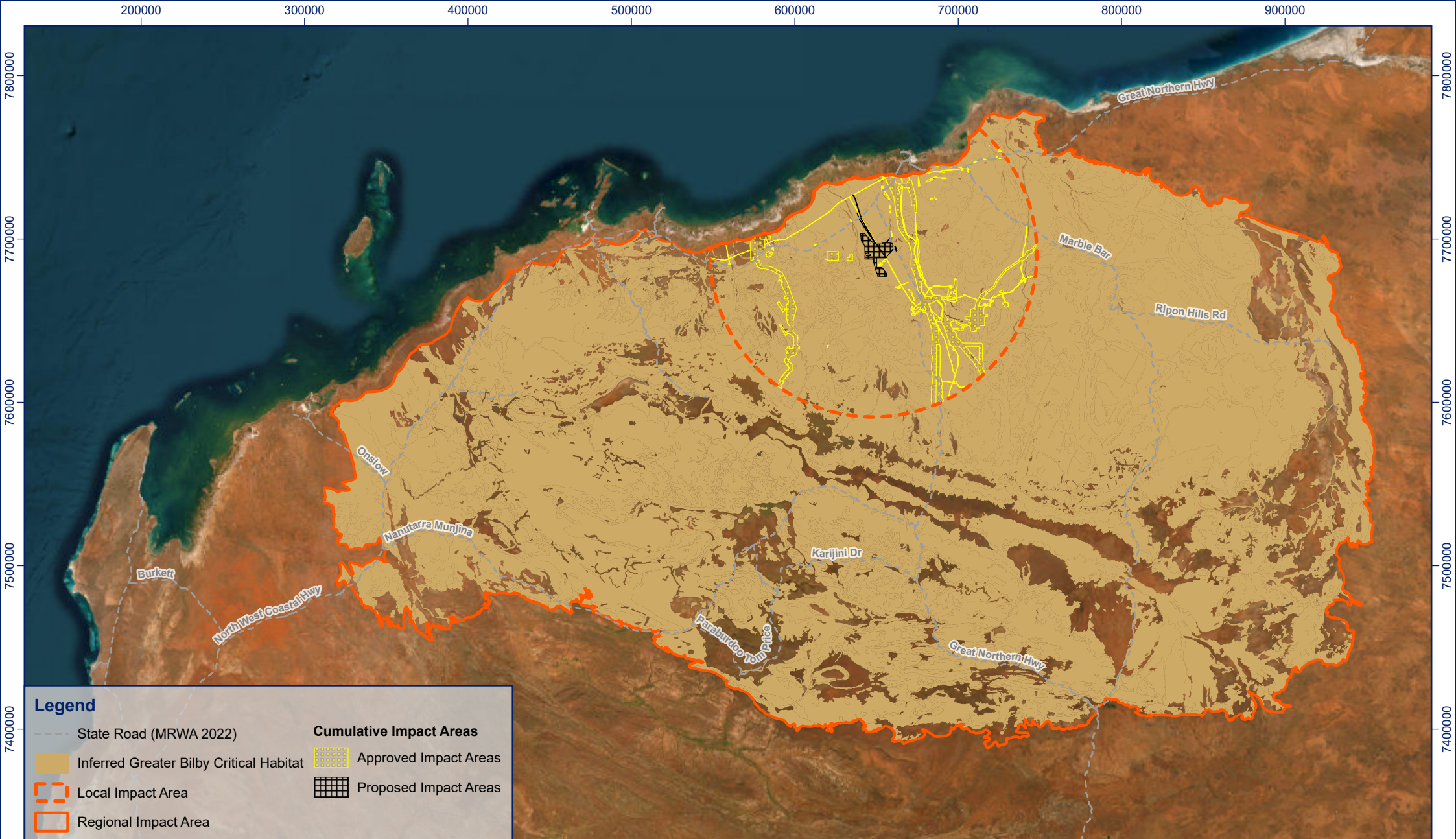
**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL



PROJECT		CLIENT
November 2024	Hemi Gold Project - Referral Supporting Document	
Figure 18-5		
ADV-AU-00673	Cumulative Impact Assessment Inferred Northern Quoll Critical Habitat	





**Legend**

- State Road (MRWA 2022)
- Inferred Greater Bilby Critical Habitat
- Local Impact Area
- Regional Impact Area
- Cumulative Impact Areas
  - Approved Impact Areas
  - Proposed Impact Areas

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<p><b>Projection:</b> GDA2020 MGA Zone 50</p> <p><b>Aerial:</b> Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community</p> <p><b>Updated/Reviewed by:</b> KM/EL</p> <p><b>RPMGLOBAL</b></p>	<p>N</p> <p>Scale: 1:3,000,000</p> <p>0 25 50 100 km</p>	<b>PROJECT</b>		<b>CLIENT</b>	
		November 2024	<p><b>Hemi Gold Project - Referral Supporting Document</b></p> <p><b>Cumulative Impact Assessment Inferred Greater Bilby Critical Habitat</b></p>		
		Figure 18-6			
		ADV-AU-00673			



**Legend**


- State Road (MRWA 2022)
- Inferred Pilbara Olive Python Critical Habitat
- Local Impact Area
- Regional Impact Area
- Cumulative Impact Areas**
- Approved Impact Areas
- Proposed Impact Areas

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**Projection:** GDA2020 MGA Zone 50

**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

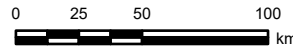
**Updated/Reviewed by:** KM/EL




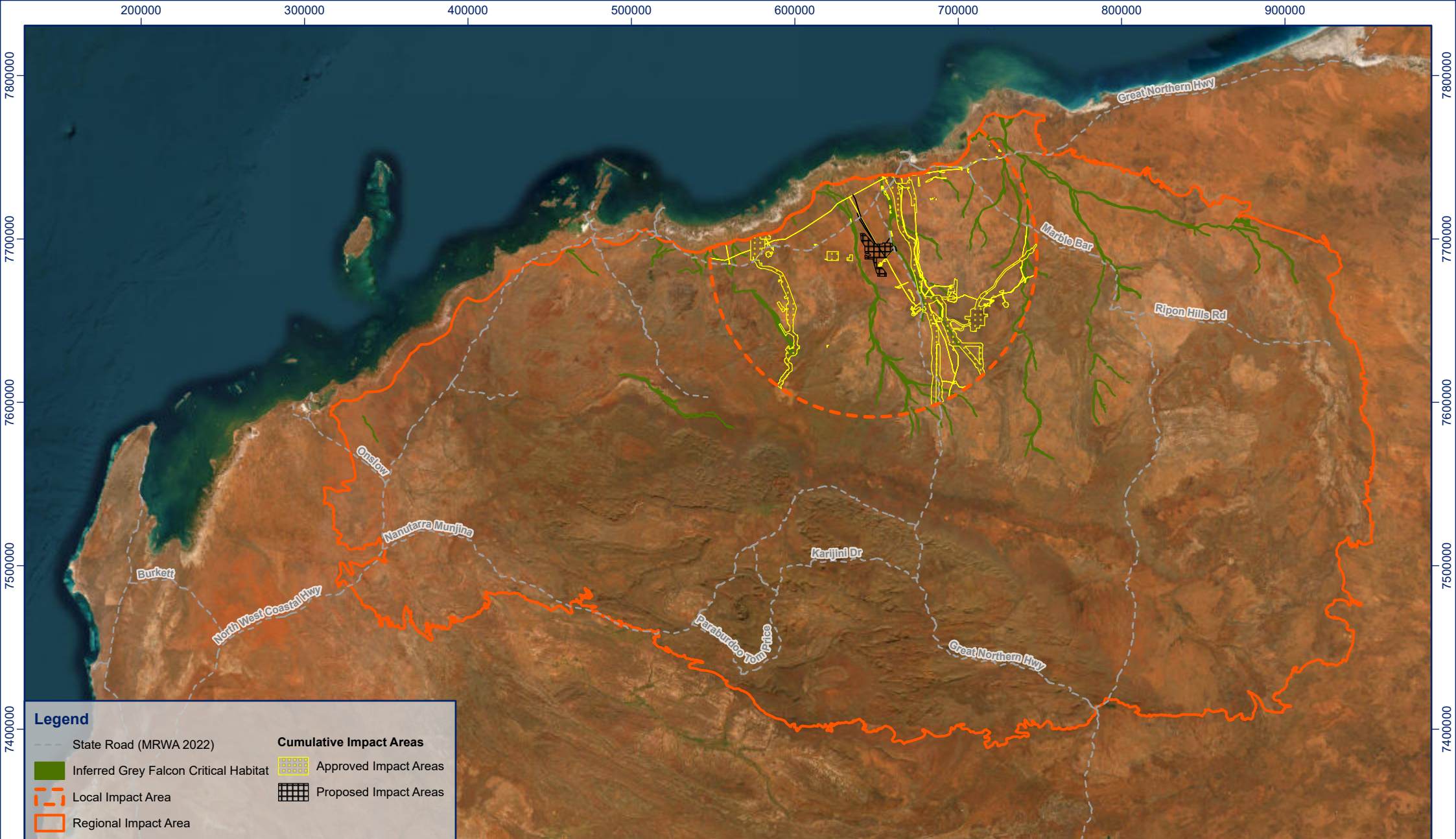
N



Scale: 1:3,000,000



<b>PROJECT</b>		<b>CLIENT</b>
November 2024	<b>Hemi Gold Project - Part IV EP Act Referral</b>	
Figure 18-7		
ADV-AU-00673	<b>Cumulative Impact Assessment Inferred Pilbara Olive Python Critical Habitat</b>	



**Legend**

- State Road (MRWA 2022)
- Inferred Grey Falcon Critical Habitat
- Local Impact Area
- Regional Impact Area
- Approved Impact Areas
- Proposed Impact Areas

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**Projection:** GDA2020 MGA Zone 50

**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**Updated/Reviewed by:** KM/EL

N

Scale: 1:3,000,000

<b>PROJECT</b>		<b>CLIENT</b>
November 2024	<b>Hemi Gold Project - Referral Supporting Document</b>	
Figure 18-8		
ADV-AU-00673	<b>Cumulative Impact Assessment Inferred Grey Falcon Critical Habitat</b>	

## 18.7 Social Surroundings – Aboriginal Heritage

The Proposal may contribute cumulative impacts to Social Surroundings at a regional scale by:

- Potential disturbance or other impacts to the heritage value of sites of cultural significance or to Aboriginal heritage places.
- Loss of access to sites of cultural significance, to Aboriginal heritage places and hunting grounds.

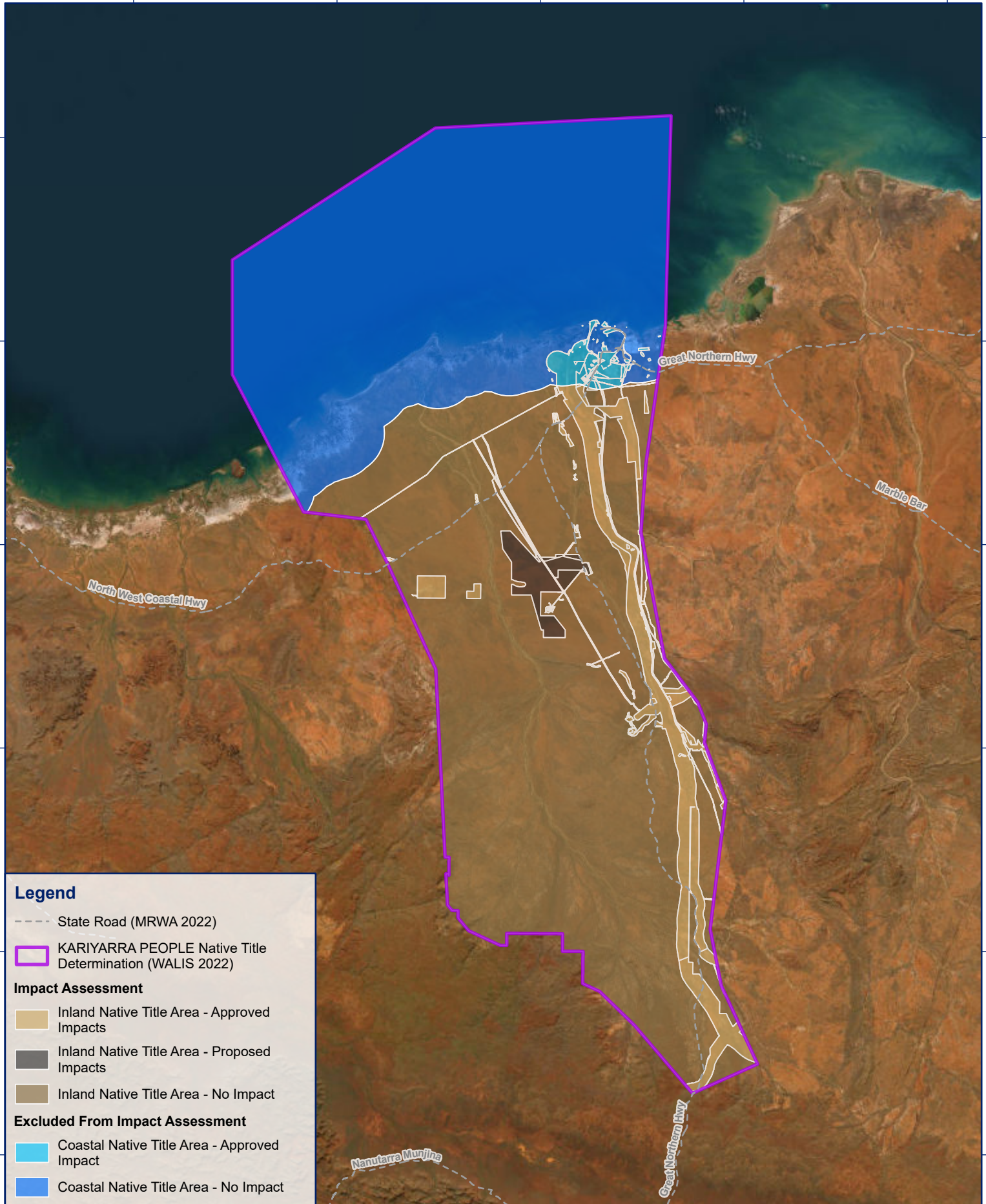
Details of heritage sites and consultation with Traditional Owners are described in Section 12.3 and the management of heritage sites in Section 12.5.3.

Impacts in the inland Kariyarra Native Title Determination Area are presented in Table 18-8 and Figure 18-9 with coastal and marine areas excluded. The Approved Impact Area is 10% of the inland Kariyarra Native Title Determination Area and the Proposed Impact Area will contribute an additional 2.3%.

De Grey has executed a Native Title Mining Agreement that includes commitments to manage disturbance and access matters. With engagement and management measures in place significant cumulative impacts are not predicted.

**Table 18-8: Cumulative Impacts to Inland Kariyarra Native Title Determination Area**

<b>Impact Type</b>	<b>Approved Impact Areas (ha)</b>	<b>Percentage of Native Title Determination Area</b>
Approved Impact Area	97,518	10.0%
Proposed Impact Area	21,957	2.3%
Balance	855,328	87.7%
Total	974,803	100.0%



**Legend**

- State Road (MRWA 2022)
- KARIYARRA PEOPLE Native Title Determination (WALIS 2022)

**Impact Assessment**

- Inland Native Title Area - Approved Impacts
- Inland Native Title Area - Proposed Impacts
- Inland Native Title Area - No Impact

**Excluded From Impact Assessment**

- Coastal Native Title Area - Approved Impact
- Coastal Native Title Area - No Impact


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Scale: 1:1,200,000

0 20 40 km

**Projection:** GDA2020 MGA Zone 50  
**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
 Updated/Reviewed by: KM/EL

**RPMGLOBAL**

PROJECT		CLIENT
<b>Hemi Gold Project - Referral Supporting Document</b>		
<b>Cumulative Impact Assessment Kariyarra Native Title Determination Area</b>		
Figure 18-9	ADV-AU-00673	

## 18.8 Water

### 18.8.1 Surface Water Catchments

Cumulative impact assessment of catchments was based on DWER's (2022) broad-scale catchment mapping to enable a broader impact assessment, rather than using Project-defined catchments. Cumulative impacts have been considered in terms of disturbance to existing vegetation and topography, which could potentially influence recharge and flood patterns.

DWER's surface water catchments are shown in Figure 18-10. The Proposed Impact Area is located within two separate catchments and potential cumulative impacts are assessed in Table 18-9. Most of the Proposed Impact Area is in the Turner River catchment and the Proposal may contribute an additional 4.3 percentage points to existing disturbance. The potential contribution to the Yule River catchment is negligible. No significant cumulative impacts to either catchment are predicted.

**Table 18-9: Cumulative Impacts to Surface Water Catchments**

Catchment	Approved Impact Area (ha)	Proposed Impact Area (ha)	Total Catchment Area (ha)	% Existing Impact	% Increase in Impact	Cumulative Impact (%)
Turner River	83,740	20,564	480,187	17.4%	4.3%	21.7%
Yule River	60,568	1,239	885,969	12.6%	0.3%	12.9%

### 18.8.2 Groundwater

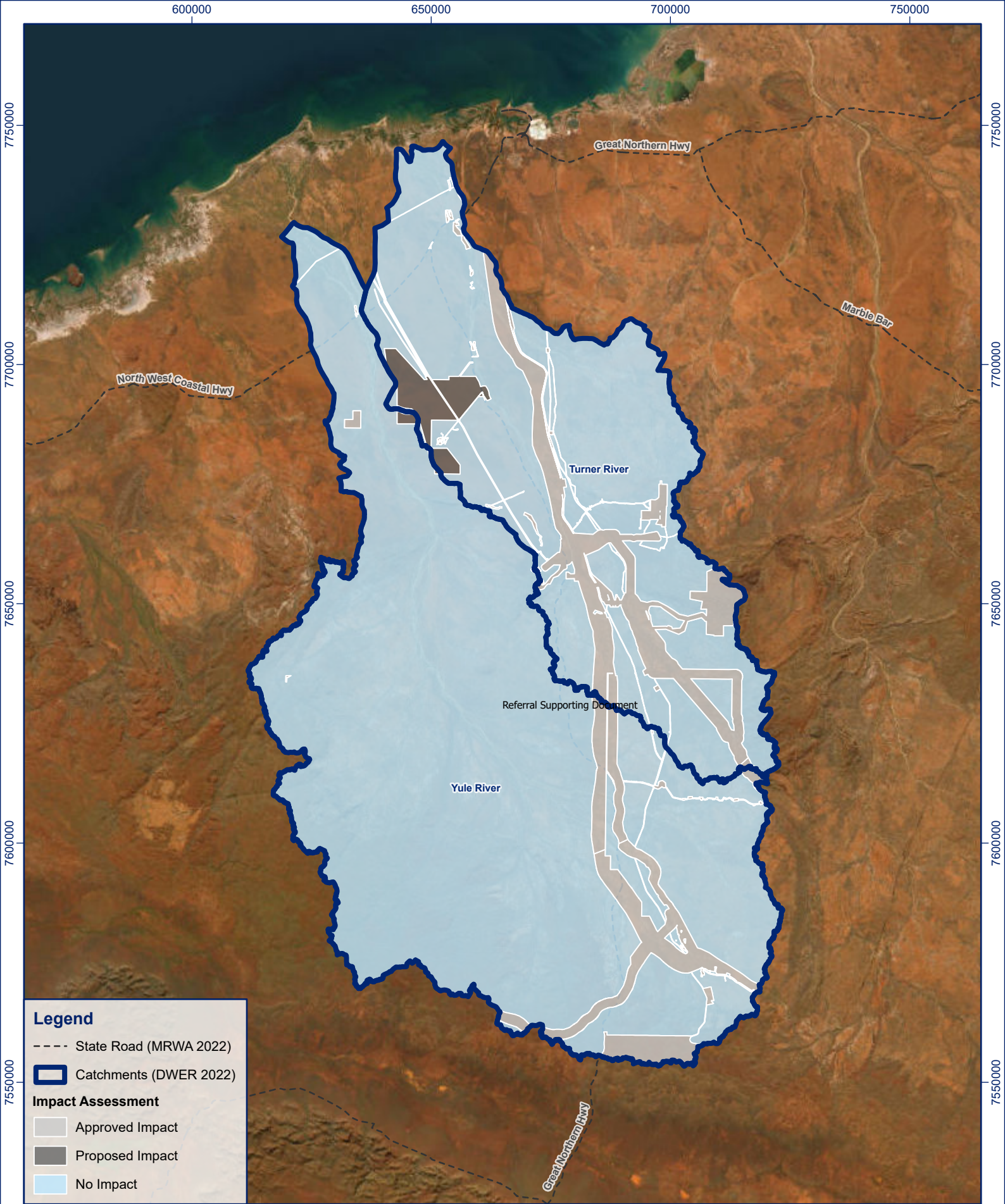
Groundwater drawdown data is not publicly available at a regional scale. Within this constraint, De Grey assessed the potential cumulative impacts associated with abstraction and reinjection by:

- Assessing whether drawdown or mounding would impact any target aquifers in the Pilbara Groundwater Allocation Plan (DoW, 2013), from which significant abstraction can occur.
- Comparing the modelled drawdown and mounding zones to the area of the Pilbara Fractured Rock Groundwater Resource. This illustrates the potential contribution to cumulative drawdown and mounding.

Cumulative impact assessment results are shown in Figure 18-11:

- Groundwater modelling indicates there will be no significant impact by drawdown of mounding on target aquifers (see Section 8.3 for further detail).
- The proposed drawdown and mounding zones represent 1.2% of the Pilbara Fractured Rock Groundwater Resource.

On this basis, no significant cumulative impacts are predicted.



**Legend**

- State Road (MRWA 2022)
- Catchments (DWER 2022)

**Impact Assessment**


- Approved Impact
- Proposed Impact
- No Impact

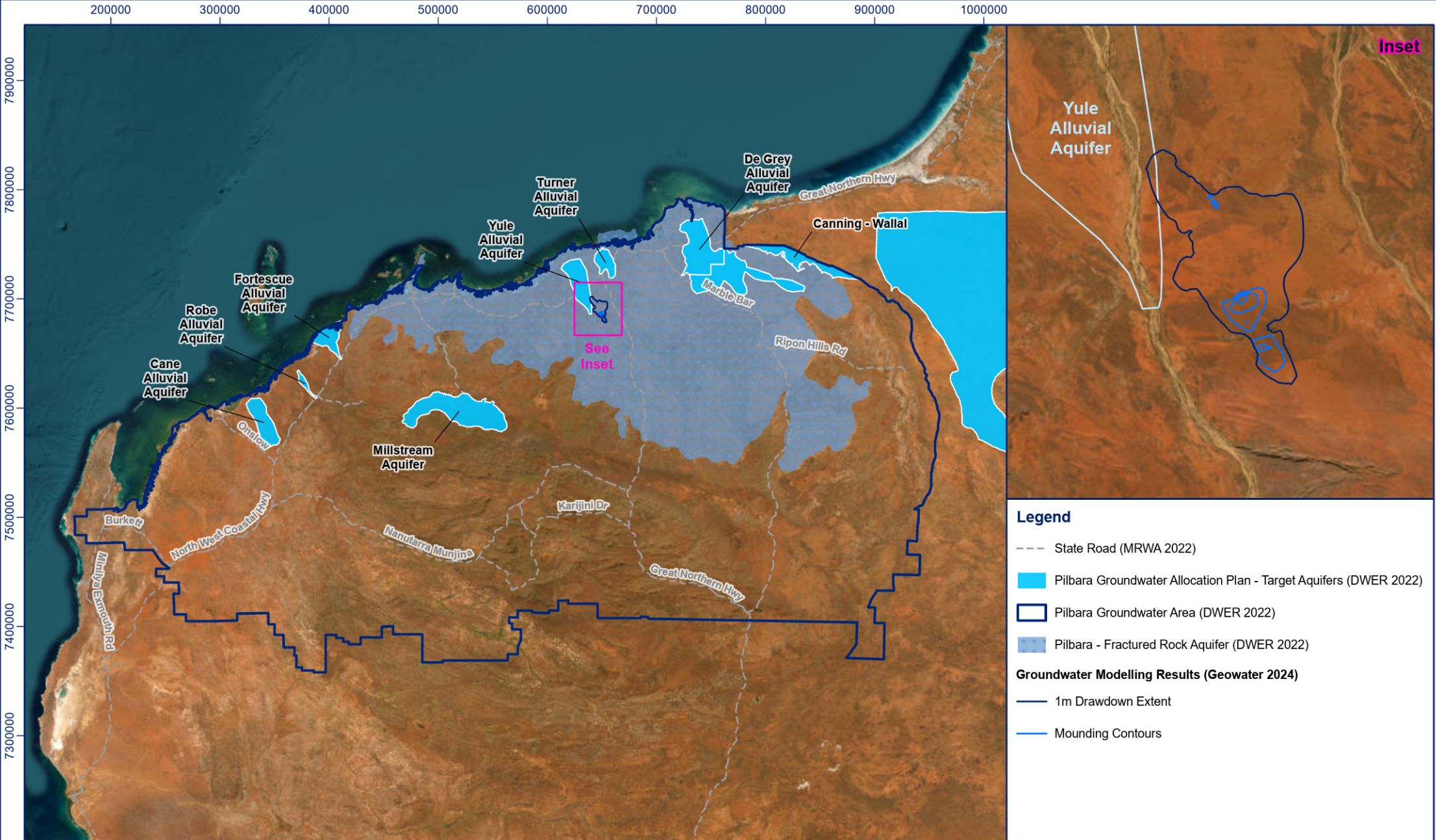
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Scale: 1:1,000,000

0 10 20 km

**Projection:** GDA2020 MGA Zone 50  
**Aerial:** Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community  
**Updated/Reviewed by:** KM/EL

PROJECT		CLIENT
<b>Hemi Gold Project - Referral Supporting Document</b>		
<b>Cumulative Impact Assessment - Surface Water Catchments</b>		
Figure 18-10	ADV-AU-00673	



**Legend**

- State Road (MRWA 2022)
- Pilbara Groundwater Allocation Plan - Target Aquifers (DWER 2022)
- Pilbara Groundwater Area (DWER 2022)
- Pilbara - Fractured Rock Aquifer (DWER 2022)

**Groundwater Modelling Results (Geowater 2024)**

- 1m Drawdown Extent
- - - Mounding Contours

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<p><b>Projection:</b> GDA2020 MGA Zone 50</p> <p><b>Aerial:</b> Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community</p> <p><b>Updated/Reviewed by:</b> KM/EL</p> <p><b>RPMGLOBAL</b></p>	<p>N</p> <p>Scale: 1:4,500,000</p> <p>0 50 100 km</p>	<b>PROJECT</b>		<b>CLIENT</b>	
		November 2024	<p><b>Hemi Gold Project - Referral Supporting Document</b></p> <p><b>Cumulative Impact Assessment - Groundwater</b></p>		
		Figure 18-11			
		ADV-AU-00673			

## 18.9 Conclusion

Cumulative impact assessment requires consideration of existing and reasonably foreseeable impacts at a wide local and regional scale. De Grey has adopted a screening approach which overestimates the potential disturbance associated with the Proposal to determine whether the potential for a significant cumulative impact exists.

The cumulative impact assessment results do not indicate that there are any potential cumulative impacts that require additional investigation. De Grey considers that the Proposal is unlikely to significantly contribute to cumulative environmental impacts for the environmental factors assessed.

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## **20. APPENDICES**

(Attached separately)

- Appendix 1: Hemi Environmental Management Plan
- Appendix 2: Hemi Gold Project – Definitive Feasibility Study: Conceptual and Numerical Groundwater Modelling – Operational Phase (Geowater, 2023b)
- Appendix 3: Technical Review – Conceptual and Numerical Groundwater Modelling – Hemi Gold Project – De Grey Mining Ltd (Jurassic Groundwater, 2022)
- Appendix 4: Tailings Storage Facility (TSF) Design Report: Hemi Gold Project, WA (CMW, 2022)
- Appendix 5: Sub-surface Materials Characterisation (SRK, 2022)
- Appendix 6: De Grey Turner River and Site Closure Flood Modelling (SWS, 2022b)
- Appendix 7: Conceptual Mine Closure Plan
- Appendix 8: Stakeholder Consultation Register
- Appendix 9: Reinjection Trial Memo (De Grey Mining Ltd, 2025b)
- Appendix 10: Hemi Pit Lake Model (De Grey Mining Ltd, 2025a)
- Appendix 11: Conceptual Long-term Drawdown at 200 Years (De Grey Mining Ltd, 2025)
- Appendix 12: Tier 2 Ecological Risk Assessment (MBS, 2024b)
- Appendix 13: Hemi Dewater Discharge Tier 3 ERA (MBS, 2024a)
- Appendix 14: Baseline Aquatic Ecology Study of the Yule and Turner Rivers (Stantec, 2022)
- Appendix 15: Baseline Aquatic Ecology Survey of the Turner and Yule Rivers, Flood Study Memorandum (Stantec, 2023)
- Appendix 16: Hemi Gold Deposit Flora and Vegetation Studies (Umwelt, 2024a)
- Appendix 17: Status of *Seringia exastia* at Hemi (Umwelt, 2022a)
- Appendix 18: Gregory Land System PEC Buffer Memo (Umwelt, 2024)
- Appendix 19: Flora and Vegetation Assessment of the Turner River (Umwelt, 2024b)
- Appendix 20: Hemi Gold Project: Detailed Vertebrate Fauna Survey 2021 – 2022 (Western Wildlife, 2024)
- Appendix 21: Mallina Gold Project Short-range Endemic Fauna Report (Bennelongia, 2023b)
- Appendix 22: Hemi Gold Project Subterranean Fauna Survey Report (Bennelongia, 2023a)

# REFERRAL SUPPORTING DOCUMENT HEMI GOLD PROJECT



Appendix 23: Targeted Stygofauna Survey Memo (Bennelongia, 2024)

Appendix 24: Subterranean Fauna Habitat Assessment (De Grey, 2024)

Appendix 25: Environmental Noise Assessment: Hemi Gold Project (Herring Storer, 2022)

Appendix 26: Hemi Gold Project - Emissions estimates, peer benchmarking and scope 3 review Summary Report (Energetics, 2023)

Appendix 27: Hemi Gold Project Greenhouse Gas Management Plan (De Grey, 2023)

Appendix 28: GHG Management Plan Peer Review (Worley, 2024)

Appendix 29: Hemi Gold Project: Air Quality Assessment (ETA, 2022)

Appendix 30: Confidential Aboriginal Heritage Sites

Appendix 31: Impact Reconciliation Procedure