Karara Iron Ore Project – Mine Life Extension

Environmental Values Updated Impact Assessment

Final

February 2026

umwelt

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Environmental Values Updated Impact Assessment

Final

Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Karara Mining Limited

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Project Manager: Emma Molloy
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Date: February 2026

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt acknowledges the Traditional Owners of Country throughout Australia and their continuing values, culture and connection to the land, waters and sky.

We pay our respects to Elders past and present.

The below image is from the artwork *Yapung Maryiyang* (Pathway Forward) by Saretta Fielding.

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1.0 Context

1.1 Background

Karara Mining Limited (KML) operates the Karara Iron Ore Project (KIOP) and Mungada Iron Ore Project (MIOP), both located approximately 225 km east-southeast of Geraldton in the Midwest region of Western Australia (WA).

KIOP was approved under Ministerial Statement (MS) 805 in 2009 and consists of the Karara open-cut magnetite pit, a processing plant to produce magnetite concentrate, a waste rock dump (WRD), tailings storage facility (TSF), rail loading facilities, accommodation facilities, airport, access roads and linear infrastructure corridor.

MIOP was approved under MS 806 in 2009 and consists of the Blue Hills North and Terapod pits and WRDs and regional infrastructure. Mining was completed in 2014, and MIOP is currently in suspension from active mining. However, infrastructure such as pipelines, access roads, laydown areas, powerlines, rail siding and pits for water storage approved under MIOP are currently utilised by KIOP.

KML is proposing to further develop the KIOP with the Mine Life Extension (MLE) significant amendment (the Proposal) which includes an expansion to the MS 805 Development Envelope (DE), an extension to the WRD and TSF, and the incorporation of infrastructure at MIOP. This significant amendment will consolidate all aspects MS 805 and MS 806 necessary for operation with the proposed KIOP MLE.

The Environmental Review Document (ERD) for the KIOP MLE was submitted in September 2025. Comments were received from Environmental Protection Authority (EPA) Services, Department of Climate Change, Energy, the Environment and Water (DCCEEW) and Department of Biodiversity, Conservation and Attractions (DBCA), with final comments received in December 2025.

1.2 Purpose

Comments received from state and federal regulators on the KIOP ERD that was submitted in September 2025 recommended that further mitigations should be investigated to avoid and minimise impacts to ecological values including Matters of National Environmental Significance (MNES), Threatened and Priority Flora, Threatened and Priority Ecological Communities and Banded Iron Formation landforms. Further mitigations have been applied to avoid and minimise impacts to significant environmental values.

The purpose of this report is to demonstrate how regulator comments have been addressed, support assessment of the changes to the proposal (application under s43A for amendment to the proposal) and inform the updated ERD for the mitigated proposal. To achieve this purpose, the report:

- describes the constraints on the project layout (**Section 1.4**)
- describes the process for mitigation of impacts and highlights the impacts that will be avoided and reduced (**Section 2.0**)

- summarises the methods for the updated impact assessment, which included sourcing additional data (**Section 3.0**)
- presents the updated assessment of impacts for ecological values (**Section 4.0**).

This report provides an updated impact assessment to reflect the changes to the Proposal and will supersede the quantification of impacts of the following reports:

- Flora and Vegetation Impact Assessment (Umwelt, 2025b)
- Terrestrial Fauna Impact Assessment (Umwelt, 2025d)
- Landforms Assessment Technical Report (Umwelt, 2025c).

This report doesn't duplicate or supersede background information in those reports, as much of the supporting information is unchanged. The updated impact assessment results are presented and further discussed in the ERD.

1.3 Assessment Areas

This report uses a combination of areas defined in the previous assessments, as well as several areas which have since been updated to reflect mitigation strategies (**Figure 1.1**). Furthermore, all area calculations for this report have been updated using geodesic methodology (rather than planar) to produce accurate and constant data, which means some of the original areas are not the same calculated area as the previous Proposal Content Document. To clarify the naming convention and areas, **Table 1.1** summarises the area names and total areas relevant to the updated analysis.

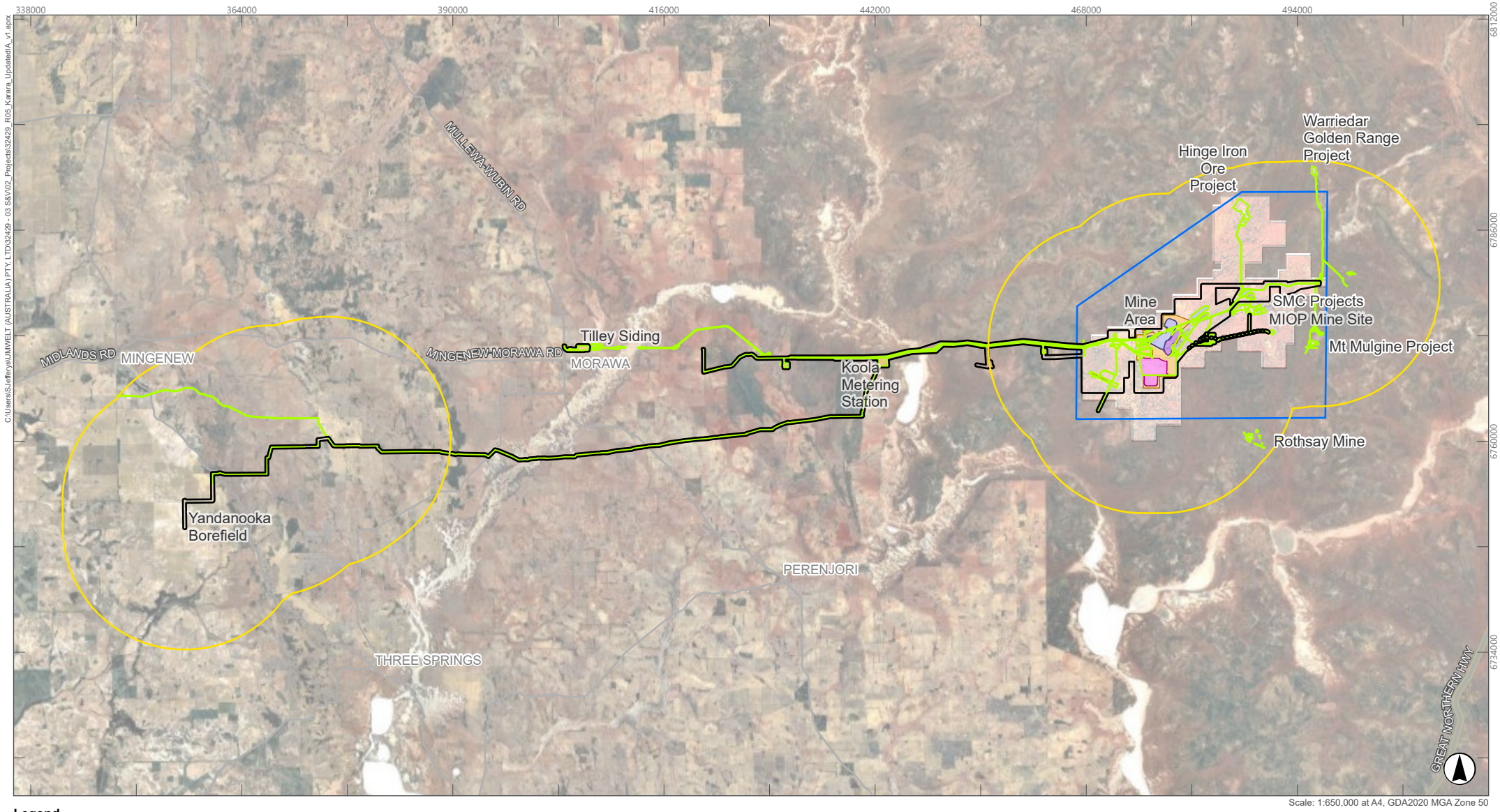
Table 1.1 Assessment Areas

Name	Description	Figure
Mitigated Assessment Areas		
'KIOP MLE mitigated disturbance footprint' or 'KIOP MLE Mitigated Proposal' **New Total Area: 1,186.3 ha (336.9 ha less)**	Supersedes the 'KIOP MLE new disturbance footprint' or 'KIOP MLE Proposal' and includes the mitigation strategies described in **Section 2.0**. **Original Total Area: 1,523.2 ha**	**Figure 1.2**
'Combined Proposal mitigated disturbance footprint' or 'Combined Proposal mitigated DF' **New Total Area: 4, 701.5 ha (342.7 ha less)**	Supersedes the 'Combined Proposal disturbance footprint' or 'Combined Proposal DF' and includes the mitigation strategies described in **Section 2.0**. **Original Total Area: 5,044.2 ha**	**Figure 1.3**
'Combined Proposal mitigated development envelope' or 'Combined Proposal mitigated DE' **New Total Area: 13,491.1 ha (76.3 ha less)**	Supersedes the 'Combined Proposal development envelope' or 'Combined Proposal DE' and includes the mitigation strategies described in **Section 2.0**. **Original Total Area: 13,567.4 ha**	**Figure 1.4**
'mitigated indirect impact zone' **New Total Area: 127.4 ha (110.2 ha less)**	Supersedes the 'indirect impact zone' and includes the mitigation strategies described in **Section 2.0**. **Original Total Area: 237.6 ha**	**Figure 1.5**

Name	Description	Figure
Previously Defined Assessment Areas		
Survey Area	The area used in the 2023 and 2024 Detailed and Targeted Flora and Vegetation Assessment (Umwelt, 2025a) and Fauna assessment of proposed disturbance areas, 2020 and 2024 (Bamford Consulting Ecologists [BCE], 2025), which is equivalent to Combined Proposal DE.	**Figure 1.1**
Mine Area	Comprised of infrastructure corridors, Karara pit, TSF, and WRDs. The Mine Area is entirely contained within the Karara Area of the Combined Proposal mitigated DE.	
Cumulative Assessment Area 1 (CAA 1)	Defined for the Terrestrial Fauna Impact Assessment (Umwelt, 2025d) cumulative impact assessment of the Mine Area and represents a 15 km buffer on the Mine Area (Section 1.2 [BCE, 2025]). CAA 1 was the area defined for regional assessment of terrestrial fauna for the Mine Area. In this report, the portion of CAA 1 used for regional assessment is smaller and does not take into account the buffer previously applied around Syncline Turner haul road.	
Currently Cleared or Approved to be Cleared (CCAC)	Areas of current or approved ground disturbance* to the extent of the CAA 1 boundary^.	
Regional Assessment Area 1 (RAA 1)	Defined for the Flora and Vegetation cumulative impact assessment of the Mine Area (Umwelt, 2025b). RAA 1 is based on the 'Blue Hills Impact Assessment Area' from the Mungada East Expansion Project (Maia, 2017; Sinosteel, 2016). RAA 1 was the area defined for regional assessment of flora and vegetation for the Mine Area.	

*Areas that are approved to be disturbed may not be cleared to their full extent; therefore, this area accounts for the maximum potential impact.

^CAA 1 was used as it represents the largest regional boundary (of the three previous impact assessments) for the Mine Area and therefore accounts for cumulative impact over the largest known area.



Scale: 1:650,000 at A4, GDA2020 MGA Zone 50

Legend

- Survey Area
- Cumulative Assessment Area 1 (CAA1)
- Currently Cleared or Approved Cleared (CCAC)
- Regional Assessment Area 1 (RAA1)
- Highway
- Main Road

Mine Activity

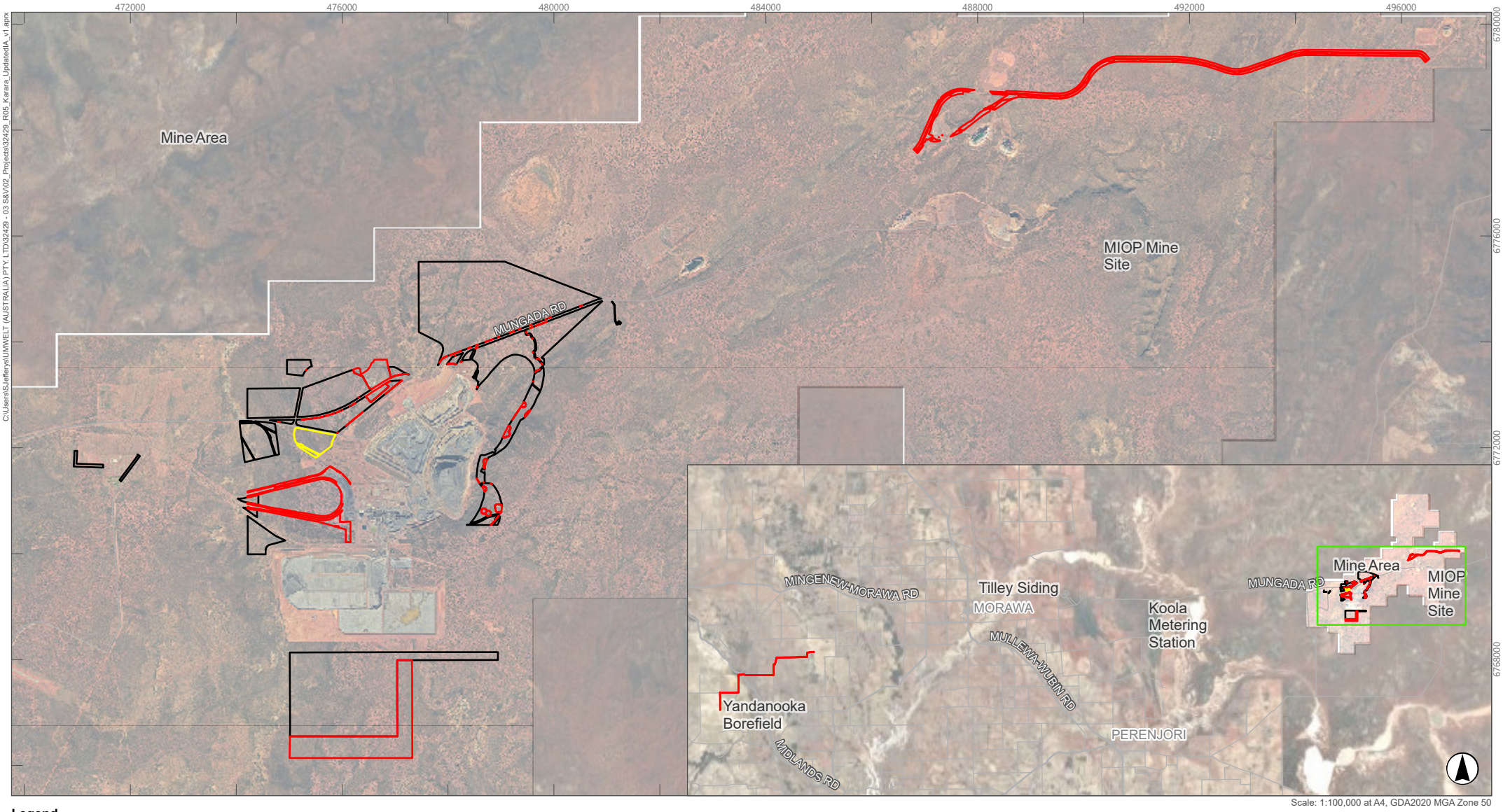
- Infrastructure
- Pit
- TSF
- WRD

FIGURE 1.1
KIOP MLE Assessment Areas

0 13 26 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt



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Legend

- KIOP MLE Mitigated Disturbance Footprint
- Added to KIOP MLE Mitigated Disturbance Footprint
- Removed from KIOP MLE Mitigated Disturbance Footprint
- Main Road
- Minor Road

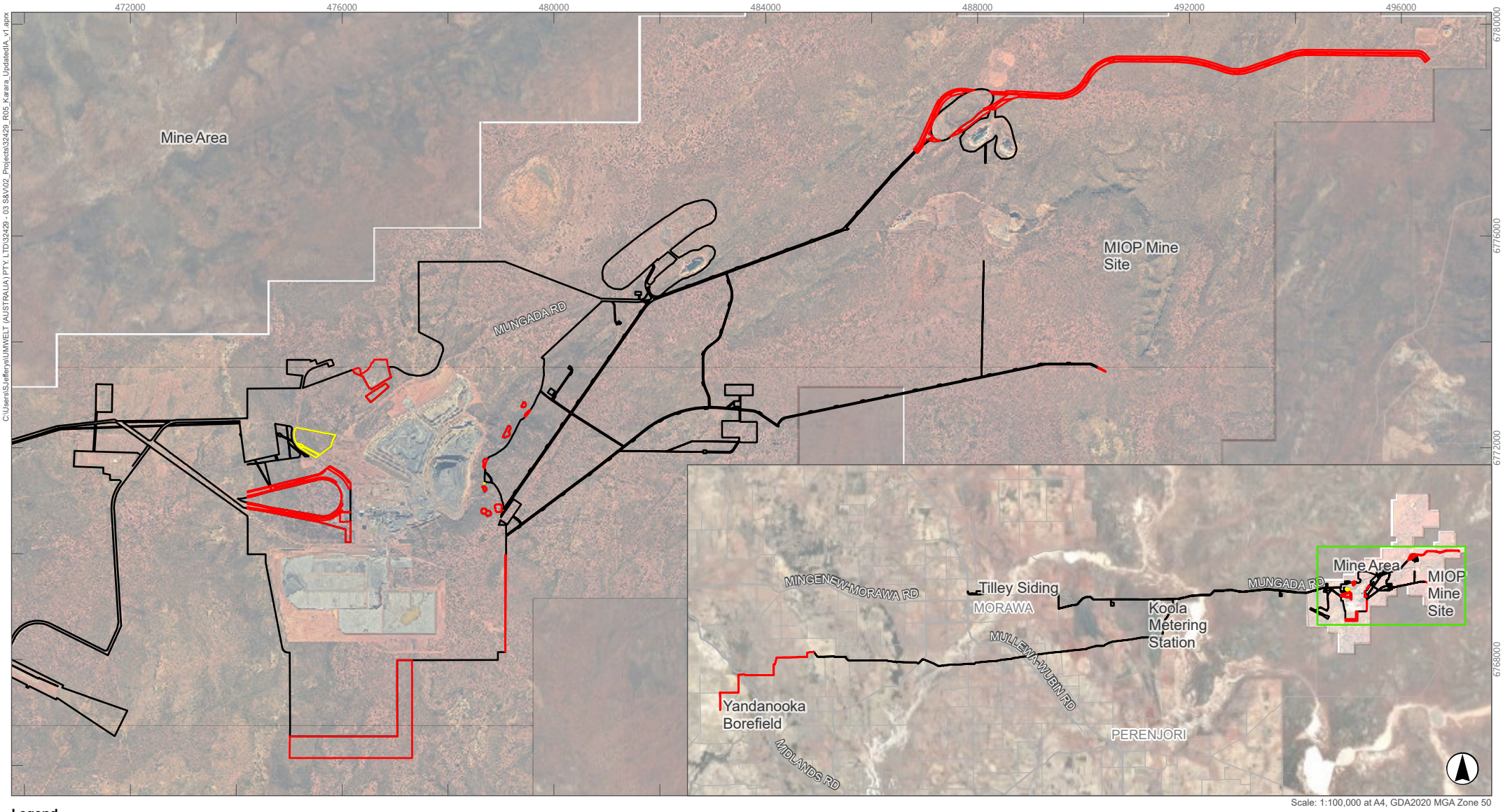
Scale: 1:100,000 at A4, GDA2020 MGA Zone 50

FIGURE 1.2

KIOP MLE Assessment Areas – KIOP MLE Mitigated Disturbance Footprint

0 2 4 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



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Legend

- Combined Proposal Mitigated Disturbance Footprint
- Added to Combined Proposal Mitigated Disturbance Footprint
- Removed from Combined Proposal Mitigated Disturbance Footprint
- Main Road
- Minor Road

Scale: 1:100,000 at A4, GDA2020 MGA Zone 50

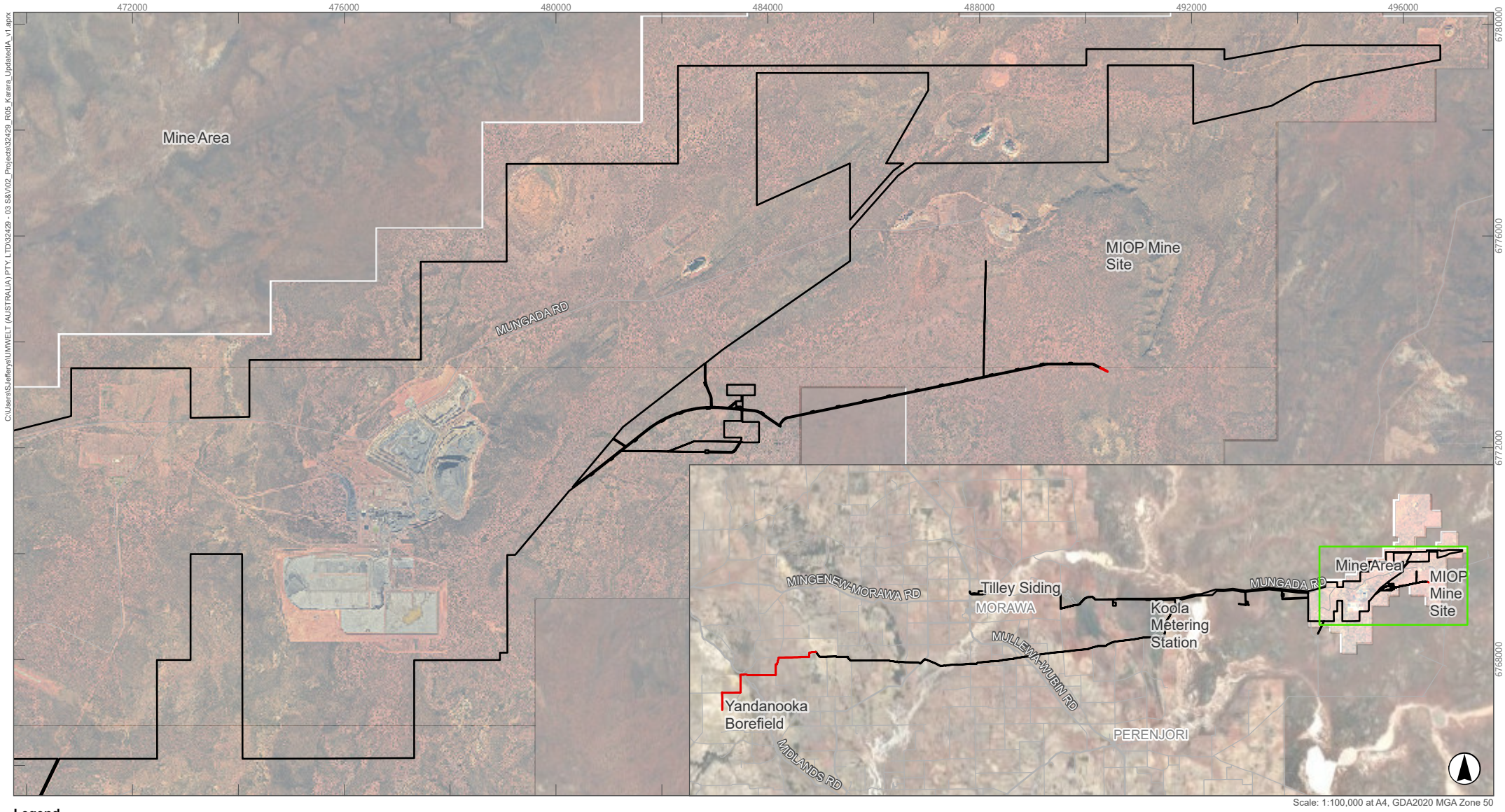
FIGURE 1.3

KIOP MLE Assessment Areas – Combined Proposal Mitigated Disturbance Footprint

0 2 4 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt



Scale: 1:100,000 at A4, GDA2020 MGA Zone 50

Legend

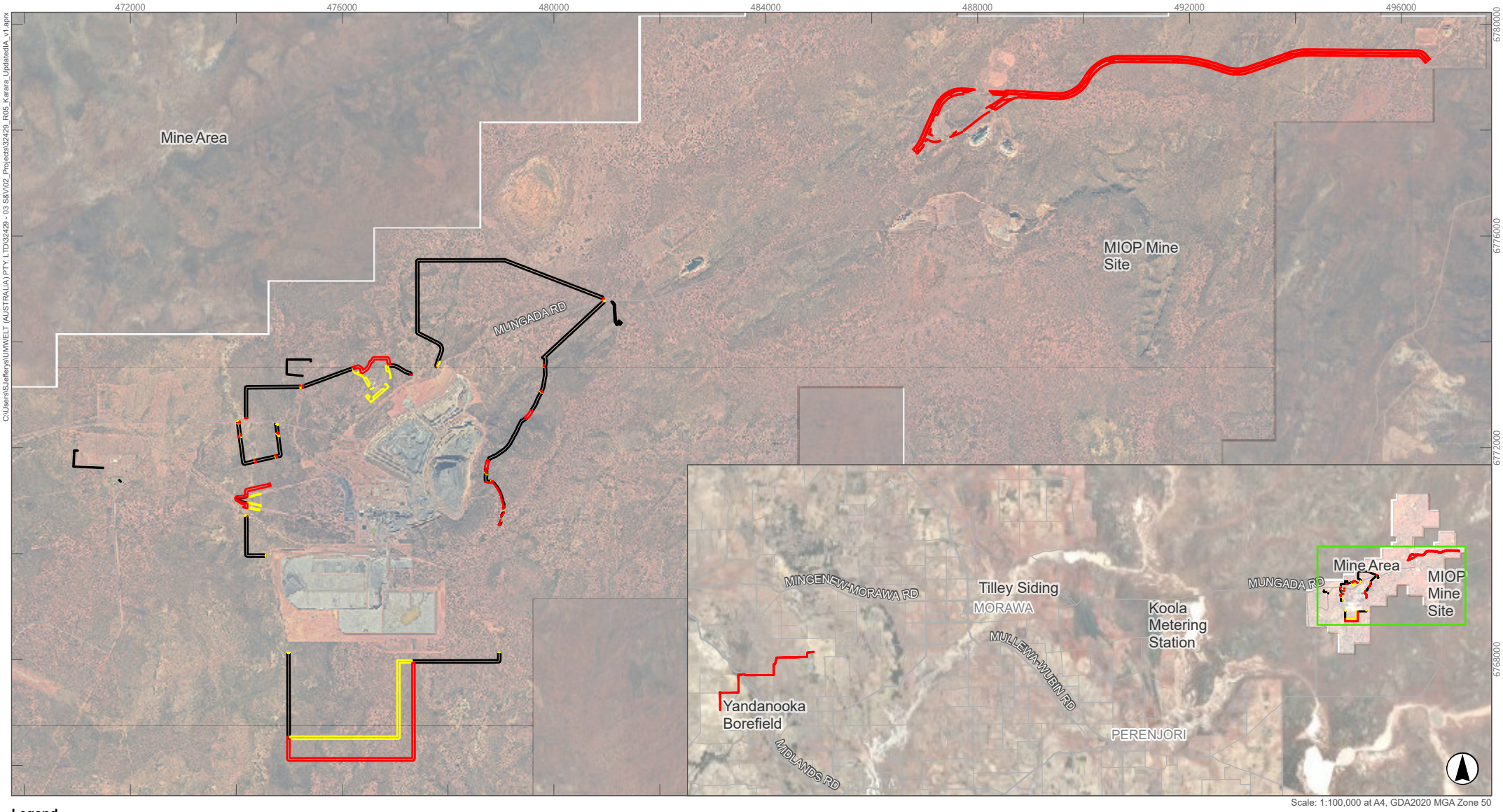
- Combined Proposal Mitigated Development Envelope
- Removed from Combined Proposal Mitigated Development Envelope
- Main Road
- Minor Road

FIGURE 1.4

KIOP MLE Assessment Areas – Combined Proposal Mitigated Development Envelope

0 2 4 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Legend

- Mitigated Indirect Impact Zone
- Added to Mitigated Indirect Impact Zone
- Removed from Mitigated Indirect Impact Zone
- Main Road
- Minor Road

Scale: 1:100,000 at A4, GDA2020 MGA Zone 50

FIGURE 1.5

KIOP MLE Assessment Areas – Mitigated Indirect Impact Zone

0 2 4 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

1.4 Constraints

Changes to the KIOP MLE Proposal within the Mine Area were made where practicable, however, there were several constraints that limited further mitigations. These included:

- The expanded waste rock dump (WRD) and tailings storage facility (TSF) landforms have been designed to be continuous with the existing facilities. This minimises the overall disturbance footprint (which would need to be increased if the new facilities were separate landforms) and reduces greenhouse gas emissions by reducing haul distance.
- The WRD and TSF can't have holes in the landforms (e.g. exclusion zones to avoid specific flora plants). This would jeopardise stability of the landforms and ultimately would be expected to result in impact within any exclusion zones that were established within the waste landform footprint.
- Areas are needed for stockpiling stripped topsoil adjacent to the expanded WRD and TSF footprints. Although the locations of topsoil stockpiles can be flexible, they are preferably close to where the topsoil is stripped to minimise dust emissions and degradation of the topsoil.
- The detailed design of the abandonment bund location has not been finalised. This would be completed closer to mine closure. The "expansion" to Karara pit is solely an allowance for the abandonment bund, which will be located within this zone but will only occupy a small fraction of the area. Although there is some flexibility in siting the abandonment bund, the location (minimum distance from the pit edge) and size (width at base of bund) must comply with requirements of the Department of Mines, Petroleum and Exploration.

The review of mitigations focused on avoiding or minimising impacts to ecological values that are already highly impacted or at risk of significant impact, where it was considered feasible to minimise impacts. These included the Banded Iron Formation landform and associated Blue Hills Priority Ecological Community (PEC) and flora such as *Lepidosperma* sp. Blue Hills.

The original design of WRD and TSF had prioritised minimising impacts to the Banded Iron Formation (BIF) while remaining within a practical distance to the Karara mine pit. The proposed TSF area avoids permanent impacts to the BIF altogether. Recent additional mitigations attempted to reduce any further permanent impacts to the Mt Karara Landform from the WRD. However, this was not practical whilst maintaining the integrity of the WRD.

The KIOP MLE Mitigated Proposal has removed an area to the west of the WRD and to the east/south of the TSF (**Section 2.3.1** and **Section 2.3.2**) to avoid impacts to priority flora and MNES fauna. Adjustments were only made along the boundaries of the proposed designs as the structural integrity of the WRD and TSF do not allow fragmentation and must remain largely continuous structures.

The exact location of the abandonment bund around the Karara mine pit is yet to be confirmed, so a large buffer area has been applied to provide flexibility for future bund placement. The area may also be utilised for other miscellaneous activities such as stockpile storage or access tracks. Impacts from these activities are likely to be temporary. This will be determined by the zone of instability calculated towards the end of the pit's operation. The buffer area is not likely to be permanently disturbed in its entirety as the bund itself is not expected to exceed 5 m in width. Nonetheless, this whole area has been categorised as permanent disturbance in the context of this assessment.

2.0 Mitigation of Impacts

Potential impacts from the KIOP MLE Proposal have been mitigated by removing from the Proposal areas that are not required for new activities and reducing areas for new activities where possible.

The western section of the Yandanooka water pipeline, the rail loop and Syncline Turner Haul Road (demarcated by Native Vegetation Clearing Permits [NVCPs] 3867/1, 3399/4 and 5605/1, respectively) were removed from the Proposal, concentrating all proposed new disturbance to the Mine Area. These areas were all associated with maintenance of existing infrastructure and are not required for new activities. NVCPs 33867/1 and 5605/1 are currently expired while 3399/4 has been renewed until the 12th of February 2027. Although the expired NVCPs don't allow for any native vegetation clearing, none is expected to be required for ongoing maintenance activities. The removal of the Yandanooka water pipeline from the proposal has resulted in the avoidance of several significant ecological values in the Wheatbelt area (as defined by the Avon Wheatbelt and Geraldton Sandplains IBRA Regions).

Further mitigation including reducing or relocating proposed disturbance associated with the WRD, TSF and abandonment bund where practicable to avoid direct impacts to significant environmental values. Mitigation of impacts to the Proposal is provided in further detail for:

- the Wheatbelt Area in **Section 2.1**
- Syncline Turner Haul Road in **Section 2.2**
- WRD and abandonment bund in **Section 2.3.1**
- the TSF in **Section 2.3.2**
- and rail loop in **Section 2.3.3.**

Table 2.1 and **Table 2.2** summarise the reduced Proposal areas following the mitigation process.

Table 2.1 Change in Combined Proposal

Item	Combined Proposal (as per PCD V2 Sept 2025)	Changes to Proposal	Combined Mitigated Proposal (rounded)
Disturbance Footprint (ha)	5,040	Reduction of 330 ha	4,710
Development Envelope (ha)	13,557	Reduction of 57 ha	13,500

Table 2.2 Change in Proposed Disturbance per IBRA Region

Item	Approved disturbance area from MS 805 & 806	Proposed Disturbance Footprint (Sept 2025)	Changes to Proposed Disturbance Footprint	Proposed Mitigated Disturbance Footprint (Feb 2026)	Approved Development Envelope from MS 805 & 806	Combined Development Envelope (Sept 2025)	Changes to Proposed Development Envelope	Combined Mitigated Development Envelope (Feb 2026)
Yalgoo IBRA Region (ha)	2,948	1,447	Reduction of 261 ha	1,186	7,571	12,559	0	12,559
Avon Wheatbelt and Geraldton Sandplains IBRA Regions (ha)	674	76	Reduction of 76 ha	0	N/A	1,008	Reduction of 76 ha	932 *

* In the Avon Wheatbelt and Geraldton Sandplains regions the Combined mitigated development envelope includes an area to encompass the rail siding alongside Mungada Road at the far eastern end of these IBRA regions (near the Mine Area).

2.1 Wheatbelt Area

The Wheatbelt area / Yandanooka borefields had been included in the Combined Proposal DE and DF to allow for maintenance activities for areas that had previously been cleared under NVCP 3867/1 issued in 2010. This NVCP was granted prior to listing of the 'Eucalypt Woodlands of the Western Australian Wheatbelt', which was listed as a Threatened Ecological Community in December 2015.

No new activities are proposed in the Wheatbelt area. The proposed disturbance in the Wheatbelt area has now been removed from the Proposal, for the reasons explained below.

Review of the significance of residual impacts for the Wheatbelt area identified the following uncertainties:

- The area of disturbance that might impact on native vegetation was unclear. As the project activities are for maintenance over a previously disturbed area, it is expected that most of these activities will not impact on native vegetation and thus could proceed without requiring environmental assessment.
- The flora values present within the Combined Proposal DF were not well characterised. The ecology survey in the Wheatbelt area was low intensity and might have missed recording some small annual species. Furthermore, MNES flora species that could be present have different survey period requirements (June-July vs Sept-Oct). Therefore, targeted surveys would need to be conducted in multiple seasons to ensure all potential conservation significance species were detected.

Multiple seasons of targeted flora surveys and/or detailed mapping of native vegetation extent would be required to address the above uncertainties. This would take at least 12 months to complete, which would substantially delay the KIOP MLE environmental assessment process. As the primary focus of the KIOP MLE is to support continuation of existing operations at the mine site, which is time critical, KML has decided to remove the Wheatbelt disturbance footprint from the Proposal.

Any proposed disturbance in the Wheatbelt area will be internally assessed under KML's Environmental Procedure – Approvals Request and Ground Disturbance (CORP_EN_PRO-1004), which includes the following requirements:

- The procedure applies to all ground disturbing works, including maintenance of roads and access tracks. The procedure would apply to the borefield maintenance activities.
- Proposed ground disturbance is assessed in accordance with:
    - *Biodiversity Conservation Act 2016*
    - *Environment Protection and Biodiversity Conservation Act 1999*
    - *Environmental Protection Act 1986*.
- The assessment considers legislative conditions that must be complied with, any additional approvals that need to be obtained or surveys to be completed.

These items would be reviewed and resolved by KML before a ground disturbance permit is issued for maintenance activities in the Wheatbelt / Yandanooka borefield area:

- Has the area been previously disturbed / cleared, and how recently?
- Will there be any native vegetation clearing or disturbance?

- If any native vegetation disturbance is proposed, the following items would be required:
    - targeted surveys for conservation significant flora including MNES and priority flora
    - delineation of patches of the 'Eucalypt woodlands of the Western Australian Wheatbelt' Threatened Ecological Community in accordance with the Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt (Department of the Environment, 2015)
    - assessment of significance of impacts to conservation significant flora and ecological communities
    - referral under Part IV or Part V (native vegetation clearing) under *Environmental Protection Act 1986* and *Environment Protection and Biodiversity Conservation Act 1999*.

The Proposal has been amended to remove the allowance for disturbance in the Wheatbelt area including removing the proposed extension to the Combined Proposal DE at the far western end of this area. There is no proposed disturbance footprint in the Wheatbelt area.

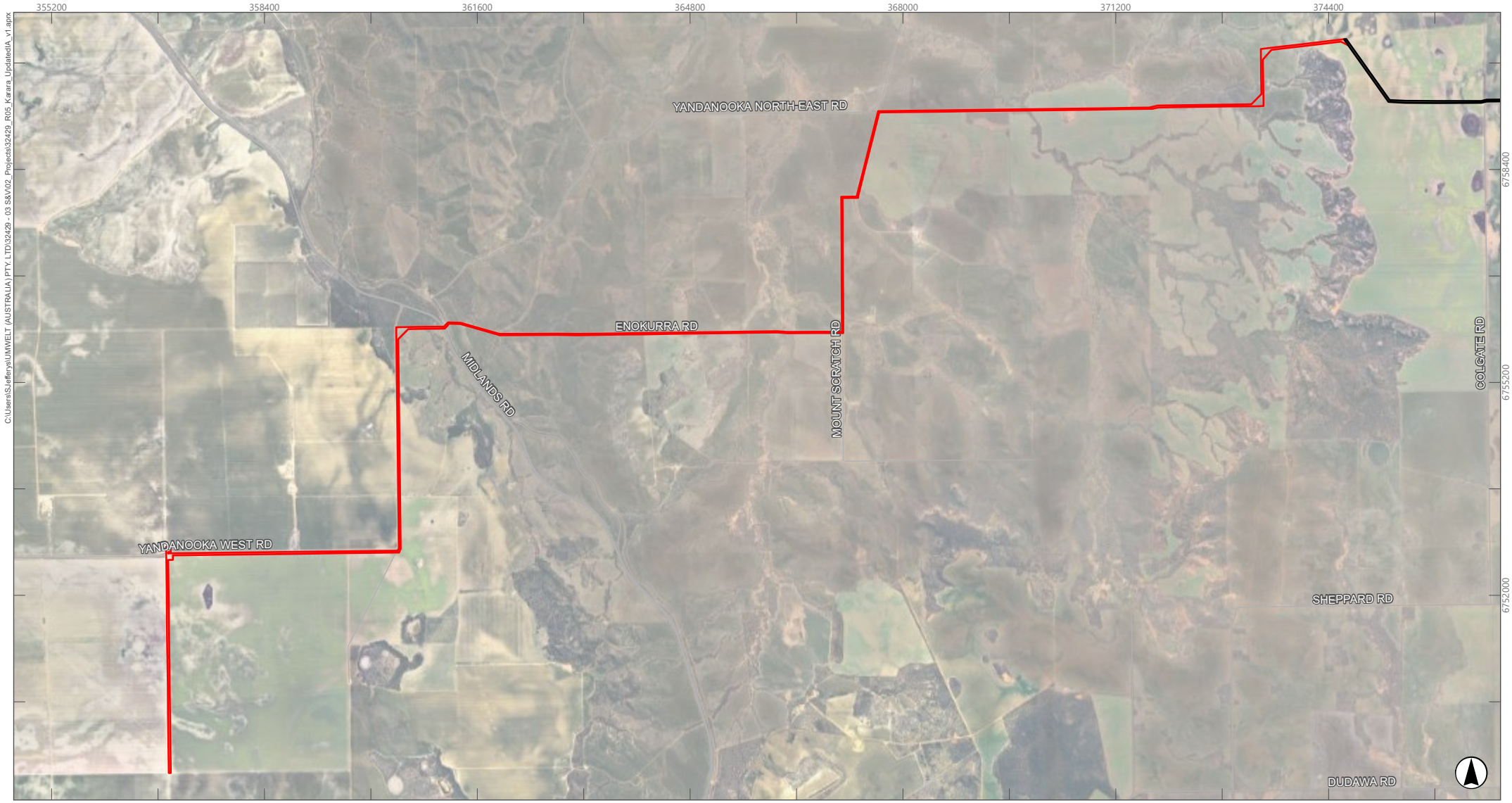
The Combined Proposal mitigated DE in the Wheatbelt area reflects the areas previously approved under MS 805 that are still required. An expanded portion of the DE is proposed to encompass the rail siding alongside Mungada Road at the far eastern end of the Wheatbelt area (near the Mine Area). These changes are shown in **Figure 2.1**.

The outcome of this change is that there is no proposed disturbance of native vegetation in the Wheatbelt area (**Table 2.2**).

This mitigation strategy will avoid any potential impacts to the following ecological values:

- 'Eucalypt woodlands of the Western Australian Wheatbelt' Threatened Ecological Community
- Mingenew Everlasting (*Schoenia filifolia* subsp. *subulifolia*) – Endangered
- Scaly-leaved Featherflower (*Verticordia spicata* subsp. *squamosa*) – Endangered
- Long-flowered Nancy (*Wurmbea tubulasa*) – Endangered
- *Acacia congesta* subsp. *cliftoniana* – P1
- *Verticordia comosa* – P1
- *Baeckea* sp. Perenjori – P2
- *Pityrodia viscida* – P4.

The changes to the Combined Proposal DE and DF avoid impacts to these significant ecological values.



Scale: 1:80,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- Borefield Corridor (removed area)
- Main Road
- Minor Road

FIGURE 2.1

Changes in Proposal Areas – Wheatbelt

0 1.6 3.2 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

2.2 Syncline Turner Haul Road

Similarly to the Wheatbelt Area, the Syncline Turner Haul Road had previously been cleared under a NVCP (NVCP5605/1 issued in 2010) and no new activities are proposed. Review of the proposed activities with KML confirmed that only maintenance of the road was required.

In the event of maintenance being required, KML's Environmental Procedure – Approvals Request and Ground Disturbance (CORP_EN_PRO-1004) will be adhered to (see summary in **Section 2.1**).

As no new activities are proposed at the Syncline Turn Haul Road, the proposed disturbance footprint at Syncline Turner Haul Road has been removed. The Development Envelope has been retained over this area.

The outcome of this change is that there is no proposed disturbance of native vegetation in the Syncline Turner Haul Road area (**Figure 2.2**).

This change will reduce impacts to the following ecological values:

- *Calotis* sp. Perrinvale Station (R.J. Cranfield 7096) (P3)
- *Grevillea globosa* (P3)
- *Persoonia pentasticha* (P3)
- *Rhodanthe collina* (P3).

2.3 Mine Area

Mitigation of impacts in the mine area focused on Blue Hills PEC, *Lepidosperma* sp. Blue Hills (**Section 2.3.1**), and other priority flora predicted to experience substantial impacts. The process and outcomes are described in the sections below per component of the mine area.

2.3.1 WRD and Abandonment Bund

The primary focus of the mitigation strategies was to dramatically reduce impacts to *Lepidosperma* sp. Blue Hills. The preliminary offset strategy had identified that there would be significant residual impact to this species, and consultation with EPA Services highlighted that other proponents had experienced challenges meeting offset outcomes for *Lepidosperma* sp. Blue Hills due to unsuccessful translocation and propagation (meeting with EPA Services 7 November 2025). *Lepidosperma* sp. Blue Hills is associated with the Blue Hills PEC and BIF landform, so mitigation of impacts to this species would also contribute other benefits. The proposed impact to these environmental values was from the WRD expansion and abandonment bund.

Due to *Lepidosperma* sp. Blue Hills inability to be successfully translocated, further mitigation measures were taken to modify the KIOP MLE disturbance footprint to avoid this species where possible. The mitigation process involved:

- A 50 m buffer (the indirect impact zone distance used in the Flora and Vegetation Impact Assessment [Umwelt, 2025b]) was applied to known *Lepidosperma* sp. Blue Hills point locations either within or adjacent to the KIOP MLE disturbance footprint. Adjacent plants were categorised as any species in the area ≤50 m from the KIOP MLE disturbance footprint boundary that are currently undisturbed (or approved to be).

- Proposed disturbance and mitigations were reviewed with KML operational team to confirm feasible mitigations and consider operational requirements. This included the constraint of needing to keep the WRD as a continuous landform and allowing sufficient areas for topsoil stockpiles and flexibility for the abandonment bund location.
- The mitigations resulted in reduced impact on *Lepidosperma* sp. Blue Hills by moving one area of proposed disturbance associated with the WRD infrastructure (26 ha in size) to an area where no *Lepidosperma* sp. Blue Hills are known to occur (27 ha, 150 m north of the rail loop).
- Exclusion zones have also been established in the proposed abandonment bund area (6.5 ha in size) to avoid all known occurrences of *Lepidosperma* sp. Blue Hills. The mitigated disturbance footprint has been amended to reflect the exclusion zones.

2.3.2 TSF

Further mitigation strategies focused on minimising impacts to priority flora that were at risk of significant impact. A review of the significance of residual impacts identified the following flora as targets for further mitigation:

- *Acacia karinae* (P3)
- *Allocasuarina tessellate* (P3)
- *Caesia* sp. Koolanooka Hills (P1)
- *Crassula* sp. nov. (Potentially Undescribed [PU])
- *Grevillea globosa* (P3)
- *Persoonia pentasticha* (P3)
- *Rhodanthe collina* (P3).

The mitigation process identified:

- It was not feasible to mitigate all impacts to *Acacia karinae*, *Allocasuarina tessellata*, *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78), *Crassula* sp. nov., *Grevillea globosa*, *Persoonia pentasticha* and *Rhodanthe collina* as they occurred within the proposed TSF footprint.
- Impacts to *Grevillea globosa* could be reduced by reducing the area allocated for infrastructure associated with the TSF (i.e. for topsoil stockpiles, access road, monitoring bores, etc.) and removing proposed disturbance at Syncline Turner Haul Road.
- A total of 63 individuals of *Persoonia pentasticha* were predicted to be impacted by the originally proposed TSF design. The mitigated design reduces this to 54 individuals.

Upon review of the areas allocated for the TSF, approximately 136 ha to the south/east of the proposed structure could be excised from the KIOP MLE disturbance footprint without having a significant impact on operability. This area was not intended to be part of the TSF but rather a buffer which had been included for associated operational activities. High numbers of significant individuals flora and terrestrial fauna habitat values including *Grevillea globosa* (P3) and two active Malleefowl mounds have been avoided because of this mitigation measure.

2.3.3 Rail Loop

As the rail loop Native Vegetation Clearing Permit (NVCP 3399/4) is valid until 2027, this area has been removed from the Proposal and will instead continue to be regulated under Part V Division 2 of the *Environmental Protection Act 1986*). This contributes to simplifying the Proposal and eliminating environmental assessment of areas that are already approved or have no new disturbance proposed.

2.3.4 Summary of Outcomes for Mine Area

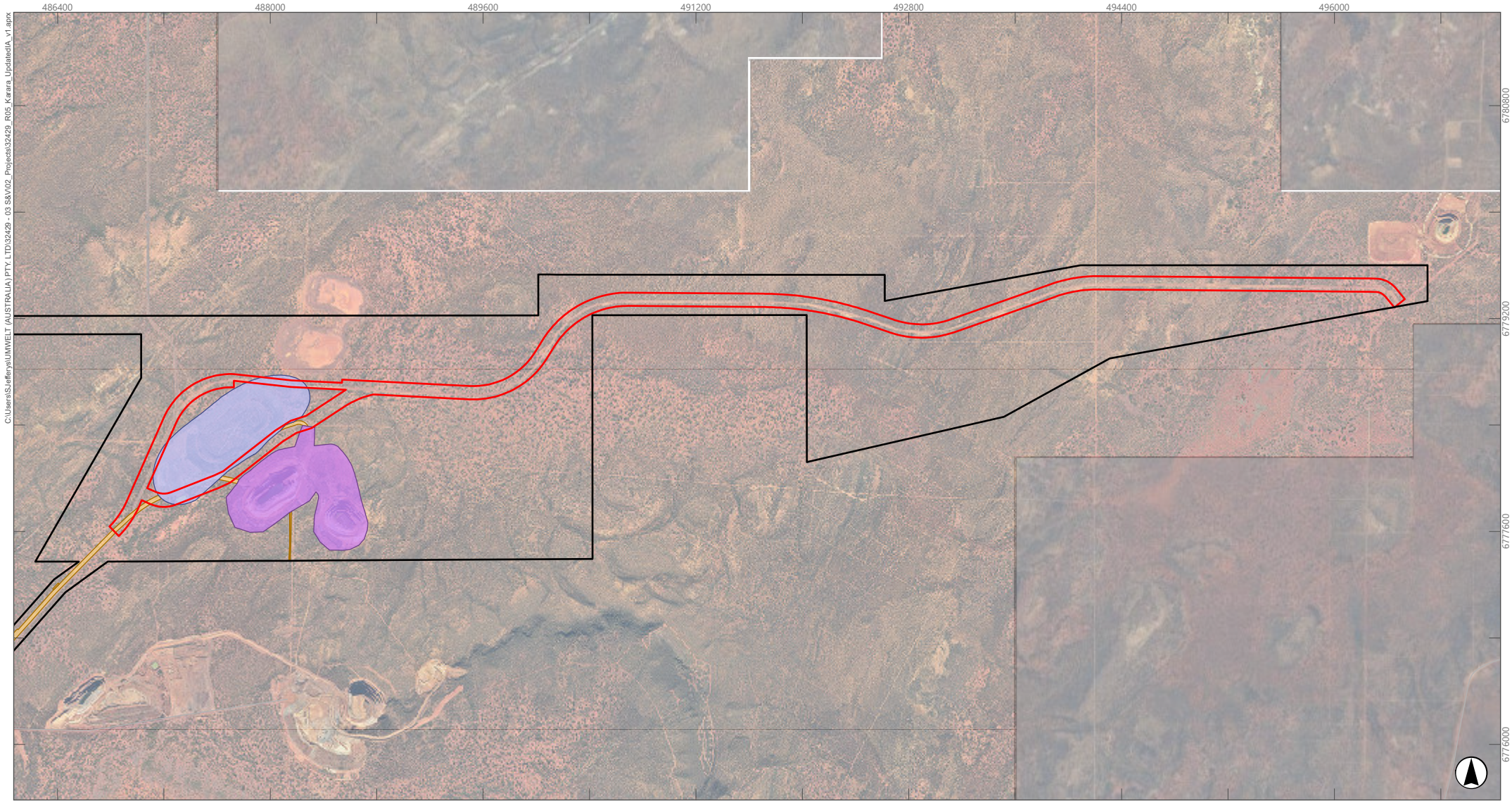
Changes to the Proposal within the mine area are shown in **Figure 2.3**.

The changes to the disturbance footprint will mitigate the impacts to key ecological values. The predicted change in impact for key ecological values is presented in **Table 2.3**.

Table 2.3 Change in Impact to Key Ecological Values

Item	Approved area from MS 805 & 806	Combined Proposal DF	Changes to Proposal	Combined Mitigated Proposal DF
Perennial Significant Flora Taxa Individuals				
Grevillea globosa	125	500	Reduction of 200 individuals	300
Lepidosperma sp. Blue Hills	38,087	38,987	Reduction of 677 individuals	38,310
Persoonia pentasticha	96	473	Reduction of 14 individuals	459
Annual and Ephemeral Significant Flora Taxa Locations				
Caesia sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)	7	223	Reduction of 44 locations	179
Crassula sp. nov.	0	2	No change	2
Rhodanthe collina	60	451	Reduction of 44 locations	407

This has changed the impacts to several of environmental values included in Umwelt's Flora and Vegetation Impact Assessment (2025b) and the Terrestrial Fauna Impact Assessment (2025d). **Section 4.0** provides the updated impact assessment for conservation significant environmental values.



Scale: 1:40,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- Syncline Turner Haul Road (removed disturbance footprint)
- Minor Road

Mine Activity

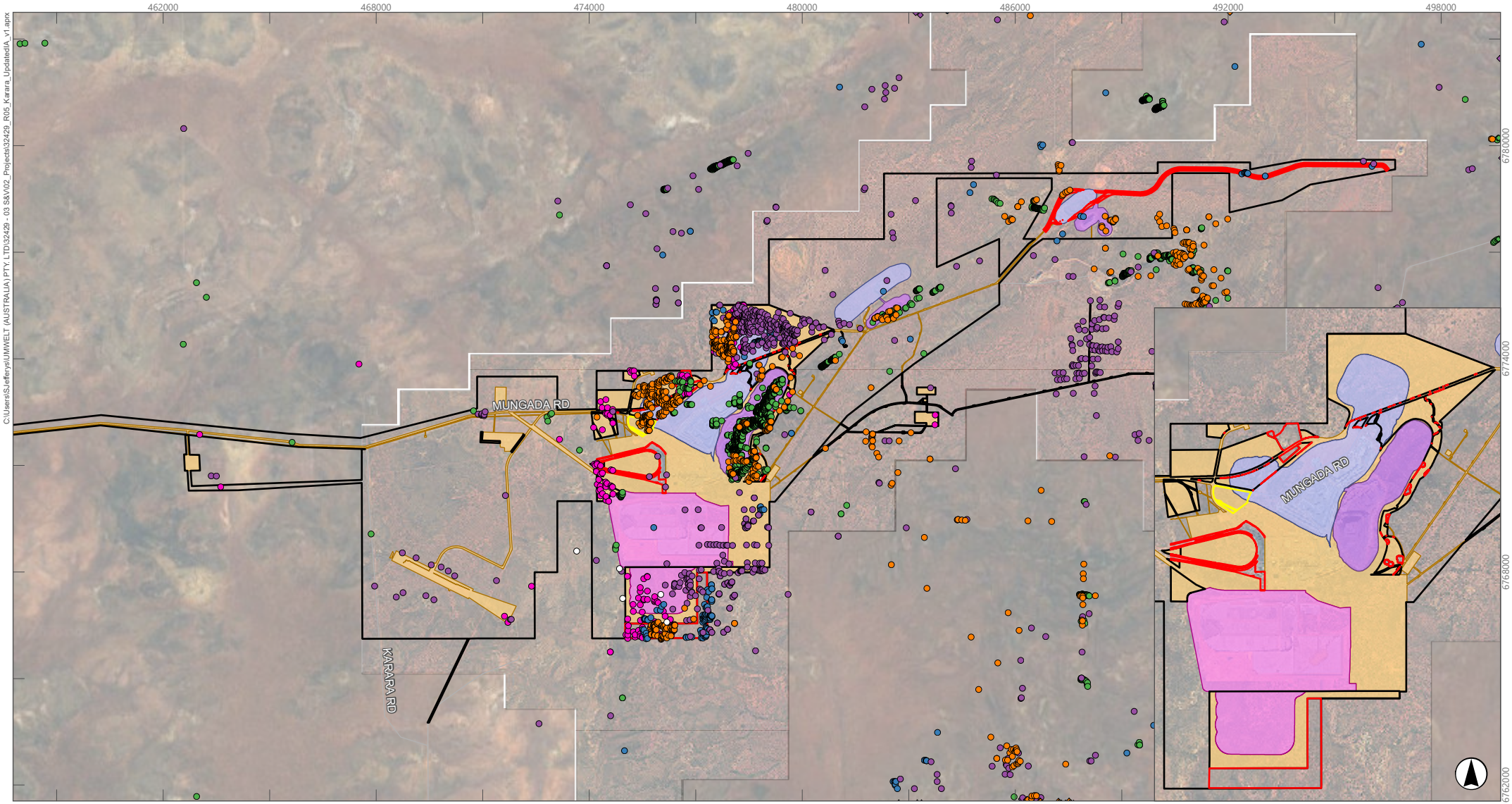
- Infrastructure
- Pit
- WRD

FIGURE 2.2

Changes in Proposal Areas – Syncline Turner Haul Road

0 0.8 1.6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:150,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Added to KIOP MLE Mitigated Disturbance Footprint
- Removed from KIOP MLE Mitigated Disturbance Footprint
- Minor Road

Mine Activity

- Infrastructure
- Pit
- TSF
- WRD

- *Caesia* sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)
- *Crassula* sp. nov.
- *Grevillea globosa*
- *Lepidosperma* sp. Blue Hills (A. Markey & S. Dillon 3468)
- *Persoonia pentasticha*
- *Rhodanthe collina*

FIGURE 2.3

Changes in Proposal Areas – Mine Area

0 3 6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

3.0 Methods

This section describes specific new or changed methods applied in the updated impact assessment, compared to the previous flora and fauna impact assessment reports. These additional methods included sourcing additional data and applying additional methods for impact assessment to address regulator comments.

3.1 Flora

3.1.1 Additional Flora Data

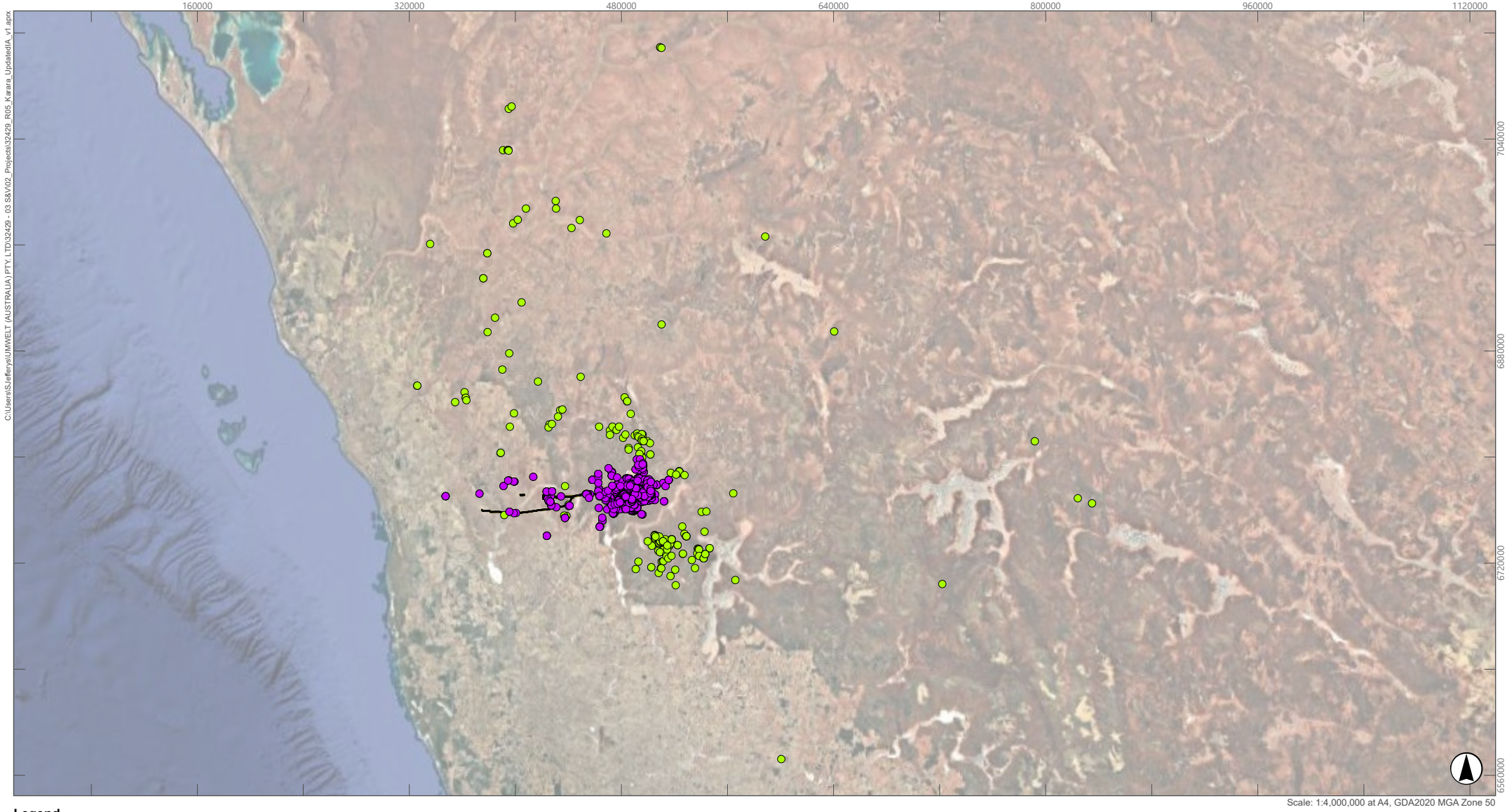
The impact assessment for significant flora was done in accordance with the methods described in the Flora and Vegetation Impact Assessment (Umwelt, 2025b) and was applied to the mitigated Proposal areas (**Table 1.1**). The methods assess impacts to significant flora populations based on known records within the Combined Proposal DE (including CCAC) as well as a 20 km buffer around it. The region for the Mine Area had refined these records within the bounds of RAA 1. For most species this provided an adequate amount of regional population data to determine no significant residual impacts to the species because of the Proposal.

However, eleven species were identified with potentially significant residual impacts. These species are the ten listed in **Table 4.4** and **Table 4.5** and *Crassula* sp. nov. (PU). No additional population records were available outside the Survey Area for *Crassula* sp. Nov.

The approach taken to assess the remaining ten species involved obtaining the total known population records from DBCA to assess the impacts against IUCN criteria for changes to the total population (see **Section 3.1.2**).

Data purchased from the Department of Biodiversity, Conservation and Attractions (DBCA) (22-1225FL) for the remaining 10 species of interest was merged with the flora data used during the Flora and Vegetation Impact Assessment (Umwelt, 2025b), XY coordinates were generated for each point to create a common factor by which duplicates could be identified and subsequently removed. Some duplicates may still exist in the data due to projection issues with historic data. **Figure 3.1** shows the original data used in flora and vegetation impact assessment, plus the additional DBCA data for the 10 species of interest.

As some records do not include species abundance, population data for perennial species was assessed against the 'total known' count and records not containing this data were excluded from the analysis. This approach was taken under the guidance from experienced botanists with the aim of only presenting confirmed population records. No such problem was applicable to annual/ephemeral species as they are assessed on location count rather than number of individuals, meaning a record lacking abundance data could still be used on location alone.



Scale: 1:4,000,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Combined Proposal Mitigated Disturbance Footprint
- Original Data
- Additional Data

FIGURE 3.1

Additional Flora Data used in Impact Assessment

0 80 160 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

3.1.2 IUCN Criteria

The *Guidelines for assessing the conservation status of native species according to the EPBC Act* (Threatened Species Scientific Committee (TSSC), 2024) ("IUCN Guidelines" or "IUCN criteria") outline the criteria for a species to be eligible for listing as Critically Endangered, Endangered or Vulnerable. These criteria align with the IUCN Red List categories and criteria. The following components of the IUCN criteria were applied to assess the potential significance of residual impacts to flora species:

- Population size reduction – reduction in total numbers over the past 10 years. The approved impact in the region (i.e. CCAC) was used as a proxy to represent the total approved population size reduction.
- Population size and decline – total known population, and percent decline in population observed or projected over the next 3-5 years. The total known population was based on the additional data as described in **Section 3.1.1**. The proposed mitigated impact was calculated as a percent of the total known population to estimate projected population decline over the next 3-5 years.

This analysis was applied for assessment of cumulative impacts to flora (**Section 4.1.2**).

3.1.3 Extrapolated Preferred Flora Habitat

EPA Services requested further information regarding potential impacts to *Calandrinia kalanniensis* (P2), *Calandrinia* sp. Warriedar (P3) and *Persoonia kararae* (P2). These species have not been found during the recent flora surveys or historic survey efforts. Thus, the impacts were assessed based on potential habitat requirements.

Botanists with extensive experience in the Karara/Midwest region were utilised to identify preferred habitat for these species based on other recorded flora species with similar habitat requirements. For example, *Calandrinia* sp. Warriedar is often observed sharing habitat with *Stylidium scintillans*, so both are categorised as preferring vegetation type (VT) 'O'. Species are included in **Table 4.3**.

3.1.4 Omitted Significant Flora Taxa

Two species (*Acacia woodmaniorum* [WA: Endangered; EPBC: Endangered] and *Seringia exastia* [EPBC: Critically Endangered; not listed in WA]) have been omitted from this report. Justification for omission is provided in Section 3.2.1 of the Flora and Vegetation Impact Assessment (Umwelt, 2025b).

3.2 Vegetation and Communities

3.2.1 Updated Impact Assessment Approach

The impact assessment for significant vegetation and ecological communities was conducted for the mitigated Proposal areas (**Table 1.1**) using the following methods:

- VTs were used for calculating direct and indirect impacts are described in Section 5.3.6 of the 2023 and 2024 Detailed and Targeted Flora and Vegetation Assessment (Umwelt, 2025a).

- Regional Floristic Community Types (FCTs) (see Section 3.6.2 of [Umwelt, 2025b]) within RAA 1 were again used to calculate cumulative impact to VTs in the Mine Area Region.
- Direct and indirect impacts to the Blue Hills PEC used mapping produced by Umwelt (see Section 5.2.8 [Umwelt, 2025b]), while cumulative impacts relied on data from Maia (2017) to establish a historic regional extent (within RAA 1).
- Impacts to the DBCA mapping of Blue Hills PEC (minus 500 m buffer) was also completed as part of the assessment (**Table 4.7**).

3.3 Terrestrial Fauna

3.3.1 Updated Impact Assessment Approach

The impact assessment for significant terrestrial fauna was done in accordance with the methods described in the Terrestrial Fauna Impact Assessment (Umwelt, 2025d) and was applied to the mitigated Proposal areas (**Table 1.1**). Vegetation and Substrate Associations (VSAs) as described by Kristancic and Bamford (2025) were used for direct and indirect impacts, with cumulative impacts being calculated with Pre-European Vegetation Associations (PEVSAs) (Table 3.1 [Umwelt, 2025d]) within CAA 1.

Sections 3.3.2, **3.3.3** and **3.3.4** describe additional data added to better understand how five of the assessed species use the Mine Area and its surrounds.

3.3.2 Malleefowl

Malleefowl mound locations were sourced from KML and Bamford Consulting Ecologists (BCE) from the 2020 and 2024 fauna survey and malleefowl mound monitoring data from 2008 to 2024.

The data provided by KML and BCE was merged and duplicates were removed (in a similar manner to the methods described in **Section 3.1.1**) (**Figure 3.2**). Mounds were deemed to be 'active' if survey comments had confirmed Malleefowl activity from 2020 onwards. All other records were categorised as 'historic'. This data was used to calculate impacts to active and historic malleefowl mounds (see **Section 4.3.2**).

3.3.3 Western Spiny-tailed Skink

Scats, direct sitings, known colonies and potentially suitable log piles (habitat values) were sourced from KML and BCE from the 2020 and 2024 fauna survey and Western Spiny-tailed Skink monitoring from 2018 to 2024.

Data provided by KML and BCE was merged and duplicates were removed (in a similar manner to the methods described in **Section 3.1.1**) (**Figure 3.3**). Records within 10 m clusters were dissolved to be represented by a single point as research has shown that Western Spiny-tailed Skink log piles are an average of 10-13 m long (Holly S. Bradley, Michael D. Craig, Adam T. Cross, Sean Tomlinson, Michael J. Bamford and Philip W. Bateman, 2022). Selection of the single point prioritised active sites over potentially active sites (potential habitat) or the most recently recorded, if all records in the cluster were only potentially active sites.

This data was used to calculate impacts to active and potential Western Spiny-tailed Skink colony sites (see **Section 4.3.2**).

3.3.4 Trapdoor Spider

Records of burrows for *Idiosoma clypeatum* (previously known as *Idiosoma nigrum*), *Idiosoma formosum* and Aganippe (*Idiosoma*) sp. were sourced from KML and BCE from the 2020 and 2024 fauna survey as well as additional BCE historic record dating back to 2006.

The data provided by KML and BCE was merged and duplicates were removed (in a similar manner to the methods described in **Section 3.1.1**) (**Figure 3.4**). Where abundance data was not recorded but a burrow was, a single count of abundance was allocated to the point. It was assumed that a burrow siting would be related to the presence of at least a single spider within its vicinity.

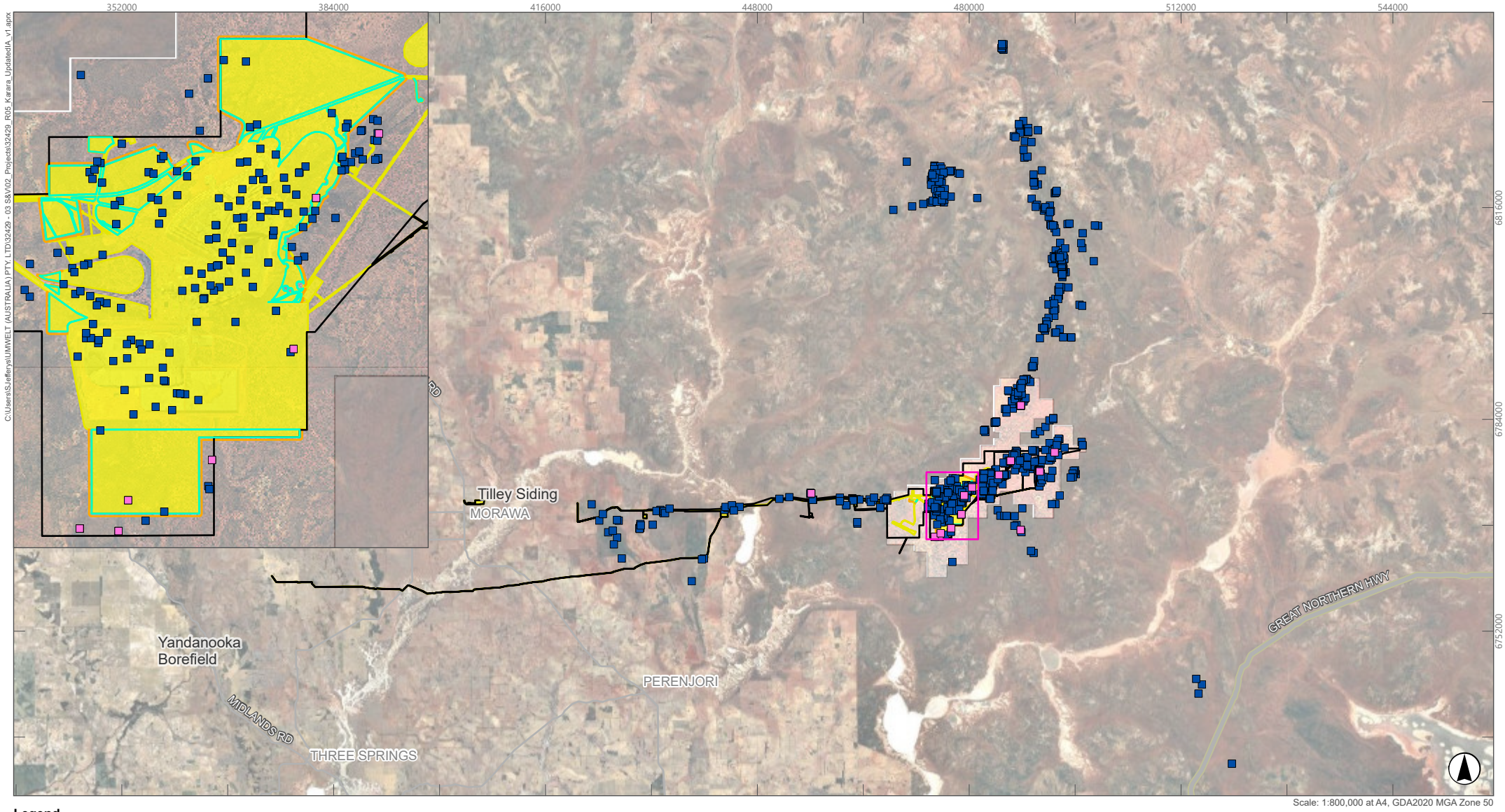
Note that not recorded location has been reported for *Aganippe* (*Idiosoma*) sp. and as such does not appear in **Figure 3.4**. The records for '*Idiosoma* sp.' in **Figure 3.4**, shows where the reporting ecologist was unable to distinguish between *Idiosoma clypeatum* and *Idiosoma formosum* during time of recording.

This data was used to calculate impacts to recorded burrows for each species of trapdoor spider (see **Section 4.3.2**).

3.4 Landforms

3.4.1 Updated Impact Assessment Approach

The updated assessment to Landforms used the same methodology as the Landforms Assessment Technical Report (Umwelt, 2025c) but primarily focuses on total permanent impacts. Changes to permanent impact on Mt Karara are primarily based on the reduction of the KIOP MLE Mitigated Proposal within the abandonment bund area (**Figure 3.5**). As stated in **Section 2.3.1**, it is unlikely that the bund area will be permanently impacted to its full extent and as a result, this report is likely to overpredict the Proposal's disturbance to the remaining landform.



Scale: 1:800,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Highway
- Main Road

Malleefowl Mound

- Active
- Historic

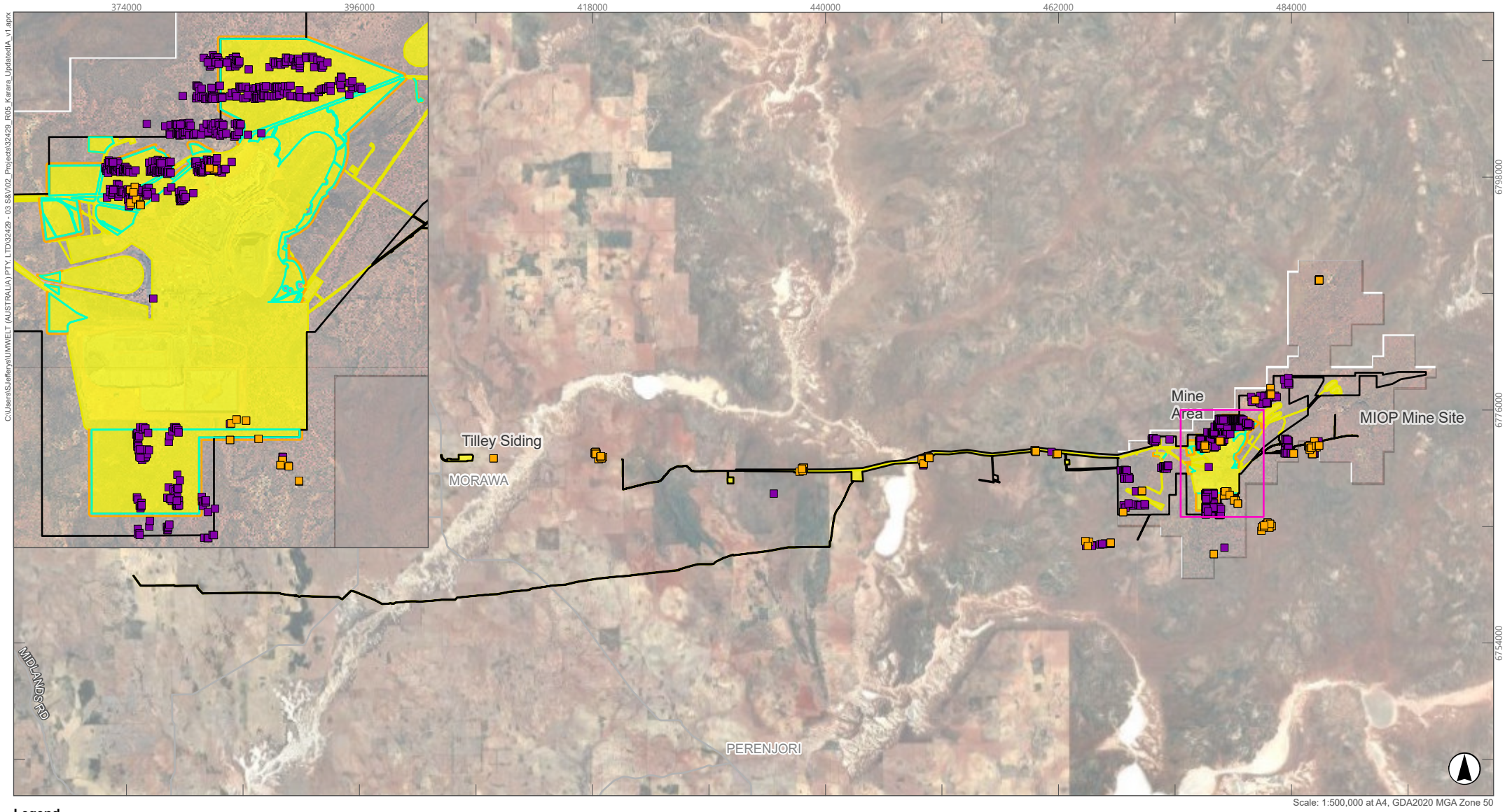
FIGURE 3.2

Predicted Impacts to Malleefowl from KIOP MLE Proposal

0 16 32 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

umwelt



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road

Western Spiny-tailed Skink

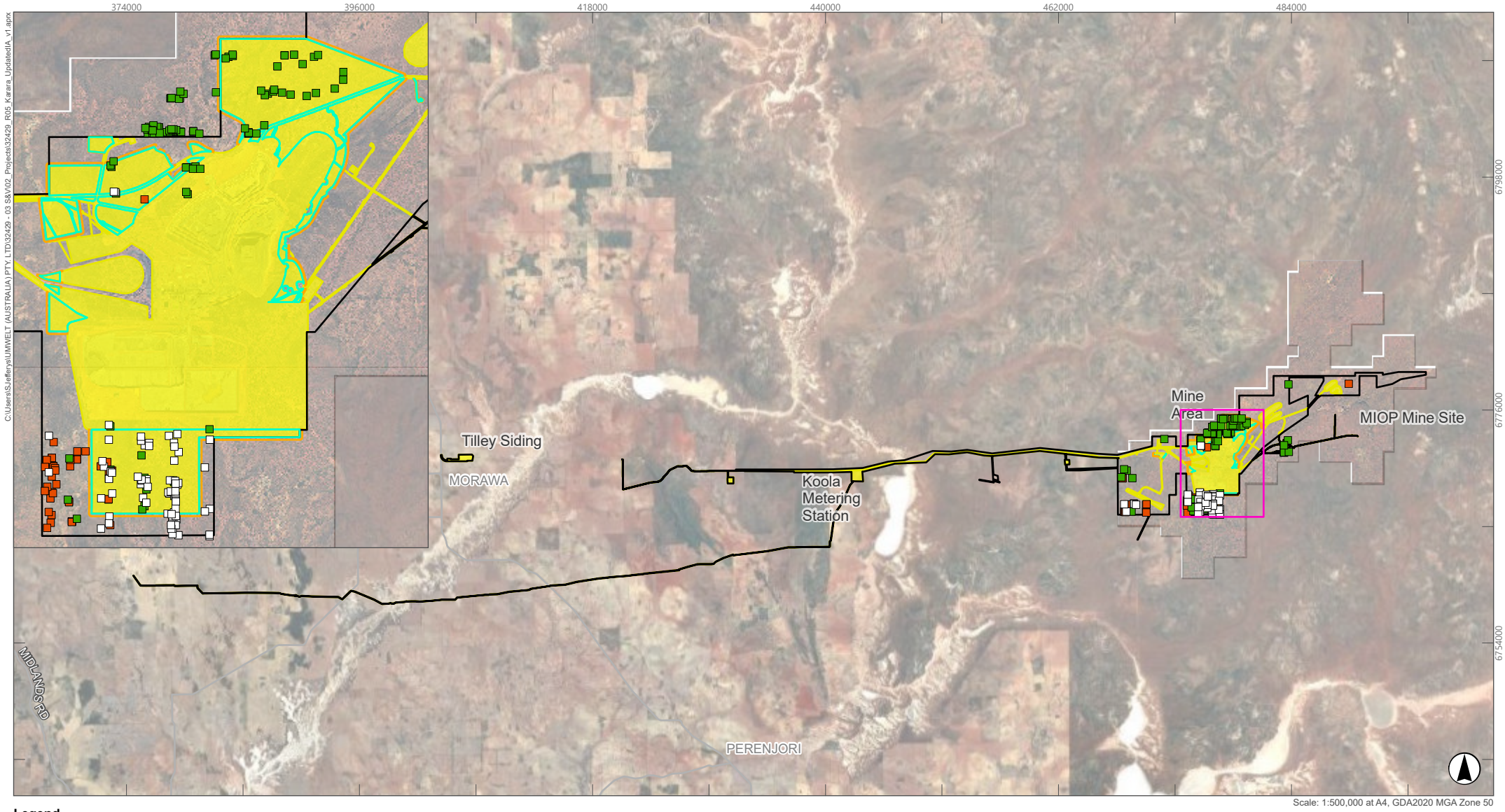
- Active Colony
- Potential Colony

FIGURE 3.3

Predicted Impacts to Western Spiny-tailed Skink from KIOP MLE Proposal

0 11 22 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:500,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mitigated Indirect Impact Zone
- Combined Proposal Mitigated Disturbance Footprint
- Main Road

Trapdoor Spider Burrow

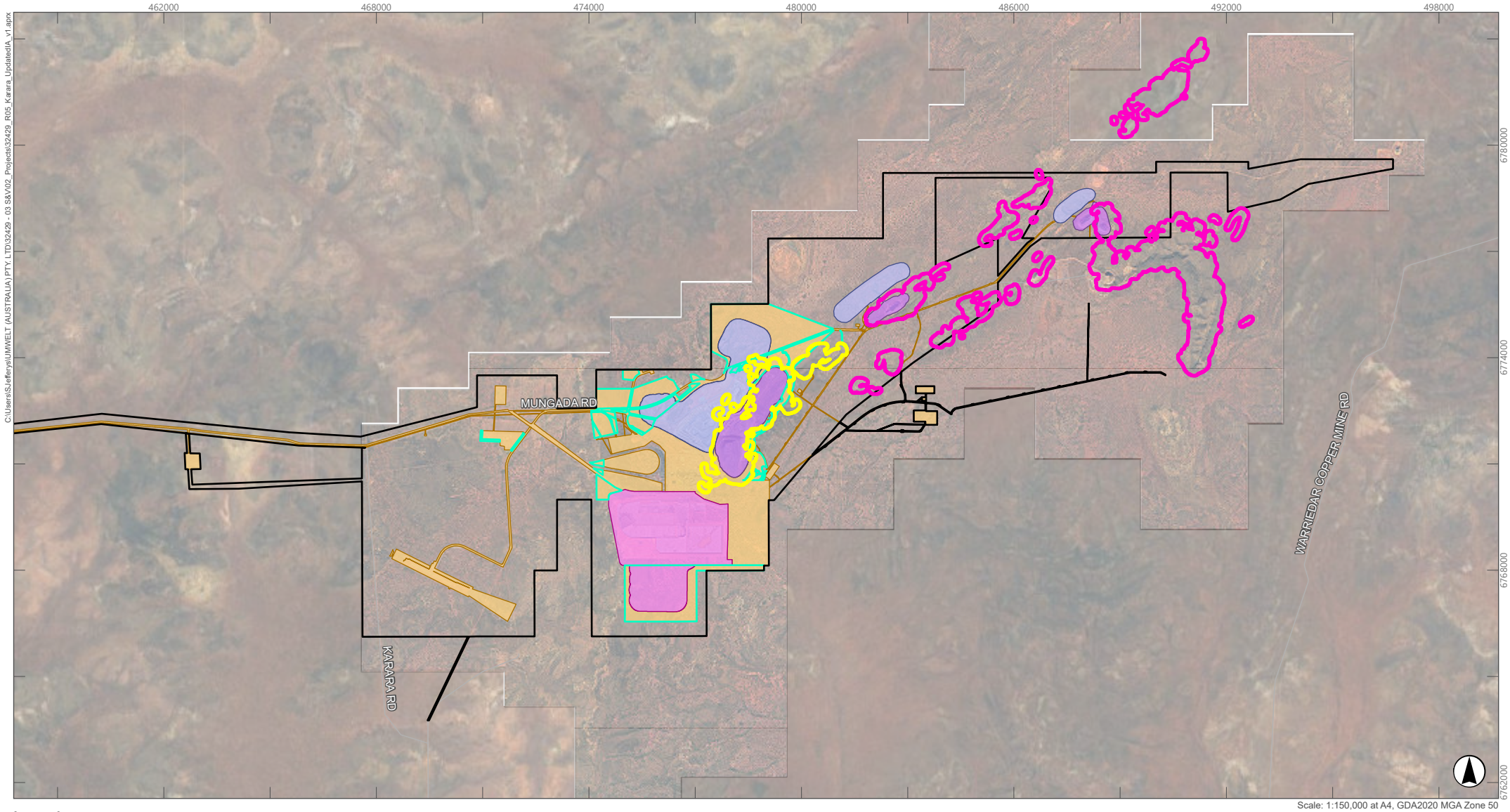
- *Idiosoma clypeatum*
- *Idiosoma formosum*
- *Idiosoma* sp.

FIGURE 3.4

Predicted Impacts to Trapdoor Spider from KIOP MLE Proposal

0 11 22 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)



Scale: 1:150,000 at A4, GDA2020 MGA Zone 50

Legend

- Combined Proposal Mitigated Development Envelope
- KIOP MLE Mitigated Disturbance Footprint
- Mt Karara (included as part of the LAU)
- Blue Hills Local Assessment Unit (LAU)
- Minor Road

Mine Activity

- Infrastructure
- Pit
- TSF
- WRD

FIGURE 3.5

Predicted Impacts to Banded Iron Formation Landforms from KIOP MLE Proposal

0 3 6 km

Image Source: KML (2024), ESRI Basemap (2025) | **Data Source:** Landgate (2025), KML (2025)

4.0 Results

4.1 Flora

4.1.1 Mitigated Residual Impacts – Flora

Table 4.1, **Table 4.2** and **Table 4.3** show the updated impact assessment that supersedes findings previously presented in Section 7.1.1 of the Flora and Vegetation Impact Assessment (Umwelt, 2025b). The tables present the mitigated residual impacts (previously approved, proposed and combined impacts) to:

- perennial significant flora individuals
- annual and ephemeral significant flora locations
- preferred habitat per species for significant flora taxa

These results are presented and discussed in the updated ERD.

Table 4.1 Mitigated Residual Impacts in Mine Region – Perennial Significant Flora Taxa Individuals

Taxon	Status (WA)	Status (EPBC)	Individuals in Survey Area + 20 km buffer (records)	Individuals in Combined Proposal mitigated DE including those in CCAC (#)	Approved impact from MS 805 & 806 (#)	Approved impact from MS 805 & 806 (% of records)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of records)	Combined Impact – Combined Proposal mitigated DF (#)	Combined Impact – Combined Proposal mitigated DF (% of records)	Proposed indirect impact – mitigated indirect impact zone (#)
Acacia karinae	P3	-	46,724	9,081	5,286	11.3	1,347	2.9	6,633	14.2	334
Allocasuarina tessellata	P3	-	28,612	726	7	0.0	583	2.0	590	2.1	71
Baeckea sp. Perenjori (J.W. Green 1516)	P2	-	95	29	29	30.5	-	-	29	30.5	-
Drummondita fulva	P3	-	3,019	516	38	1.3	-	-	38	1.3	-
Eucalyptus synandra	VU	VU	1,162	46	-	-	-	-	-	-	-
Grevillea globosa	P3	-	996	704	125	12.6	175	17.6	300	30.1	-
Grevillea granulosa	P3	-	14	11	1	7.1	-	-	1	7.1	-
Grevillea scabrida	P3	-	12,700	976	1	0.0	944	7.4	945	7.4	31
Grevillea subtiliflora	P3	-	1,338	1	-	-	-	-	-	-	-
Hemigenia sp. aff. *botryphylla*	PU	-	2	2	-	-	-	-	-	-	-
Hibbertia cockertoniana	P3	-	2	1	-	-	-	-	-	-	-
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	P1	-	78,528	42,130	38,087	48.5	223	0.3	38,310	48.8	-
Melaleuca barlowii	P3	-	26	9	5	19.2	-	-	5	19.2	-
Micromyrtus acuta	P3	-	35,540	4,751	2,828	8.0	-	-	2,828	8.0	-
Micromyrtus trudgenii	P3	-	12,155	1,292	672	5.5	28	0.2	699	5.8	-
Persoonia pentasticha	P3	-	1,329	525	96	7.2	363	27.4	458	34.5	14
Petrophile pauciflora	P3	-	167	22	20	12.0	-	-	20	12.0	-
Pityrodia viscida	P4	-	54	1	1	1.9	-	-	1	1.9	-
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	P1	-	312	9	-	-	1	0.3	1	0.3	-
Stenanthemum poicilum	P3	-	443	25	3	0.7	-	-	3	0.7	-
Tecticornia fimbriata	P3	-	7	2	2	28.6	-	-	2	28.6	-
Tecticornia sp. 'Karara 1'	PU	-	5	4	4	80.0	-	-	4	80.0	-
Tecticornia sp. 'Karara 2'	PU	-	5	5	5	100.0	-	-	5	100.0	-

Table 4.2 Mitigated Residual Impacts in Mine Region – Annual and Ephemeral Significant Flora Taxa Locations

Taxon	Status (WA)	Status (EPBC)	Locations in Survey Area + 20 km buffer (records)	Locations in Combined Proposal mitigated DE including those in CCAC (#)	Approved impact from MS 805 & 806 (#)	Approved impact from MS 805 & 806 (% of records)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of records)	Combined Impact – Combined Proposal mitigated DF (#)	Combined Impact – Combined Proposal mitigated DF (% of records)	Proposed indirect impact - Extent in mitigated indirect impact zone (#)
Caesia sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)	P1	-	269	235	7	2.6	172	63.9	179	66.5	11
Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	P3	-	69	41	2	2.9	28	40.6	30	43.5	1
Crassula sp. nov.	PU	-	5	4	-	-	2	40.0	2	40.0	-
Epitriche demissus	P2	-	9	4	4	44.4	-	-	4	44.4	-
Fitzwillia axilliflora	P2	-	3	1	1	33.3	-	-	1	33.3	-
Gnephosis setifera	P1	-	10	2	1	10.0	-	-	1	10.0	-
Gunniopsis divisa	P3	-	133	25	2	1.5	21	15.8	23	17.3	4
Menkea draboides	P3	-	6	2	2	33.3	-	-	-	-	-
Millotia dimorpha	P1	-	538	55	54	10.0	-	-	54	10.0	-
Nicotiana salina	P1	-	3	1	1	33.3	-	-	1	33.3	-
Podotheca uniseta	P3	-	2	1	1	50.0	-	-	1	50.0	-
Rhodanthe collina	P3	-	841	499	60	7.1	347	41.3	407	48.4	9
Roebuckiella halophila	P3	-	19	13	3	15.8	-	-	3	15.8	-
Stylidium scintillans	VU	-	211	17	2	0.9	-	-	2	0.9	-
Swainsona picta	P1	-	9	2	-	-	-	-	-	-	-
Tricoryne soullierae	P3	-	2	1	-	-	-	-	-	-	-

Table 4.3 Mitigated Residual Impacts in Mine Region – Habitat for Significant Flora Taxa

Species	Status (WA)	Status (EPBC)	Habitat VTs	Habitat VTs Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of DE)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of DE)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of DE)	Proposed indirect impact - Extent in mitigated indirect impact zone (ha)
Acacia karinae	P3	-	A, O, P and S	1,910.4	274.3	14.4	281.2	14.7	555.5	29.1	35.6
Allocasuarina tessellata	P3	-	A and S	744.4	65.0	8.7	146.6	19.7	211.6	28.4	18.3
Baeckea sp. Perenjori (J.W. Green 1516)	P2	-	AA and E	670.9	49.7	7.4	28.3	4.2	78.0	11.6	5.0
Caesia sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)	P1	-	A and S	744.4	65.0	8.7	146.6	19.7	211.6	28.4	18.3
Calandrinia kalanniensis	P2	-	A, B, F and O	1,317.0	218.4	16.6	169.9	12.9	388.3	29.5	27.1
Calandrinia *sp. Warriedar*	P3	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	P3	-	D and G	4,018.9	498.4	12.4	552.0	13.7	1,050.4	26.1	48.9
Crassula sp. nov.	PU	-	B and O	658.5	146.8	22.3	90.8	13.8	237.6	36.1	16.5
Drummondita fulva	P3	-	O, P and R	1,951.4	341.3	17.5	238.9	12.2	579.5	29.7	24.9
Epitriche demissus	P2	-	N	10.7	8.9	82.6	-	-	8.9	82.6	-
Eucalyptus synandra	VU	VU	R	785.4	131.9	16.8	104.4	13.3	235.5	30.0	7.6
Fitzwillia axilliflora	P2	-	N	10.7	8.9	82.6	-	-	8.9	82.6	-
Gnephosis setifera	P1	-	M and N	28.9	10.0	34.4	-	-	10.0	34.4	-
Grevillea globosa	P3	-	P, Q and R	3,093.4	250.2	8.1	253.5	8.2	502.9	16.3	23.6
Grevillea granulosa	P3	-	T	187.3	12.5	6.7	-	-	12.5	6.7	-
Grevillea scabrida	P3	-	A, D and K	3,049.0	370.8	12.2	437.8	14.4	808.6	26.5	46.3
Grevillea subtiliflora	P3	-	F	366.8	26.3	7.2	13.2	3.6	39.5	10.8	4.4
Gunniopsis divisa	P3	-	G and K	1,888.8	362.0	19.2	239.1	12.7	601.1	31.8	24.2
Hemigenia sp. aff. *botryphylla*	PU	-	A	291.7	45.2	15.5	65.9	22.6	111.2	38.1	6.2
Hibbertia cockertoniana	P3	-	Q	1,688.2	54.0	3.2	101.5	6.0	155.5	9.2	9.7
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	P1	-	O and P	1,166.0	209.4	18.0	134.6	11.5	344.0	29.5	17.3
Melaleuca barlowii	P3	-	P and T	807.1	76.8	9.5	47.6	5.9	124.4	15.4	6.2
Menkea draboides	P3	-	A, E and S	1,415.0	114.5	8.1	174.9	12.4	289.3	20.4	23.3
Micromyrtus acuta	P3	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Micromyrtus trudgenii	P3	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Millotia dimorpha	P1	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Nicotiana salina	P1	-	L	50.9	20.4	40.0	-	-	20.4	40.0	-
Persoonia kararae	P2	-	T	187.3	12.5	6.7	-	-	12.5	6.7	-
Persoonia pentasticha	P3	-	D, G, H and K	4,472.3	604.2	13.5	651.7	14.6	1,255.9	28.1	59.5
Petrophile pauciflora	P3	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Pityrodia viscida	P4	-	HMVT B	0.2	0.2	100.0	-	-	0.2	100.0	-
Podotheca uniseta	P3	-	L	50.9	20.4	40.0	-	-	20.4	40.0	-
Prostanthera sp. Karara (D. Coultas & K. Greenacre Opp 8)	P1	-	Q	1,688.2	54.0	3.2	101.5	6.0	155.5	9.2	9.7

Species	Status (WA)	Status (EPBC)	Habitat VTs	Habitat VTs Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of DE)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of DE)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of DE)	Proposed indirect impact - Extent in mitigated indirect impact zone (ha)
Rhodanthe collina	P3	-	A, K and O	1,151.6	285.0	24.7	182.4	15.8	467.3	40.6	25.0
Roebuckiella halophila	P3	-	E, G and R	3,031.3	448.8	14.8	342.2	11.3	790.3	26.1	29.1
Stenanthemum poicilum	P3	-	E	670.7	49.5	7.4	28.3	4.2	77.8	11.6	5.0
Stylidium scintillans	VU	-	O	546.2	145.1	26.6	86.9	15.9	232.1	42.5	11.1
Swainsona picta	P1	-	B	112.3	1.7	1.5	3.8	3.4	5.5	4.9	5.4
Tecticornia fimbriata	P3	-	L, N	61.7	29.2	47.4	-	-	29.2	47.4	-
Tecticornia sp. 'Karara 1'	PU	-	N	10.7	8.9	82.6	-	-	8.9	82.6	-
Tecticornia sp. 'Karara 2'	PU	-	N	10.7	8.9	82.6	-	-	8.9	82.6	-
Tricoryne soullierae	P3	-	I and T	197.7	14.5	7.3	-	-	14.5	7.3	-

4.1.2 Cumulative Impacts – Flora

Table 4.4 and **Table 4.5** show the updated impact assessment that supersedes findings previously presented in Section 7.2.1 of the Flora and Vegetation Impact Assessment (Umwelt, 2025b). The tables present the cumulative impacts (assessed against IUCN criteria with respect to the total known population) to:

- perennial significant flora individuals
- annual and ephemeral significant flora locations.

These results are presented and discussed in the updated ERD.

Table 4.4 Significance of Cumulative Impact to Total Known Population – Perennial Significant Flora Taxa Individuals

Taxon	Status (WA)	Status (EPBC)	Total known population (#)	Approved regional impact i.e. CCAC (#)	Approved regional impact (% of total population) [Proxy for observed population size reduction]	Meets IUCN Criteria for Species Listing based on population size approved (observed) reduction	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of total population) [Projected population size decline]	Meets IUCN Criteria for Species Listing based on total population and projected population size reduction
Acacia karinae	P3	-	46,724	6,936	14.8	No	1,347	2.9	No
Allocasuarina tessellata	P3	-	28,612	7	0.0	No	583	2.0	No
Grevillea globosa	P3	-	996	125	12.6	No	175	17.6	No Population <2,500 but <20% decline in 5 years.
Grevillea scabrida	P3	-	12,700	7	0.1	No	944	7.4	No
Lepidosperma sp. Blue Hills (A. Markey & S. Dillon 3468)	P1	-	78,528	38,898	49.5	Meets criteria for Vulnerable listing (>30% of population reduction observed, cause has not ceased)	223	0.3	No
Persoonia pentasticha	P3	-	1,329	150	11.3	No	364	27.4	Meets criteria for Endangered Population <2,500 and >20% decline in 5 years.

Table 4.5 Significance of Cumulative Impact to Total Known Population – Annual and Ephemeral Significant Flora Taxa Locations

Taxon	Status (WA)	Status (EPBC)	Total known no. locations (estimated population)	Approved regional impact i.e. CCAC (#)	Approved regional impact (% of total population) [Proxy for observed population size reduction]	Meets IUCN Criteria for Species Listing based on population size approved (observed) reduction	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of total population) [Projected population size decline]	Meets IUCN Criteria for Species Listing based on total population and projected population size reduction
Caesia sp. Koolanooka Hills (R. Meissner & Y. Caruso 78)	P1	-	269 (population ~800-1,000 individuals)	7	2.6	No	172	63.9	Meets criteria for Endangered Population <2,500 and >20% decline in 5 years.
Calotis sp. Perrinvale Station (R.J. Cranfield 7096)	P3	-	69 (population ~11,000-40,000 individuals)	3	4.3	No	28	40.6	No
Gunniopsis divisa	P3	-	133 (population ~3,000-30,000 individuals)	3	2.3	No	21	15.8	No
Rhodanthe collina	P3	-	841 (population ~7-24 million)	67	8.0	No	347	41.3	No

4.2 Vegetation and Communities

4.2.1 Mitigated Residual Impacts – Vegetation and Communities

Table 4.6 and **Table 4.7** show the updated impact assessment that supersedes findings previously presented in Section 7.1.2 and Section 7.1.3, respectively of the Flora and Vegetation Impact Assessment (Umwelt, 2025b). The tables present the mitigated residual impacts (previously approved, proposed and combined impacts) to:

- Vegetation types
- Blue Hills Priority Ecological Community.

These results are presented and discussed in the updated ERD.

Table 4.6 Mitigated Residual Impacts in Mine Region – Vegetation Types

VT	Extent in Survey Area (ha)	Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of DE extent)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of DE extent)	Combined impact – Combined Proposal mitigated DF (ha)	Combined impact – Combined Proposal mitigated DF (% of DE extent)	Proposed indirect impact – Extent in mitigated indirect impact zone (ha)
A	291.9	291.9	45.2	15.5	65.9	22.6	111.2	38.1	5.4
B	112.4	112.4	1.7	1.5	3.8	3.4	5.5	4.9	5.4
C	327.4	327.4	5.9	1.8	0.7	0.2	6.7	2.0	-
D	2,445.6	2,445.6	231.0	9.4	342.4	14.0	573.4	23.4	29.3
E	671.2	671.2	49.5	7.4	28.3	4.2	77.8	11.6	5.0
F	367.1	367.1	26.3	7.2	13.2	3.6	39.5	10.8	4.1
G	1,576.5	1,576.5	267.4	17.0	209.6	13.3	477.0	30.3	5.7
H	139.9	139.9	11.2	8.0	70.2	50.2	81.5	58.2	1.7
I	10.4	10.4	2.0	19.4	-	-	2.0	19.4	-
J	99.4	99.4	-	-	-	-	-	-	-
K	313.8	313.8	94.6	30.1	29.5	9.4	124.1	39.5	3.1
L	51.0	51.0	20.4	40.0	-	-	20.4	40.0	-
M	18.2	18.2	1.1	6.0	-	-	1.1	6.0	-
N	10.7	10.7	8.9	82.6	-	-	8.9	82.6	-
O	546.7	546.7	145.1	26.5	86.9	15.9	232.1	42.4	11.1
P	620.3	620.3	64.3	10.4	47.6	7.7	111.9	18.0	5.8
Q	1,689.5	1,689.5	54.0	3.2	101.5	6.0	155.5	9.2	6.4
R	786.0	785.7	131.9	16.8	104.4	13.3	235.3	39.9	7.5
S	453.0	453.0	19.7	4.4	80.7	17.8	100.4	22.2	9.5
T	187.5	187.4	12.5	6.7	-	-	12.5	6.7	-
U	64.3	64.3	-	-	-	-	-	-	-
V	0.4	0.4	0.4	100.0	-	-	0.4	100.0	-
W	0.6	0.6	0.6	100.0	-	-	0.6	100.0	-
X	0.2	0.2	0.2	100.0	-	-	0.2	100.0	-
Y	1.8	1.8	1.8	100.0	-	-	1.8	100.0	-
Z	0.7	0.7	0.7	100.0	-	-	0.7	100.0	-
AA	0.2	0.2	0.2	100.0	-	-	0.2	100.0	-
AB*	-	-	-	-	-	-	-	-	-
HMVT A	0.1	0.1	0.1	100.0	-	-	0.1	100.0	-
HMVT B	0.2	0.2	0.2	100.0	-	-	0.2	100.0	-
HMVT C	0.1	0.1	0.1	100.0	-	-	0.1	100.0	-
HMVT D	4.7	-	-	-	-	-		-	-
HMVT E	1.7	-	-	-	-	-		-	-
HMVT F	2.0	-	-	-	-	-		-	-
HMVT G	3.3	1.0	1.0	100.0	-	-	1.0	100.0	-
CP	6.7	6.7	-	-	-	-		-	-
PL	3.9	0.3	0.3	100.0	-	-	0.3	100.0	-
Water	1.6	1.6	0.0	1.1	-	-	0.0	1.1	-
CL	2,756.4	2,694.7	2,321.2	86.1	1.5	0.1	2,319.1	86.1	0.1

*VT AB was only calculated as part of the indirect impact zone for the Flora and Vegetation Impact Assessment (Umwelt, 2025b), this area has since been removed from the assessed area.

Table 4.7 Mitigated Residual Impacts in Mine Region – Listed Ecological Communities (Including Cumulative Impacts)

Community	Original Extent in Region (ha)	Extent in Combined Proposal mitigated DE including CCAC (ha)	Historical Impact in Region* (ha original extent)	Historical Impact in Region (% of original extent)	Approved impact from MS 805 & 806 (ha of original extent)	Approved impact from MS 805 & 806 (% of original extent)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha of original extent)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of original extent)	Combined impact – Combined Proposal mitigated DF (ha of original extent)	Combined impact – Combined Proposal mitigated DF (% of original extent)	Total Cumulative Impact – Historical + Proposal mitigated DF (ha of original extent)	Total Cumulative Impact – Historical + Proposal mitigated DF (% of original extent)	Proposed indirect impact – Extent in mitigated indirect impact zone (ha)
Blue Hills (Mount Karara/Mungada Ridge/Blue Hills) vegetation assemblages (banded ironstone formation)	7,098^	771	953ǂ	13	171	2	89	1	260	4	1,041	15	17
DBCA blue hills PEC (minus 500 m buffer zone)	8,732	2,606	1,376	16	1,064	12	391	4	1,453	17	1,767	20	45

* Includes impacts from Karara Mining Limited.

^ As per 'Total area mapped ha Pre' in Table 3.6 and 3.7 of Maia (2017).

ǂ As per 'Total existing impact in Blue Hills Impact Assessment Area before proposal impact' in Table 3.7 of Maia (2017).

4.2.2 Cumulative Impacts – Vegetation Types

Table 4.8 shows the updated impact assessment that supersedes findings previously presented in Section 7.2.1.2 of the Flora and Vegetation Impact Assessment (Umwelt, 2025b). The table presents the predicted cumulative impacts to Floristic Community Types (FCTs) within Regional Assessment Area 1 (RAA 1). These results are presented and discussed in the updated ERD.

Table 4.8 Cumulative Direct Impact to Woodman Environmental (2012) FCTs within RAA 1

FCT	Equivalent VT(s)	Original Regional Extent in RAA 1 (ha)	Extent in All CCAC Areas in RAA 1 (ha)	Extent in All CCAC Areas in RAA 1 (% FCT in RAA 1)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% FCT extent in RAA 1)	Total Cumulative Impact – CCAC + Combined Proposal mitigated DF (ha)	Total Cumulative Impact – CCAC + Combined Proposal mitigated DF (% FCT in RAA 1)
1	O	696.3	219.5	31.5	24.2	3.5	243.6	35.0
2	O	1,623.2	71.1	4.4	10.5	0.6	81.7	5.0
3	O	156.6	-	-	-	-	-	-
4	O	190.4	0.6	0.3	5.3	2.8	5.9	3.1
5	-	108.9	-	-	-	-	-	-
6	P	1,196.4	235.3	19.7	31.9	2.7	267.2	22.3
7	Q	8,063.4	672.5	8.3	195.8	2.4	868.0	10.8
8	P	312.0	0.9	0.3		-	0.9	0.3
9	Q	3,144.2	92.0	2.9	4.8	0.2	96.8	3.1
10	P	2,259.5	240.2	10.6	50.6	2.2	290.7	12.9
11	S	1,234.1	23.4	1.9	63.1	5.1	86.5	7.0
12	O	160.6	10.3	6.4		-	10.3	6.4
13	Q	1,463.8	70.8	4.8	37.8	2.6	108.6	7.4
14	-	125.9	-	-		-	-	-
15	G	672.4	34.5	5.1		-	34.5	5.1
16	B	12.1	-	-		-	-	-
17	-	969.8	4.9	0.5		-	4.9	0.5
18	-	626.0	33.9	5.4		-	33.9	5.4
19a	G, K	12,975.6	562.5	4.3	119.6	0.9	682.1	5.3
19b	J	103.0	-	-		-	-	-
19c	-	54.5	-	-		-	-	-
19d	U	159.6	-	-		-	-	-
20	-	782.3	-	-		-	-	-
21a	K	610.8	-	-		-	-	-
21b	C	4.4	1.5	34.4		-	1.5	34.4
21c	-	36.2	-	-		-	-	-
22	-	730.2	-	-		-	-	-
23	E, F	3,008.6	54.4	1.8	0.2	0.0	54.7	1.8
24	C, H	625.3	83.5	13.4	5.7	0.9	89.2	14.3
25	D, H	213.2	21.2	9.9		-	21.2	9.9
26	D, H	4,696.9	207.5	4.4	96.8	2.1	304.3	6.5
27	D, H	4,211.1	685.0	16.3	448.8	10.7	1,133.8	26.9
28	E	879.7	16.8	1.9	1.3	0.1	18.1	2.1
29	A	599.9	6.9	1.1		-	6.9	1.1
30	-	157.9	-	-		-	-	-
31	A	1,815.8	-	-	24.6	1.4	24.6	1.4
32	A, F	3,523.2	157.3	4.5	65.5	1.9	222.7	6.3
33	CP	13.4	-	-		-	-	-
C	CL	88.8	86.5	97.4		-	86.5	97.4
Total		**58,306.0**	**3,593.0**	**6.2**	**1,186.3**	**2.0**	**4,778.9**	**8.2**

4.3 Fauna

4.3.1 Mitigated Residual Impacts – Fauna Habitat Types

Table 4.9 provides the mitigated residual impacts to fauna habitat types (vegetation community types, or Vegetation and Substrate Associations [VSAs]) based on the mitigated Proposal areas.

Table 4.10 shows the updated impact assessment (mitigated residual impacts) for habitat per conservation significant fauna species that supersedes findings previously presented in Section 7.1 of the Terrestrial Fauna Impact Assessment (Umwelt, 2025d).

These results are presented and discussed in the updated ERD.

Table 4.9 Mitigated Residual Impacts in Mine Region – Fauna Habitat Types (VSAs)

VSA	Extent in Survey Area (ha) [proxy for region]	Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of the region)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of the region)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of the region)	Proposed indirect impact – Extent in mitigated indirect impact zone (ha)
1 Breakaways and Rocky Ridges	913.7	913.7	171.5	18.8	100.1	11.0	271.6	29.7	15.5
2 Acacia Shrubland over Granite	112.4	112.4	1.7	1.5	3.8	3.4	5.5	4.9	5.4
3 Acacia Tall Shrubland	2,408.4	2,405.8	258.5	10.7	269.6	11.2	527.3	21.9	21.6
4 Acacia Shrubland with Sand Pine	2,445.6	2,445.6	231	9.4	342.4	14.0	573.4	23.4	32.4
5 Mixed Acacia and Tall Thicket (Acacia and Melaleuca)	2,309.8	2,309.8	118.2	5.1	149.1	6.5	267.4	11.6	16
6 Acacia Low Shrubland on Gravelly Rises	456.1	456.1	22.8	5.0	80.7	17.7	103.4	22.7	12.1
7 York Gum Open Woodland	1,904.4	1,900.7	364	19.1	239.1	12.6	603.1	31.7	24.2
8 *Eucalyptus clelandiorum* Woodland/Forest	64.3	64.3	-	-	-	-	-	-	-
9 Chenopod Shrubland/Salt Lakes/Clay Pans	186.1	186.1	30.5	16.4	-	-	30.5	16.4	-
10 Cleared Land	2,756.4	2,694.7	2,321.2	84.2	1.5	0.1	2,319.1	84.1	0.1
11 Creek lines	4.7	-	-	-	-	-	-	-	-
12 Planted Eucalypts	3.9	0.3	0.3	7.7	-	-	0.3	6.8	-
Water	1.6	1.6	-	-	-	-	0.0	1.1	-

Table 4.10 Mitigated Residual Impacts in Mine Region – Habitat for Conservation Significant Fauna

Species	Status	Habitat VSAs	Habitat VSAs Extent in Survey Area (ha)	Habitat VSAs Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of the Survey Area)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of the Survey Area)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of the Survey Area)	Proposed indirect impact – Extent in mitigated indirect impact zone (ha)
Frogs											
Desert Trilling Frog	• Locally significant	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12 and water	13,381.3	13,305.0	3,489.2	26.1	1,186.3	8.9	4,671.1	34.9	127.4
Reptiles											
Gilled Slender Blue-tongue	• VU (WA)	1, 2, 3, 7 and 11	5,343.7	5,332.6	795.7	14.9	612.6	11.5	1,407.5	26.3	66.8
Mulga Dragon	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
Reticulated Velvet Gecko	• Locally significant	7	1,904.4	1,900.7	364.0	19.1	239.1	12.6	603.1	31.7	24.2
Western Spiny-tailed Skink	• VU (WA) • EN (EPBC)	7	1,904.4	1,900.7	364.0	19.1	239.1	12.6	603.1	31.7	24.2
Birds											
Bush Stone-curlew	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
Crested Bellbird	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
Major Mitchell's Cockatoo	• Locally significant	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12 and water	13,381.3	13,305.0	3,489.2	26.1	1,186.3	8.9	4,671.1	34.9	127.4
Malleefowl –habitat (nesting/foraging)	• VU (WA) • VU (EPBC)	3, 4 and 6	5,310.1	5,307.5	512.3	9.6	692.6	13.0	1,204.1	22.7	66.2
Malleefowl – habitat (foraging only)		7 and 11	1,909.2	1,900.7	364.0	19.1	239.1	12.5	603.1	31.6	24.2
Peregrine Falcon	• OS (WA)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and water	13,567.5	13,491.1	3,519.7	25.9	1,186.3	8.7	4,701.5	34.7	127.4
Redthroat	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
Regent Parrot	• Locally significant	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and water	13,567.5	13,491.1	3,519.7	25.9	1,186.3	8.7	4,701.5	34.7	127.4
Rufous Treecreeper	• Locally significant	7 and 8	1,968.7	1,965.0	364.0	18.5	239.1	12.1	603.1	30.6	24.2
Southern Whiteface	• VU (WA) • VU (EPBC)	3, 4, 5, 6 and 9	7,806.1	7,803.4	661.0	8.5	841.8	10.8	1,502.0	19.2	82.1
Western Yellow Robin	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
White-browed Babbler	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,471.5	19.3	82.1
White-browed Treecreeper	• Locally significant	6 and 7	2,360.5	2,356.8	386.8	16.4	319.8	13.5	706.5	29.9	36.3
Mammals											
Central Long-eared Bat	• P3 (WA)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and water	13,567.5	13,491.1	3,519.7	25.9	1,186.3	8.7	4,701.5	34.7	127.4
Kultarr	• Locally significant	3, 4, 5 and 6	7,619.9	7,617.3	630.5	8.3	841.8	11.0	1,490.9	19.3	82.1
Long-tailed Dunnart	• P4 (WA)	1, 2, 3, 7 and 11	5,343.7	5,332.6	795.7	14.9	612.6	11.5	1,423.6	26.3	66.8
Woolley's Pseudantechinus	• Locally significant	1, 2, 3, 7 and 11	5,343.7	5,332.6	795.7	14.9	612.6	11.5	1,423.6	26.3	66.8
Invertebrates											
Karara Millipede	• Locally significant • SRE	1 and 3	3,322.2	3,319.5	430.0	12.9	369.7	11.1	805.8	24.0	37.2

Species	Status	Habitat VSAs	Habitat VSAs Extent in Survey Area (ha)	Habitat VSAs Extent in Combined Proposal mitigated DE including CCAC (ha)	Approved impact from MS 805 & 806 (ha)	Approved impact from MS 805 & 806 (% of the Survey Area)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of the Survey Area)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of the Survey Area)	Proposed indirect impact – Extent in mitigated indirect impact zone (ha)
Millipede sp. nov. 'PM1'	• Locally significant • SRE	1 and 3	3,322.2	3,319.5	430.0	12.9	369.7	11.1	805.8	24.0	37.2
Mt Gairdner Scorpion	• Locally significant • SRE	1 and 3	3,322.2	3,319.5	430.0	12.9	369.7	11.1	805.8	24.0	37.2
Northern Shield-backed Trapdoor Spider	• P3 (WA) • VU (EPBC)	1, 3, 5, 6	6,088.0	6,085.4	571.0	9.4	599.5	9.8	1,187.3	19.2	65.2
Ornate Trapdoor Spider	• EN (WA)	4, 5, 6 and 7	7,115.9	7,112.2	736.0	10.3	811.3	11.4	1,572.1	21.7	84.7
Unidentified trapdoor spider*	• Locally significant	2	112.4	112.4	1.7	1.5	3.8	3.4	5.5	4.9	5.4

**Aganippe* (*Idiosoma*) sp.

4.3.2 Mitigated Residual Impacts – Fauna Habitat Values

Table 4.11, **Table 4.12** and **Table 4.13** were not explicitly presented in Terrestrial Fauna Impact Assessment (Umwelt, 2025d). These tables have been prepared to address regulator comments and present mitigated residual impacts to:

- Malleefowl mounds (active and historic)
- Western Spiny-tailed Skink active and potential colony sites (recorded suitable log piles)
- Trapdoor Spider burrows per species.

The calculation of fauna habitat values in approved impact areas is based on available monitoring and survey data, which largely focuses on areas outside of approved and cleared areas. Therefore, these tables do not accurately represent the actual impact from previous approvals.

These results are presented and discussed in the updated ERD.

Table 4.11 Mitigated Residual Impacts in Mine Region – Malleefowl Mounds

Category	Total Combined Population (based on BCE and KML Records)	Recorded in Combined Proposal mitigated DE (#)	Approved impact from MS 805 & 806 (#) ^	Approved impact from MS 805 & 806 (% of records)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of records)	Combined Impact – Combined Proposal mitigated DF (#)	Combined Impact – Combined Proposal mitigated DF (% of records)	Proposed indirect impact – Extent in mitigated indirect impact zone (#)
Active / recently active mounds (classed as active any year from 2020 onwards)	15	10	1	6.7	2	13.3	3	20.0	0
Historic	789	278	128	16.2	27	3.4	153	19.4	4
TOTAL	**804**	**288**	**129**	**16.0**	**29**	**3.6**	**156**	**19.4**	**4**

Table 4.12 Mitigated Residual Impacts in Mine Region – Western Spiny-tailed Skink Log Piles

Category	Total Combined Population (based on BCE and KML Records)	Recorded in Combined Proposal mitigated DE (#)	Approved impact from MS 805 & 806 (#) ^	Approved impact from MS 805 & 806 (% of records)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of records)	Combined Impact – Combined Proposal mitigated DF (#)	Combined Impact – Combined Proposal mitigated DF (% of records)	Proposed indirect impact – Extent in mitigated indirect impact zone (#)
Active colonies (scats present or individual sighted)	123	29	9	7.3	7	5.7	16	13.0	2
Potential colony sites (potentially suitable log piles)	758	593	100	13.2	326	43.0	426	56.2	8
TOTAL	**881**	**622**	**109**	**12.4**	**333**	**37.8**	**442**	**50.2**	**10**

Table 4.13 Mitigated Residual Impacts in Mine Region – Trapdoor Spider Burrows

Category	Total Combined Population (based on BCE and KML Records)	Recorded in Combined Proposal mitigated DE (#)	Approved impact from MS 805 & 806 (#) *	Approved impact from MS 805 & 806 (% of records)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (#)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of records)	Combined Impact – Combined Proposal mitigated DF (#)	Combined Impact – Combined Proposal mitigated DF (% of records)	Proposed indirect impact – Extent in mitigated indirect impact zone (#)
Idiosoma clypeatum (previously known as *Idiosoma nigrum*) Northern Shield-backed Trapdoor Spider	177	174	0	-	29	16.4	29	16.4	0
Idiosoma formosum Ornate Trapdoor Spider	338	208	27	8.0	167	49.4	194	57.4	3
Idiosoma sp.^	98	97	1	1.0	64	65.3	65	66.3	4
TOTAL	**613**	**479**	**28**	**4.6**	**260**	**42.4**	**288**	**47.0**	**7**

* The calculation of fauna habitat values in approved impact areas is based on available monitoring and survey data, which largely focuses on areas outside of approved and cleared areas. Therefore, these tables do not accurately represent the actual impact from previous approvals.

^Trapdoor spiders recorded to genus level only.

4.3.3 Cumulative Impacts – Fauna Habitat

Table 4.14 shows the updated cumulative impact assessment to fauna habitat that supersedes findings previously presented in Section 7.2.1 of the Terrestrial Fauna Impact Assessment (Umwelt, 2025d). These results are presented and discussed in the updated ERD.

Table 4.14 Cumulative Direct Impact to Fauna Habitat Within 15 km Buffer of KIOP MLE Mitigated Disturbance Footprint

Species	Status (WA)	Status (EPBC)	Original Pre-European Extent of PEVSAs in CAA 1 (ha)	Historical Impact to PEVSAs in CAA 1 (ha)	Historical Impact to PEVSAs in CAA 1 (% of original extent)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed direct impact – KIOP MLE mitigated disturbance footprint (% of original extent)	Total Cumulative Impact to PEVSAs in CAA 1* (ha)	Total Cumulative Impact to PEVSAs in CAA 1 (% of original extent)
Frogs									
Desert Trilling Frog	-	-	520,980.4	13,068.0	2.5	6,229.7	1.2	16,990.3	3.3
Reptiles									
Gilled Slender Blue-tongue	VU	-	340,412.1	8,954.5	2.6	4,279.6	1.3	11,705.6	3.4
Mulga Dragon	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
Reticulated Velvet Gecko	-	-	119,658.4	3,540.4	3.0	1,950.1	1.6	5,492.5	4.6
Western Spiny-tailed Skink	VU	EN	119,658.4	3,540.4	3.0	1,950.1	1.6	5,490.5	4.6
Birds									
Bush Stone-curlew	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
Crested Bellbird	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
Major Mitchell's Cockatoo	-	-	520,980.4	13,068.0	2.5	6,229.7	1.2	16,990.3	3.3
Malleefowl – foraging only habitat	VU	VU	120,676.1	3,575.2	3.0	1,950.1	1.6	4,761.2	3.9
Malleefowl – nesting/foraging habitat			200,904.9	4,244.2	2.1	1,950.1	1.0	5,430.4	2.7
Peregrine Falcon	OS		537,104.7	13,283.6	2.5	7,015.0	1.3	17,212.7	3.2
Redthroat	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
Regent Parrot	-	-	537,104.7	13,283.6	2.5	7,015.0	1.3	17,212.7	3.2
Rufous Treecreeper	-	-	119,734.5	3,540.4	3.0	1,950.1	1.6	4,726.4	3.9
Southern Whiteface	VU	VU	269,945.9	4,948.2	1.8	2,735.4	1.0	6,141.3	2.3
Western Yellow Robin	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
White-browed Babbler	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
White-browed Treecreeper	-	-	194,035.2	6,694.3	3.5	3,900.2	2.0	9,051.2	4.7
Mammals									
Inland Long-eared Bat	P4	-	537,104.7	13,283.6	2.5	7,015.0	1.3	17,212.7	3.2
Kultarr	-	-	253,821.6	4,732.6	1.9	1,950.1	0.8	5,919.0	2.3
Long-tailed Dunnart	P4	-	340,412.1	8,954.5	2.6	4,279.6	1.3	11,705.6	3.4
Woolley's Pseudantechinus	-	-	340,412.1	8,954.5	2.6	4,279.6	1.3	11,705.6	3.4
Invertebrates									
Karara Millipede	-	-	155,919.8	3,761.2	2.4	1,164.7	0.7	4,940.6	3.2
Millipede sp. nov. 'PM1'	-	-	155,919.8	3,761.2	2.4	1,164.7	0.7	4,940.6	3.2
Mt Gairdner Scorpion	-	-	155,919.8	3,761.2	2.4	1,164.7	0.7	4,940.6	3.2
Northern Shield-backed Trapdoor Spider	P3	-	283,213.2	7,403.5	2.6	3,114.8	1.1	9,754.0	3.4
Ornate Trapdoor Spider	EN	-	300,150.6	7,654.0	2.6	3,900.2	1.3	10,011.1	3.3
Unidentified trapdoor spider^	-	-	63,816.2	1,618.0	2.5	1,164.7	1.8	2,782.7	4.4

*All CCAC and Combined Proposal mitigated DF impact (within CAA 1).

^*Aganippe* (*Idiosoma*) sp.

4.4 Landforms

4.4.1 Mitigated Residual Impacts – Landforms

Table 4.15 shows the mitigated residual impact assessment to landform values that supersedes findings previously presented in Section 7.2.3 of the Landforms Assessment Technical Report (Umwelt, 2025c). These results are presented and discussed in the updated ERD.

Table 4.15 Mitigated Residual Impacts – Banded Iron Formation Landform Values

Landform Value	Mapped Landform Value Area (ha)	Approved permanent impact from MS 805 & 806 (ha)	Approved permanent impact from MS 805 & 806 (% of landform area)	Proposed permanent impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed permanent impact – KIOP MLE mitigated disturbance footprint (% of landform area)	Combined Impact – Combined Proposal mitigated DF (ha)	Combined Impact – Combined Proposal mitigated DF (% of landform area)	Proposed temporary impact - Extent in mitigated indirect impact zone (ha)
Mt Karara*	506.0	357.0	70.6	32.5	6.4	389.5	77.0	6.1
Blue Hills Local Assessment Unit (LAU)	1,939.0	427.0	22.0	32.5	1.7	491.5	25.3	6.1

*Mt Karara is part of the LAU.

4.4.2 Cumulative Impacts – Landforms

Table 4.16 shows the updated cumulative impact assessment to landform values that supersedes findings previously presented in Section 7.2.3 of the Landforms Assessment Technical Report (Umwelt, 2025c). These results are presented and discussed in the updated ERD.

Table 4.16 Mitigated Residual Impacts – Banded Iron Formation Landform Values

Landform Value	Mapped Landform Value Area (ha)	Current cumulative permanent impact from approved projects in region - CCAC (ha)	Current cumulative permanent impact from approved projects in region (% of landform area)	Proposed permanent impact – KIOP MLE mitigated disturbance footprint (ha)	Proposed permanent impact – KIOP MLE mitigated disturbance footprint (% of landform area)	Total cumulative permanent impact – current + proposed (ha)	Total cumulative permanent impact – current + proposed (% of landform area)
Mt Karara*	506.0	357.0	70.6	32.5	6.4	389.5	77.0
Blue Hills Local Assessment Unit (LAU)	1,939.0	459.0	23.7	32.5	1.7	491.5	25.3

*Mt Karara is part of the LAU.

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