Pilbara Green Link Project Gap Areas Biological Assessment



Prepared for

GHD | Horizon Power

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1.0 Executive Summary

Horizon Power is proposing to construct the Pilbara Green Link project (PGL), which comprises a 330kV transmission line connecting Horizon Power's existing network at Port Hedland to the Australian Renewable Energy Hub site, approximately 250 km east. The corridor is approximately 2 km wide and will accommodate the proposed transmission line within a 70 m wide (approximate) easement.

Following an initial biological survey of the PGL corridor by Biota Environmental Sciences (Biota 2024a), some additional development areas were identified outside of the previous survey area, of the 2km wide corridor. These areas are part of early investigation works to assist in determining the alignment of the proposed transmission line. These new areas required an additional survey, as detailed in this report.

Scope and Methods of the Current Study

The biological survey reported here addressed 39 additional development areas provided by Horizon Power on 24 January 2025 ('the survey area'; 132.6 ha in extent). These areas are part of early investigations works to assist in determining the alignment of the proposed transmission line.

The botanical scope comprised a reconnaissance and targeted flora and vegetation survey (EPA 2016). This included mapping of vegetation types and condition, with appropriate floristic sampling using relevés (unbounded flora sampling sites); and targeted and opportunistic searches for significant flora species (those listed as being of elevated conservation significance at State and/or Commonwealth level).

The scope for terrestrial fauna comprised a basic fauna survey as per the relevant EPA Guidance (EPA 2020). This consisted of a field survey using a range of methods to characterise and describe the range of fauna habitats present. Foot traverses were undertaken across prospective habitat to search for evidence of significant species and to characterise fauna habitats.

Following the field survey, mapping of vegetation types, vegetation condition and fauna habitats was also extrapolated over four additional development areas and across minor boundary additions to some surveyed polygons (13.5 ha), bring the total survey area reported here to 145.4 ha in extent.

Survey Timing and Effort

The biological survey was completed by two botanists and two zoologists over a 4-day period from the 28th to 31st of January 2025. The survey timing was consistent with the recommended period for the bioregion based on technical guidance (EPA 2016, 2020), following above-average rainfall in the locality.

A total of 29 relevés were assessed in the survey area and representatively sampled all of the vegetation types present. Twenty additional mapping notes describing the vegetation types were also collected during the survey to inform the vegetation mapping. Targeted, systematic searches were conducted across the survey area focussing on significant (i.e. Threatened and Priority) species identified in the desktop study.

Fauna habitat assessments were completed at 78 sites across the survey area, representatively sampling the range of habitats present. A total of 22 foot traverses were also undertaken to search for evidence of significant species and to characterise fauna habitats.

Vegetation

Ten vegetation types were identified for the survey area from five broad landforms: drainage areas, sand dunes (one only), plains, low stony rises, and rocky outcrops and breakaways. All were recorded from the original PGL corridor; no new vegetation types were identified.

None of the vegetation types represented any Threatened Ecological Communities or Priority Ecological Communities. One riparian unit, D2, had *Eucalyptus victrix* (Coolibah) as a dominant species and would likely be considered Groundwater Dependent Vegetation. This vegetation type occurred in two moderate-sized drainage lines in the survey area (Tabba Tabba Creek and Callawa Creek).

Most of the vegetation in the survey area and additional extrapolation areas (over 97%) was in Very Good to Excellent condition. A small amount (1.5%) was cleared. Areas in poorer condition were typically associated with drainage lines or historically disturbed areas, with the main disturbance factors being weed invasion and grazing/trampling by cattle.

Flora

A total of 79 native flora species from 50 genera and 28 families were recorded during the survey, the majority of which (92%) were also recorded along the PGL corridor by Biota (2024a).

No flora species listed as Threatened at the Commonwealth or State level were recorded from the survey area, however two Priority 3 species were recorded, both from vegetation type P3 on pindan plains in the east of the survey area: *Croton aridus* and *Tribulopis marliesiae* were both recorded from 52 locations, with a total of 225 and 231 individuals recorded respectively. Three other Priority 3 flora species may occur in the area: *Bonamia oblongifolia, Indigofera ammobia,* and *Polymeria* sp. Broome (K.F. Kenneally 9759) are all widespread but scattered in the locality.

Five introduced species were recorded, one of which is a significant weed: **Calotropis procera* (Calotrope) was recorded only from TP18 on the southern side of the De Grey River, and is a Declared Pest in Western Australia. All of the weeds had been previously recorded along the PGL corridor by Biota (2024a).

Fauna

Five fauna habitats were identified within the survey area and extrapolation areas, all of which were also present in the PGL corridor (Biota 2024a):

- *Acacia* shrubland on spinifex sandplain;
- Low stony rises;
- Degraded areas;
- Minor/moderate drainage line; and
- Sand dunes.

Acacia shrubland on spinifex sandplain was the dominant habitat recorded, accounting for over 76% of the survey area and extrapolation areas, followed by low stony rises (21.3%),

degraded areas (1.53%), minor/moderate drainage lines (0.59%) and sand dunes (0.05%). None of the fauna habitats are significant; all were recorded within the original PGL survey area, and all are typical of the wider bioregion.

A total of 38 vertebrate fauna species were recorded in the survey area during the field survey, comprising two mammal species, 33 birds and three reptiles. Nine of these species were not recorded during the survey of the PGL corridor by Biota (2024a), including two significant Migratory birds, the Migratory-listed Pacific Swift (*Apus pacificus*) and Oriental Pratincole (*Glareola maldivarum*). An additional Vulnerable species, the Grey Falcon (*Falco hypoleucos*), was recorded 3.2 km outside the survey area.

An updated likelihood of occurrence assessment for significant fauna species was completed for the current study by revising the findings from the original assessment completed for the PGL corridor (Biota 2024a) to focus on the habitats occurring in the current survey area and extrapolation areas. The updated assessment indicated that 13 significant fauna species have the potential to occur, in addition to the three species already recorded above. These include three migratory bird species that would only be periodically present, and four species that are only likely to use the survey area and extrapolation areas as transiting or foraging habitat. Of the species previously identified as having the potential to occur, seven species have specific habitat requirements that are not present in the current survey area and are therefore considered unlikely to occur.

2.0 Introduction

2.1 Project Background

Horizon Power anticipates significant transmission developments in the Pilbara region of Western Australia (WA) as industry prepares to further electrify and decarbonise its operations. The electricity requirements for current and planned projects are substantial, and the need for all parties to transition to renewable energy solutions provides unique challenges for the State. The Australian Renewable Energy Hub (AREH) project is one of many private developments that the State can support to assist with this transition.

Horizon Power is proposing to construct the Pilbara Green Link project (PGL), which comprises a 330kV transmission line connecting Horizon Power's existing network at Port Hedland to the AREH site. The PGL extends approximately 250 km east of Port Hedland (see Figure 2.1). The investigation corridor is approximately 2 km wide and will accommodate the proposed transmission line within a 70 m wide (approximate) easement.

The corridor was developed by a multi-criteria analysis (MCA) taking into consideration numerous factors, including but not limited to sensitive environmental areas, cultural heritage, land zoning and tenure. By collectively considering these factors, an indicative transmission line route was generated that avoided significant impacts where practicable and minimised disturbance. A nominal buffer of approximately 2 km was then applied to define an area that various assessments, including biological surveys, could be undertaken to allow any adjustments to the transmission line route to further avoid and minimise disturbance to identified constraints.

Horizon Power engaged GHD to assist with statutory approval planning for the PGL, and GHD engaged Biota Environmental Sciences (Biota) to undertake the required biological surveys necessary to inform and support those approvals. An initial biological survey of the PGL corridor was carried out by Biota Environmental Sciences (Biota) (2024a), however some additional proposed access and investigation areas were subsequently identified outside the areas that were surveyed in 2024. These areas are part of early investigation works (geotechnical and groundwater investigations) to assist in determining the alignment of the proposed transmission line.

2.2 Survey Scope

The biological survey reported here addresses some additional disturbance envelopes for tracks, and geotechnical and groundwater drill pads outside of the previous survey extent associated with the PGL corridor, as provided by Horizon Power on 24 January 2025. A total of 39 separate areas (hereafter 'the survey area') were identified, together comprising 132.6 ha and extending over approximately 202 km east-west (Figure 2.1).

The scope of work required a basic and targeted flora and vegetation survey as detailed in the relevant Environmental Protection Authority (EPA) technical guidance (EPA 2016). A single phase field survey was completed during the wet season, which included a combination of mapping of vegetation types and vegetation condition (consistent with that completed for the PGL corridor, and supported by floristic sampling using relevés within individual vegetation types), and targeted and opportunistic searches for significant flora species.

The scope of work for terrestrial fauna required a basic fauna survey as detailed in EPA guidance (EPA 2020). This comprised a field survey to characterise the likely faunal assemblage, and to map and describe fauna habitats.

Following the current survey, four additional development areas (TP29a/BH15a, TP30a, TP31a/BH16a and TP32a) were identified on 28 April 2025 for inclusion in the current study. The biological values of these areas were assessed based on information from the current survey and the previous survey by Biota (2024a), including extrapolation of mapping of vegetation types, vegetation condition, and fauna habitats. Some extensions to the boundaries of surveyed areas were also subsequently provided on 5 May 2025 which were similarly treated. These additional development areas and boundary extensions added 13.5 ha, bring the overall survey area reported on here to 145.4 ha in extent.

Digital survey data arising from the study have been supplied in EPA's Index of Biodiversity Assessments (IBSA) format along with this report.

2.3 Significance Framework

The focus of the survey was to identify features of significance within the survey area, including flora and fauna species, fauna habitats and ecological communities. The framework for formal listing of species and communities of significance in WA is summarised in Section 2.3.1 and 2.3.2.

2.3.1 Significant Species

Native flora and fauna species that are rare, threatened with extinction, or have high conservation value, are specially protected by law as threatened species under the WA *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Migratory and Marine fauna species are also protected under the EPBC Act as Matters of National Environmental Significance (MNES).

In addition, the Department of Biodiversity, Conservation and Attractions (DBCA) maintains a list of species that are deemed a priority for conservation, which have not been assigned statutory protection under the BC Act but are still considered to be of conservation priority, or are rare but not threatened and are in need of monitoring. Appendix 1 details categories of significance recognised under the above frameworks.

2.3.2 Significant Communities

Threatened Ecological Communities (TECs) are described by the DBCA as biological assemblages occurring in a particular habitat, which are under threat of modification or destruction from various processes. TECs are significant at State-level, being protected under the BC Act, as well as having protection as Environmentally Sensitive Areas (ESAs) under the WA *Environmental Protection Act 1986* (EP Act). Some TECs are also protected at Commonwealth level under the EPBC Act. Further information regarding the classification of TECs is provided in Appendix 1.

Priority Ecological Communities (PECs) are ecological communities that are recognised at a State-level by DBCA to be of significance, but do not meet the criteria for listing as a TEC. There are five categories of PECs, none of which are currently protected under legislation (see Appendix 1).

Groundwater dependent ecosystems (GDEs) are also generally considered to be of significance. Some are listed as TECs or PECs, particularly organic mound springs and particular riparian systems with high water permanence.

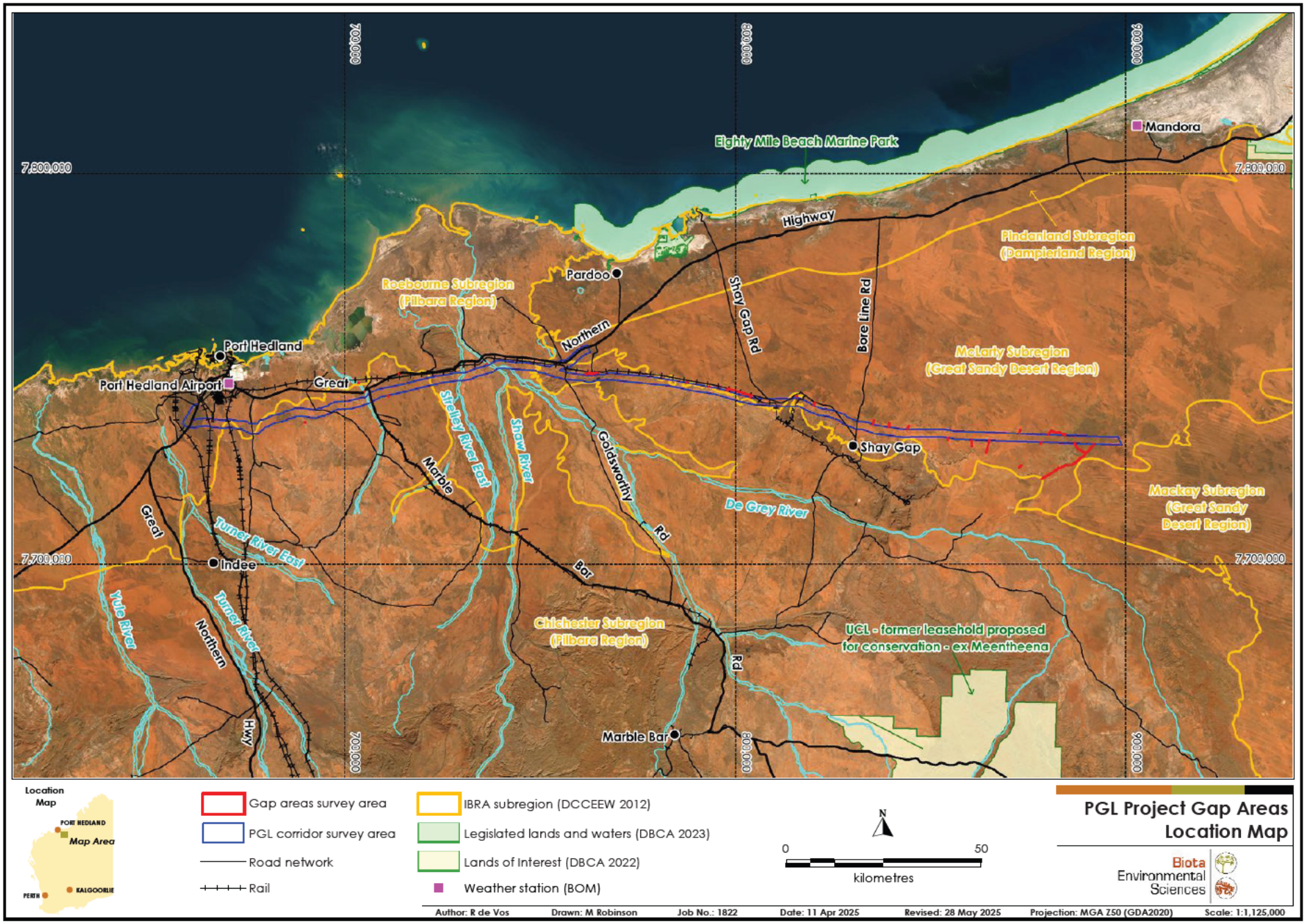

Figure 2.1: **Location of the survey area.**

3.0 Methods

3.1 Policy Framework

Our approach and methodology were prepared with reference to relevant policy documents and technical guidelines, particularly:

- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016); and
- Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020).

3.2 Desktop Study

A desktop study was undertaken as part of the original biological assessment of the PGL corridor (Biota 2024a). As the information compiled for this desktop study was recent and the study area encompassed the survey areas associated with this report, no separate desktop study was completed for the current report, however location records of significant flora and fauna were investigated to identify any additional species that should be considered.

The desktop study presented in Biota (2024a) reviewed past records of significant species and communities from the locality, and used these to produce a list of the significant flora and fauna species and significant ecological communities that may occur in the PGL corridor. For significant species or communities identified as potentially occurring, an assessment of the likelihood of occurrence was undertaken for the PGL survey area. The desktop study incorporated regional information, previous biological surveys in the survey area, and the results of database searches. This likelihood of occurrence assessment was revised for the current study to focus on the current survey area (see Section 3.3).

3.3 Assessment of Likelihood of Occurrence

The significant species and communities identified through the Biota (2024a) desktop study were reviewed, and reassessed for their likelihood to occur in the current survey area. The likelihood assessment was based on factors including previous records identified in the area through the PGL corridor (Biota 2024a), the proximity of previous records to the current survey area, knowledge of the associated landforms or habitat preferences, an assessment of the habitats present within the survey area made during the field survey, and any records obtained during the field survey. The guide used to rank the likelihood of species occurrence outlined in Table 3.1, and was adapted to assess communities. For the purposes of this report, the term “proximity” is defined as within 20 km of the survey area, while ‘locality’ is within 40 km of the survey area. The revised likelihood of occurrence assessments are provided in Appendix 2 for flora and Appendix 3 for fauna.

Table 3.1: Likelihood ranking guide for species that may occur in the survey area.

Rank / Likelihood	Criteria
Recorded	1. The species has been recorded in the survey area.
Likely to occur / High	1. There are existing records of the species in proximity to the survey area; and • the species is strongly linked to a specific habitat, which is present in the survey area; or • the species has more general habitat preferences, and suitable habitat is present.
May occur / Moderate	1. There are existing records of the species from the locality, however • the species is strongly linked to a specific habitat, of which only a small amount is present in the survey area; or • the species has more general habitat preferences, but only some suitable habitat is present. 2. There is suitable habitat in the survey area, but the species is recorded infrequently in the locality.
Unlikely to occur / Low	1. The species is linked to a specific habitat, which is absent from the survey area; or 2. Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or 3. There is some suitable habitat in the survey area, however the species is very infrequently recorded in the locality or the only records are historical (>40 years old).
Would not occur / Negligible	1. The species is strongly linked to a specific habitat, which is absent from the survey area; or 2. The species' range is very restricted and does not include the survey area; or 3. The species is not considered extant in the locality.

3.4 Survey Timing and Personnel

Areas not surveyed in the initial study by Biota (2024a) were subject to an additional field survey, during which the participation of local Traditional Owners is gratefully acknowledged. The flora, vegetation and fauna surveys were completed over a four-day period from the 28th to 31st January 2025. A summary of Biota's survey team, their roles in the survey and experience is shown in Table 3.2.

Table 3.2: Team for the current survey.

Name	Position	Survey Role	Years of Experience
[redacted]	Senior Botanist	Flora (Project manager, field team lead, vegetation mapping, data analysis, reporting)	7
[redacted]	Botanist	Flora (field team member)	2
[redacted]	Biologist	Fauna (Field team lead, data analysis, reporting)	7
[redacted]	Early Career Zoologist	Fauna (field team member, reporting)	2

3.5 Weather and Climate

Weather during a survey will influence the activity of terrestrial fauna, while conditions in the months leading up to the survey, particularly rainfall, may influence productivity and thereby the overall abundance of individuals for both flora and fauna species. The amount of rainfall preceding a botanical survey has a direct relationship with flora, influencing the number and

type of species recorded and the condition of flora and vegetation. One of the more notable effects is the increased presence of annual flora species following high rainfall, in addition to a higher likelihood of plants bearing reproductive material (flowers and/or fruit).

Given the geographic extent of the survey area, data were retrieved from two of the Bureau of Meteorology's weather stations, at Port Hedland Airport station (#4032) in the west (22.6 km northwest of the western end of the survey area), and Mandora station (#4019) in the east (84 km north of the eastern end of the survey area).

In the year preceding the field survey, both maximum and minimum temperatures slightly exceeded the median temperatures at both Port Hedland Airport (Figure 3.1) and Mandora (Figure 3.2). Rainfall was well above average at both Port Hedland and Mandora in January 2025, and Mandora also received substantial rainfall in December 2024. Rainfall in the preceding spring months was typically low.

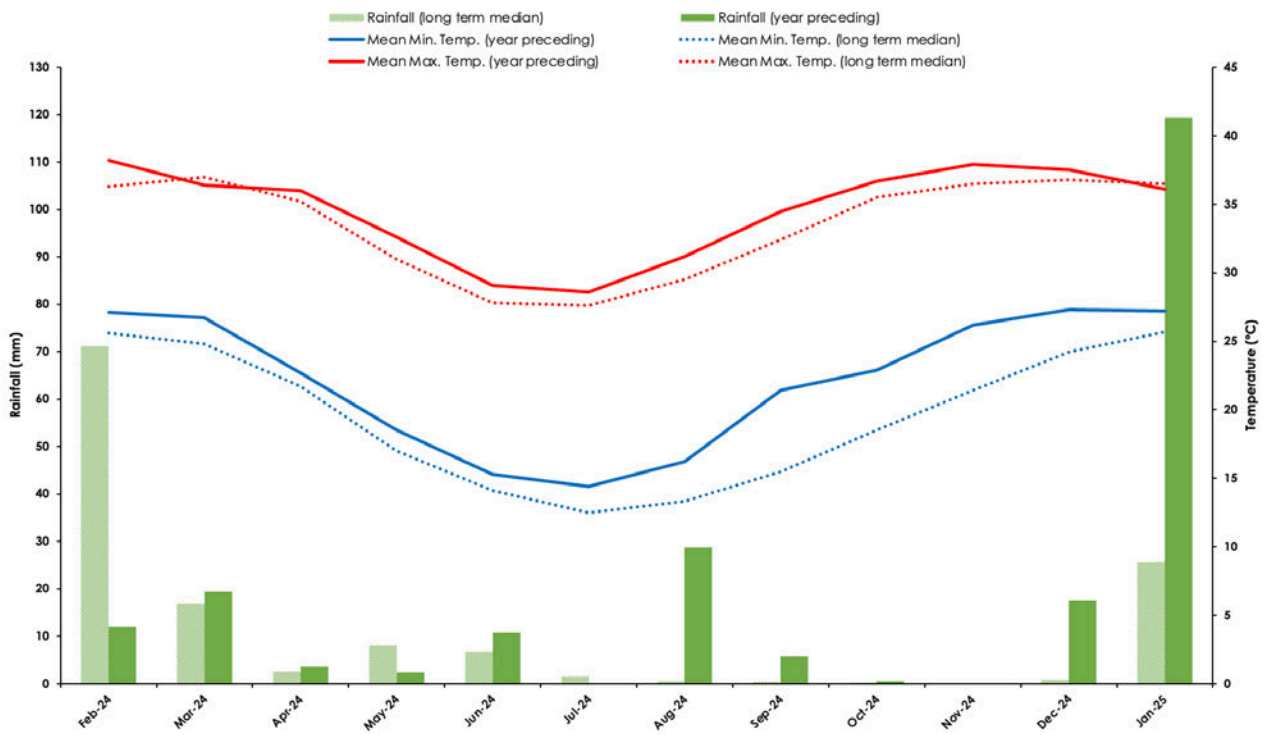

Figure 3.1: **Climate graph depicting long-term averages and monthly data for the Port Hedland Airport (#4032) weather station (data from Bureau of Meteorology).**
(Long-term data 1948-2024; black arrow indicates survey timing).

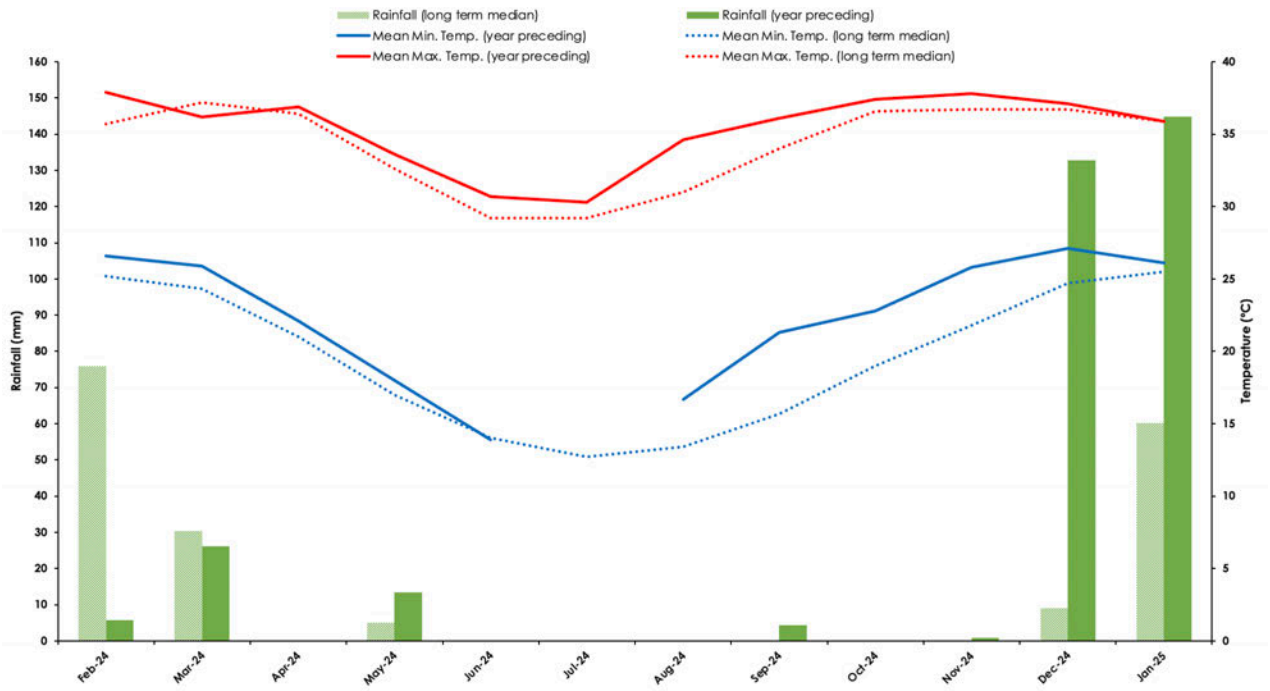

Figure 3.2: **Climate graph depicting long-term averages and monthly data for the Mandora (#4019) weather station (data from Bureau of Meteorology).**

Long-term data 1913-2024; black arrow indicates survey timing). No minimum temperature or rainfall data available for July 2024.

3.6 Reconnaissance and Targeted Flora and Vegetation Survey

3.6.1 Floristic Sampling

Indicative sites were selected prior to the field survey, based on the broad habitats and vegetation types apparent from aerial imagery. Once in the field, the actual locations of some sites were adjusted as necessary (e.g. to be placed in an area more representative of the broader vegetation type or to avoid recently burnt areas).

Given the reconnaissance survey type, flora and vegetation sampling sites were established as relevés (unbounded floristic sampling sites) and the following parameters were recorded:

1. Location coordinates[1] (±2 m) were recorded using a hand-held Global Positioning System (GPS) unit. Coordinates were recorded as a central point for the relevés, with a start and end point recorded for relevés that were undertaken in linear habitats such as creek lines.
2. Habitat: A description of the landform and habitat.
3. Soil: A broad description of the soil and any stony surface mantle or rocky outcrops, where present.
4. Fire History: An estimate of time since last fire.
5. Disturbance Details: Vegetation condition was ranked according to the scale from EPA (2016); this considers evidence of grazing, physical disturbance, weed invasion etc. (see Appendix 4).

[1] All coordinates presented in this report are in GDA2020 datum and MGA50 projection.

6. Vegetation Description: A broad description based on the height and estimated cover of dominant species after Aplin's (1979) modification of the vegetation classification system of Specht (1970) (see Appendix 4).
7. Flora Species: The estimated percentage foliar cover of each flora species present within the relevé.
8. Photograph: A representative digital photograph of the vegetation was taken, typically from the centre of a relevé. Linear vegetation types were photographed at the start and end points.

A total of 29 relevés were established in the survey area (see Appendix 5 for sampling sites). Raw data from the sites are provided in Appendix 6.

3.6.2 Vegetation Description and Mapping

The scale of vegetation mapping is influenced by a range of factors including spatial characteristics of the survey area (e.g. the size and variety of habitats present), and other factors such as the scope of the survey and the availability of current, high-resolution aerial photography. The vegetation types for this survey were described at the association level (level V as per the National Vegetation Information System; NVIS[2]). This level of detail would be considered fine-scale (intra-locality) delineation of vegetation types as per EPA (2016). In general, minor variations in the vegetation that were not clearly defined on aerial photography, did not display a high degree of differentiation from surrounding vegetation, or were not practical to accurately map in the field (e.g. minor flowlines) were incorporated into the surrounding 'parent' vegetation type.

Vegetation mapping focused on the data retrieved from the relevés and mapping notes, and also took into account data and vegetation mapping completed for the PGL corridor and for surveys associated with the AREH project (Biota 2024a, 2024b). A total of 20 mapping notes were utilised to mark the boundaries of vegetation types in the field and to allow for more accurate delineation of these boundaries following the survey.

Vegetation types and boundaries were subsequently verified using both the data collected in the field and digital imagery. Each vegetation type mapped was given an alphanumeric code, comprising a character representing the broad landform group or vegetation type (e.g. 'D' for drainage lines, 'S' for sand dunes, 'P' for plains and 'H' for low stony rises, and 'R' for rocky outcrops and breakaways), followed by a number sequence. Wherever possible, codes and vegetation descriptions were kept consistent with those mapped by previous studies (Biota 2024a, 2024b).

Note that additional areas adjacent to the original PGL corridor were added subsequent to the current field survey. Mapping was required to be extrapolated over areas that were not surveyed:

- Four additional 100 x 100 m areas (TP29a/BH15a, TP30a, TP31a/BH16a and TP32a) adjacent to or partly overlapping the original PGL corridor were added subsequent to the current field survey; TP31a/BH16a was also partly overlapped by one of the current gap areas, the access track for TP31/GH16. These four additional areas were at their furthest points within 165 m of the previously surveyed areas. There is a high degree of confidence

[2] See the NVIS Information Hierarchy: https://www.dcceew.gov.au/environment/environment-information-australia/national-vegetation-information-system.

in the attribution of vegetation types (as well as vegetation condition and fauna habitats) for these areas, due to the consistency of the aerial imagery signatures across the surveyed and unsurveyed areas, and the proximity of the surveyed areas.

- A subset of 19 of the polygons that were assessed in the current field survey were slightly enlarged and/or partially shifted subsequent to the survey. In the most substantial cases polygons increased from a 68 x 65 m area to a 100 x 100 m area, but some represented very minor changes requiring extrapolation over areas less than 10 m wide. All 19 polygons were substantially (and sometimes almost entirely) overlapped by previously surveyed areas. Again, there is a high degree of confidence in the extrapolated mapping of vegetation types, vegetation condition and fauna habitats over these unsurveyed areas, as the aerial imagery signatures were consistent and there was substantial overlapping mapping that had been prepared based on field sampling.
- One polygon (DS01a) was added approximately 300 m west of the area previously surveyed for DS01a; this was 108-118 x 96 m in size. The aerial imagery signatures within this polygon were not particularly consistent with those from the original DS01a area, but were similar enough to those approximately 1.8 km north in the original PGL corridor to have reasonable confidence in the assigned P1b vegetation type and Very Good vegetation condition, and high confidence in the fauna habitat attribution as Acacia shrubland on spinifex sandplain.

The codes and a full description of each vegetation type are presented in Section 5.1. Vegetation condition mapping was also prepared using the categories from EPA (2016).

Vegetation maps were created and consolidated using Geographical Information System (GIS) software (QGIS and MapInfo Professional). All maps in this report were produced by Melissa Robinson (Principal GIS Cartographer at Biota).

3.6.3 Searches for Significant Flora and Weeds

Targeted systematic searches were conducted through all habitats in the survey area focussing on significant (i.e. Threatened and Priority) species identified in the desktop study (see Section 4.1). Track logs illustrating search effort and vehicle access routes are shown in Appendix 5.

Locations of any significant species were recorded using a handheld GPS unit. The number of individuals and extent of the population were also recorded for each location.

Locations of introduced flora species (weeds) were also recorded during foot traverses, along with an actual count or estimate of their population size. These latter searches were particularly focussed on weeds of management concern; i.e. Declared Pests under the WA *Biosecurity and Agriculture Management Act 2007* (the BAM Act) and Weeds of National Significance (WONS). Other weeds were opportunistically recorded, but there was no attempt to record locations of all species.

3.6.4 Specimen Identification, Nomenclature and Data Entry

Common taxa that were well known to the survey botanists were identified in the field. A voucher specimen was collected if the taxon was either difficult to determine without closer examination, belonged to a recognised species complex, was poorly collected or otherwise unusual. Voucher specimens of significant species were also collected for lodgement with

the WA Herbarium as required. Each voucher specimen was assigned a unique internal code to facilitate tracking of data. Specimens were pressed in the field and then returned to Perth for further examination and confirmation.

Voucher specimens were identified using all available flora keys, and comparison with reference collections of specimens at the WA Herbarium and in-house at Biota. Specimens were identified by Biota botanists with assistance from Pierre-Louis de Kock (consultant specialist taxonomist and Principal of dK Botanical).

All data were entered into a Microsoft Access database maintained at Biota, which was developed by Ted Griffin at the request of Malcolm Trudgen (M.E. Trudgen & Associates). Nomenclature and significance rankings used in this report are consistent with the current listing of WA flora recognised by the WA Herbarium on Florabase[3] at the time of writing (WA Herbarium 2025).

3.7 Basic Fauna Survey

A basic fauna survey was conducted as per the relevant EPA Guidance (EPA 2020). A Regulation 27 'Fauna taking (biological assessment) licence' was not required, as the survey did not constitute disturbance of fauna under the BC Act.

Fauna sampling sites are shown on the survey effort maps in Appendix 5.

3.7.1 Fauna Habitat Assessment

A preliminary review of the fauna habitats present in the survey area was conducted by examination of the existing data from the PGL corridor (Biota 2024a), aerial photography and thematic layers including geology, soils, and regional vegetation mapping. Ground-truthing of preliminary fauna habitat mapping was conducted in the field while traversing on foot through the survey area.

Fauna habitat assessments were completed at all search locations and sampling sites, and wherever distinctions in habitat were evident. Habitat descriptions included soil type, landform, any notable microhabitats present, disturbance (e.g., fire, weeds, grazing, evidence of introduced fauna), broad vegetation characteristics and representative photographs. The habitat descriptions and detailed vegetation mapping were then used to define and map the fauna habitats. Fauna habitat types were extrapolated over the four additional areas (TP29a/BH15a, TP30a, TP31a/BH16a and TP32a) based on interpretation of aerial imagery.

3.7.2 Opportunistic Records

Foot traverses were undertaken when prospective habitat was encountered to search for evidence of significant species and to characterise fauna habitats within the current survey area. Searches were mostly focused on the collection of secondary evidence of the occurrence of significant fauna, including tracks, burrows, diggings, scats and remains, however any opportunistic sightings of other fauna were also recorded. Some areas observed to be in poor condition (e.g. recently burnt) were not searched as they were unlikely to support significant fauna.

[3] http://florabase.dbca.wa.gov.au

3.8 Survey Limitations

In accordance with the relevant EPA technical guidance (EPA 2016, 2020), potential constraints and limitations of this biological survey are addressed in Table 3.3.

Table 3.3: Potential constraints and limitations of the biological survey.

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	Several large surveys have been undertaken in the locality, including in proximity to the current survey area, and the survey by Biota (2024a) provided a considerable amount of recent data that is directly relevant to the current study. Extensive regional data is also available from DBCA databases to place the significant species from the survey area in context. Contextual information was not a limitation.
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	All field personnel were suitably qualified and had previous Pilbara survey experience. Both of the team leads had more than 5 years of experience, as recommended by the EPA (2016, 2020). Competency was not considered to be a limitation.
3. Proportion of species recorded and/or collected, any identification issues	All vascular flora encountered in the survey area were recorded, with collections made of any taxa that were unusual, or difficult to identify without microscopic examination. A total of 79 native flora species from 50 genera and 28 families were recorded from the survey area, along with five weed species. This is in keeping with the relatively small size of the survey area, the limited habitats present, and the reconnaissance nature of the survey. All but two of the flora taxa were able to be identified to the lowest level possible within the current taxonomic framework, and neither of the two unidentified taxa represent significant species. All terrestrial vertebrate fauna species encountered within the survey area were able to be identified with confidence. The overall identification and proportion of species recorded were not considered to be limitations, given the scope of the surveys.
4. Appropriate area fully surveyed (effort and extent)	Flora and vegetation sampling was completed through all representative habitats in the survey area, and a total of 29 relevés and 20 mapping notes were completed. Targeted searches for significant flora were completed in representative areas of all prospective habitat, in keeping with the reconnaissance and targeted level of the survey. Basic fauna habitat characterisation was conducted across most survey areas either on foot or via helicopter overflight. Opportunistic searches for secondary evidence of significant species were conducted in prospective habitat on foot. Mapping of vegetation types, vegetation condition and fauna habitats for four areas (TP29a/BH15a, TP30a, TP31a/BH16a and TP32a) was completed by interpreting the photographic signatures apparent on aerial imagery, in combination with the adjacent mapping prepared by Biota (2024a). No sampling was completed in these areas. Overall, effort and extent were not considered to be limitations, given the scope of the surveys undertaken.
5. Access restrictions within the survey areas	Parts of the survey area were not accessible by vehicle, however a helicopter was utilised to access these areas. All fauna habitat types present in the survey area were surveyed either via ground-truthing or overflight. Access was not a significant limitation.

Potential Constraint	Statement of Limitations
6. Survey timing, rainfall, season of survey	The flora and vegetation survey was undertaken in late January 2025, which is during the wet season in the Pilbara region. The recommended season for a primary survey in the Eremaean Province as per EPA (2016) is 6-8 weeks post wet season, which is typically March – June, however rainfall in December and January prior to the survey was well above average. Conditions were optimal for the collection of annual species, particularly the Priority 3 herb *Tribulopis marliesiae*. Rainfall and survey timing were not limitations for the flora survey.
7. Disturbance that may have affected the results of survey such as fire, flood or clearing	Some small sections of the survey area have been previously cleared, many of which are minor tracks that are now overgrown. Parts of the survey area were recently burnt. While there were generally sufficient unburnt remnant patches remaining (or regenerating and juvenile plants) to be able to characterise the vegetation, this was sometimes difficult for very recently burnt areas. Extensively burnt areas were surveyed via helicopter flyover, rather than on-ground surveys. Fire was considered a limitation for the flora survey, but one that is typically encountered during surveys in the Eremaean Province. It is not considered a major limitation for the overall survey adequacy.

4.0 Desktop Study Results

The complete desktop study for the PGL corridor is provided in Biota (2024a). A summary of the findings from that study that are relevant to the current survey area is provided in Sections 4.1 to 4.3, including updated likelihood of occurrence assessments for significant species and communities.

4.1 Significant Flora

The desktop study for the PGL corridor (Biota 2024a) identified 36 significant flora species as having been previously recorded from the study area, comprising 11 Priority 1 species, three Priority 2 species, 19 Priority 3 species and three Priority 4 species. No Threatened flora species were returned by the desktop study, and none are listed for the Great Sandy Desert bioregion. Figure 4.1 shows the spatial location of all significant flora returned by the DBCA database search, together with the locations recorded in the PGL survey (Biota 2024a).

Three additional records of Priority 3 flora occur just to the south of the eastern end of the PGL corridor study area but within 40 km of the easternmost polygon in the current survey area (the access track for TP50):

- *Rostellularia adscendens* var. *latifolia*, 32.2 km south;
- *Pterocaulon xenicum*, 38 km southeast; and
- *Euphorbia australis* var. *glabra*, 39.2 km southeast.

These are the most northern records to date for all three species, and their distributions are not known to extend as far north as the current survey area. These species are therefore unlikely to occur in the survey area and are not considered further.

Based on the Biota (2024a) desktop study, nine Priority flora species were considered to have some potential to occur in the current survey area prior to the field survey, given the proximity of previous records and the presence of suitable or potential habitat (Table 4.1). These formed the target species for the field survey.

Table 4.1: Significant flora considered to have the potential to occur in the current survey area prior to the field survey.

Taxon	Habitat	Pre-survey Likelihood of Occurrence Assessment
Priority 2		
Goodenia hartiana	Sand dunes, swales and sandplains.	**Likely to occur** at the eastern end of the survey area; suitable habitat present and two records in proximity.
Priority 3		
Bonamia oblongifolia	Pindan plains.	**Likely to occur**; suitable habitat present and records in proximity.
Croton aridus	Sand dunes and sandplains.	**Likely to occur** in the eastern third of the survey area; multiple records in proximity, including a number within 1 km.
Euphorbia clementii	Gravelly hillsides and stony grounds.	**Likely to occur**; two records less than 400 m from BH12.

Taxon	Habitat	Pre-survey Likelihood of Occurrence Assessment
Euploca mutica	Loamy and/or sandy plains.	**May occur:** one record in proximity; multiple records in the locality, but mostly west of the current survey area.
Indigofera ammobia	Sandplains, sand dunes and swales.	**Likely to occur** in the eastern half of the survey area if sand dunes are present; one record in proximity.
Polymeria sp. Broome (K.F. Kenneally 9759)	Pindan plains.	**May occur** in eastern half of the survey area; suitable habitat and one record in proximity.
Tribulopis marliesiae	Pindan plains.	**Likely to occur** in the eastern third of the survey area; suitable habitat and recorded at multiple locations, including a number within 1 km.
Priority 4		
Bulbostylis burbidgeae	Granitic soils and granite outcrops.	**May occur**; suitable habitat may be present; a single record within 1.7 km.

None of the other 27 species recorded in the PGL corridor by Biota (2024a) were considered to have the potential to occur in the current survey area. In particular:

- Although the Priority 3 species *Euphorbia inappendiculata* var. *queenslandica* and *Euphorbia inappendiculata* var. *inappendiculata* were recorded 3 km and just over 5 km west of BH12, respectively, no suitable clay plain habitat was present in the current survey area.
- The closest records of the Priority 3 *Abutilon* sp. Pritzelianum (S. van Leeuwen 5095) are approximately 23 km west of the westernmost component of the current survey area, and this species is not known to extend this far east.

4.2 Significant Communities

A total of 65 TECs are listed for WA, with two occurring in each of the Pilbara and Great Sandy Desert bioregions (DBCA 2023a). No TECs were identified for the study area, and the current survey area does not contain suitable habitat for any of these communities (they comprise vegetation associated with mound springs and clay plains, and a stygofaunal community from an inland aquifer).

A total of 390 PECs are listed for WA, including 43 from the Pilbara bioregion and several from the Dampierland or Great Sandy Desert bioregions (DBCA 2023b).

Two of these PECs are known to occur in the study area (Figure 4.2):

- The closest occurrence of the Priority 3 'Lime Land System' PEC is over 23 km north of the survey area. This PEC is described as "Calcareous plains supporting soft and hard spinifex grasslands and melaleuca shrublands" (DBCA 2023b).
- The Priority 3 'Eighty Mile Land System' PEC occurs over 27 km north and is associated with near-coastal habitats.

Neither of these PECs would occur in the current survey area, as no suitable habitat is present.

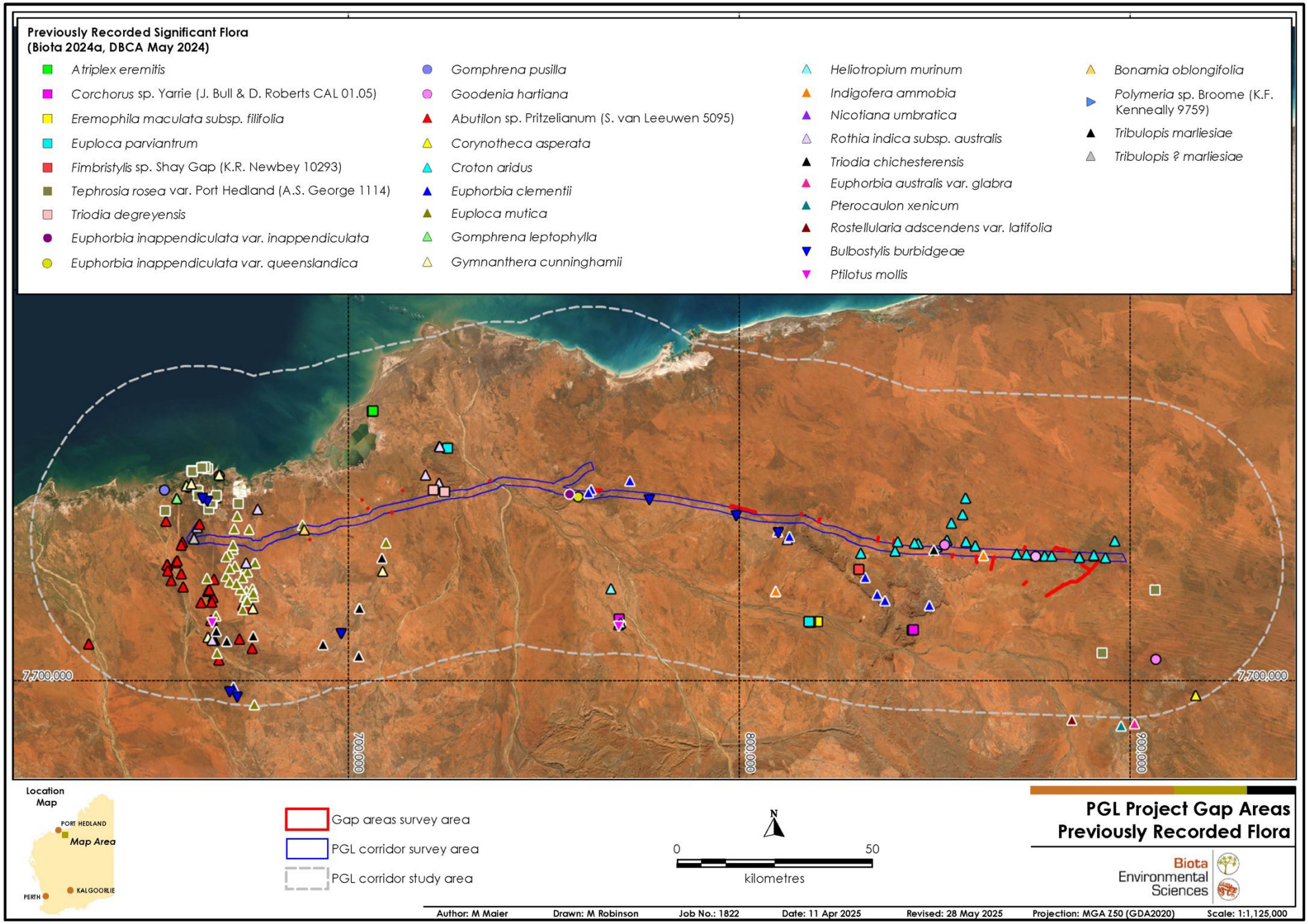

Figure 4.1: **Previous significant flora records from the study area.**

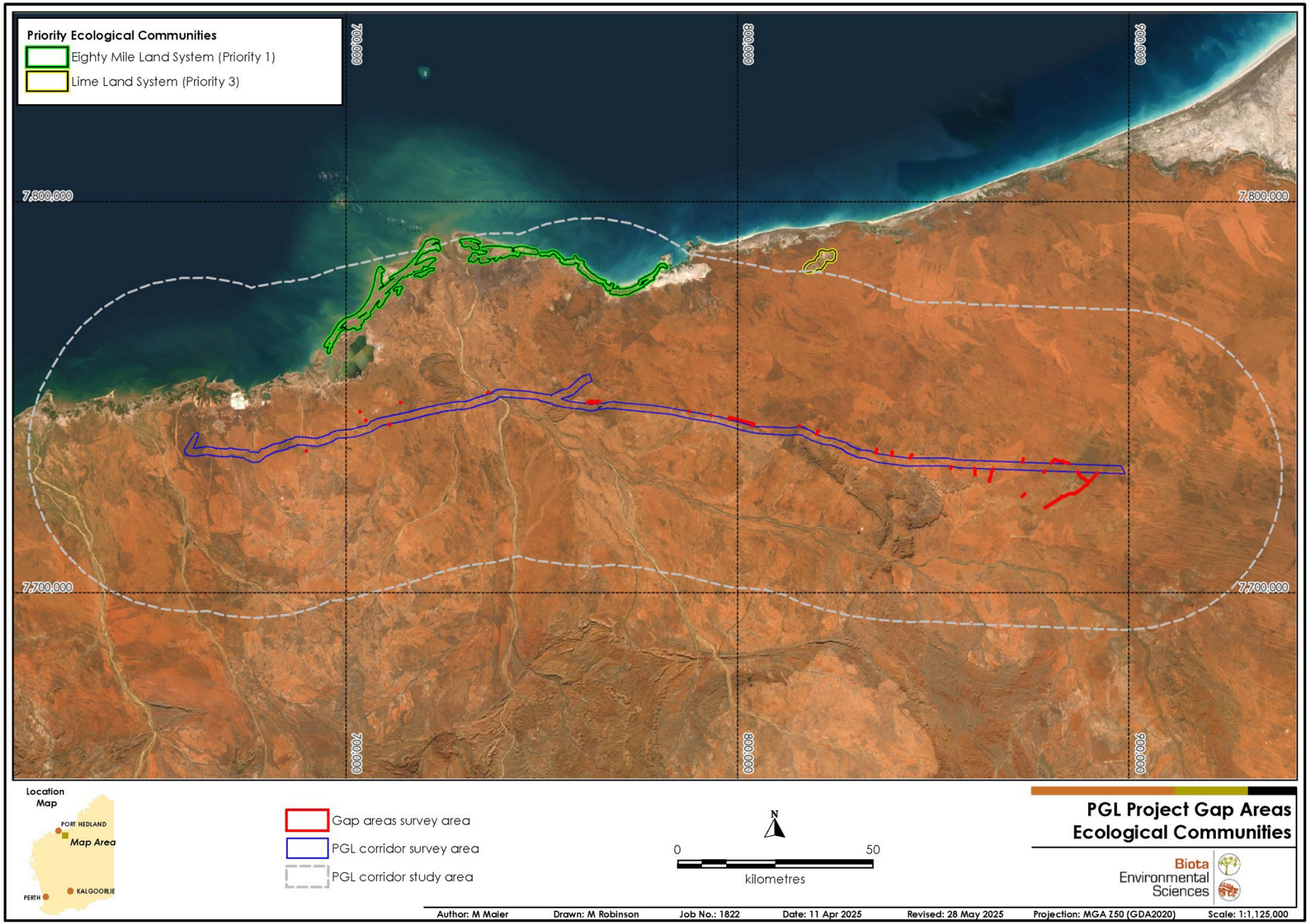

Figure 4.2: **Significant ecological communities in the study area.**

4.3 Significant Vertebrate Fauna and Assemblage

A total of 460 vertebrate fauna species were identified as potentially occurring in the PGL corridor based on the desktop study (Biota 2024a). Of these, 74 are listed as significant species. The locations of previous records of significant fauna are mapped Figure 4.3 and Figure 4.4.

For the current survey area, the likelihood of occurrence of significant species was assessed (Table 4.2). This assessment took into account previous records identified in the area through the PGL corridor (Biota 2024a), available habitat in the survey area, and findings from the current field survey. The likelihood of occurrence assessment from Biota (2024a) is shown in Appendix 3. A total of 16 species were assessed as potentially occurring in the survey area, including seven mammals, seven birds and two reptile species (Table 4.2).

Table 4.2: Significant fauna species potentially occurring in the survey area.

Species Name	Common Name	Status		Likelihood of Occurrence
		State	Commonwealth	
Mammals				
Dasycercus blythi	Brush-tailed Mulgara, Ampurta	P4		Likely to occur
Dasyurus hallucatus	Northern Quoll	EN	EN	Likely to occur
Macrotis lagotis	Bilby, Dalgyte	VU	VU	Likely to occur
Lagorchestes conspicillatus	Spectacled Hare-wallaby	P4		May occur
Pseudomys chapmani	Western Pebble-mound Mouse	P4		Likely to occur
Rhinonicteris aurantia Pilbara form	Pilbara Leaf-nosed Bat	VU	VU	Likely to occur (foraging only)
Macroderma gigas	Ghost Bat	VU	VU	Likely to occur (foraging only)
Birds				
Apus pacificus	Pacific Swift	MI	MI	Recorded
Anarhynchus veredus	Oriental Plover	MI	MI	May occur
Numenius minutus	Little Curlew	MI	MI	May occur
Glareola maldivarum	Oriental Pratincole	MI	MI	Recorded
Gelochelidon macrotarsa	Australian Tern	MI	MI	Likely to occur
Falco hypoleucos	Grey Falcon	VU	VU	Recorded
Falco peregrinus	Peregrine Falcon	OS		Likely to occur
Reptiles				
Lerista separanda	Dampierland plain slider	P2		May occur
Liasis olivaceus barroni	Pilbara Olive Python	VU	VU	May occur

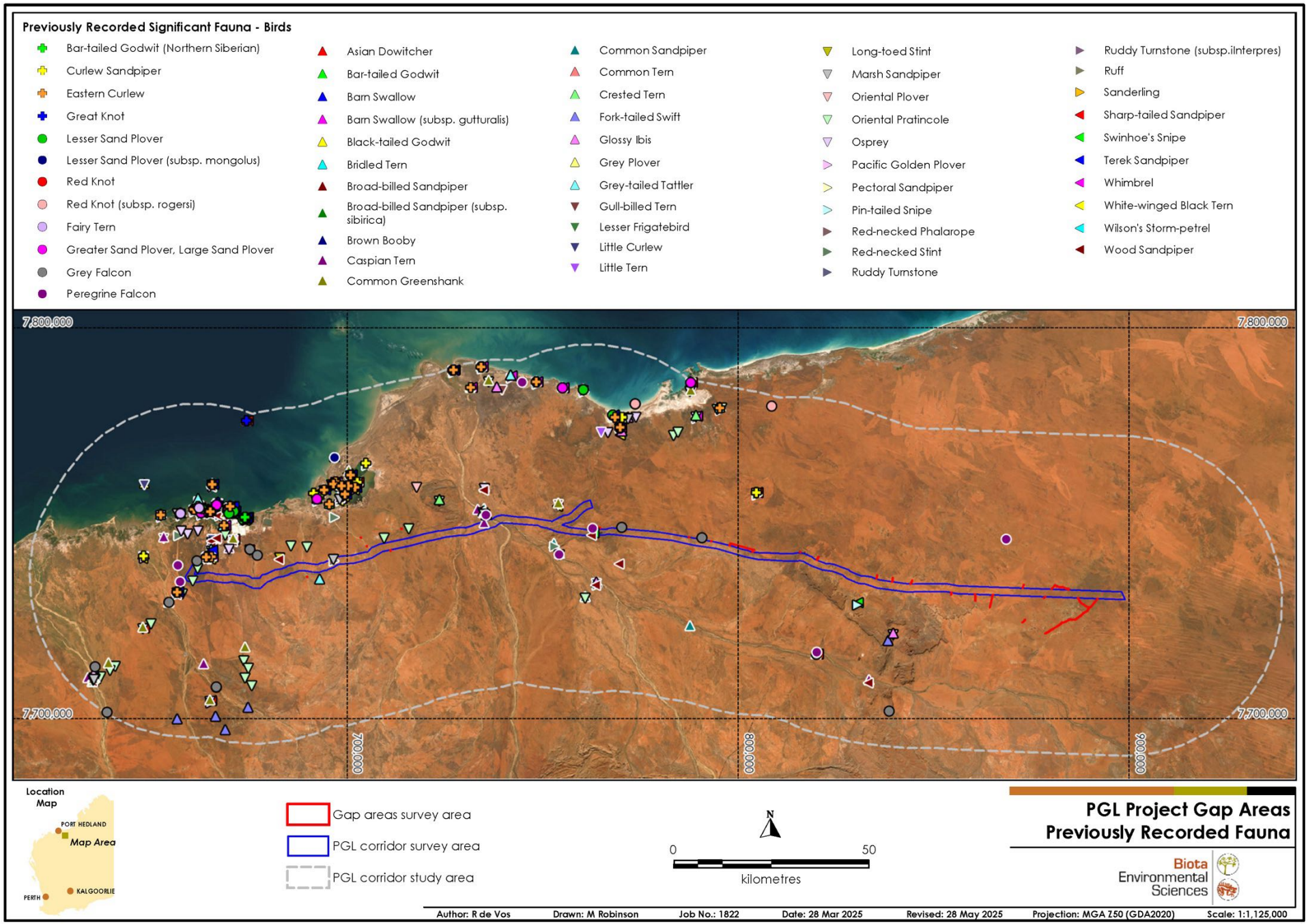

Figure 4.3: **Previous significant birds recorded from the study area.**

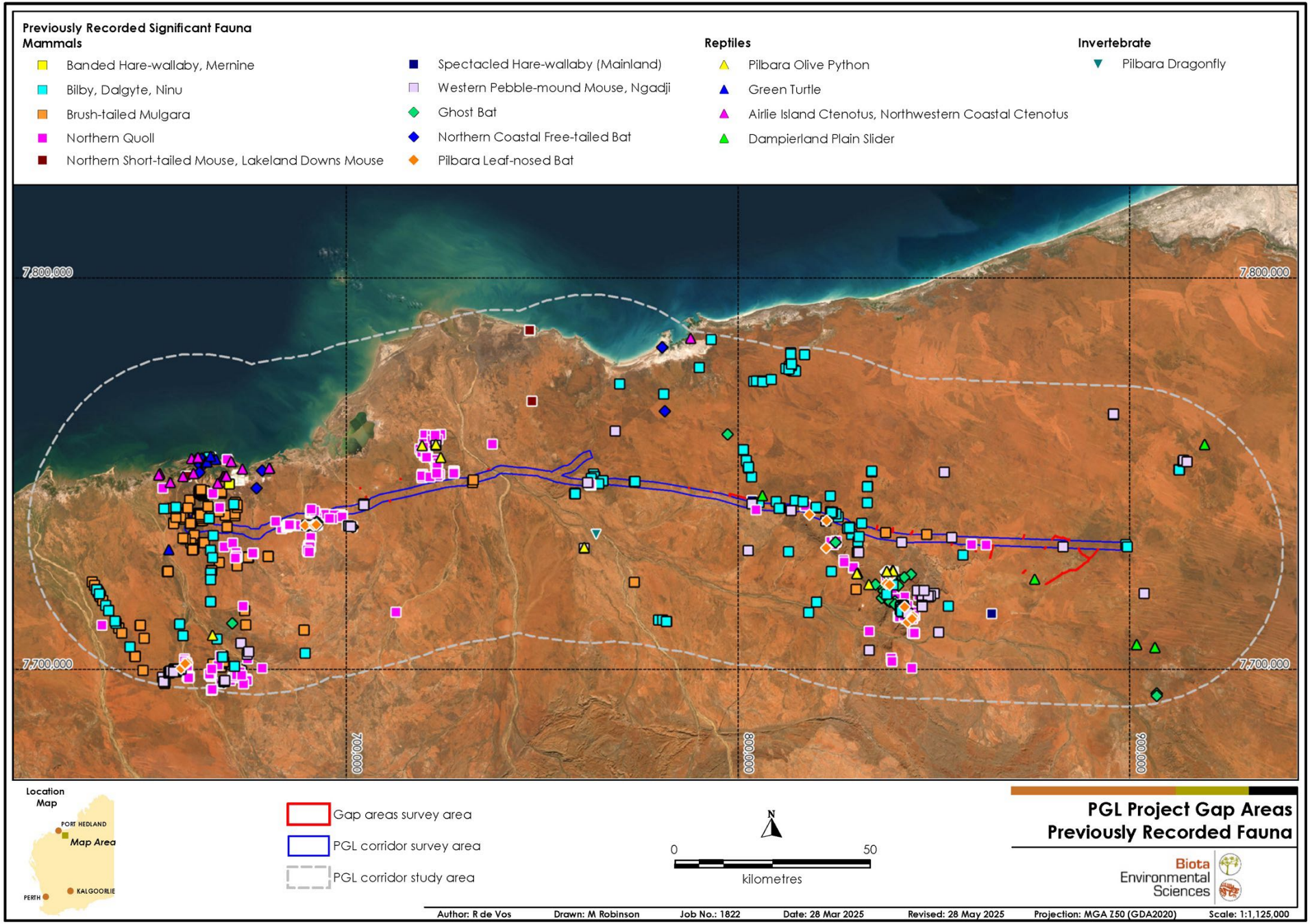

Figure 4.4: **Previous significant mammals and reptiles recorded from the study area.**

5.0 Survey Results

5.1 Vegetation

5.1.1 Overview of Vegetation Types

Ten vegetation types were identified from the survey area, associated with five broad landforms:

- drainage areas;
- sand dunes;
- plains;
- low stony rises; and
- rocky outcrops and breakaways.

Areas that had been cleared of vegetation, generally for roads and tracks, were mapped separately.

Vegetation types are mapped in Appendix 7 and summarised in Table 5.1. A brief overview is provided below, with more detailed descriptions in Sections 5.1.2.1 to 5.1.2.5.

Drainage areas
Two moderate sized drainage lines were intersected by the survey area: Tabba Tabba Creek and Callawa Creek. Both supported vegetation type D2, which comprised a riparian woodland dominated by *Eucalyptus victrix* (Coolibah) over a tall *Acacia trachycarpa* (Minni Ritchi) shrubland over mixed native and weedy tussock grasses and a very open hummock grassland of *Triodia epactia* (Humpback Spinifex).

There were also numerous minor drainage lines dissecting the rocky outcrops (vegetation type R2a). These supported an upper stratum of scattered low trees of *Corymbia* spp. (bloodwoods) over tall *Acacia* (wattle) shrubs over an open hummock grassland of mainly *Triodia epactia*. These were not mapped separately due to their small size but are described below (Section 5.1.2.5).

Sand dunes
A single linear sand dune was intersected by the survey area, supporting vegetation type S2. While this dune had been very recently burnt, based on the species remaining the vegetation could be determined to comprise scattered *Corymbia zygophylla* (Broome Bloodwood) low trees over a mixed shrubland over a very open hummock grassland of *Triodia schinzii* (Feathertop Spinifex). This is consistent with the inland sand dunes unit S2 mapped as part of the AREH development envelope by Biota (2024b).

Plains
Four plains vegetation types were mapped (one with two subtypes), differentiated based on a combination of location, substrate, and the dominant tree, shrubs and spinifex species present. The P1 vegetation type was the dominant plains unit located in the western half of the PGL survey area (Biota 2024a). The subtype P1a was typically dominated by wattles, particularly *Acacia inaequilatera* (Baderi) tall shrubs over *Acacia ancistrocarpa* (Fitzroy Wattle) and *Acacia stellaticeps* (Northern Star Wattle) over *Triodia epactia* open hummock

grassland. Unit P1b occurred on floodplains adjacent to the De Grey River and had occasional trees to a low woodland of *Eucalyptus victrix* and *Corymbia hamersleyana*, over a tall open shrubland of *Acacia colei* (Kalkardi, or Cole's Wattle) and an open hummock grassland of *Triodia epactia*.

The P2 vegetation type also occurred on floodplains adjacent to the De Grey river, but had scattered trees of *Lysiphyllum cunninghamii* (Bauhinia) over a tall shrubland of *Acacia inaequilatera*. In the broader PGL corridor, the ground layer was dominated by a very open hummock grassland of *Triodia ? longiceps* (Giant Grey Spinifex) (Biota 2024a), however the introduced tussock grasses **Cenchrus ciliaris* (Buffel Grass) and **C. setiger* (Birdwood Grass) were dominant in the current survey area.

The P3 vegetation type was the dominant plain unit in the eastern half of the survey area, typically consisting of *Corymbia zygophylla* (Broome Bloodwood) scattered low trees over a tall shrubland of mixed *Acacia* species over an open to very open hummock grassland of *Triodia schinzii* and *T. epactia*. The P3 vegetation type is representative of the P3 unit mapped on pindan soils of the AREH development envelope (Biota 2024b). Two Priority 3 species were recorded from numerous locations within this vegetation type (see Section 5.2.2).

The P4 vegetation type occurred in the central section of the survey area, and consisted of scattered *Corymbia hamersleyana* low trees over a mixed *Acacia* and *Grevillea wickhamii* (Wickham's Grevillea) tall open shrubland over a mixed open hummock grassland dominated by *Triodia epactia*.

Low stony rises

Low stony rises were mapped as two separate vegetation types. The H1a vegetation unit is a subtype of the H1 unit that was mapped in the AREH development envelope (Biota 2024b), and occurred in the eastern section of the PGL corridor (Biota 2024a). This subtype consisted of tall shrubs of *Grevillea wickhamii* over a low open shrubland of *Acacia hilliana* (Hill's Tabletop Wattle) and *Acacia adoxa* var. *adoxa* (Grey Whorled Wattle) over a hummock grassland dominated by *Triodia scintillans*.

The H2b vegetation unit is a subtype of vegetation type H2, which was widespread particularly in granite areas in the centre of the PGL corridor (Biota 2024a). This subtype considered of scattered low trees of *Corymbia hamersleyana* scattered low trees over a low shrubland of *Acacia stellaticeps* and *Acacia bivenosa* (Nerved Wattle) over an open hummock grassland of *Triodia epactia*.

Rocky outcrops and breakaways

Two broad vegetation types associated with rocky outcrops and breakaways were mapped in the survey area:

- R2d comprised scattered tall shrubs of *Acacia inaequilatera* and *Grevillea* spp. over an open hummock grassland of Triodia epactia. Minor drainage lines through these areas supported vegetation unit R2a, which had a dense shrub layer of *Acacia tumida* var. pilbarensis and *A. acradenia*.
- R5a occurred only in the BH18 Borehole Investigation Pad. This unit comprised scattered tall shrubs of *Acacia inaequilatera* over an open hummock grassland of *Triodia epactia*.

Table 5.1: Summary of vegetation types recorded from the survey area.

Broad Landform	Vegetation		Description	Extent in Survey Area	
	Type	Sub-Type		Hectares	Proportion
Drainage Areas	D2	-	*Eucalyptus camaldulensis* subsp. *refulgens* and/or *Eucalyptus* victrix open to low open woodland over *Melaleuca argentea* tall open scrub to open woodland over *Acacia trachycarpa, Acacia colei* tall shrubland over *Corchorus* ? *incanus* subsp. *incanus* scattered low shrubs over *Triodia epactia* open to very open hummock grassland over **Cenchrus* spp. scattered to very open tussock grassland.	0.6 ha	0.4%
Sand Dunes	S2	-	*Corymbia zygophylla* scattered low trees over *Acacia* spp. scattered tall shrubs over *Dicrastylis doranii* low open shrubland over *Triodia schinzii* very open hummock grassland over *Aristida holathera* var. *holathera* scattered tussock grasses.	0.1 ha	0.1%
Plains	P1	a	*Acacia inaequilatera* scattered tall shrubs over *Acacia ancistrocarpa* scattered shrubs over *Acacia stellaticeps* scattered to low open shrubland over *Triodia epactia* scattered tussocks to open hummock grassland.	2.7 ha	1.9%
		b	*Eucalyptus victrix* low woodland over *Corymbia hamersleyana* scattered low trees over *Acacia colei* var. *colei* tall open shrubland over *Triodia epactia* open hummock grassland.	1.7 ha	1.2%
	P2	-	*Lysiphyllum cunninghamii* scattered low trees over *Acacia inaequilatera* tall shrubland over *Triodia* ? *longiceps* very open hummock grassland.	1.0 ha	0.7%
	P3	-	*Corymbia zygophylla* scattered low trees to low open woodland over *Grevillea refracta* subsp. *refracta, Acacia tumida, Acacia ancistrocarpa, Acacia eriopoda, Acacia monticola* tall open shrubland over *Jacksonia aculeata, Croton aridus* low open shrubland over *Triodia schinzii (T. epactia)* open to very open hummock grassland.	89.3 ha	61.4%
	P4	-	*Acacia inaequilatera, Acacia ancistrocarpa, Grevillea wickhamii* tall open shrubland over *Acacia stellaticeps* low open shrubland over *Triodia epactia (T. wiseana, T. angusta)* open to very open hummock grassland.	16.6 ha	11.4%
Low Stony Rises	H1	a	*Grevillea wickhamii* scattered tall shrubs *Acacia hilliana, Acacia stellaticeps* low open shrubland over *Triodia scintillans* hummock grassland to open hummock grassland.	21.4 ha	14.7%
	H2	b	*Corymbia hamersleyana* scattered low trees over *Acacia stellaticeps*, *Acacia bivenosa* low shrubland to open shrubland over *Triodia epactia* open to very open hummock grassland.	6.7 ha	4.6%
Rocky Outcrops and Breakaways	R2	a	*Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis, Acacia acradenia* tall open scrub over *Triodia epactia* (*T. wiseana*) open to very open hummock grassland *over* **Cenchrus ciliaris* scattered tussock grasses.	0.3 ha	0.2%
		d	*Acacia inaequilatera, Grevillea* spp. scattered tall shrubs over *Triodia epactia* open hummock grassland.	1.9 ha	1.3%
	R5	a	*Acacia inaequilatera* scattered tall shrubs over *Triodia epactia* open to very open hummock grassland.	1.0 ha	0.7%
Other mapping units					
Cleared			Cleared vegetation for roads, rail and mining areas.	2.2 ha	1.5%

5.1.2 Description of Vegetation Types

Note that the "other associated species" in the descriptions below are drawn from the descriptions in Biota (2024a); while indicative of the broad vegetation type, they may not always be relevant to the specific components of the current survey area.

5.1.2.1 Vegetation of Drainage Areas

Vegetation type D2 was recorded from various moderate to large drainage lines in the PGL corridor, including at Devils Creek, King Edward River, Turner River and tributaries of the De Grey River (Biota 2024a). The drainage lines supporting *Eucalyptus camaldulensis* subsp. *refulgens* (River Gum) were larger in scale than those dominated by *E. victrix* (Coolibah).

D2:	***Eucalyptus camaldulensis* subsp. *refulgens* and/or *Eucalyptus victrix* open to low open woodland over *Melaleuca argentea* tall open scrub to open woodland over *Acacia trachycarpa, Acacia colei* tall shrubland over *Corchorus ? incanus* subsp. *incanus* scattered low shrubs over *Triodia epactia* open to very open hummock grassland over **Cenchrus* spp. scattered to very open tussock grassland.**
Distribution and Extent	This vegetation type was recorded from two moderate drainage lines: Tabba Tabba Creek, in the northern section of development area DS_01b; and from Callawa Creek in the access track for TP50. In these areas, the dominant overstorey tree was *Eucalyptus victrix* (Plate 5.1).
Other Associated Species	Trees/Tall Shrubs: *Corymbia flavescens, Corymbia hamersleyana*. Shrubs: **Calotropis procera*. Low Shrubs: *Afrohybanthus aurantiacus, Arivela viscosa, Crotalaria cunninghamii, Tephrosia* sp. B Kimberley Flora (C.A. Gardner 7300). Climbers: *Cynanchum floribundum, *Passiflora foetida* var. *hispida, Tinospora smilacina*. Grasses: *Cymbopogon ambiguus*. Herbs: *Euphorbia australis* var. *subtomentosa, Ptilotus fusiformis, Trianthema pilosum*.
Vegetation Condition	Very Good; cattle activity and some weeds.
Sites in the Survey Area	GAP02, GAP13; only two sections of moderate drainage line intersected by survey area, so no additional sites sampled.
Sites from Previous Surveys	HPL135, HPL146, HPL156, HPL157, HPL166 and HPL167 (Biota 2024a).



Plate 5.1: Vegetation type D2 (GAP02).

5.1.2.2 Vegetation of Sand Dunes

S2:	***Corymbia zygophylla* scattered low trees over *Acacia* spp. scattered tall shrubs over *Dicrastylis doranii* low open shrubland over *Triodia schinzii* very open hummock grassland over *Aristida holathera* var. *holathera* scattered tussock grasses.**
Distribution and Extent	This vegetation type is representative of unit S2 from the AREH development envelope (Biota 2024b), which was also recorded in the eastern half of the PGL survey area (Biota 2024b). Within the current survey area, this vegetation type was recorded from a single sand dune along the access track for TP46.
Other Associated Species	Trees/Tall Shrubs: *Grevillea stenobotrya*. Shrubs: *Calytrix carinata*. Grasses: *Triodia epactia*. Herbs: *Trianthema pilosum*.
Vegetation Condition	Likely to be Excellent; entire area was recently burnt at time of survey (Plate 5.2).
Sites in the Survey Area	Not sampled with a site as recently burnt.
Sites from Previous Surveys	HPL040 and HPL042 (Biota 2024a).



Plate 5.2: Vegetation type S2.

5.1.2.3 Vegetation of Plains

Vegetation types P1a and P1b are sub-units of vegetation type P1 from Biota (2024a).

P1a:	***Acacia inaequilatera* scattered tall shrubs over *Acacia ancistrocarpa* scattered shrubs over *Acacia stellaticeps* scattered to low open shrubland over *Triodia epactia* scattered tussocks to open hummock grassland.**
Distribution and Extent	This vegetation sub-type was the dominant type on flat sandy clay loam plains in the western half of the PGL survey area (Biota 2024a). Within the current survey area, it occurred only in DS_03a, on the southern side of the Great Northern Highway; 6.1 km southwest along the access track for BH07/TP13; and in MRD01 (Plate 5.3 and Plate 5.4).
Other Associated Species	Trees/Tall Shrubs: *Acacia sericophylla, Acacia tumida* var. *pilbarensis, Corymbia hamersleyana, Grevillea pyramidalis* subsp. *leucadendron, Hakea lorea* subsp. *lorea*. Shrubs: *Dodonaea coriacea*. Low Shrubs: **Aerva javanica, Bonamia alatisemina, Bonamia erecta, Pluchea tetranthera, Ptilotus astrolasius, Sida* sp. Pilbara (A.A. Mitchell PRP 1543). Climbers: *Cassytha capillaris, Tinospora smilacina*. Grasses: *Eriachne mucronata, Triodia secunda*. Herbs: *Trigastrotheca molluginea*.
Vegetation Condition	Excellent to Very Good; minor cattle activity and weed presence.
Sites in the Survey Area	GAP03, GAP04, GAP28.
Sites from Previous Surveys	HPL143, HPL144, HPL145, HPL149, HPL150, HPL152, HPL158, HPL159, HPL164, HPL168, HPL169, HPL170, HPL171, HPL173, HPL174, HPL175, HPL177, HPL178, HPL179, HPL180 and HPL181 (Biota 2024a).



Plate 5.3: Vegetation type P1a (GAP04).



Plate 5.4: Vegetation type P1a (GAP28).

P1b:	***Eucalyptus victrix* low woodland over *Corymbia hamersleyana* scattered low trees over *Acacia colei* var. *colei* tall open shrubland over *Triodia epactia* open hummock grassland.**
Distribution and Extent	This vegetation sub-type occurred towards Port Hedland in DS_01a, adjacent to a tributary of Petermarer Creek; and in DS_01b, on the southern side of Tabba Tabba Creek (Plate 5.5 and Plate 5.6).
Other Associated Species	Trees/Tall Shrubs: *Corymbia deserticola* subsp. *deserticola*. Shrubs: *Capparis spinosa* subsp. *nummularia*. Grasses: *Chrysopogon fallax*.
Vegetation Condition	Very Good; some cattle activity.
Sites in the Survey Area	GAP01, GAP29
Sites from Previous Surveys	HPL172 (Biota 2024a).



Plate 5.5: Vegetation type P1b (GAP01).



Plate 5.6: Vegetation type P1b (GAP29).

P2:	***Lysiphyllum cunninghamii* scattered low trees over *Acacia inaequilatera* tall shrubland over *Triodia* ? *longiceps* very open hummock grassland.**
Distribution and Extent	This vegetation type was located on the floodplains adjacent to the De Grey River and occurred only in TP18 (Plate 5.7).
Other Associated Species	Trees/Tall Shrubs: *Corymbia flavescens, Hakea lorea* subsp. *lorea*. Shrubs: **Calotropis procera, *Vachellia farnesiana*. Low Shrubs: *Carissa lanceolata, Pluchea tetranthera*.
Vegetation Condition	Poor to Good; cattle activity (heavy grazing) and weed presence (including the Declared Pest **Calotropis procera,* and considerable cover of **Cenchrus* spp.).
Sites in the Survey Area	GAP23.
Sites from Previous Surveys	HPL128 and HPL129 (Biota 2024a).



Plate 5.7: **Vegetation type P2 (GAP23).**

P3:	***Corymbia zygophylla* scattered low trees to low open woodland over *Grevillea refracta* subsp. *refracta, Acacia tumida, Acacia ancistrocarpa, Acacia eriopoda, Acacia monticola* tall open shrubland over *Jacksonia aculeata, Croton aridus* low open shrubland over *Triodia schinzii (T. epactia)* open to very open hummock grassland.**
Distribution and Extent	This vegetation type was the dominant type on flat plains in the eastern half of the survey area, including in the areas between the access track for TP48 (pt 1) and the access track between TP49/BH2 and TP50, and along various access tracks for BH20/TP39, TP31/BH16, TP36, TP40, TP41/BH21, TP43/BH22, TP44, TP45/BH23, and TP46 (Plate 5.8 and Plate 5.9). This vegetation type is representative of the P3 unit from the AREH development envelope (Biota 2024b).
Other Associated Species	Trees/Tall Shrubs: *Acacia sericophylla, Grevillea wickhamii, Hakea macrocarpa*. Shrubs: *Calytrix carinata, Seringia* ? *exastia*. Low Shrubs: *Afrohybanthus aurantiacus, Bonamia erecta, Dampiera candicans, Halgania solanacea* var. *solanacea, Isotropis atropurpurea, Lysiandra eremica, Ptilotus astrolasius, Ptilotus calostachyus, Sida* sp. Pindan (B.G. Thomson 3398), *Tephrosia* sp. D Kimberley Flora (R.D. Royce 1848). Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Eriachne lanata, Eriachne obtusa, Sorghum plumosum* var. *plumosum*. Sedges: *Bulbostylis barbata*. Herbs: *Tribulopis marliesiae* (Priority 3), *Trigastrotheca molluginea, Zornia chaetophora*.
Vegetation Condition	Mostly Excellent, occasionally Very Good; minor cattle activity.
Sites in the Survey Area	GAP05, GAP06, GAP08, GAP09, GAP10, GAP17, GAP18, GAP19, GAP20, GAP21.
Sites from Previous Surveys	HPL022, HPL025, HPL026, HPL031, HPL034, HPL035, HPL037, HPL038, HPL039, HPL041, HPL046, HPL047, HPL052, HPL067, HPL069 and HPL087 (Biota 2024a).



Plate 5.8: **Vegetation type P3 (GAP08).**



Plate 5.9: **Vegetation type P3 (GAP17).**

P4:	***Acacia inaequilatera, Acacia ancistrocarpa, Grevillea wickhamii* tall open shrubland over *Acacia stellaticeps* low open shrubland over *Triodia epactia (T. wiseana, T. angusta)* open to very open hummock grassland.**
Distribution and Extent	This vegetation type was located on flat plains in the central portion of the survey area, including in Camp TP1 to Camp TP5, CB_01, DS_05, TP24, and the associated access tracks (Plate 5.10 and Plate 5.11).
Other Associated Species	Trees/Tall Shrubs: *Acacia sericophylla, Acacia sphaerostachya*. Shrubs: *Gossypium australe*. Low Shrubs: *Bonamia erecta, Hibiscus sturtii, Indigofera monophylla, Pluchea tetranthera, Ptilotus polystachyus, Tephrosia rosea* var. *clementii*. Climbers: *Cassytha capillaris*. Grasses: *Chrysopogon fallax*.
Vegetation Condition	Very Good; minor cattle activity.
Sites in the Survey Area	GAP24, GAP25.
Sites from Previous Surveys	HPL088, HPL091, HPL093, HPL094, HPL095, HPL095A and HPL098 (Biota 2024a).



Plate 5.10: **Vegetation type P4 (GAP24).**



Plate 5.11: **Vegetation type P4 (GAP25).**

5.1.2.4 Vegetation of Low Stony Rises

H1a:	***Grevillea wickhamii* scattered tall shrubs *Acacia hilliana, Acacia stellaticeps* low open shrubland over *Triodia scintillans* hummock grassland to open hummock grassland.**
Distribution and Extent	The H1a vegetation type is a sub-unit of the H1 unit from the AREH development envelope (Biota 2024b), which occurred on low rocky rises in the eastern half of the PGL survey area (Biota 2024a). Within the current survey area, it was recorded from the access track between TP48 and TP49/BH25, the access track for TP50, the access track between TP49/BH25 and TP50, and the access track for TP41/BH21(Plate 5.12 and Plate 5.13).
Other Associated Species	Shrubs: *Calytrix carinata*. Low Shrubs: *Acacia adoxa* var. *adoxa*, *Afrohybanthus aurantiacus*, *Bonamia alatisemina*, *Codonocarpus cotinifolius*, *Dampiera candicans*, *Halgania solanacea* var. *solanacea*, *Mirbelia viminalis*, *Ptilotus calostachyus*, *Tephrosia* sp. Bungaroo Creek (M.E. Trudgen 11601). Grasses: *Amphipogon sericeus, Triodia epactia*. Sedges: *Fimbristylis simulans*. Herbs: *Trigastrotheca molluginea*.
Vegetation Condition	Excellent.
Sites in the Survey Area	GAP11, GAP12, GAP14, GAP15, GAP16.
Sites from Previous Surveys	HPL020, HPL023, HPL024, HPL027, HPL028, HPL036 and HPL050 (Biota 2024a).



Plate 5.12: Vegetation type H1a (GAP11).



Plate 5.13: Vegetation type H1a (GAP14).

H2b:	***Corymbia hamersleyana* scattered low trees over *Acacia stellaticeps*, *Acacia bivenosa* low shrubland to open shrubland over *Triodia epactia* open to very open hummock grassland.**
Distribution and Extent	This vegetation sub-type was located on stony calcrete, chert and quartz plains in the overarching vegetation type H2 in the centre of the PGL survey area (Biota 2024a). Within the current survey area, it was recorded only from DS_07a and the access track for TP31/BH16 (Plate 5.14).
Other Associated Species	Trees/Tall Shrubs: *Acacia ancistrocarpa, Acacia orthocarpa, Acacia tumida* var. *pilbarensis, Grevillea wickhamii, Hakea lorea* subsp. *lorea, Petalostylis labicheoides*. Shrubs: *Acacia adoxa* var. *adoxa, Acacia arida, Carissa lanceolata*. Low Shrubs: *Afrohybanthus aurantiacus, Bonamia* ? *pilbarensis, Bonamia alatisemina, Bonamia erecta, Dampiera candicans, Goodenia* ? *scaevolina, Indigofera monophylla, Isotropis atropurpurea, Ptilotus calostachyus, Scaevola amblyanthera* var. *centralis*, *Sida* sp. Pilbara (A.A. Mitchell PRP 1543), *Tephrosia* sp. Bungaroo Creek (M.E. Trudgen 11601). Grasses: *Chrysopogon fallax*. Climbers: *Cassytha capillaris*. Herbs: *Trigastrotheca molluginea*.
Vegetation Condition	Excellent.
Sites in the Survey Area	GAP07.
Sites from Previous Surveys	HPL068, HPL072, HPL073, HPL075, HPL082, HPL089 and HPL092 (Biota 2024a).



Plate 5.14: Vegetation type H2b (GAP07).

5.1.2.5 Vegetation of Rocky Outcrops and Breakaways

R2a:	***Corymbia hamersleyana* low open woodland over *Acacia tumida* var. *pilbarensis, Acacia acradenia* tall open scrub over *Triodia epactia* (*T. wiseana*) open to very open hummock grassland *over* *Cenchrus ciliaris* scattered tussock grasses.**
Distribution and Extent	This vegetation sub-type was located in the drainages of the overarching vegetation type R2 through the PGL survey area (Plate 5.15). Within the current survey area, it occurred in a single drainage along the access track to TP23/BH12.
Other Associated Species	Low Shrubs: *Afrohybanthus aurantiacus, Bonamia pilbarensis, Corchorus parviflorus, Dampiera candicans, Hibiscus sturtii* var. *campylochlamys, Sida* sp. Pilbara (A.A. Mitchell PRP1543), *Tephrosia rosea* var. *rosea*.
Vegetation Condition	Very Good; minor cattle activity and weed presence.
Sites in the Survey Area	No sites; inadequate area.
Sites from Previous Surveys	HPL102, HPL105, HPL117, HPL118 and HPL121 (Biota 2024a).



Plate 5.15: Vegetation type R2a (HPL118 and HPL121 from the PGL corridor; Biota 2024a).

R2d:	***Acacia inaequilatera, Grevillea* spp. scattered tall shrubs over *Triodia epactia* open hummock grassland.**
Distribution and Extent	This vegetation sub-type was located on the mid to upper slopes of the overarching vegetation type R2 (Plate 5.16). It occurred in BH12 and along the access track to BH12 and TP23.
Other Associated Species	Trees/Tall Shrubs: *Acacia acradenia, Acacia ancistrocarpa, Acacia orthocarpa, Corymbia hamersleyana, Grevillea pyramidalis* subsp. *leucadendron, Grevillea wickhamii, Petalostylis labicheoides*. Low Shrubs: *Acacia adoxa* var. *adoxa, Bonamia pilbarensis, Corchorus parviflorus, Ptilotus calostachyus, Tephrosia rosea*. Grasses: *Eriachne ciliata*.
Vegetation Condition	Very Good; minor cattle activity and weed presence.
Sites in the Survey Area	GAP26, GAP27
Sites from Previous Surveys	HPL096, HPL097, HPL099, HPL100, HPL101, HPL103, HPL111, HPL112 and HPL119 (Biota 2024a).



Plate 5.16: **Vegetation type R2d (GAP26).**

R5a:	***Acacia inaequilatera* scattered tall shrubs over *Triodia epactia* open to very open hummock grassland.**
Distribution and Extent	This vegetation sub-type was located on rocky hills of the overarching vegetation type R5 near the Nimingarra mine in the eastern portion of the survey area, where it occurred over the entirety of area BH18 (Plate 5.17).
Other Associated Species	Trees/Tall Shrubs: *Grevillea wickhamii*. Low Shrubs: *Acacia ? hilliana*.
Vegetation Condition	Excellent.
Sites in the Survey Area	GAP22; insufficient area to sample additional sites.
Sites from Previous Surveys	HPL065 and HPL066 (Biota 2024a).



Plate 5.17: **Vegetation type R5a (GAP22).**

5.1.3 Significant Vegetation

No TECs or PECs were recorded within the survey area, and none would be expected to occur given their known distributions, the habitats present, and the vegetation types recorded.

The riparian vegetation type D2 would be considered to be a GDE or Groundwater Dependent Vegetation (GDV) due to the presence of *Eucalyptus victrix* as a dominant species.

Vegetation type P3 supported numerous locations of the Priority 3 species *Croton aridus* and *Tribulopis marliesiae*. These species are likely to be widespread through the pindan plains in the vicinity.

5.1.4 Vegetation Condition

Vegetation condition mapping using the condition categories from EPA (2016) is provided in Appendix 8. Areas completely devoid of native vegetation were mapped as Cleared and were assigned a condition rating of Completely Degraded. Degraded areas comprised 1.5% of the survey area (e.g. roads, rail, and mining areas). Note that some minor tracks in the eastern parts of the survey area were not mapped separately due to the tracks being minor, overgrown, and difficult to define using aerial imagery. These were encompassed within the mapping of the surrounding vegetation type.

The condition of the remaining vegetation in the survey area ranged from Excellent to Poor, with most (over 97%) being in Very Good to Excellent condition (Table 5.2). Apart from the existing clearing, the main disturbance factors in the survey area comprised weed invasion and cattle grazing and/or trampling. The areas in the worst condition were associated with drainage lines and floodplains, particularly along the De Grey River, and supported high densities of weed species. Areas rated as Excellent, Excellent to Very Good and Very Good were typically associated with hills or stony plains vegetation, which is less susceptible to weed invasion.

Table 5.2: Extent of vegetation condition categories in the survey area.

Condition Rating	Area	Proportion of Survey Area
Excellent	116.0 ha	79.8%
Very Good to Excellent	3.3 ha	2.3%
Very Good	22.9 ha	15.7%
Poor to Good	1.0 ha	0.7%
Cleared (Completely Degraded)	2.2 ha	1.5%
Total	**145.4 ha**	**100.0%**

5.2 Flora

5.2.1 Overview

A total of 79 native flora species from 50 genera and 28 families were recorded during the survey (Appendix 9). The dominant native plant families and genera recorded from the survey area are presented in Table 5.3, and are typical of the region. With the exception of six non-significant species (*Boerhavia coccinea, Commelina ensifolia, Drosera finlaysoniana, Fimbristylis depauperata, Heliotropium ? crispatum*, and *Sida cardiophylla*), all of the native species were previously recorded along the PGL corridor by Biota (2024a). *Fimbristylis*

depauperata is poorly represented in the WA Herbarium collection, and this specimen will be vouchered.

Five introduced flora species (weeds) were also recorded (see Section 5.2.4).

Table 5.3: Dominant native families and genera recorded from the survey area.

Family	No. of Native Species	Genus	No. of Native Species
Fabaceae	28	*Acacia*	18
Poaceae	9	*Ptilotus*	4
Amaranthaceae	4	*Corymbia*	3
Myrtaceae	4	*Triodia*	3

5.2.2 Significant Flora Species of the Survey Area

No MNES species under the EPBC Act and no Threatened species under the BC Act were recorded from the survey area, however two Priority 3 flora species were recorded. These species are discussed below and their locations within the survey area are mapped and tabulated in Appendix 7.

Croton aridus **Priority 3**

This shrub (Plate 5.18) grows to 1.5 m tall and grows on sand dunes and sandplains. It is vouchered at the WA Herbarium by 17 specimens from locations extending between the western part of the Great Sandy Desert and the eastern Northern Territory, although there are large gaps throughout this distribution.

A total of 225 individuals of *Croton aridus* were recorded from 52 locations in the eastern half of the survey area. Most records were of small numbers of individuals (between 1 and 5), with occasional larger numbers (up to approximately 80 individuals at GAP08 in the access track for BH20/TP39). All records were from the P3 vegetation type on pindan plains.



Plate 5.18: *Croton aridus* (left: growth form, right: close up of leaves and fruit).

***Tribulopis marliesiae* (Eichler's Tribulopis)** **Priority 3**

This spreading herb (Plate 5.19) grows to 40 cm high and 80 cm across, with spindly stems from a corky perennial rootstock. It occurs on pindan plains, and the nine specimens lodged with the WA Herbarium cover an approximately 350 km area extending from Sandfire into the northwestern Great Sandy Desert.

A total of 231 individuals of *Tribulopis marliesiae* were recorded from 52 locations in the eastern half of the survey area. Most records were of small numbers of individuals (between 1 and 5), with occasional larger numbers (up to 15 individuals at GAP29 in the alternative track for TP45/BH23). All records were from vegetation type P3 on pindan plains.



Plate 5.19: ***Tribulopis marliesiae*.**

5.2.3 Significant Species with Potential to Occur

Following the field survey, it is considered that three other Priority 3 species 'may occur' in the survey area, based on the availability of suitable habitat and the proximity of other records (see Appendix 3). These comprise:

- *Bonamia oblongifolia* and *Polymeria* sp. Broome (K.F. Kenneally 9759): both of these species are small herbs that may be overlooked in dense vegetation. If present these would be most likely to occur in vegetation type P3.
- *Indigofera ammobia*: sand dunes are the preferred habitat for this species, and the single dune in the survey area had been very recently burnt. If present, this species would be most likely to occur in vegetation type S2.

The other species identified through the desktop study as having some potential to occur are now considered unlikely, either because they were not recorded during the survey and/or because no suitable habitat was present (see Appendix 3).

5.2.4 Introduced Species

Five introduced flora species were recorded from the survey area, one of which (**Calotropis procera*) is listed as a Declared Pest for WA (see Table 5.4 and Appendix 8). No Weeds of National Significance (WONS) were recorded. All of the weeds had been previously recorded along the PGL corridor by Biota (2024a). In the current survey area, the development area TP18 on the southern side of the De Grey River had the greatest number of weeds.

Table 5.4: Summary of weed species recorded from the survey area.

Family	Species (Common Name)	Broad Distribution in the Survey Area
Declared Pests		
Apocynaceae	**Calotropis procera* (Calotrope)	Recorded in TP18 associated with the De Grey River.
Other weeds		
Amaranthaceae	**Aerva javanica* (Kapok Bush)	Recorded from a single location (DS_01b) associated with Tabba Tabba Creek.
Fabaceae	**Vachellia farnesiana* (Mimosa Bush)	Recorded from TP18 on the southern side of the De Grey River.
Poaceae	**Cenchrus ciliaris* (Buffel Grass)	Recorded from DS_01a, associated with a tributary of Petermarer Creek; in TP18 on the southern side of the De Grey River; in Callawa Creek in the access track for TP50; and associated with historical disturbance areas in MRD_01, north of Tabba Tabba Creek.
	**Cenchrus setiger* (Birdwood Grass)	Recorded from TP18 on the southern side of the De Grey River.

The species recorded from the survey area are briefly described below:

- ****Calotropis procera* (Calotrope)** is a shrub or tree that grows in sandy and often clayey soils. This weed species is a Declared Pest for the whole of WA under Section 22(2) of the BAM Act, however it has not been assigned a control category and is in the "exempt" keeping category. While there are no statutory requirements to control Calotrope, best practice weed management should incorporate control measures such as cutting and spraying to eradicate localised populations. A total of 22 individuals were recorded in TP18, on the southern side of the De Grey River.
- ****Aerva javanica* (Kapok Bush)** is a perennial herb to low shrub that is widespread through the northern half of WA. It is particularly common in sandy soils, especially in coastal areas and disturbed sites. Kapok Bush was recorded from a single location in DS_01b, associated with Tabba Tabba Creek.
- ****Cenchrus ciliaris* (Buffel Grass)** is a perennial grass that was introduced by pastoralists as a fodder species. It is widespread throughout WA and is commonly found in association with drainage lines, floodplains, sandy coastal areas and disturbed sites (WA Herbarium 2025), where it may form dense tussock grasslands. This species has demonstrated allelopathic capacities, whereby it releases chemicals that inhibit the growth of other plants, and it competes aggressively and effectively with native flora species (Cheam 1984a, 1984b, Hussain et al. 2010). Buffel Grass was recorded from four locations, mostly associated with drainage lines or historical disturbance areas. This species would be widespread through the survey area in similar habitats.
- ****Cenchrus setiger* (Birdwood Grass)** is an erect perennial tussock grass that occurs in similar habitats to Buffel Grass (creeklines, floodplains and sandy coastal areas). Birdwood Grass was recorded from TP18 associated with the De Grey River, but would be likely to occur more widely in the survey area, in the same habitats as **Cenchrus ciliaris*.
- ****Vachellia farnesiana* (Mimosa Bush)** is an erect, spreading, thicket-forming shrub, growing in low lying areas, river and creek banks and disturbed sites. This species is widespread in the Pilbara and is known from many bioregions in WA and other states. Mimosa Bush was recorded from TP18 associated with the De Grey River.

5.3 Fauna Habitats

Five fauna habitats were identified within the current survey area, all of which were also present in the PGL corridor (Biota 2024a):

- *Acacia* shrubland on spinifex sandplain;
- Low stony rises;
- Minor/moderate drainage line;
- Degraded areas; and
- Sand dunes.

The fauna habitats are described further below in Table 5.5 and mapped in Appendix 10. *Acacia* shrubland on spinifex sandplain was the dominant habitat recorded, accounting for over three-quarters of the survey area (Table 5.5).

Table 5.5: Fauna habitats of the survey area.

Habitat	Area and Proportion	Description	Photo
Acacia shrubland on spinifex sandplain	111.2 ha, 76.5%	Mix of open and dense *Acacia* shrubland including *A. stellaticeps, A. ancistrocarpa, A. monticola*, with scattered *Corymbia* and *Eucalyptus victrix* trees, over hummock grasslands of spinifex (*Triodia* spp.) on broad sandy plains. Some areas have been subject to previous clearing and vegetation was therefore in varying condition, especially Camp TP1 to Camp TP5, CB_01, DS_05, TP24, and the associated access tracks. This habitat may be used by species such as the Bilby and Brush-tailed Mulgara, as sandy soils are preferable for burrowing. Bilby also have a strong association with particular *Acacia* species that host root-dwelling larvae, which form a major food resource for the species in the Pilbara. Spectacled Hare-wallabies may utilise areas that support large spinifex hummocks.	
Low stony rises	31.0 ha, 21.3%	Low rocky undulating plains, rises and slopes. Mixed *Acacia* tall shrubland with some scattered *Corymbia, Grevillea wickhamii, Triodia epactia,* and open tussock grasses. Low stony rises may be used by the Western-Pebble-mound Mouse, which constructs mounds out of the small stones associated with this habitat type.	

Habitat	Area and Proportion	Description	Photo
Degraded areas	2.2 ha, 1.5%	Cleared/previously cleared, or otherwise extensively disturbed areas, including vegetation regrowth in poor condition. This habitat is unlikely to support any significant fauna.	
Minor/moderate drainage line	0.9 ha, 0.6%	Minor to moderate drainage lines and floodplains fringed with low eucalypts (*Eucalyptus victrix, Corymbia flavescens, C. hamersleyana*) over sparse *Acacia* shrubland and *Triodia* grassland. Drainage lines provide suitable foraging and nesting habitat for most species but particularly bats and avifauna, and movement corridors for species such as the Northern Quoll. Pilbara Olive Pythons may utilise pools of water.	

Habitat	Area and Proportion	Description	Photo
Sand dunes	0.1 ha, 0.1%	Sparse *Corymbia* low open woodland over *Acacia* shrubland and very open *Triodia* grassland on linear sand dunes. Recently burnt. This habitat may be used by species such as the Bilby and Brush-tailed Mulgara, as sandy soils are preferable for burrowing.	

5.4 Vertebrate Fauna

A total of 38 vertebrate fauna species were recorded in the survey area during the field survey, comprising two mammals, 33 birds, and three reptiles (Table 5.6; Appendix 11). The Camel (*Camelus dromedarius*) was the only introduced species recorded. Nine of these species were not recorded during the PGL corridor survey by Biota (2024a): the birds *Apus pacificus, Glareola maldivarum, Threskiornis spinicollis, Todiramphus pyrrhopygius, Epthianura tricolor, Artamus minor, Mirafra javanica,* and *Cincloramphus mathewsi*; and the skink *Ctenotus pantherinus*.

Table 5.6: Vertebrate fauna species recorded during field survey.

Fauna Group	Number of Species	Significant Species
Mammals • Native terrestrial • Introduced terrestrial • Native bats	2 (1) (1) -	-
Birds	33	2
Reptiles	3	0
Amphibians	-	0
Total	**38**	**2**

Two significant fauna species were recorded within the current survey area; the Pacific Swift (*Apus pacificus*) and Oriental Pratincole (*Glareola maldivarum*) (see Section 5.4.1). An additional species, Grey Falcon (*Falco hypoleucos*) was recorded from 3.2 km outside of the survey area and is discussed in Section 5.4.1.3. None of these species were previously recorded along the PGL corridor by Biota (2024a).

5.4.1 Significant Vertebrate Fauna Recorded

Each significant species recorded during the field survey is discussed below, with records mapped in Figure 5.1.

5.4.1.1 Pacific Swift (*Apus pacificus*)

The Pacific Swift (previously known as the Fork-tailed Swift) is listed as Migratory under both the EPBC Act and BC Act.

The Pacific Swift occurs as a non-breeding migrant across much of Australia from September to April, particularly in the northern half of the continent. In general, the species is most common closer to the coast, but occurs over much of the Pilbara and Kimberley. In Australia, the species is entirely aerial in habit, foraging for flying insects and even sleeping on the wing. It is highly mobile, often occurring in association with unsettled weather and low pressure systems (Johnstone and Storr 1998).

Pacific Swifts were recorded in four of the survey areas; DS_01a, TP36, TP46, and TP39/BH20 (Table 5.7).

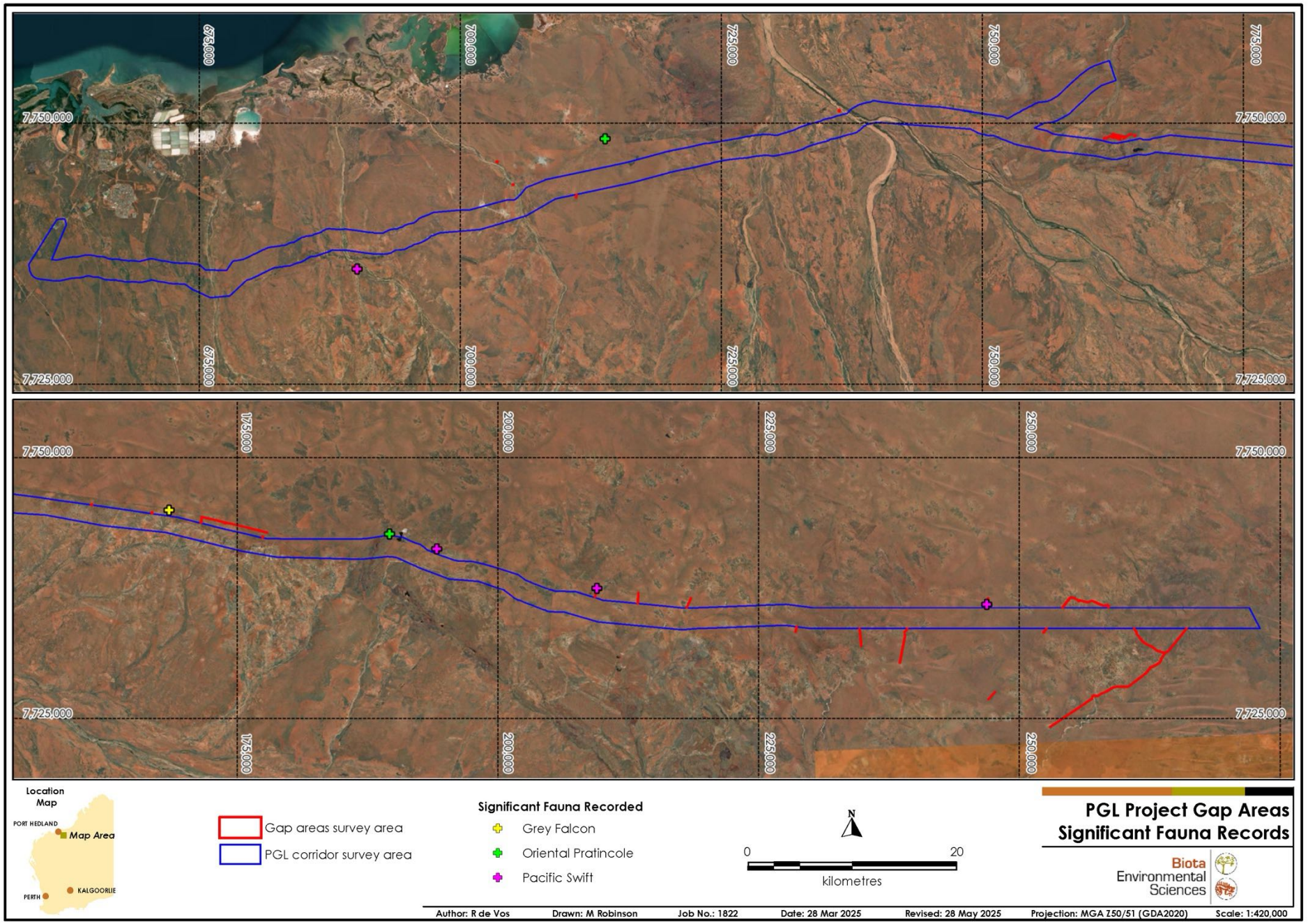

Figure 5.1: **Significant fauna species recorded during the survey.**

Table 5.7: Pacific Swift records from the current survey.

Site	Dates	Location		Fauna Habitat	Count
		Latitude	Longitude		
DS_01a	28/01/2025	-20.463654	118.822841	*Acacia* shrubland on spinifex sandplain	20
TP36	29/01/2025	-20.401669	120.069495	*Acacia* shrubland on spinifex sandplain	20
TP46	29/01/2025	-20.457538	120.573571	*Acacia* shrubland on spinifex sandplain	6
TP39/BH20	30/01/2025	-20.438111	120.215893	*Acacia* shrubland on spinifex sandplain	15

5.4.1.2 Oriental Pratincole *(Glareola maldivarum)*

The Oriental Pratincole is listed as Migratory under both the EPBC Act and BC Act.

The species is a non-breeding migrant to Australia and is typically present from October to May, with the largest numbers present from December to March (Johnstone and Storr 1998, Sitters et al. 2004). The Oriental Pratincole often uses broadly similar foraging habitats to the Oriental Plover, including short-grassed or bare plains, bare wetland margins. However, Oriental Pratincoles take most of their insect prey aerially (Johnstone and Storr 1998), and so will forage over a wider range of open habitat types, and occasionally over more wooded areas. Oriental Pratincole will also use tidal mudflats, beaches, sewage ponds and freshwater wetland areas, primarily for roosting during the heat of the day. They are mobile in response to conditions, and disperse across inland northern Australia during the wet season, occasionally gathering in exceptionally high numbers (Sitters et al. 2004).

Oriental Pratincoles were recorded during the survey at two sites; BH18, and DS_03a (Table 5.8), in relatively high numbers. Due to the timing of this survey, it was not unexpected for this species to be present.

Table 5.8: Oriental Pratincole records from the current survey.

Site	Dates	Location		Fauna Habitat	Count
		Latitude	Longitude		
BH18	29/01/2025	-20.388096	120.026380	Degraded areas	50
DS_03a	31/01/2025	-20.348499	119.048665	*Acacia* shrubland on spinifex sandplain	100

5.4.1.3 Grey Falcon *(Falco hypoleucos)*

The Grey Falcon is listed as Vulnerable both the EPBC Act and the BC Act.

The species is sparsely distributed across much of arid inland and northern Australia, occurring mainly on lightly wooded plains and along major watercourses (Johnstone et al. 2013). Breeding usually takes place in taller trees such as river red gums, or on isolated man-made structures such as communications towers.

Although the Grey Falcon was not recorded from within the survey boundary, one individual was recorded 3.2 km west of TP31/BH16 during the current survey (Table 5.9). This individual was initially seen perched on a transmission tower before flying westwards. Additionally, there are multiple records in close proximity to the survey area. All habitats within the survey area are likely to be suitable for foraging for the species.

Table 5.9: Grey Falcon records from the current survey.

Site	Dates	Location		Fauna Habitat	Count
		Latitude	Longitude		
Near TP31/BH16	30/01/2025	-20.36387	119.82452	(Outside survey area) *Acacia* shrubland on spinifex sandplain	1

5.4.2 Other Significant Species Likely to Occur

Eight significant vertebrate fauna species were considered likely to occur in the survey area (Table 4.2, Sections 5.4.2.1 to 5.4.2.8).

5.4.2.1 Northern Quoll *(Dasyurus hallucatus)*

The Northern Quoll is listed as Endangered under both the EPBC Act and the BC Act.

The species formerly occurred across much of northern Australia but is now restricted to six main areas. Two of these areas are in WA: the northwest Kimberley and the Pilbara regions (Braithwaite and Griffiths 1994). Northern Quolls are most abundant in open, rocky habitats and also commonly utilise gorges, breakaways, and hills, particularly for denning (Baker and Gynther 2023). They also occur along drainage lines, where adjacent plains and vegetated areas provide habitats for foraging and dispersal of young (Baker and Gynther 2023). Populations fluctuate on both annual and inter-annual cycles, driven by both the reproductive biology of the species and longer-term cycles in response to regional stochastic processes such as rainfall, fire and related changes of prey populations (How et al. 2009).

No Northern Quoll or associated secondary evidence were recorded during the survey, however they are known to occur in the region and were recorded during the PGL survey (Biota 2024a). Although there is limited suitable habitat for denning in the survey area, it is in proximity to gorges, breakaways and other rocky habitat. It is likely that Northern Quoll will transit through the survey area.

5.4.2.2 Bilby *(Macrotis lagotis)*

The Bilby is listed as Vulnerable under both the EPBC Act and the BC Act.

The species formerly occurred in a wide range of semi-arid and arid habitats across over 70% of the Australian mainland; however, it has declined markedly and now occupies less than 20% of its former range (Department of the Environment 2014). In WA, there are disjunct populations in the Gibson Desert, south-western Kimberley, inland areas of the Pilbara and northern Great Sandy Desert (Friend 1990), and reintroduced populations at Peron Peninsula, Mount Gibson, and the Matuwa Indigenous Protected Area (DCCEEW 2023). Extant populations occur in a variety of habitats, usually on landforms of low topographic relief and light to medium soils. In the Pilbara, the species prefers areas suitable for burrowing where the substrate comprises sand, soil, sandy clay or sandy gravel (DBCA 2017), though it is also known from atypical stony gravelly areas (M. Dziminski, DBCA, pers. comm.). Additionally, the Bilby demonstrates strong association with particular species of *Acacia* that host root-dwelling larvae, which form a major food resource for the species in the Pilbara (DBCA 2017).

No Bilby or associated secondary evidence were recorded during the survey, however they are likely to occur in the Acacia shrubland on spinifex sandplain habitat, and were recorded from secondary evidence during the PGL survey (Biota 2024a).

5.4.2.3 Pilbara Leaf-nosed Bat *(Rhinonicteris aurantia* Pilbara Form)

The Pilbara Leaf-nosed Bat is listed as Vulnerable under both the EPBC Act and BC Act.

It is a sub-population of the Orange Leaf-nosed Bat that is endemic to the Pilbara and Ashburton regions of WA. The Pilbara population is isolated from the main tropical Orange Leaf-nosed Bat populations in the Kimberley, Northern Territory and Queensland by 400 km of unsuitable habitat in the Great Sandy Desert (Armstrong 2001).

The Pilbara Leaf-nosed Bat is semi-desert adapted and has specific roosting requirements , requiring roost sites in caves or mine adits with stable, very hot (28 – 32ºC) and very humid (96 – 100%) microclimates (Churchill 2008). Caves deep enough to create this environment are

relatively uncommon in the Pilbara (Baker and Gynther 2023), which limits the availability of diurnal roosts for this species (Bat Call WA 2021). Observed foraging habitat includes *Triodia* hummock grassland, sparse tree and shrub savannah, and riparian vegetation along drainage lines (Duncan et al. 1999).

No Pilbara Leaf-nosed Bats were recorded during the survey, however this species is known to occur in the region and were recorded during the PGL survey (Biota 2024a). Although there are no suitable caves or suitable roosting habitat present in the survey area, there is potentially suitable foraging habitat across most habitat types so it is likely to occur, primarily as a foraging visitor.

5.4.2.4 Ghost Bat *(Macroderma gigas)*

The Ghost Bat is listed as Vulnerable under both the EPBC Act and the BC Act.

Ghost Bats previously occurred across most of inland and northern Australia, but are now restricted to the tropical and subtropical north of the continent (Churchill 2008). The distribution of this species is fragmented, with each population showing some genetic differentiation (Armstrong and Wilmer 2004). Ghost Bats occur in a broad range of habitats, with distribution influenced by the availability of suitable caves for roost sites, and are known to forage over areas up to 60 ha (Churchill 2008). Scat material from the Ghost Bat is quite distinctive and can be used to identify temporary roosts or feeding sites. Feeding sites are also usually readily identifiable based on the accumulation of discarded remains of prey animals (van Dyck and Strahan 2008).

No Ghost Bats were recorded during the survey, but the species is known from the area, with potentially suitable foraging habitat exists within the survey area across most habitat types, so it is likely to occur. however they are known to occur in the region and were recorded during the PGL survey (Biota 2024a) No suitable caves or suitable roosting habitat was identified in the survey area, so the occurrence of Ghost Bat is likely to be dependent on the proximity of suitable roost sites in the areas outside of the survey area.

5.4.2.5 Brush-tailed Mulgara *Dasycercus blythi*

The Brush-tailed Mulgara is listed as a Priority 4 species by the DBCA.

The species occurs from south-western Queensland across the Simpson, Tanami and Great Sandy Deserts of southern and central Northern Territory, through central WA. It typically occurs in spinifex grasslands on sandplains and sandy swales between low dunes but is also known to inhabit gibber (rock and pebble covered flat plains). It is closely associated with gently sloping to flat topographic positions rather than steep-sided sand ridges (Pavey et al. 2011). Within WA, the species has a widespread distribution including the Gascoyne, Murchison, Pilbara and some of the central deserts (Ric How, pers. comm., 2012).

No Brush-tailed Mulgara or associated secondary evidence were found during the survey, however they are known from the area and likely to occur in the Acacia shrubland on spinifex sandplain habitat and were recorded through secondary evidence during the PGL survey (Biota 2024a).

5.4.2.6 Western Pebble-mound Mouse *(Pseudomys chapmani)*

The Western Pebble-mound Mouse is listed as a Priority 4 species by the DBCA.

Previously described as endemic to the central and eastern parts of the Pilbara (Menkhorst and Knight 2011), it is now known to occur much more widely across the entire Pilbara region and into the Gascoyne (ALA 2025), where it is commonly found on stony hillsides with hummock grasslands (Menkhorst and Knight 2011). The species is well known for the extensive mounds of small stones it constructs, which are the most obvious indication of the

species' occurrence in an area. Mounds are most common on spurs and gentle slopes where suitably sized stones are present (Baker and Gynther 2023).

No Western Pebble-mound Mouse or associated mounds (active or defunct) were found during the survey, however they are known from the area and likely to occur in the low stony rises habitat, and were recorded through secondary evidence during the PGL survey (Biota 2024a).

5.4.2.7 Peregrine Falcon *(Falco peregrinus)*

The Peregrine Falcon is listed as Other Specially Protected Fauna under the BC Act.

It occurs almost Australia-wide, but is absent from most deserts and the Nullarbor Plain (Johnstone and Storr 1998). This species inhabits a wide range of habitats including forests, woodlands, wetlands and open country (Pizzey and Knight 2007). Individuals maintain large home ranges of up to 30 km^2, and nest in recesses of cliff faces, tree hollows and along rivers (Johnstone and Storr 1998).

No Peregrine Falcon were recorded during the survey but there are known from the area. The survey areas falls within the published distribution for the species (e.g. Menkhorst et al. 2017), and all habitats within the survey area are likely to be suitable for foraging. The Peregrine Falcon is therefore likely to occur within the survey area.

5.4.2.8 Australian [Gull-billed] Tern (*Gelochelidon [nilotica] macrotarsa)*

The Gull-billed Tern is listed as Migratory under both the EPBC Act and BC Act.

However, there are two populations of Gull-billed Tern in Australia; a resident population, *G.* [*nilotica*] *macrotarsa* and a migratory population *G. nilotica affinis*. Most authorities now recognise the resident Australian population as a distinct species, the Australian [Gull-billed] Tern, based on differences in plumage, structure, ecology and genetics (Rogers et al. 2005). The Australian [Gull-billed] Tern is still listed as Migratory under the EPBC Act due to a lag in updating the taxonomy of the species. Australian [Gull-billed] Terns are nomadic and occur widely across Australia, including both coastal and inland areas, but generally remain within Australia. They breed colonially on inland wetlands, and forage over sheltered coastal and inland wetlands, and over open grassland and bare ground (Johnstone and Storr 1998).

No Australian [Gull-billed] Terns were recorded during the current survey. However, the species are known from the area and the survey areas fall within the published distribution for the species (e.g. Menkhorst et al. 2017) and potentially suitable foraging habitat occurs in the major drainage lines habitat type and in man-made dams, so the species is likely to occur as a foraging visitor.

5.4.3 Significant Species That May Occur

A further five species may occur in the survey area (Appendix 3; Sections 5.4.3.1 to 5.4.3.4).

5.4.3.1 Pilbara Olive Python *(Liasis olivaceus barroni)*

The Pilbara Olive Python is listed as Vulnerable under both the EPBC Act and BC Act.

It is a distinct subspecies of the Olive Python (which is found across northern Australia). The distribution of the *barroni* subspecies roughly coincides with the Pilbara bioregion, with a seemingly disjunct population around Mount Augustus in the Gascoyne region (DCCEEW 2025). Preferred habitat for the Pilbara Olive Python includes rocky areas such as gorges, escarpments, and rocky outcrops, and it is most-readily found close to pools (DAWE 2020). This is likely a function of its increased detectability around pools, rather than a distinct preference for them, as individuals have large home ranges (between 88 ha and 449 ha) and radio-tracking data shows they often reside significant distances from water (Tutt et al. 2004,

Biota, unpublished data). They shelter and ambush prey from caves, crevasses, beneath boulders, rocks and vegetation, underwater, and in trees (Bush and Maryan 2011, Biota, unpublished data).

No Pilbara Olive Pythons were recorded during the survey, but suitable transiting or sheltering habitat is present throughout the survey area. Pilbara Olive Pythons may to occur in the survey area.

5.4.3.2 Spectacled Hare-wallaby *(Lagorchestes conspicillatus)*

The Spectacled Hare-wallaby is listed as Priority 4 by the DBCA.

There are scattered records of this species from the Kimberley and Pilbara regions of WA. It has declined in numbers over most of its range, including drastic declines in the mainland Pilbara region (Ingleby 1991, Burbidge and Johnson 2008). While abundant on Barrow Island, it was eliminated from the Montebello group of islands (located just to the north of Barrow Island) prior to 1950, most likely as a result of predation by feral cats (Burbidge and Main 1971). Individuals are mostly solitary, but sometimes feed in groups up to three (van Dyck and Strahan 2008), and occupy home ranges of about 1.77 km^2 (McCosker 1997).

The Spectacled Hare-wallaby was not recorded during the survey, but it can be hard to detect and is most commonly recorded incidentally when flushed from its daytime shelter in spinifex hummocks. Some parts of the survey area supported large spinifex hummocks (within the Acacia shrubland on spinifex sandplain habitat) so the species may occur in the survey area.

5.4.3.3 Dampierland Plain Slider *(Lerista separanda)*

The Dampierland Plain Slider (*Lerista separanda*) is listed as a Priority 2 species by the DBCA.

The Dampierland Plain Slider was not recorded during the survey. This species prefers sandy substrates, including coastal areas and inland sand dunes and plains (Wilson and Swan 2021). The sand dune habitat in the survey area may represent suitable habitat for this species, but had been recently burnt at the time of the survey.

5.4.3.4 Migratory Shorebirds

Two species of Migratory-listed shorebird species may occur in the survey area; listed under both the BC Act and EPBC Act:

- Oriental Plover (*Anarhynchus veredus*) - BC Act and EPBC Act Migratory; and
- Little Curlew (*Numenius minutus*) – BC Act and EPBC Act Migratory.

These species are non-breeding migrants to Australia and will use shallows and margins of a variety of freshwater wetlands, grassland plains, or bare country. None were recorded during the current survey, however numerous records are known from the wider study area. Some small areas of potentially suitable habitat occur in the survey area, so these species may occur in the survey area, most likely as occasional passage visitors between August and May.

6.0 Discussion and Conclusions

The current study draws heavily on the recent biological survey of the larger PGL corridor as detailed in Biota (2024a), and should be read in conjunction with that report. The field survey of the current survey area produced similar findings to those of Biota (2024a), particularly in regard to significant communities and species.

6.1 Vegetation

Ten vegetation types were mapped in the survey area over five broad landforms, all of which were represented in the PGL corridor (Section 5.1). The vegetation of the survey area was mainly in Very Good to Excellent or Excellent condition (over 97%). Only 1.5% of the survey area was cleared and Completely Degraded. The remaining 0.7% was in Poor to Good condition; these areas were associated with drainage lines and floodplains, or historically disturbed areas (Section 5.1.4).

None of the vegetation types in the survey area represented any significant ecological communities listed at Commonwealth or State level, however the riparian vegetation type D2 in Tabba Tabba Creek and Callawa Creek would likely be considered Groundwater Dependent Vegetation due to the presence of *Eucalyptus victrix* as a dominant species (see Section 5.1.2.1).

6.2 Flora

A total of 79 native flora species from 50 genera and 28 families were recorded in the survey area, along with five introduced species (including one Declared Pest) (Section 5.2.4).

No MNES species under the EPBC Act and no Threatened species under the BC Act were recorded from the survey area, however two Priority species were recorded in vegetation type P3 in the eastern section of the survey area:

- *Croton aridus* (P3) – a total of 225 individuals were recorded from 52 locations;
- *Tribulopis marliesiae* (P3) – a total of 231 individuals were recorded from 52 locations.

Although not recorded during the field survey, three other Priority 3 species may occur in the survey area:

- The small herbs *Bonamia oblongifolia* and *Polymeria* sp. Broome (K.F. Kenneally 9759) would be most likely to occur in vegetation type P3 on the pindan plains in the eastern half of the survey area;
- The low shrub *Indigofera ammobia* would be most likely to occur in vegetation type S2 on the single sand dune intersected by the survey area, which had been recently burnt.

Five introduced species were recorded from the survey area, including one significant weed:

- **Calotropis procera* (Calotrope) is a Declared Pest in WA. This species was recorded in TIP18 from the southern side of the De Grey River.

6.3 Vertebrate Fauna

Five fauna habitats were identified within the survey area. All of these are typical of the bioregion, were recorded during the survey of the primary PGL corridor, and are not considered to be significant.

Two significant Migratory-listed fauna species, the Pacific Swift (*Apus pacificus)* and Oriental Pratincole (*Glareola maldivarum*), were observed within the survey area. An additional species listed as Vulnerable under the BC Act and EPBC Act, the Grey Falcon (*Falco hypoleucos*), was recorded from 3.2 km outside the survey area. Overall, a total of 38 vertebrate fauna species were recorded in the survey area during the field survey, comprising two mammals, 33 birds and three reptiles.

Significant species likelihoods were reassessed for the current survey, based on factors including previous records identified in the area through the PGL corridor (Biota 2024a), available habitat in the survey area, and findings from the current field survey. This updated likelihood of occurrence assessment indicated that a further eight significant vertebrate species are likely to occur in the survey area:

- Northern Quoll, *Dasyurus hallucatus* (Endangered EPBC and BC Act);
- Bilby, *Macrotis lagotis* (Vulnerable EPBC and BC Act);
- Pilbara Leaf-nosed Bat, *Rhinonicteris aurantia* Pilbara Form (Vulnerable EPBC and BC Act);
- Ghost Bat, *Macroderma gigas* (Vulnerable EPBC and BC Act);
- Brush-tailed Mulgara, *Dasycercus blythi* (Priority 4 DBCA);
- Western Pebble-mound Mouse, *Pseudomys chapmani* (Priority 4 DBCA);
- Peregrine Falcon, *Falco peregrinus* (Other Specially Protected Fauna BC Act); and
- Australian [Gull-billed] Tern, *Gelochelidon [nilotica] macrotarsa* (Migratory EPBC and BC Act).

While another five may occur:

- Pilbara Olive Python, *Liasis olivaceus barroni* (Vulnerable EPBC and BC Act);
- Spectacled Hare-wallaby*, Lagorchestes conspicillatus* (Priority 4 DBCA);
- Dampierland Plain Slider, *Lerista separanda* (Priority 2 DBCA);
- Oriental Plover, *Anarhynchus veredus* (Migratory EPBC and BC Act); and
- Little Curlew, *Numenius minutus* (Migratory EPBC and BC Act).

Of the species previously identified in the PGL corridor as having the potential to occur (Appendix 3), seven have specific habitat requirements that are not present in the current survey area and are therefore considered unlikely to occur.

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Appendix 1

Framework for Conservation Significance Ranking of Communities and Species in WA

A. Categories for Threatened and Priority Ecological Communities in WA

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Biodiversity and Conservation Science

CONSERVATION CATEGORY DEFINITIONS

for Western Australian Ecological Communities

GENERAL DEFINITIONS

An **ecological community** is a naturally occurring assemblage of organisms that occurs in a particular habitat, as defined in the *Biodiversity Conservation Act 2016* (BC Act). Ecological communities may comprise various life forms including plants, animals and microorganisms.

Note: The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) means an ecological community that is listed under section 27(1) of the BC Act as a critically endangered, endangered or vulnerable ecological community, or is a rediscovered ecological community to be regarded as a threatened ecological community under section 33 of the BC Act.

An **assemblage** is a defined group of biological entities.

Habitat, as defined in the BC Act, means the biophysical medium or media —

a) occupied (continuously, periodically or occasionally) by an organism or group of organisms, or
b) once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced.

An **occurrence** is a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres with, for example: a different ecological community, a sealed road, a building, a water body (for terrestrial communities), or a terrestrial body (for aquatic communities). There is no minimum size of an occurrence of a threatened or priority ecological community. By ensuring that every discrete occurrence is recognised and recorded, future changes in status can be readily monitored.

Adequately surveyed is defined as an ecological community that has been searched for thoroughly in most likely habitats, by relevant experts.

Community structure is defined as the spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage. For example, the vegetation structure (e.g., *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs) or the trophic structure in a faunal assemblage (e.g., dominance by feeders on detritus as distinct from feeders on live plants).

To **modify** an occurrence of an ecological community, as defined in section 44 of the BC Act, means to take action that results in —

(a) the modification of the occurrence of the threatened ecological community to such an extent that the occurrence is unlikely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure; or
(b) the destruction of the occurrence of the threatened ecological community.

Destruction of an occurrence of an ecological community means modification such that reestablishment of ecological processes, species composition or community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention.

Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Refer to the document Guidance note – Modification of an occurrence of a threatened ecological community for more information on what constitutes modification and how to determine whether an action is likely to modify an occurrence of a threatened ecological community.

Threatening process means a process that threatens, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community, as defined under the BC Act. Examples of some of the continuing threatening processes in Western Australia include: vegetation clearance; competition and land degradation by introduced fauna; dieback caused by the root-rot fungus (*Phytophthora cinnamomi*); competition and displacement of native plants by introduced flora; hydrological changes (declining groundwater levels); drying climate, fire regimes that cause declines in biodiversity; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

LISTED ECOLOGICAL COMMUNITIES

Assessment of the conservation status of ecological communities is carried out in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline Number 1 and Ministerial Guideline Number 4 that adopt the use of the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Categories and Criteria.

CO Collapsed ecological communities

An ecological community listed by order of the Minister as collapsed under section 31(1) of the BC Act. As determined by criteria set out in section 32 of the BC Act, an ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —

(a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or
(b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —
    (i) its species composition or structure; or
    (ii) its species composition and structure.

CR Critically endangered ecological communities

A threatened ecological community listed in the category of critically endangered under section 27(1)(a) of the BC Act, as determined by criteria set out in section 28 of the BC Act and the ministerial guidelines. A critically endangered ecological community faces an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as a critically endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Assemblages of the organic springs and mound springs of the Mandora Marsh area' is listed as critically endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: CR.

EN Endangered ecological communities

A threatened ecological community listed in the category of endangered ecological community under section 27(1)(b) of the BC Act, as determined by criteria set out in section 29 of the BC Act and the ministerial guidelines. A threatened ecological community faces a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson *et al*. (1994))' is listed as an endangered threatened ecological community under the *Biodiversity Conservation Act 2016*.
- 'Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))' is listed as endangered under the *Biodiversity Conservation Act 2016*.
- Listing reference in a table – column heading: BC Act; row text: EN.

VU Vulnerable ecological communities

A threatened ecological community listed in the category of vulnerable ecological community under section 27(1)(c) of the BC Act, as determined by criteria set out in section 30 of the BC Act and the ministerial guidelines. A vulnerable ecological community faces a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines.

Examples of use:

- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as a vulnerable threatened ecological community under the *Biodiversity Conservation Act 2016.*
- '*Calothamnus graniticus* subsp. *graniticus* heaths on south west coastal granites' is listed as vulnerable under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table – column heading: BC Act; row text: VU.

PRIORITY ECOLOGICAL COMMUNITIES

Priority is not a listing category under the BC Act. The Priority Ecological Communities list is maintained by the department and is published on the department's website.

All fauna and flora that may be present in an ecological community are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when these species occur in an ecological community that is not listed as threatened, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Possible threatened ecological communities that do not meet survey criteria or are not adequately defined to enable listing are added to the department's Priority Ecological Communities for Western Australia list under priority 1, 2 or 3. Ecological communities that are adequately known and not threatened but rare, near threatened, or have recently been removed from the threatened list are placed in priority 4. Conservation dependent ecological communities are placed in priority 5.

P1 Priority 1: Poorly known ecological communities – very few occurrences, very restricted distribution

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g., within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Examples of use:

- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as a Priority 1 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Banded Ironstone Hills with *Dryandra arborea*' is listed as Priority 1 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P1.

P2 Priority 2: Poorly known ecological communities – few occurrences, restricted distribution

Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Examples of use:

- 'Aquatic invertebrate communities of peat swamps' is listed as a Priority 2 ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Aquatic invertebrate communities of peat swamps' is listed as Priority 2 on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P2.

P3 Priority 3: Poorly known ecological communities – inadequately surveyed or not well defined

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them. This category includes three sub-categories:

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation.

(ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years).

(iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change, etc.

Examples of use:

- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as a Priority 3(iii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Assemblages of gypsum dunes of the central and southern wheatbelt' is listed as Priority 3(iii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table – column heading: DBCA; row text: P3(iii).

P4 Priority 4: Adequately known ecological communities – rare, near threatened, or recently removed from the threatened list

Ecological communities that are adequately known and either rare but not threatened, near threatened, or have recently been removed from the threatened list. These communities require regular monitoring.

(i) Rare: ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(ii) Near threatened: ecological communities that are considered to have been adequately surveyed and that do not qualify as conservation dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Examples of use:

- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as a Priority 4(ii) ecological community by the Department of Biodiversity, Conservation and Attractions.
- 'Nimalaica (Nimalarragun) claypan and associated wetland assemblages' is listed as Priority 4(ii) on the DBCA Priority Ecological Communities List.
- Listing reference in a table: column heading: DBCA, row text: P4(ii).

P5 Priority 5: Conservation dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

B. Categories for Flora and Fauna Species

B1. WA *Biodiversity Conservation Act 2016*, and Priority Species Classification

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Biodiversity and Conservation Science

CONSERVATION CATEGORY DEFINITIONS

For Western Australian Fauna and Flora

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is the species of fauna that are listed as critically endangered, endangered or vulnerable threatened species.

Threatened flora is the species of flora that are listed as critically endangered, endangered or vulnerable threatened species.

The assessment of the conservation status of threatened species is in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline Number 1 and Ministerial Guideline Number 2 that adopts the use of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species Categories and Criteria[3], and is based on the national distribution of the species.

CR Critically endangered species

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.

Examples of use:

- The western ringtail possum (*Pseudocheirus occidentalis*) is listed as a critically endangered threatened species under the *Biodiversity Conservation Act 2016.*
- Western ringtail possum is listed as critically endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: CR.

EN Endangered species

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.

Examples of use:

- *Caladenia hopperiana* is listed as an endangered threatened species under the *Biodiversity Conservation Act 2016.*
- *Caladenia hopperiana* is listed as endangered under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: EN.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.

Examples of use:

- The forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) is listed as a vulnerable threatened species under the *Biodiversity Conservation Act 2016.*
- Forest red-tailed black cockatoo is listed as vulnerable under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: VU.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX **Extinct species**

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Examples of use:

- *Acacia kingiana* is listed as an extinct species under the *Biodiversity Conservation Act 2016.*
- *Acacia kingiana* is listed as extinct under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: EX.

EW **Extinct in the wild species**

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no fauna or flora species listed as extinct in the wild.

SP Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered, or vulnerable) or extinct species under the BC Act cannot also be listed as specially protected species.

MI **Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Migratory species include birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA)[4], China (CAMBA)[5] or The Republic of Korea (ROKAMBA)[6], and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention)[7], an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Examples of use:

- The wedge-tailed shearwater (*Ardenna pacifica*) is listed as a specially protected migratory species under the *Biodiversity Conservation Act 2016.*
- Wedge-tailed shearwater is listed as migratory under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: MI.

Conservation category definitions for Western Australian fauna and flora

CD **Species of special conservation interest (conservation dependent)**

Species of special conservation need that are dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Currently only fauna are listed as species of special conservation interest.

Examples of use:

- The wambenger, south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) is listed as a specially protected species of special conservation interest under the *Biodiversity Conservation Act 2016.*
- Wambenger, south-western brush-tailed phascogale, is listed as conservation dependent under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: CD.

OS **Species otherwise in need of special protection (other specially protected)**

Species otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Currently only fauna are listed as species otherwise in need of special protection.

Examples of use:

- The dugong (*Dugong dugon*) is listed as a specially protected species otherwise in need of special protection under the *Biodiversity Conservation Act 2016.*
- Dugon is listed as other specially protected fauna under the *Biodiversity Conservation Act 2016.*
- Listing reference in a table: column heading: BC Act, row text: OS.

P **Priority species**

Priority is not a listing category under the BC Act. The Priority Flora and Fauna lists are maintained by the department and are published on the department's website.

All fauna and flora are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when a species is not listed as threatened or specially protected, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Species that may possibly be threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of prioritisation for survey and evaluation of conservation status so that consideration can be given to potential listing as threatened.

Species that are adequately known, meet criteria for near threatened, or are rare but not threatened, or that have been recently removed from the threatened species list or conservation dependent or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of priority status is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 **Priority 1: Poorly-known species - known from few locations, none on conservation lands**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, for example, agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under immediate threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Borya stenophylla* is listed as a Priority 1 species by the Department of Biodiversity, Conservation and Attractions.
- *Borya stenophylla* is listed as Priority 1 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P1.

2 Priority 2: Poorly-known species - known from few locations, some on conservation lands

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, for example, national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation.

Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements for threatened listing and appear to be under threat from known threatening processes. These species are in urgent need of further survey.

Examples of use:

- *Caladenia nivalis* is listed as a Priority 2 species by the Department of Biodiversity, Conservation and Attractions.
- *Caladenia nivalis* is listed as Priority 2 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P2.

3 Priority 3: Poorly-known species - known from several locations

Species that are known from several locations and the species does not appear to be under imminent threat or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.

Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. These species need further survey.

Examples of use:

- *Acacia nitidula* is listed as a Priority 3 species by the Department of Biodiversity, Conservation and Attractions.
- *Acacia nitidula* is listed as Priority 3 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P3.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as a conservation dependent specially protected species.

(c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy.

(d) Other species in need of monitoring.

Examples of use:

- *Banksia aculeata* is listed as a Priority 4 species by the Department of Biodiversity, Conservation and Attractions.
- *Banksia aculeata* is listed as Priority 4 on the DBCA Priority Flora List.
- Listing reference in a table: column heading: DBCA, row text: P4.

[1] The definition of flora includes algae, fungi, and lichens.

[2] Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

[3] Western Australia has assigned species to threat categories using the *IUCN Red List of Threatened Species Categories and Criteria* since 1996 (referencing all criteria).

[4] JAMBA - first included in the WA migratory species list in 1980.

[5] CAMBA - first included in the WA migratory species list in 2010.

[6] ROKAMBA - first included in the WA migratory species list in 2010.

[7] Bonn Convention (Birds) - first included in the WA migratory species list in 2015.

Updated 8/08/2023

B2. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Many of the species that are specially protected at State level are also listed as Threatened species at the Federal level, as one of the Matters of National Environmental Significance (MNES) identified under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). These may be classified as 'critically endangered', 'endangered', 'vulnerable' or 'lower risk', consistent with IUCN categories:

- **Critically Endangered (CR):** a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered (EN):** a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
- **Vulnerable (VU):** a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
- **Lower Risk (LR):** a taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:
    - **Conservation Dependent (CD).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
    - **Near Threatened (NT).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
    - **Least Concern (LC).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

In addition, numerous **Migratory (MI)** species are listed as MNES under the EPBC Act (some of which are also listed as Threatened). Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. The list of migratory species consists of those species listed under the following international conventions:

- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
- China-Australia Migratory Bird Agreement (CAMBA);
- Japan-Australia Migratory Bird Agreement (JAMBA); and,
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Marine (MA) species are also protected under the EPBC Act, and are listed to ensure the long-term conservation of the species. Marine species include all Australian sea snakes, seals, crocodiles, dugongs, marine turtles, seahorses and seabirds that naturally occur in the Commonwealth marine area.

Under the terms of the EPBC Act, an action (e.g. a project or development) is required to be referred to the Australian Government Environment Minister for approval if it has, will have, or is likely to have, a significant impact on an MNES. The term 'action' includes projects and developments subsequent to commencement of the Act, however there are a number of exemptions (e.g. projects in Commonwealth areas). According to Department of the Environment (2013), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to

have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

References:

Department of the Environment (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Canberra, Australia.

Appendix 2

Likelihood of Occurrence Assessment for Significant Flora

Taxon	Habit and Habitat (from WA Herbarium 2025)	Database Searches			Past Surveys	Likelihood of Occurrence Assessment	
		DBCA TPFL	WAH	ALA		Pre-Survey	Post-Survey
Priority 2							
Goodenia hartiana	Perennial herb to sub-shrub to 0.4 m tall, growing on sand dunes, swales and sandplains.		✓	✓	✓	**Likely to occur** at the eastern end of the survey area; two records within 4.5 km of four components of the survey area and suitable habitat present.	**Unlikely to occur**; not recorded during the survey; a robust, shrubby species which should have been observed if present.
Priority 3							
Bonamia oblongifolia	Sprawling perennial herb growing on pindan plains.	✓	✓		✓	**Likely to occur**; suitable habitat present, and records within 5 km of four components of the survey area.	**May occur**; not recorded during the field survey, but a small herb that may be overlooked.
Croton aridus	Shrub to 0.4 m, growing on sand dunes, and sandplains.		✓	✓	✓	**Likely to occur** in the eastern third of the survey area; multiple records, including a number within 1 km of components of the survey area.	**Recorded during current survey** at multiple locations in various development polygons in the eastern half of the survey area.
Euphorbia clementii	Erect annual herb to 0.6 m, growing on gravelly hillsides and stony grounds.	✓	✓	✓	✓	**Likely to occur**; two records less than 400 m from BH12.	**Unlikely to occur:** not recorded during the field survey.
Euploca mutica	Perennial herb to 0.3 m, growing on loamy and/or sandy plains.		✓	✓		**May occur**: one record within 5 km of one component of the survey area; multiple records in the locality, but mostly west of the current survey area.	**Unlikely to occur**; not recorded during the field survey.
Indigofera ammobia	Shrub to 1 m, growing on sandplains, sand dunes and swales.	✓	✓	✓	✓	**Likely to occur** in the eastern half of the survey area on sand dunes; one record within 3 km of two components of the survey area.	**May occur;** single sand dune intersected by the survey area; this area had been very recently burnt, so the presence of this species cannot be ruled out.
Polymeria sp. Broome (K.F. Kenneally 9759)	Erect or sprawling herb growing on pindan plains.				✓	**May occur**: in eastern half of the survey area; one record within 5 km of one component of the survey area. Note that the status of this species is uncertain, as the *Polymeria* genus is recognised to contain numerous undescribed entities and is in need of revision.	**May occur**; a small herb that may be overlooked.
Tribulopis marlesiae	Spreading herb to 0.5 m, growing on pindan plains.				✓	**Likely to occur** in the eastern third of the survey area; multiple records, including a number within 1 km of components of the survey area.	**Recorded during current survey** at multiple locations in various development polygons in the eastern half of the survey area.
Priority 4							
Bulbostylis burbidgeae	Erect to spreading sedge, up to 0.3 m tall, growing in granitic soils, granite outcrops and cliff bases.		✓	✓	✓	**May occur**; one record 1.7 km south of DS_07a and the associated access track, however the granitic habitat does not appear to extend north into the survey area.	**Unlikely to occur**; no particularly suitable habitat and not recorded during the survey.

Appendix 3

Likelihood of Occurrence Assessment for Significant Fauna

Species name	Common name	State	C'wealth	Preferred Habitat	Habitat Available in Survey Area?	Desktop Records	Likelihood of Occurrence
Mammals							
Dasycercus blythi	Brush-tailed Mulgara, Ampurta	P4		Spinifex (Triodia spp.) grasslands on sandplains and sandy swales.	Yes	One record in the survey area, over 250 in the desktop study area with records largely concentrated towards the western end.	Recorded
Dasyurus hallucatus	Northern Quoll	EN	EN	Pilbara: Rocky habitats, commonly utilising gorges, breakaways, outcrops and hills. Also occurs near creek lines and drainage lines.	Yes	179 records in the survey area and over 1000 within the desktop study area. Records present along the length of the survey area.	Recorded
Macrotis lagotis	Bilby, Dalgyte	VU	VU	In WA, primarily Acacia shrubland and spinifex (Triodia spp.) grassland on sand plains, dunes and along drainage lines. Formerly occupied wider range of habitats.	Yes	8 records in the survey area and over 250 in the desktop study area, records span the length of the desktop study area.	Recorded
Lagostrophus fasciatus	Banded Hare-wallaby	VU	VU	Extant island populations occupy shrublands on sandplains and dunes, little information on preferred habitat on mainland prior to extinction, recorded from dense scrubs.	Unknown, only on mainland in fenced reserves	Single historical record in the desktop study area, only accurate to 50 000m.	Would not occur
Lagorchestes conspicillatus	Spectacled Hare-wallaby	P4		Tropical spinifex (Triodia spp.) or tussock grasslands with mid-dense tree and shrub cover.	Yes, though impact of fire has reduced the extent of available habitat.	A single record from the survey area (1983), 3 further records in the desktop study area.	May occur
Lagorchestes hirsutus	Rufous Hare-wallaby	VU	VU	Spinifex (Triodia spp.) grasslands and sandplain shrublands	Unknown, only on mainland in fenced reserves	Single record from desktop study area, dated 1992.	Would not occur
Petrogale lateralis lateralis	Black-footed Rock-wallaby	EN	EN	Rocky hills, outcrops and breakaways with caves and crevices for shelter, foraging on surrounding flats vegetation that includes grasses & herbs.	Yes	Recorded on previous surveys (Biota, 2019, 2023) east of the desktop study area.	May occur
Leggadina lakedownensis	Short-tailed Mouse	P4		Tussock grasslands on cracking clays, variety of grassland habitats particularly seasonally inundated sandy clay soils, but known to occur in eucalypt and Melaleuca woodlands, samphire, acacia shrublands and stony ranges.	Limited	15 records in the desktop study area, only two since 2008. Two more recent records (2022) are within 10km of western survey area boundary.	May occur
Pseudomys chapmani	Western Pebble-mound Mouse	P4		Stony hillslopes and plateaux vegetated with spinifex (Triodia spp.).	Yes	Three records in the survey area, over 100 in the desktop study area.	Recorded
Rhinonicteris aurantia Pilbara form	Pilbara Leaf-nosed Bat	VU	VU	Occurrence influenced by the availability of suitable roost caves that offer high humidity and a stable temperature. Restricted to caves with semi-permanent or permanent water nearby, usually in rocky habitat. Foraging typically occurs over open grasslands in gorges, low hills and plains.	No permanent roost sites, potential day roosts available; foraging sites present	More than 200 records within the survey area (echolocation calls), some within 300m of the desktop study area boundary.	Recorded
Macroderma gigas	Ghost Bat	VU	VU	Roost in caves, rock crevices and old mines, foraging in wide variety of habitats with distribution influenced by the availability of suitable caves for roost sites.	No permanent roost sites, potential day roosts available; foraging sites present	5 records within the survey area and more than 750 in the desktop study area (echolocation calls).	Likely to occur
Ozimops cobourgianus	Northern Coastal Free-tailed Bat	P1		Mangrove specialist, restricted to mangrove forests, adjacent areas of monsoon forest, vine thickets, and coastal woodland.	No	11 records in desktop study area, in coastal areas, most recent 2017.	Would not occur
Birds							
Apus pacificus	Pacific Swift	MI	MI; MA	Aerial over most habitats, largest numbers usually over coastal and near coastal plains.	Yes	7 records from the desktop study area, most recently in 2022.	Likely to occur
Cuculus optatus	Oriental Cuckoo	MI	MI; MA	Dense to open woodlands and forest, especially riparian areas, rainforest patches, vine thickets, mangroves	No	Single record in the desktop study area from 1973, also returned from EPBC search.	Unlikely to occur

Species name	Common name	State	C'wealth	Preferred Habitat	Habitat Available in Survey Area?	Desktop Records	Likelihood of Occurrence
Pluvialis squatarola	Grey Plover	MI	VU; MI; MA	Coastal and estuarine intertidal flats, sandy beaches, salt ponds, and adjacent rocky shorelines. Less commonly on near-coastal salt lakes and sewage ponds.	No	Over 30 records in the desktop study area. Predominately on the coast in the western extent of the desktop study area.	Unlikely to occur
Pluvialis fulva	Pacific Golden Plover	MI	MI; MA	Coastal and estuarine intertidal flats, sandy beaches and adjacent rocky shorelines, shallow margins of freshwater wetlands including sewage ponds, short grasslands including sportfields	No	24 records in the desktop study area, predominately on the coast in the western extent.	Unlikely to occur
Charadrius dubius	Little Ringed Plover	MI	MI; MA	Sandy or muddy fringes of freshwater and estuarine wetlands	Limited	Single record in the desktop study area from 1972.	Unlikely to occur
Anarhynchus veredus	Oriental Plover	MI	MI; MA	Open plains, bare, rolling country, muddy or sandy wastes near inland swamps or intertidal mudflats; bare claypans, margins of coastal marshes; grassy airfields, sportsfields, lawns and coastal dune areas	Limited	21 records from the desktop study area, predominately along the coastline, closest being approximately 7km from the survey area.	May occur
Anarhynchus mongolus	Siberian Sand Plover	EN	EN; MI; MA	Coastal and estuarine intertidal flats, sandy beaches, salt ponds	No	36 records in the desktop study area, all on the coast except one (1979).	Unlikely to occur
Anarhynchus leschenaultii	Greater Sand Plover	VU	VU; MI; MA	Coastal and estuarine intertidal flats, sandy beaches, occasionally adjacent rocky shorelines, less commonly near-coastal wetlands, salt lakes and salt ponds	No	Over 57 records in the desktop study area, concentrated along the coastline.	Unlikely to occur
Rostratula australis	Australian Painted-snipe	EN	EN; MA	Shallow vegetated ephemeral wetlands. Less commonly saltmarsh, claypans, sewage farms, dams, bores and irrigation channels	Limited	Single record in the desktop study area, approximately 30km from the survey area.	Unlikely to occur
Numenius phaeopus	Eurasian Whimbrel	MI	MI; MA	Coastal and estuarine intertidal flats, saltmarsh, tidal creeks and mangroves, less commonly sandy beaches and rocky shorelines.	No	Over 85 records in the desktop study area, concentrated on the coastline following the desktop study area.	Unlikely to occur
Numenius minutus	Little Curlew	MI	MI; MA	Short grassland plains and bare country, roosts on sandy beaches and mudflats or margins of wetlands.	Limited	29 records in the desktop study area, largely along the coastline with the some inland. Nearest record 2.5km from the survey area boundary (2010).	May occur
Numenius madagascariensis	Far Eastern Curlew	CR	CR; MI; MA	Coastal and estuarine intertidal mudflats and sandflats, adjacent sandy beaches, saltmarsh, tidal creeks and mangrove fringes.	No	53 records in the desktop study area, largely along the coastline with the some inland. Nearest record 2.5km from the survey area boundary (2019).	Unlikely to occur
Limosa lapponica	Bar-tailed Godwit	CR	EN; MI; MA	Coastal and estuarine intertidal flats, adjacent sandy beaches and rocky shorelines, near-coastal salt lakes and saltworks ponds.	No	72 records in desktop study area, all on the coast, most recent 2017.	Unlikely to occur
Limosa limosa	Black-tailed Godwit	MI	EN; MI; MA	Shallow freshwater wetlands, coastal and estuarine intertidal mudflats, preferring softer, muddy substrates, adjacent sandy beaches, saltworks ponds	Limited	12 records in the desktop study area, nearest record is from 2005, 3km from the desktop study area boundary.	Unlikely to occur
Limnodromus semipalmatus	Asian Dowitcher	MI	VU; MI; MA	Coastal and estuarine intertidal flats, adjacent sandy beaches, salt ponds.	No	16 records in the desktop study area, all on the coast in the north west.	Unlikely to occur
Gallinago megala	Swinhoe's Snipe	MI	MI; MA	Shallow margins of well-vegetated freshwater wetlands, including sewage ponds, damp grasslands	Limited	One record in the survey area (1977) and one in the desktop study area (1985). 1977 record from now decommissioned Goldsworthy sewage ponds, species unlikely to occur within exisiting survey area habitat.	Unlikely to occur
Gallinago stenura	Pin-tailed Snipe	MI	MI; MA	Shallow margins of well-vegetated freshwater wetlands, including sewage ponds, damp grasslands	Limited	4 records in desktop study area, only one since 1982, in 2014.	Unlikely to occur
Phalaropus lobatus	Red-necked Phalarope	MI	MI; MA	Primarily open seas in this region, when ashore favours natural salt lakes, artificial salt ponds, and sewage treatment ponds, sometimes freshwater wetlands.	No	11 records in the desktop study area, predominately coastal and most recently in 2017.	Unlikely to occur
Xenus cinereus	Terek Sandpiper	MI	VU; MI; MA	Coastal and estuarine intertidal flats, saltworks ponds, adjacent sandy beaches and rocky shorelines.	No	34 records in the desktop study area, predominately coastal and in the north-western end of the desktop study area.	Unlikely to occur

Species name	Common name	State	C'wealth	Preferred Habitat	Habitat Available in Survey Area?	Desktop Records	Likelihood of Occurrence
Actitis hypoleucos	Common Sandpiper	MI	MI; MA	Margins of coastal and inland wetlands, including mangroves/mangrove creeks, rocky shorelines, river banks, sewage ponds, but less often intertidal flats.	Yes	101 records in the desktop study area, with multiple records inland within 2km of the survey area boundary.	May occur
Tringa brevipes	Grey-tailed Tattler	MI; P4	MI; MA	Coastal and estuarine intertidal flats and adjacent sandy beaches and rocky shorelines, mangrove fringes, near-coastal wetlands	No	75 records in the desktop study area, predominately coastal, most recent inland record from 1981.	Unlikely to occur
Tringa stagnatilis	Marsh Sandpiper	MI	MI; MA	Shallow freshwater wetlands and wetland margins, less commonly intertidal mudflats	Limited	38 records in the survey area, predominately coastal.	Unlikely to occur
Tringa glareola	Wood Sandpiper	MI	MI; MA	Shallow freshwater wetlands and wetland margins, particularly ones with taller fringing vegetation, including sewage ponds	Limited	One record in the survey area (1981), 36 more in the desktop study area, scattered inland records. 1981 record from now decommissioned Goldsworthy sewage ponds, species unlikely to occur within exisiting survey area habitat.	Unlikely to occur
Tringa totanus	Common Redshank	MI	MI; MA	Most Australian records from coastal and estuarine tidal flats, or roosting on adjacent sandy beaches or rocky shorelines. Uses a broad range of wetland habitats overseas.	No	3 records in the desktop study area, all coastal most recently 1995.	Would not occur
Tringa nebularia	Common Greenshank	MI	EN; MI; MA	Inhabits a variety of coastal and freshwater habitats, intertidal flats and adjacent sandy beaches, mangrove fringes, shallow freshwater wetlands and wetland margins, salt ponds ponds, less commonly on sandy beaches	Limited	95 records in the desktop study area, predominately coastal, some scattered inland records.	May occur
Arenaria interpres	Ruddy Turnstone	MI	VU; MI; MA	Coastal and estuarine intertidal flats, sandy beaches esp. with extensive tide wrack, rocky shorelines, near-coastal salt lakes and salt ponds	No	106 records in the desktop study area, predominately coastal, nearest record within 3kms from SH sewage treatment (2007).	Unlikely to occur
Calidris tenuirostris	Great Knot	CR	VU; MI; MA	Coastal and estuarine intertidal mudflats, adjacent sandy beaches and rocky shorelines, near coastal salt lakes and salt ponds	No	41 records in the desktop study area, almost exclusively coastal.	Unlikely to occur
Calidris canutus	Red Knot	EN	VU; MI; MA	Coastal and estuarine intertidal mudflats, adjacent sandy beaches and rocky shorelines, near coastal salt lakes and salt ponds, occasionally near coastal freshwater wetlands	No	26 records in the desktop study area, almost exclusively coastal, single inland record (1979).	Unlikely to occur
Calidris pugnax	Ruff	MI	MI; MA	Shallows and margins of coastal and inland wetlands, preferring freshwater, less commonly estuarine intertidal mudflats and salt ponds	Limited	2 records in the desktop study area, one from 1979, the other from 2017 at the PH Saltworks.	Unlikely to occur
Calidris falcinellus	Broad-billed Sandpiper	MI	MI; MA	Coastal and estuarine intertidal mudflats, adjacent sandy beaches and rocky shorelines, salt ponds, less commonly shallow margins of freshwater wetlands	Limited	28 records in the desktop study area, all confined to the coastline.	Unlikely to occur
Calidris acuminata	Sharp-tailed Sandpiper	MI	VU; MI; MA	Shallows and margins of coastal and inland wetlands, preferring freshwater, less commonly coastal and estuarine intertidal mudflats.	Limited	Single record in the survey area (1981), 55 other records in the desktop study area, largely coastal and the SH sewage treatment (2014). 1981 record from now decommissioned Goldsworthy sewage ponds, species unlikely to occur within exisiting survey area habitat.	Unlikely to occur
Calidris ferruginea	Curlew Sandpiper	CR	CR; MI; MA	Coastal and estuarine intertidal flats and adjacent sandy beaches and rocky shorelines, shallow fresh and saline wetlands including sewage ponds and salt ponds	No	55 records from the desktop study area, closest record is within 3km from 2010 (SH sewage treatment).	Unlikely to occur
Calidris subminuta	Long-toed Stint	MI	MI; MA	Muddy fringes of freshwater wetlands (including sewage ponds), often with short vegetation, less commonly brackish estuarine mudflats and saltmarsh	No	12 records in the desktop study area, largely between the coastline and the survey area boundary.	Unlikely to occur
Calidris ruficollis	Red-necked Stint	MI	MI; MA	Variety of wetland habitats including coastal and estuarine intertidal flats, adjacent sandy beaches and rocky coasts, muddy fringes of freshwater wetlands, sewage ponds, salt ponds.	Limited	94 records within the desktop study area, predominately coastal, nearest record within 3km from SH sewage treatment (2014).	Unlikely to occur

Species name	Common name	State	C'wealth	Preferred Habitat	Habitat Available in Survey Area?	Desktop Records	Likelihood of Occurrence
Calidris alba	Sanderling	MI	MI; MA	Sandy ocean beaches, less commonly tidal sand or reef flats.	No	24 records in the desktop study area, a single inland record (1981) otherwise coastal.	Unlikely to occur
Calidris melanotos	Pectoral Sandpiper	MI	MI; MA	Shallows and margins of freshwater wetlands, occasionally coastal or estuarine intertidal flats and flooded samphire	Limited	Two records in the desktop study area, 1998 and 2014.	Unlikely to occur
Glareola maldivarum	Oriental Pratincole	MI	MI; MA	Primarily forages aerially over open country, roosts on bare ground near water (e.g. tidal flats, sandy beaches, margins of freshwater wetlands)	Yes	1 record in the survey area (2004), 32 in the desktop study area inlcuding four within 3km of the survey area.	Recorded (previously)
Sternula albifrons	Little Tern	MI	MI; MA	Sheltered coastal waters, estuaries, and tidal creeks, roosting on adjacent sandy and rocky shorelines, breed on open sandy beaches	No	29 records in the desktop study area, all along the coastline.	Unlikely to occur
Sternula nereis	Fairy Tern	VU	VU; MA	Sheltered coasts and estuaries, with sandy beaches, sandbars, offshore islands with sandy beaches.	No	Two coastal records in the north-west of the desktop study area, 1995 and 2008.	Unlikely to occur
Gelochelidon macrotarsa	Australian Tern	MI	MI; MA	Coasts and estuaries, particularly in vicinity of intertidal flats, inland wetlands, grasslands and open country (sometimes far from water). Breeding primarily on large ephemeral wetlands inland.	Yes	1 record in the survey area (2004), 47 in the desktop study area, mostly coastal.	Recorded (previously)
Hydroprogne caspia	Caspian Tern	MI	MI; MA	Sheltered coastal waters, estuaries, and larger inland water bodies (including larger rivers, reservoirs, fresh and salt lakes, salt ponds)	Yes	1 record in the survey area (1999), 117 in the desktop study area, predominately coastal with some inland records.	Recorded (previously)
Chlidonias leucopterus	White-winged Tern	MI	MI; MA	Estuaries, sheltered seas, freshwater wetlands, sewage ponds, and flooded grasslands and samphire flats	Yes	45 records in the desktop study area, mostly coastal, some further inland, nearest record within 3km (SH sewage treatment).	May occur
Sterna hirundo	Common Tern	MI	MI; MA	Sheltered seas, coasts, estuaries, salt ponds, occasionally other near-coastal wetlands	No	12 records in the desktop study area, exclusively coastal.	Unlikely to occur
Sterna dougallii	Roseate Tern	MI	MI; MA	Coastal and offshore waters, exposed rocky shorelines, islands	No	Two records in the desktop study area, both off the coast in the north-west (2006 and 2022).	Unlikely to occur
Thalasseus bergii	Greater Crested Tern	MI	MI; MA	Coastal seas and estuaries, primarily inshore but foraging offshore as far as continental shelf edge, roosts on sandy beaches, rocks and man-made structures. Breeds on sandy or rocky offshore islands	No	35 records in the desktop study area, predominately coastal.	Unlikely to occur
Fregata ariel	Lesser Frigatebird	MI	MI; MA	Aerial over tropical coasts and seas, breeding on offshore islands.	No	18 records in the desktop study area, all but one (1979) along the coastline.	Unlikely to occur
Sula leucogaster	Brown Booby	MI	MI; MA	Inshore and offshore waters of tropical seas, breeds on offshore islands.	No	Single record (1979) just off the coastline in the north west of the desktop study area.	Would not occur
Plegadis falcinellus	Glossy Ibis	MI	MI; MA	Shallows of wetlands and floodplains, occasionally dry grasslands.	Yes	17 records within the desktop study area, nearest five within 2km of the survey area (1999-2011).	May occur
Pandion haliaetus	Osprey	MI	MI; MA	Estuaries, coasts and offshore islands, less commonly large inland wetlands.	Limited	93 records within the desktop study area, largely coastal but some inland records.	Unlikely to occur
Elanus scriptus	Letter-winged Kite	P4		Arid and semi-arid grasslands, open country and timbered watercourses, roosting and breeding in trees. Irruptive, and after good seasons wandering individuals may appear far from their core range in a wider range of habitats.	Yes	Two records from the north-west of the desktop study area, one from 1994.	Unlikely to occur
Erythrotriorchis radiatus	Red Goshawk	VU	EN	Tall open forest and woodland, especially along watercourses with tall eucalypts and melaleucas, potentially occupying wider range of habitats post-breeding.	No	Returned from EPBC search only, no known records in the desktop study area.	Unlikely to occur

Species name	Common name	State	C'wealth	Preferred Habitat	Habitat Available in Survey Area?	Desktop Records	Likelihood of Occurrence
Falco hypoleucos	Grey Falcon	VU	VU	Lightly wooded or untimbered arid plains, especially those that are crossed by major watercourses lined with taller trees, or isolated man-made structures such as communications towers.	Yes	1 record in the survey area, 13 records spread inland across the desktop study area, two very close, within 1km, of the survey area (2012, 2017).	Recorded (previously)
Falco peregrinus	Peregrine Falcon	OS		Most habitats, favouring areas with concentrations of bird prey (e.g. wetlands, coastal cliffs with seabird colonies, cities with large numbers of feral pigeons). Cliffs faces preferred for breeding, but also in trees (using old stick nests of other species or tree hollows) where cliffs are in short supply	Yes	9 records within the survey area (1977-2012), six of them within 5km of the desktop study area.	Likely to occur
Polytelis alexandrae	Princess Parrot	P4	VU	Desert sand dune country with scattered trees (particularly marble gums and desert oak) and good ground cover of shrubs and spinifex (Triodia).	No	Returned from EPBC search only, no known records in the desktop study area.	Unlikely to occur
Pezoporus occidentalis	Night Parrot	CR	EN	Arid or semi-arid spinifex grasslands with patches of large, established and unburnt hummocks, usually in association with palaeodrainage/drainage areas, salt lakes or rocky breakaways. Foraging habitat includes high productivity grassland areas, and shrublands of samphire, bluebush and saltbush.	No	Returned from EPBC search only, no known records in the desktop study area.	Unlikely to occur
Hirundo rustica	Barn Swallow	MI	MI	Open habitats including urban environments, particularly near water	Yes	23 records in the desktop study area, largely coastal, two records within 5km of the survey area (2001 and 2005).	Unlikely to occur
Motacilla tschutschensis	Eastern Yellow Wagtail	MI	MI; MA	Short grasslands and bare ground (including sports ovals, agricultural areas), wetland margins, sewage ponds.	Limited	Returned from ALA and NatureMap, desktop study area only.	Unlikely to occur
Motacilla cinerea	Grey Wagtail	MI	MI; MA	A variety of habitats near water, particularly along fast- flowing freshwater waterways. Rare migrant to the Kimberley region, vagrant elsewhere in the state	Limited	Returned from EPBC search, desktop study area only.	Unlikely to occur
Reptiles							
Ctenotus angusticeps		P3		On mainland, coastal saltmarsh vegetation on mudflats, often near mangroves and with numerous crabholes. On Airlie Island occurs in acacia shrubland, coastal spinifex, and tussock grassland.	No	18 records in the desktop study area, from 2010-2019, all located along the coastline.	Would not occur
Lerista separanda	Dampierland plain slider	P2		Sandy coastal areas and inland sand dunes and sandplains	Yes	17 records within the desktop study area from 2006 to 2018, towards the eastern end of the desktop study area.	May occur
Liopholis kintorei	Great Desert Skink	VU	VU	Spinifex (*Triodia* spp.) on arid sandy, clay or loamy flats.	Yes	Returned from EPBC search only, no known records in the desktop study area, some habitat present in the eastern end of the desktop study area.	Unlikely to occur
Liasis olivaceus barroni	Pilbara Olive Python	VU	VU	Most commonly encountered in habitats with ready access to shelter and freshwater, such as gorges, rockpiles, springs and vegetated watercourses - but will travel long distances and use a variety of other habitats in passing, both natural and artificial. Regularly shelters beneath boulders on dry escarpments, hills and creeklines.	Yes	Five records within the desktop study area, three within 10km of the survey boundary. Species recorded in 2023 by biota approximately 20km north of desktop study area.	Likely to occur

Appendix 4

Vegetation Structural Framework and Condition Scale

Table 1: Vegetation structure and canopy cover classes.

Stratum	Canopy Cover (%)				
	70-100%	30-70%	10-30%	2-10%	<2%
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Mallee >8 m (Tree Mallee)	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee	Scattered tree mallee
Mallee <8 m (Shrub Mallee)	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee	Scattered shrub mallee
Shrubs over 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs under 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Tussock grasses	Closed tussock grassland	Tussock grassland	Open tussock grassland	Very open tussock grassland	Scattered tussock grasses
Annual grasses	Closed annual grassland	Annual grassland	Open annual grassland	Very open annual grassland	Scattered annual grasses
Herbs	Closed herbland	Herbland	Open herbland	Very open herbland	Scattered herbs
Sedges	Closed sedgeland	Sedgeland	Open sedgeland	Very open sedgeland	Scattered sedges
Ferns	Closed fernland	Fernland	Open fernland	Very open fernland	Scattered ferns
Climbers	Closed climbers	Climbers	Open climbers	Very open climbers	Scattered climbers

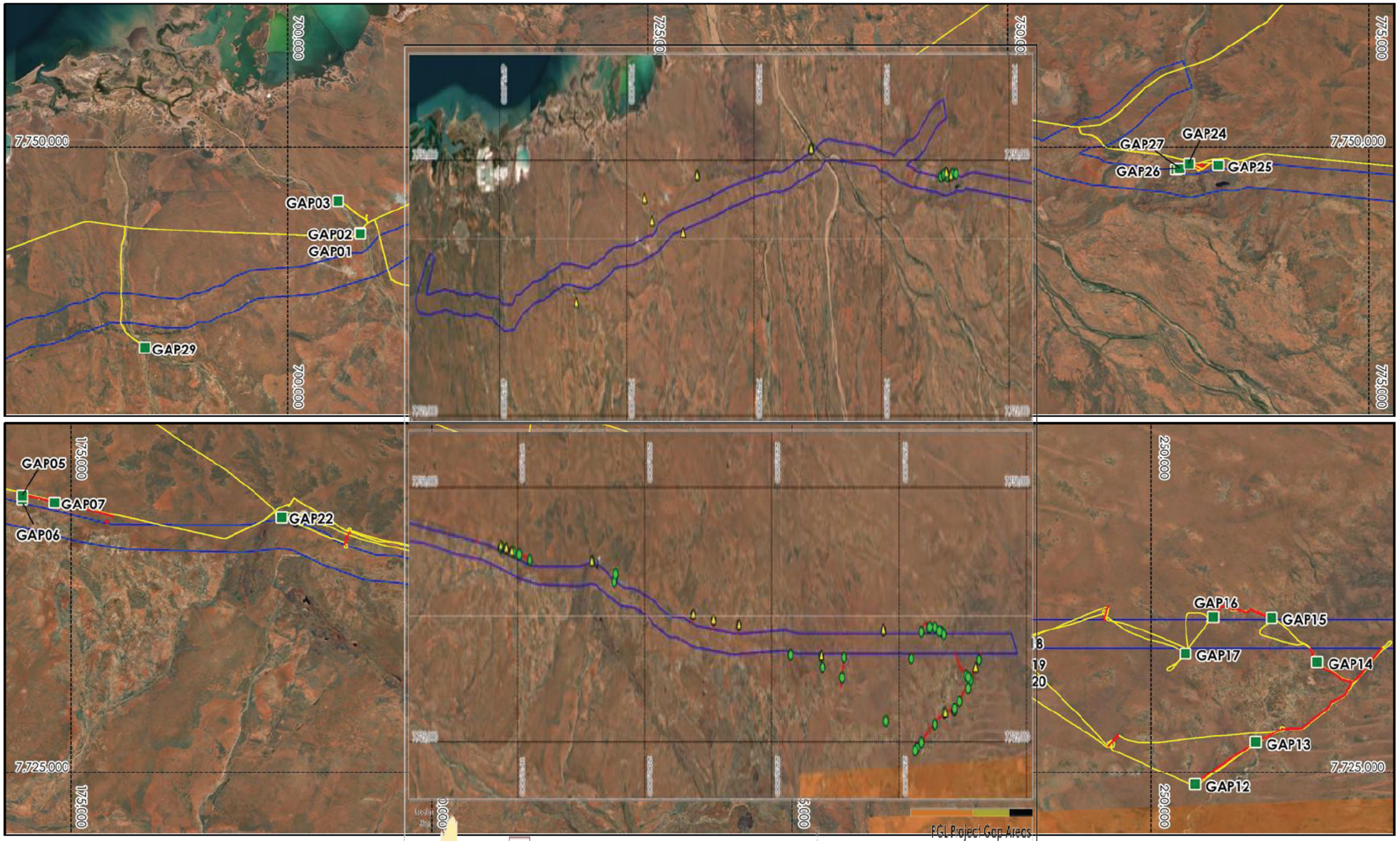
- Based on Muir (1977), and Aplin's (1979) modification of the vegetation classification system of Specht (1970):
  - Aplin T.E.H. (1979). The Flora. Chapter 3 *In* O'Brien, B.J. (ed.) (1979). *Environment and Science*. University of Western Australia Press;
  - Muir B.G. (1977). Biological Survey of the Western Australian Wheatbelt. Part II: Vegetation and habitat of Bendering Reserve. *Records of the Western Australian Museum, Suppl*. No. 3;
  - Specht R.L. (1970). Vegetation. In *The Australian Environment*. 4th edn (Ed. G.W. Leeper). Melbourne.

Table 2: Vegetation Condition Ratings (extract from Table 2, page 10, in EPA 2016)

Vegetation Condition	Eremaean and Northern Botanical Provinces
Pristine	
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

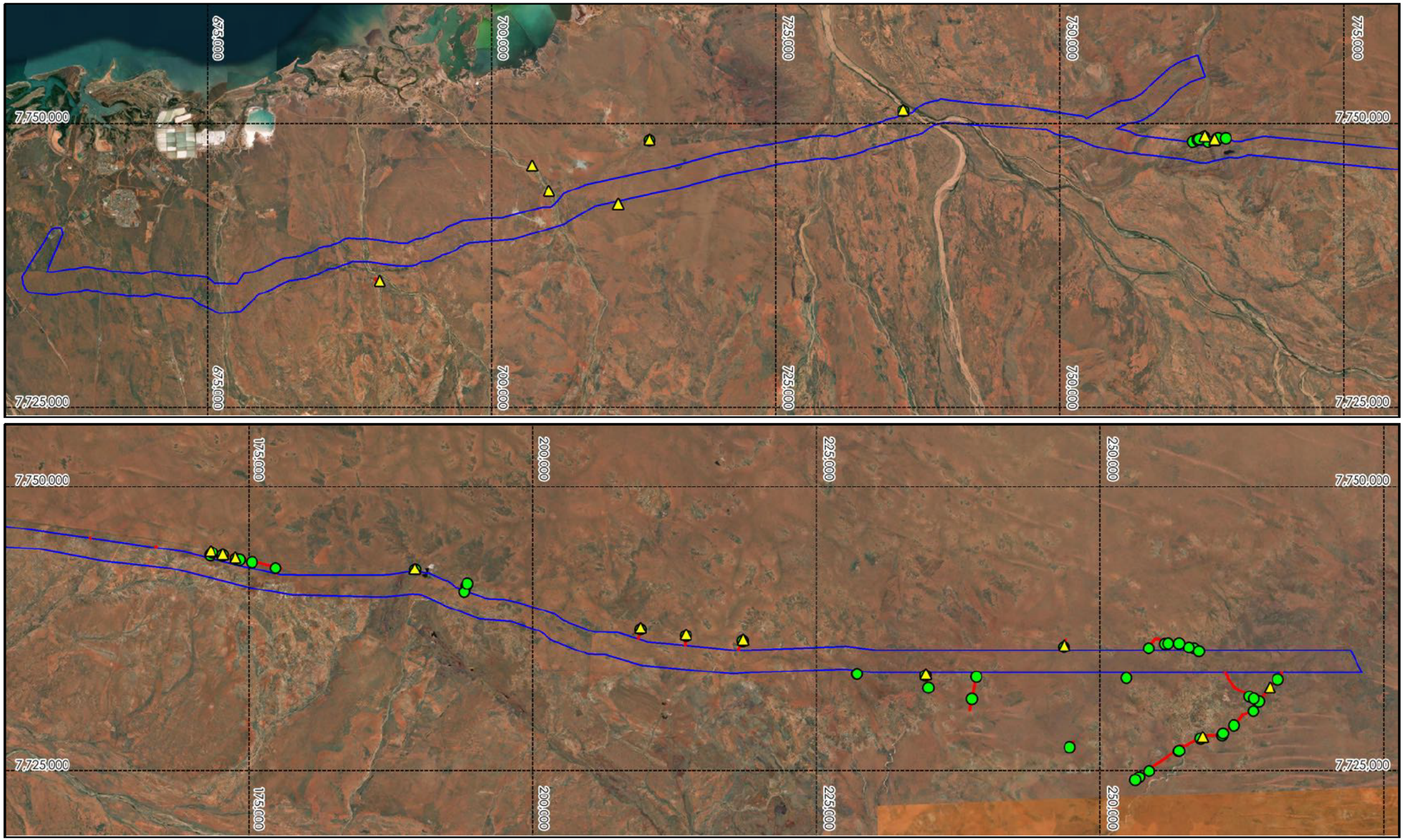
Appendix 5

Flora and Fauna Survey Effort



PGL Project Gap Areas
Flora Survey Effort

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 11 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z50/51 (GDA2020) | Scale: 1:330,000



Location Map



Gap areas survey area

PGL corridor survey area

Search site (foot traverse)

Habitat assessment site

N

0 20

kilometres

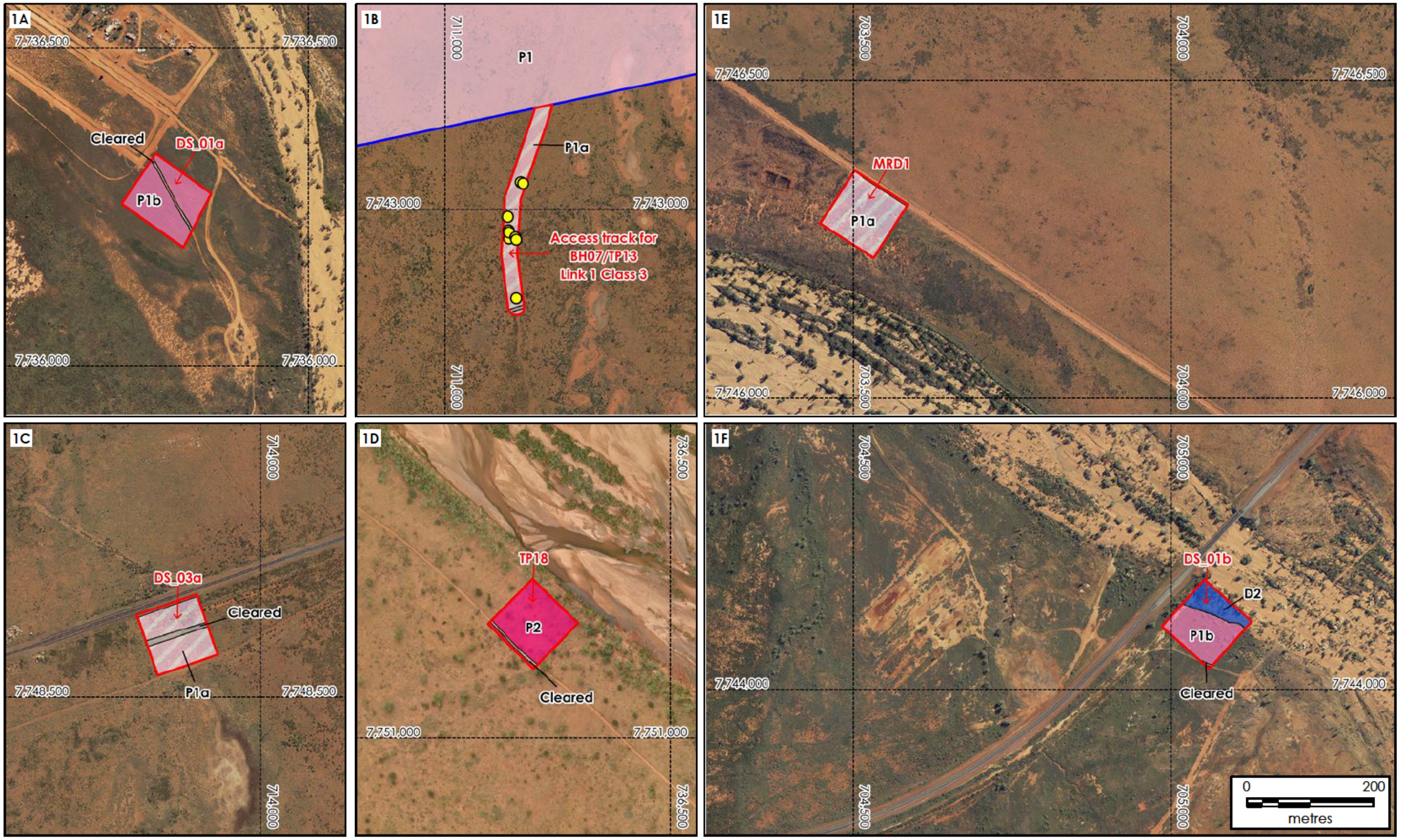
PGL Project Gap Areas Fauna Survey Effort

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 28 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z50/51 (GDA2020) | Scale: 1:420,000

Appendix 7

Mapping of Vegetation Types and Significant Flora Locations



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Tribulopis marliesiae (P3) record

Vegetation Units

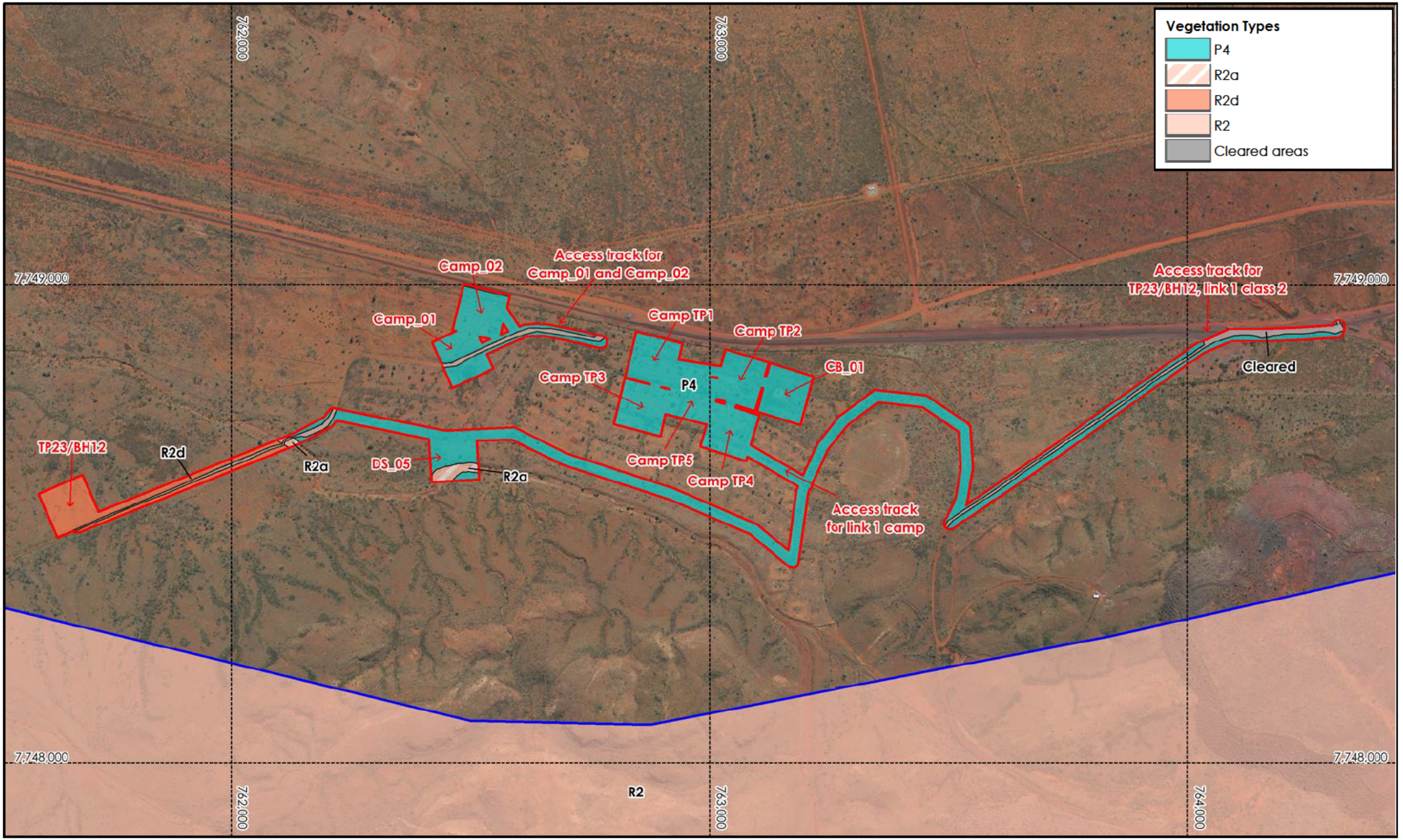
- P1
- P1a
- P1b
- P2
- D2
- Cleared

N

PGL Project Gap Areas Vegetation Map 1

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA 50 (GDA2020) | Scale 1: 7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

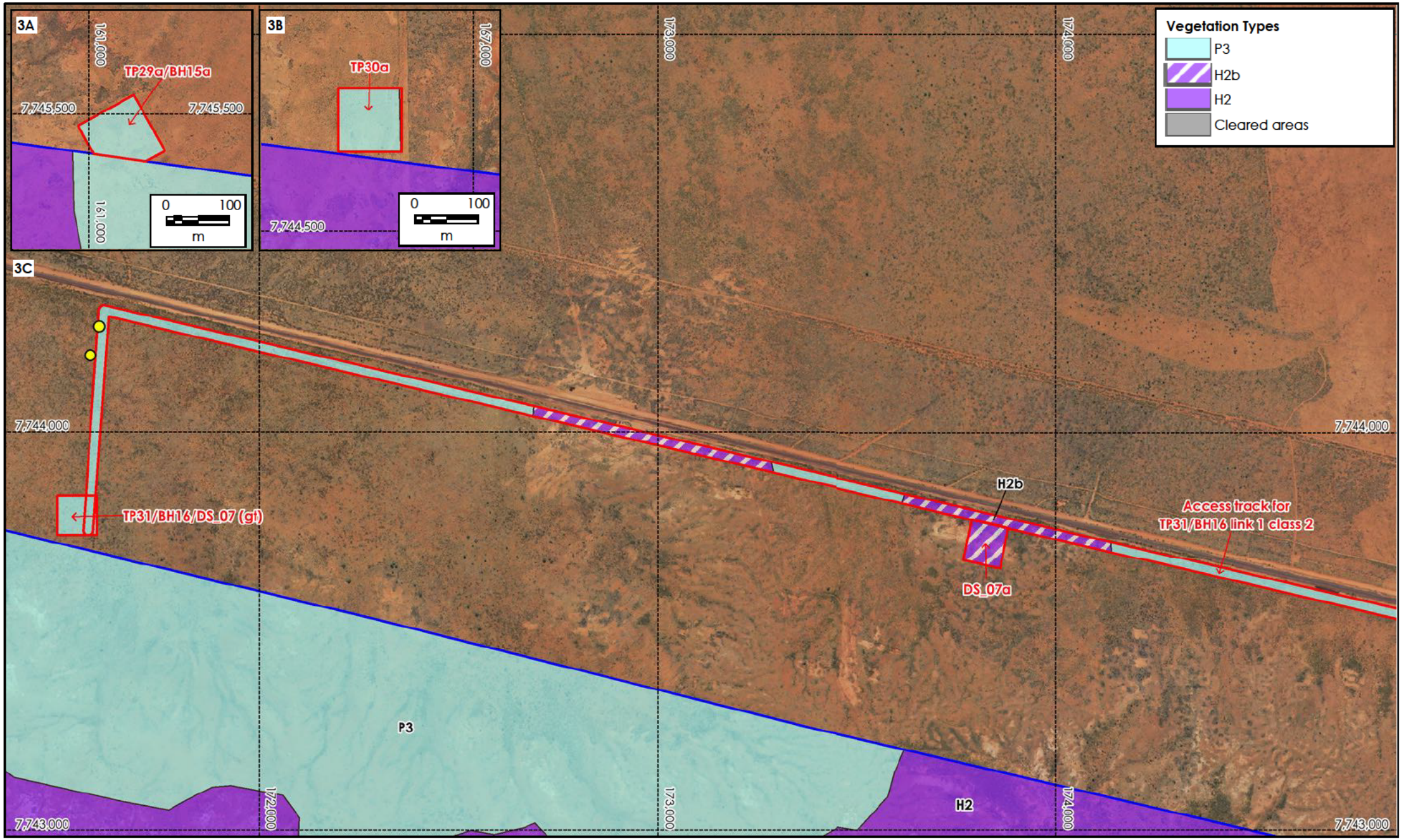
0 400

metres

PGL Project Gap Areas Vegetation Map 2

Biota Environmental Sciences

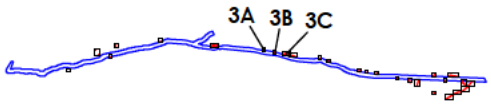
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z50 (GDA2020) | Scale: 1:10,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Tribulopis marliesiae (P3) record

N

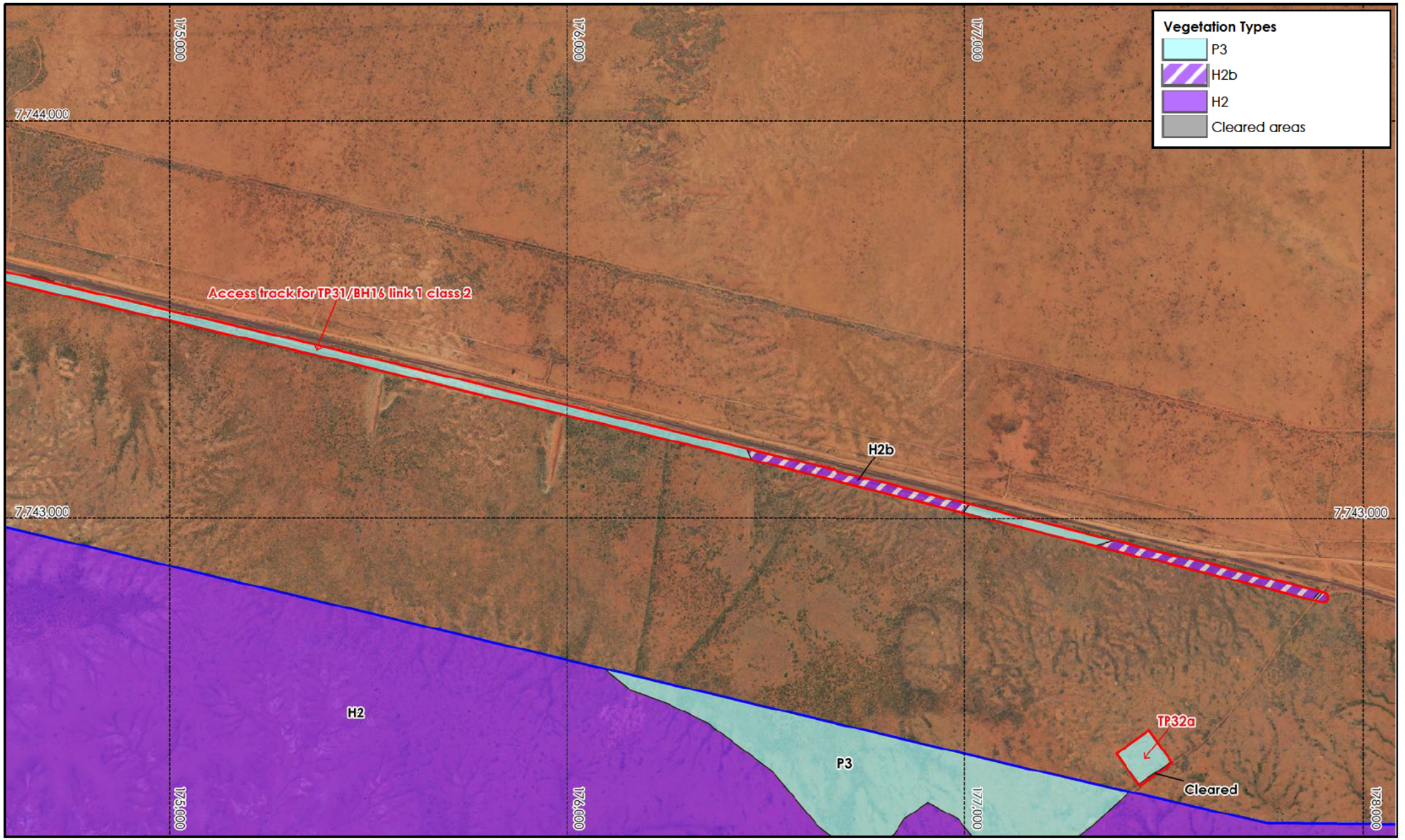
0 500

metres

PGL Project Gap Areas Vegetation Map 3

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:12,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

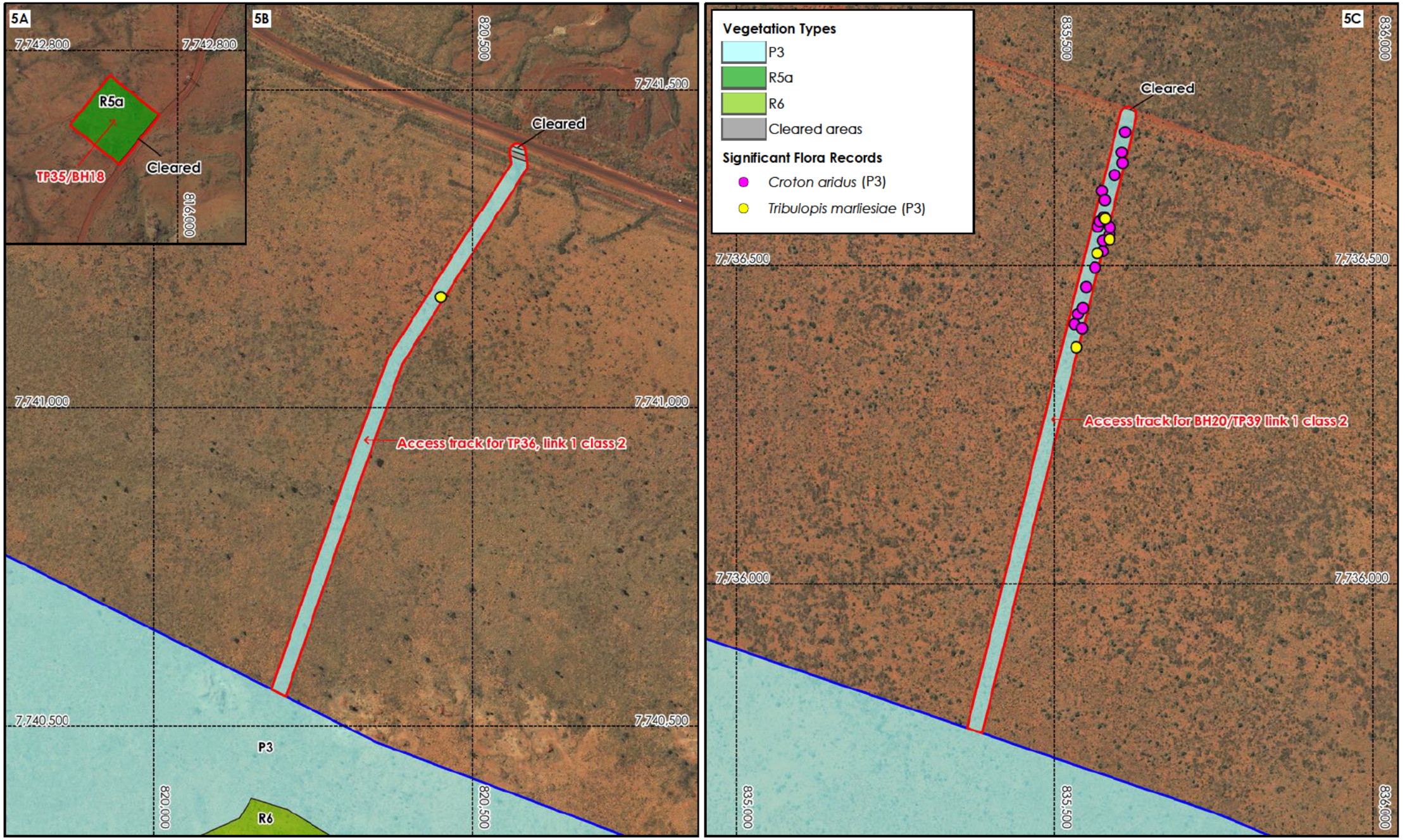
0 500

metres

PGL Project Gap Areas Vegetation Map 4

Biota Environmental Sciences

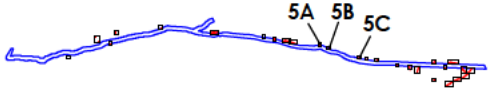
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:12,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

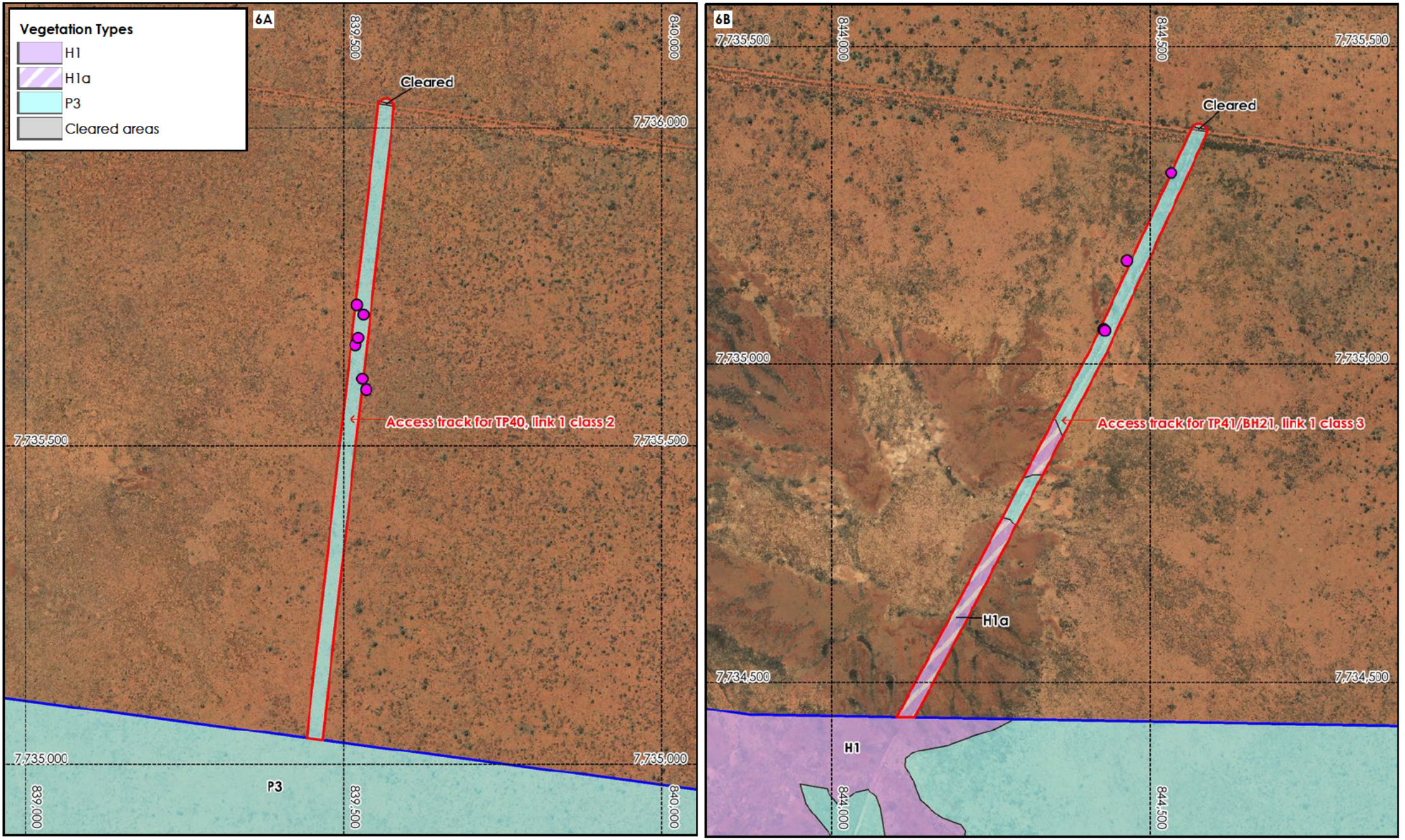
0 300

metres

PGL Project Gap Areas Vegetation Map 5

Biota Environmental Sciences

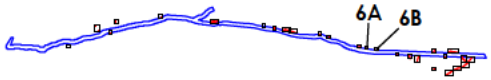
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Croton aridus (P3) record

N

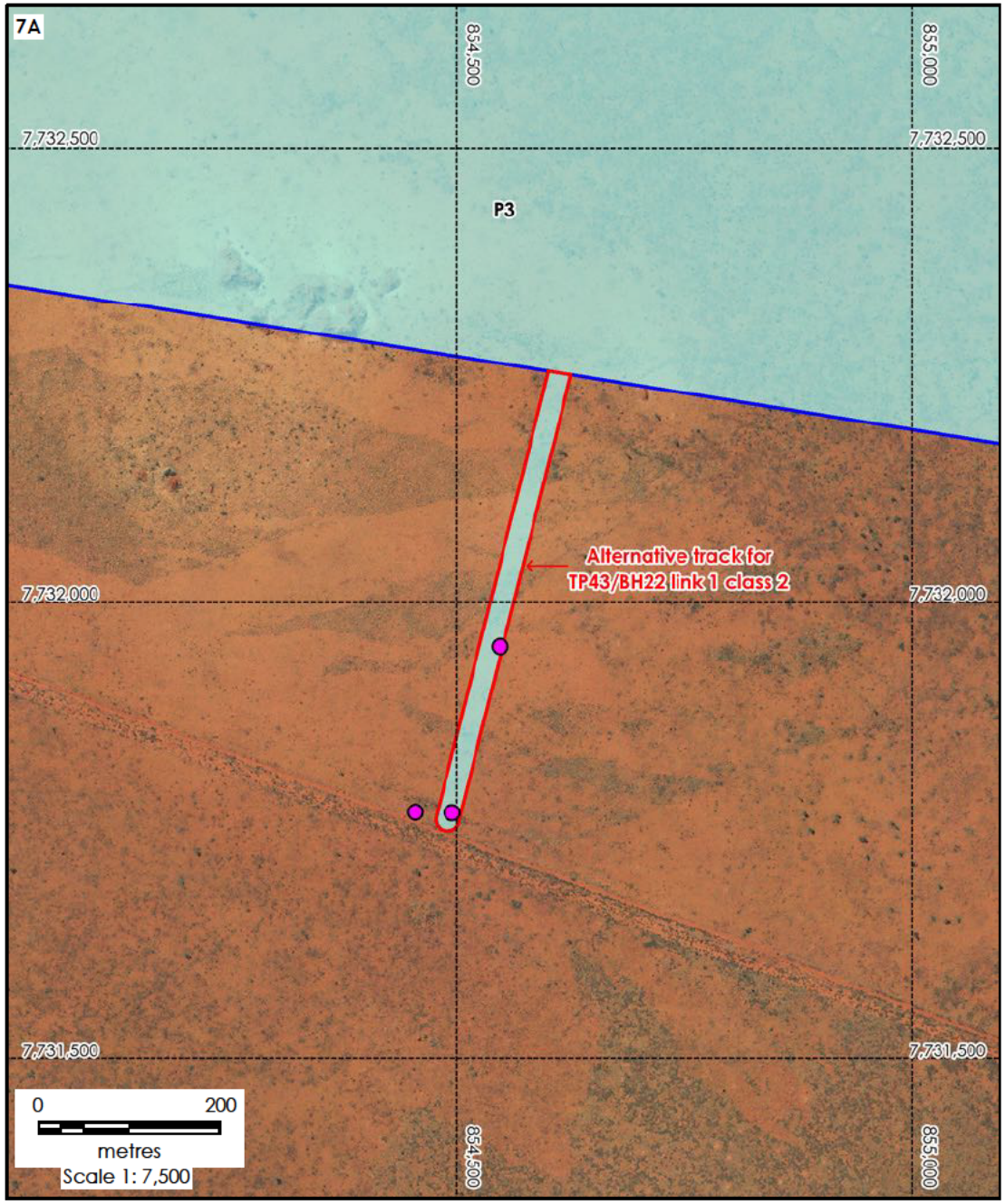
0 300

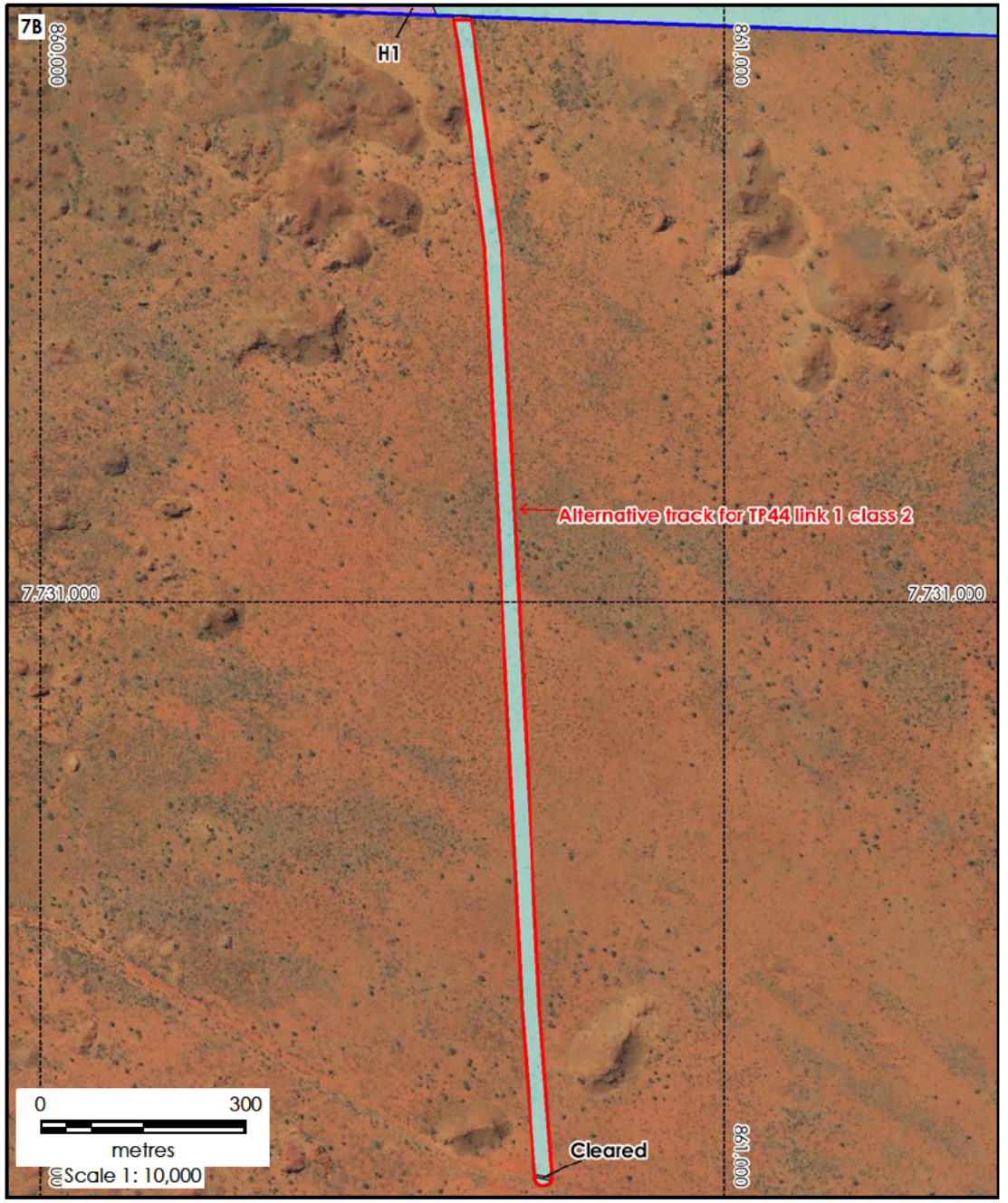
metres

PGL Project Gap Areas Vegetation Map 6

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500

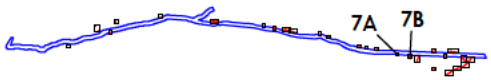




Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Croton aridus (P3) record

Vegetation Types

H1

P3

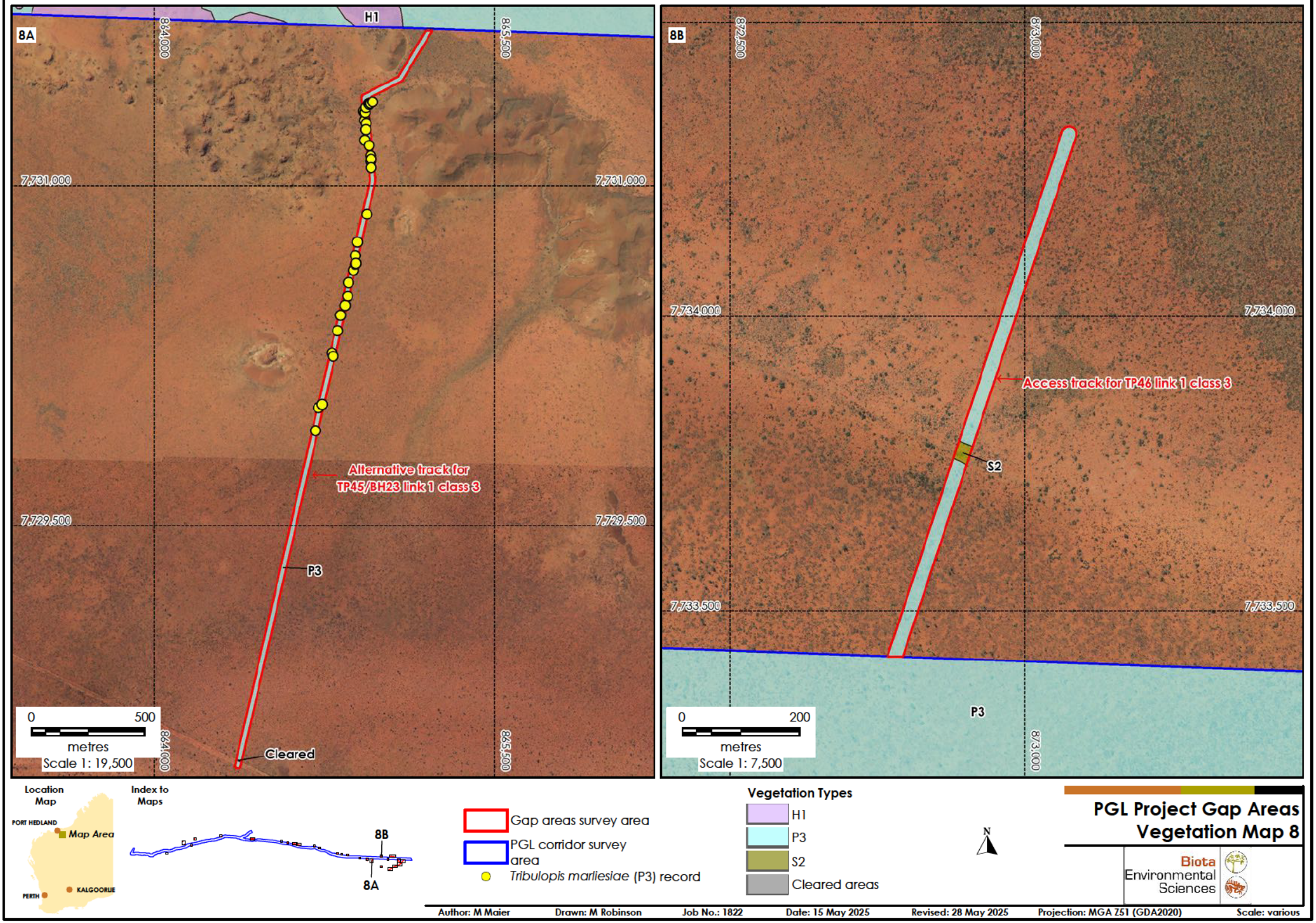
Cleared areas

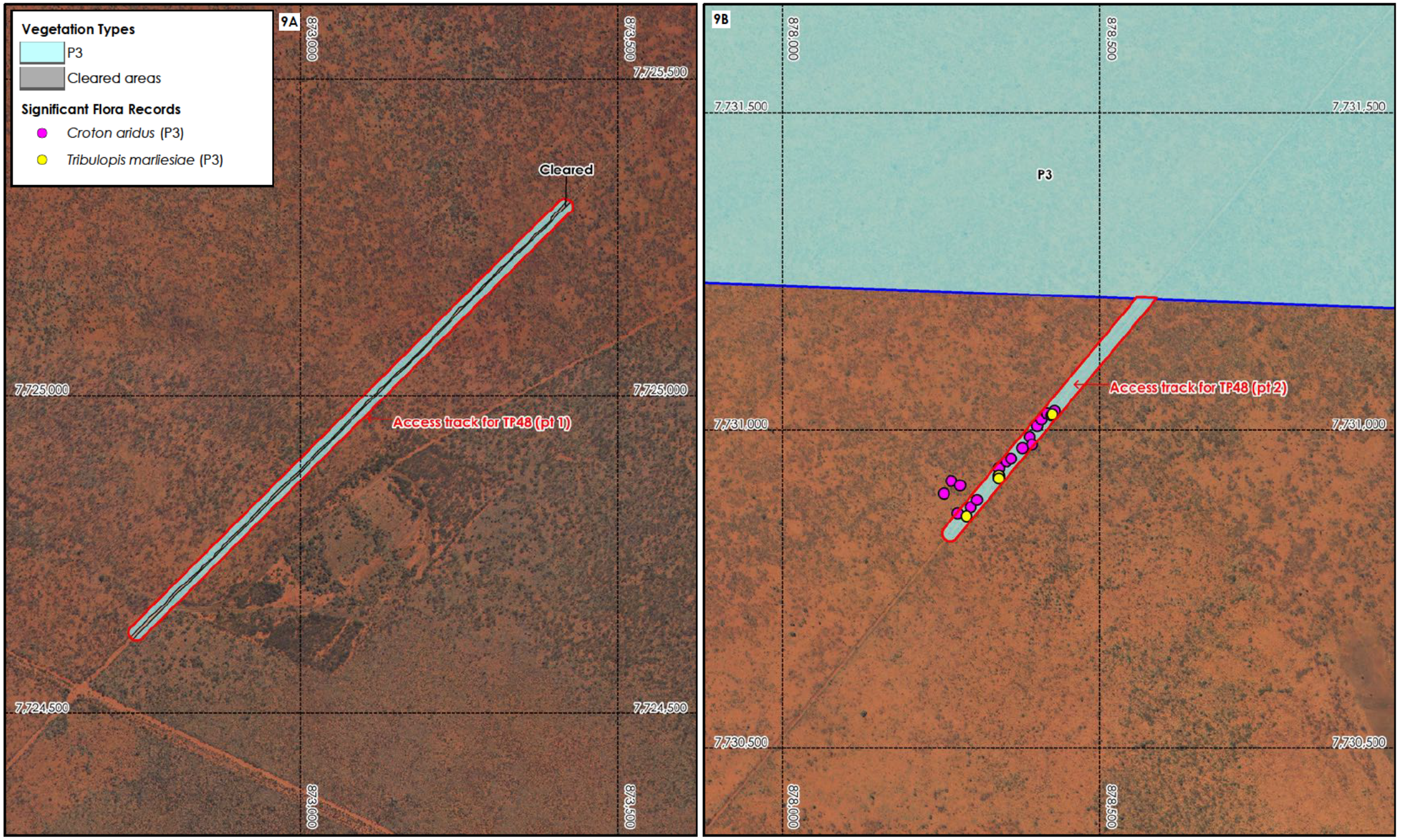
N

PGL Project Gap Areas Vegetation Map 7

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: various


8A
H1
864,000
865,500
7,731,000
7,729,500
Alternative track for TP45/BH23 link 1 class 3
P3
Cleared
0
500
metres
Scale 1: 19,500
8B
872,500
873,000
7,734,000
7,733,500
Access track for TP46 link 1 class 3
S2
P3
0
200
metres
Scale 1: 7,500
Location Map
PORT HEDLAND
Map Area
KALGOORLIE
PERTH
Index to Maps
8B
8A
Gap areas survey area
PGL corridor survey area
Tribulopis marliesiae (P3) record
Vegetation Types
H1
P3
S2
Cleared areas
N
PGL Project Gap Areas
Vegetation Map 8
Biota Environmental Sciences
Author: M Maier
Drawn: M Robinson
Job No.: 1822
Date: 15 May 2025
Revised: 28 May 2025
Projection: MGA Z51 (GDA2020)
Scale: various



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

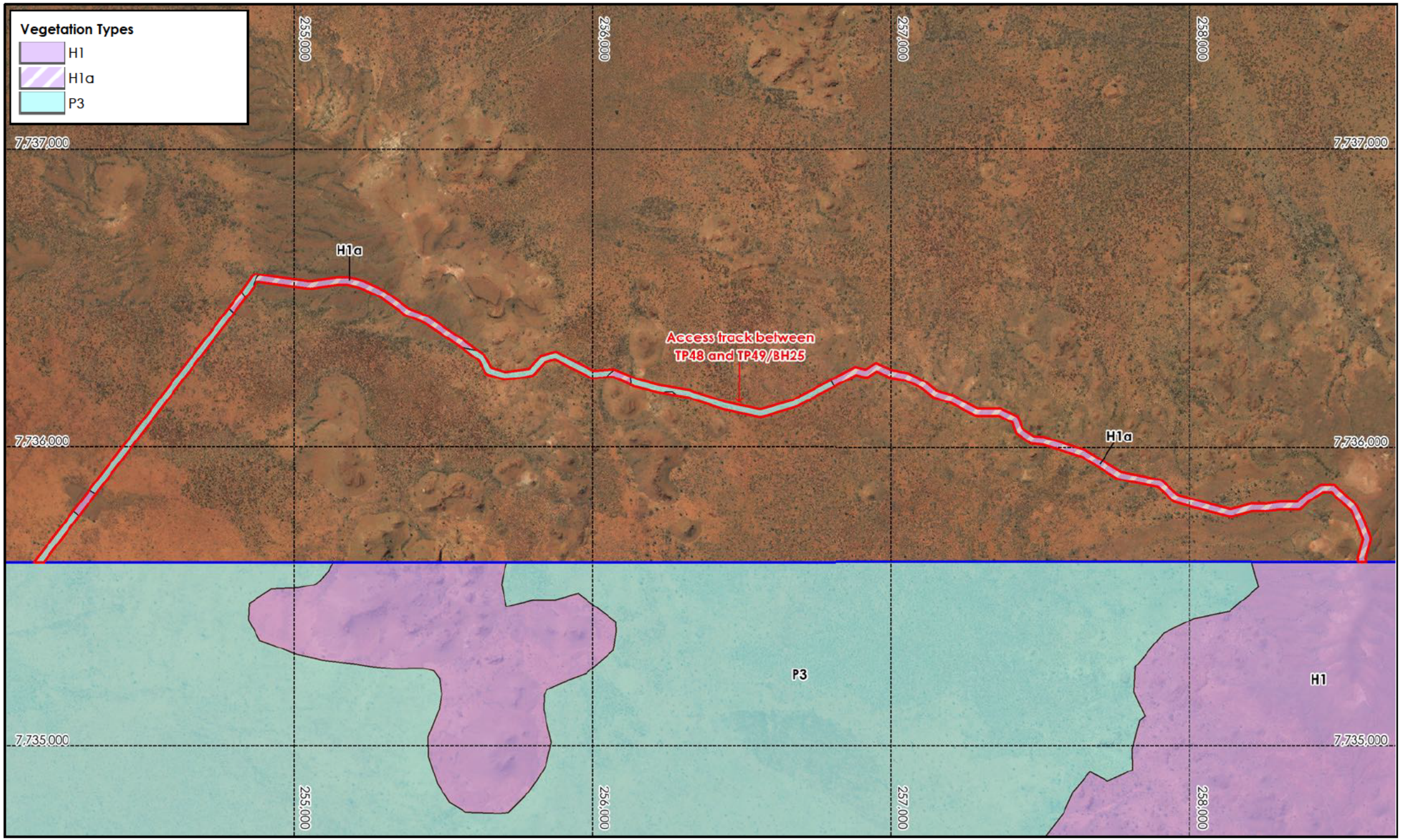
0 300

metres

PGL Project Gap Areas Vegetation Map 9

Biota Environmental Sciences

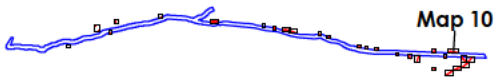
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

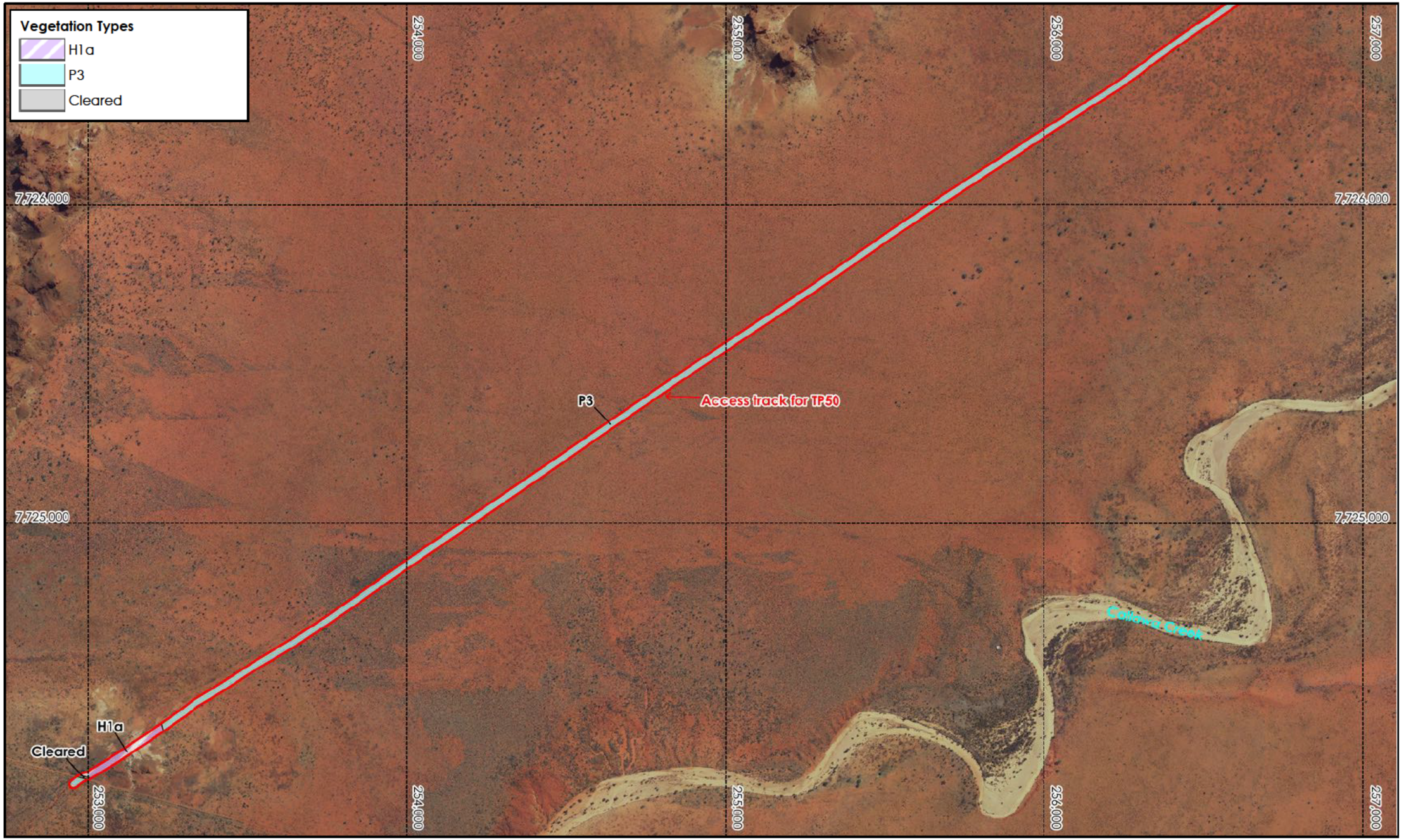
0 800

metres

PGL Project Gap Areas Vegetation Map 10

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:16,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

0 600

metres

PGL Project Gap Areas Vegetation Map 11

Biota Environmental Sciences

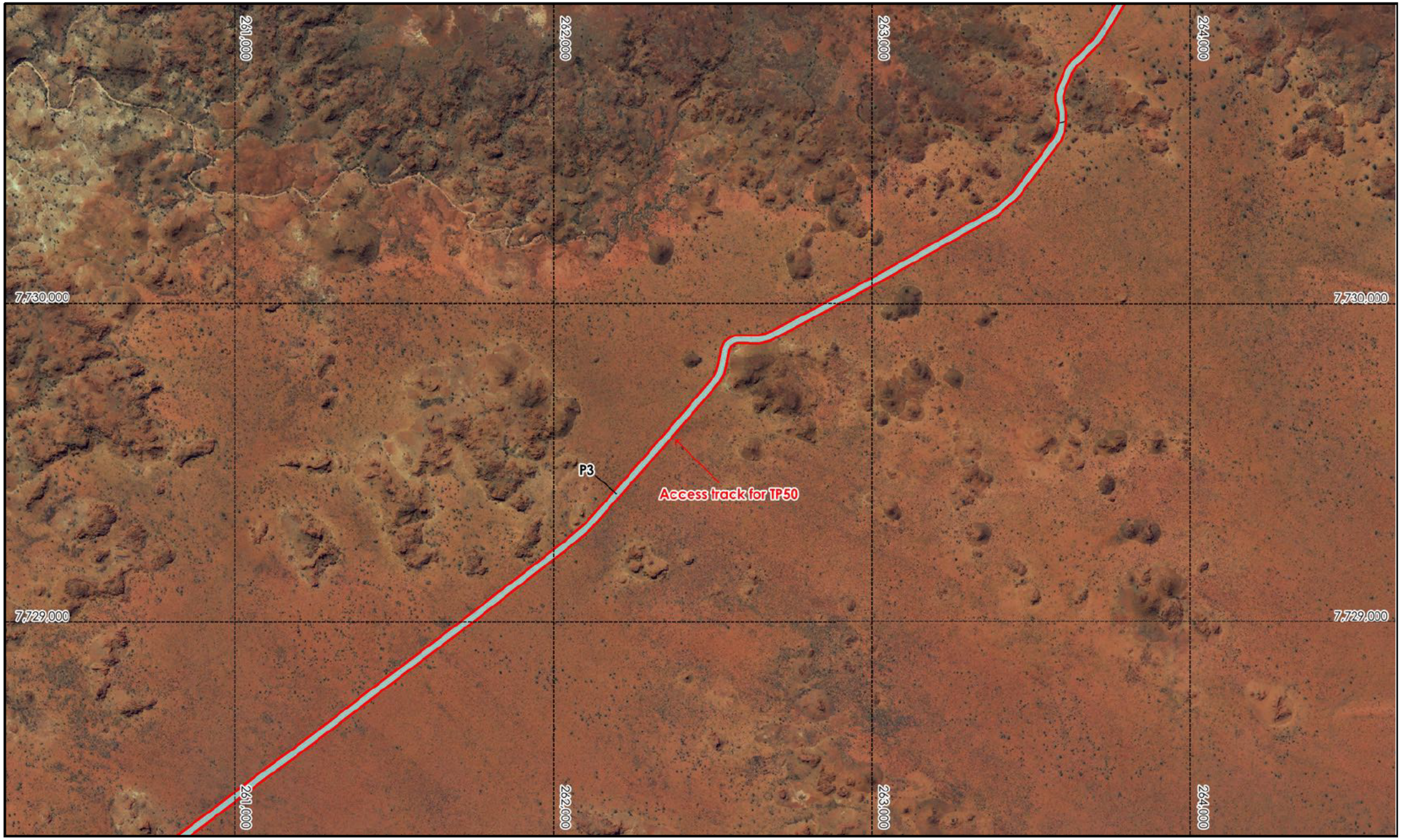
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



PGL Project Gap Areas Vegetation Map 12

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Vegetation Type

P3

N

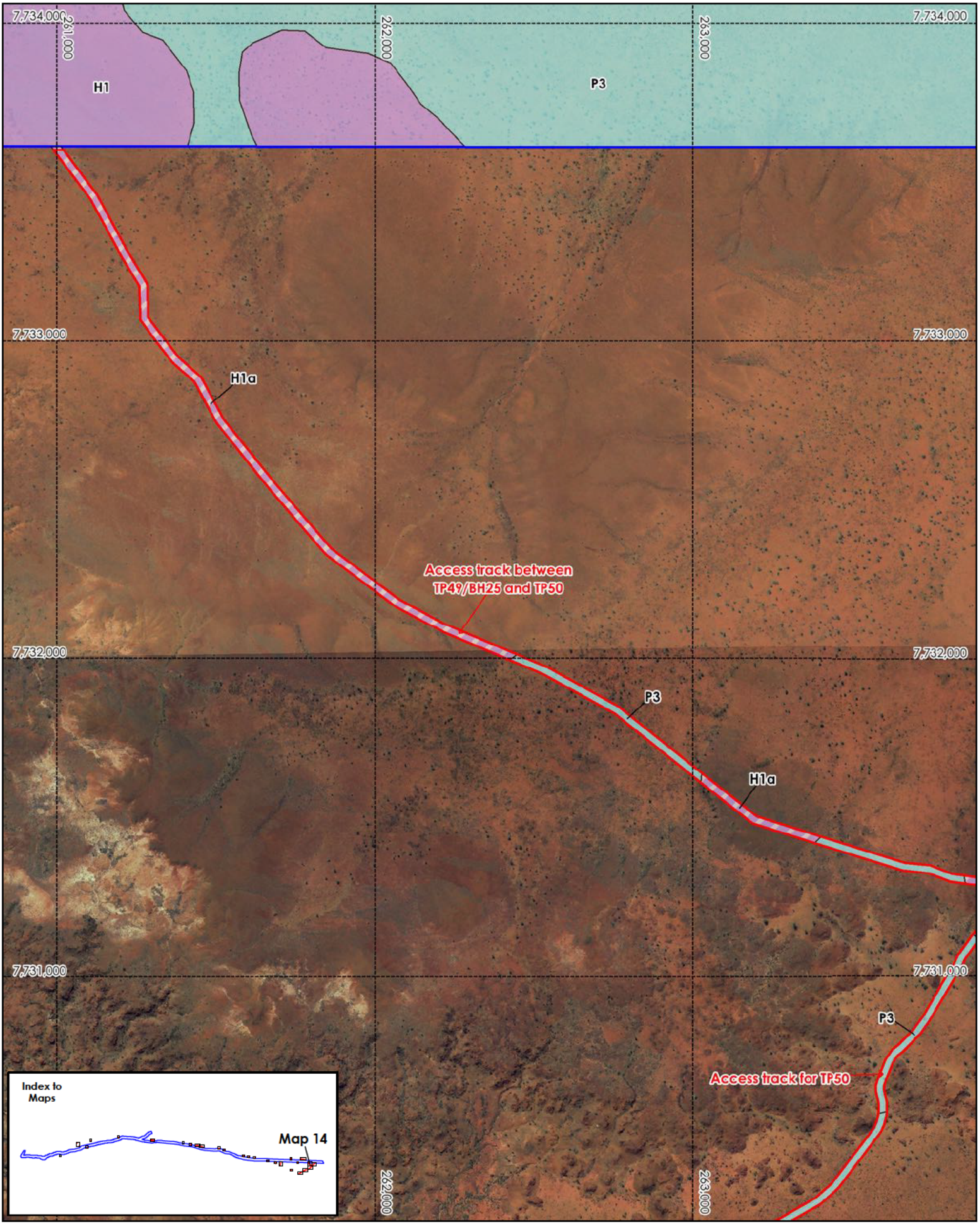
0 600

metres

PGL Project Gap Areas Vegetation Map 13

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map



Gap areas survey area

PGL corridor survey area

Vegetation Types

H1

H1a

P3

N

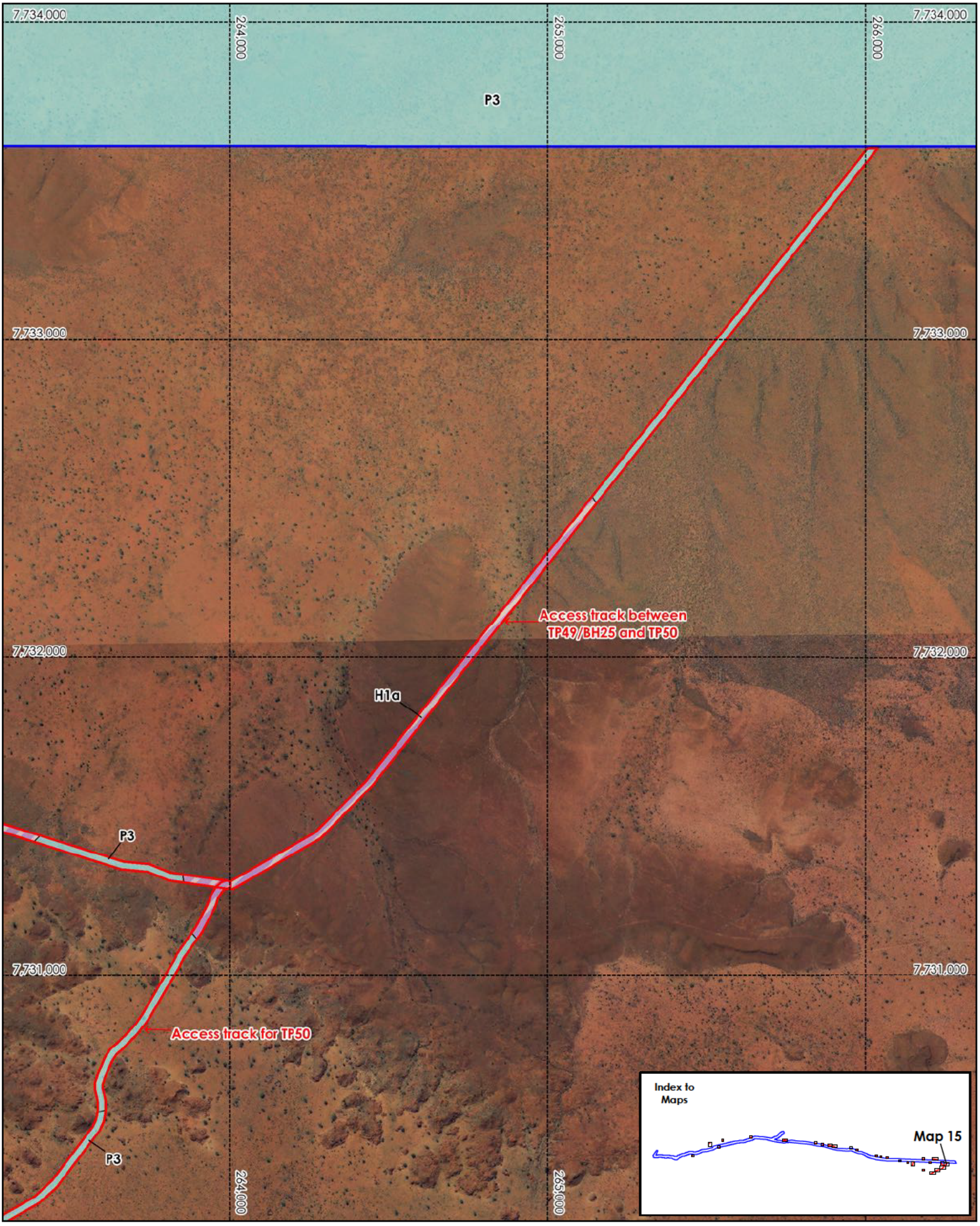
0 600

metres

PGL Project Gap Areas Vegetation Map 14

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map

KARRATHA

Map Area

KALGOORLIE

PERTH

Gap areas survey area

PGL corridor survey area

Vegetation Types

H1a

P3

N

0 600

metres

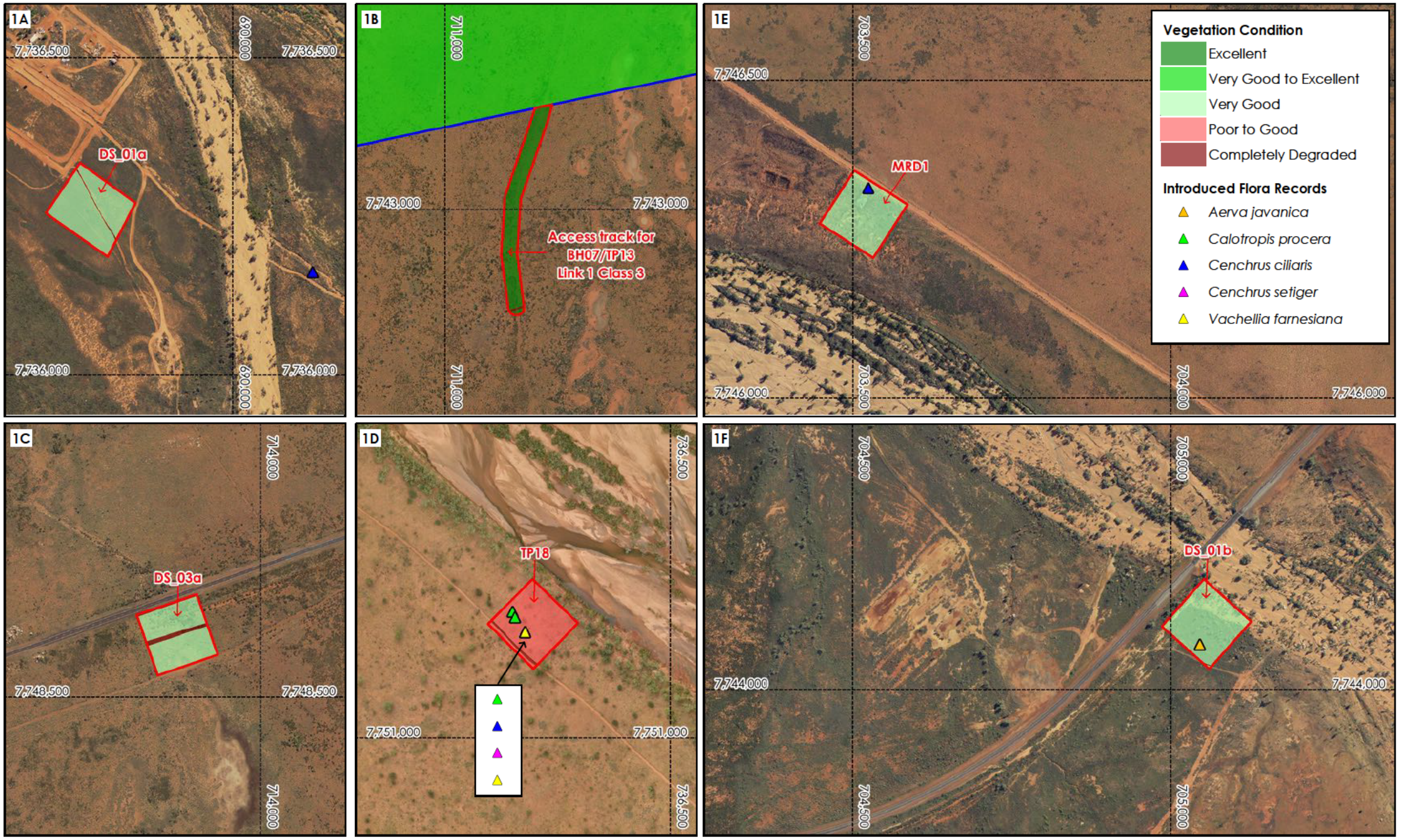
PGL Project Gap Areas Vegetation Map 15

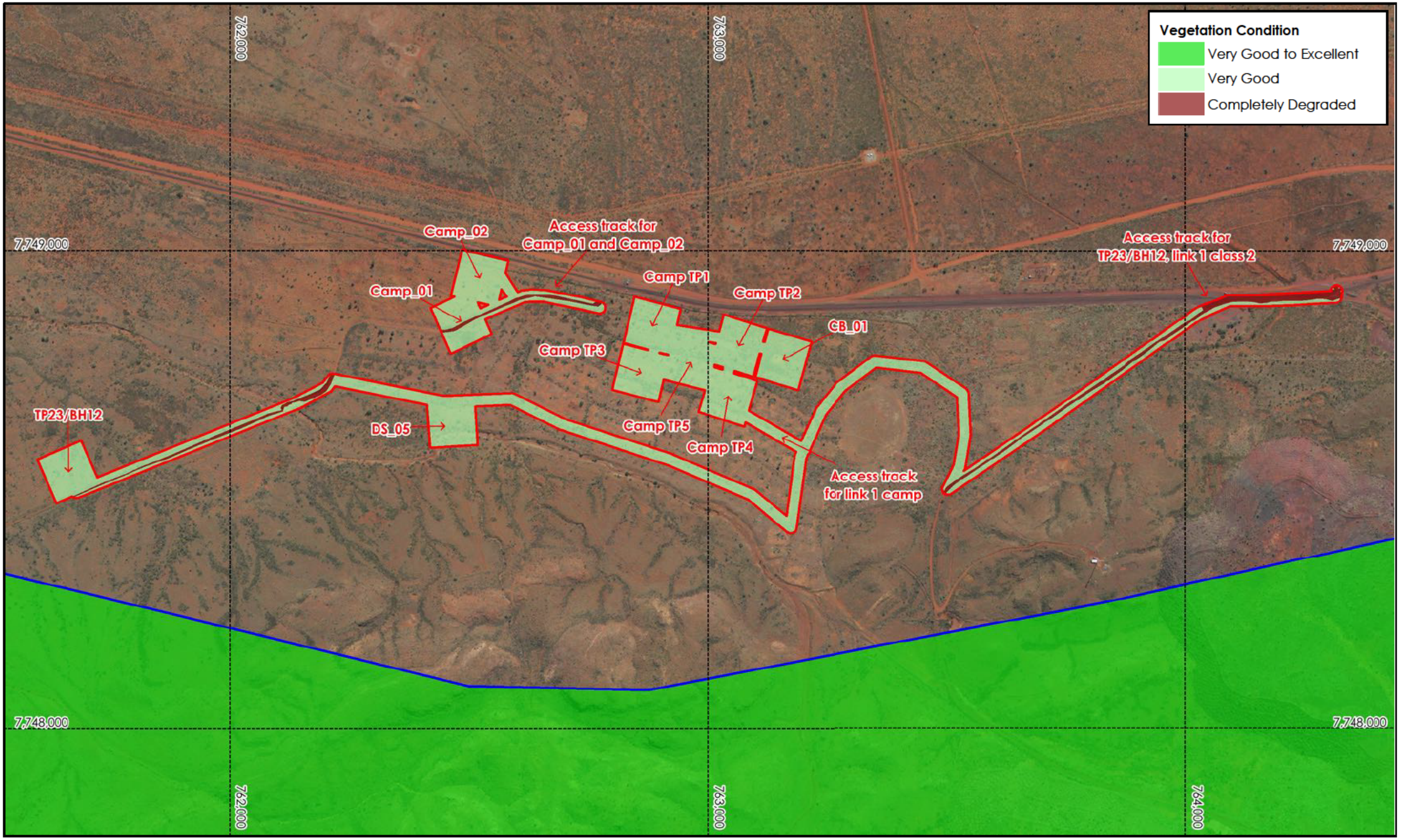
Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000

Appendix 8

Mapping of Vegetation Condition and Weed Locations


1A
1B
1C
1D
1E
1F
DS_01a
DS_03a
TP18
MRD1
DS_01b
Access track for
BH07/TP13
Link 1 Class 3
7,736,500
7,736,000
7,743,000
7,748,500
7,751,000
7,746,500
7,746,000
7,744,000
690,000
711,000
714,000
736,500
703,500
704,000
704,500
705,000
Vegetation Condition
Excellent
Very Good to Excellent
Very Good
Poor to Good
Completely Degraded
Introduced Flora Records
Aerva javanica
Calotropis procera
Cenchrus ciliaris
Cenchrus setiger
Vachellia farnesiana
Location Map
Map Area
PORT HEDLAND
PERTH
KALGOORLIE
Index to Maps
Gap areas survey area
PGL corridor survey area
N
0
300
metres
PGL Project Gap Areas
Vegetation Condition Map 1
Biota Environmental Sciences
Author: M Maier
Drawn: M Robinson
Job No.: 1822
Date: 08 Apr 2025
Revised: 28 May 2025
Projection: MGA Z50 (GDA2020)
Scale 1: 7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

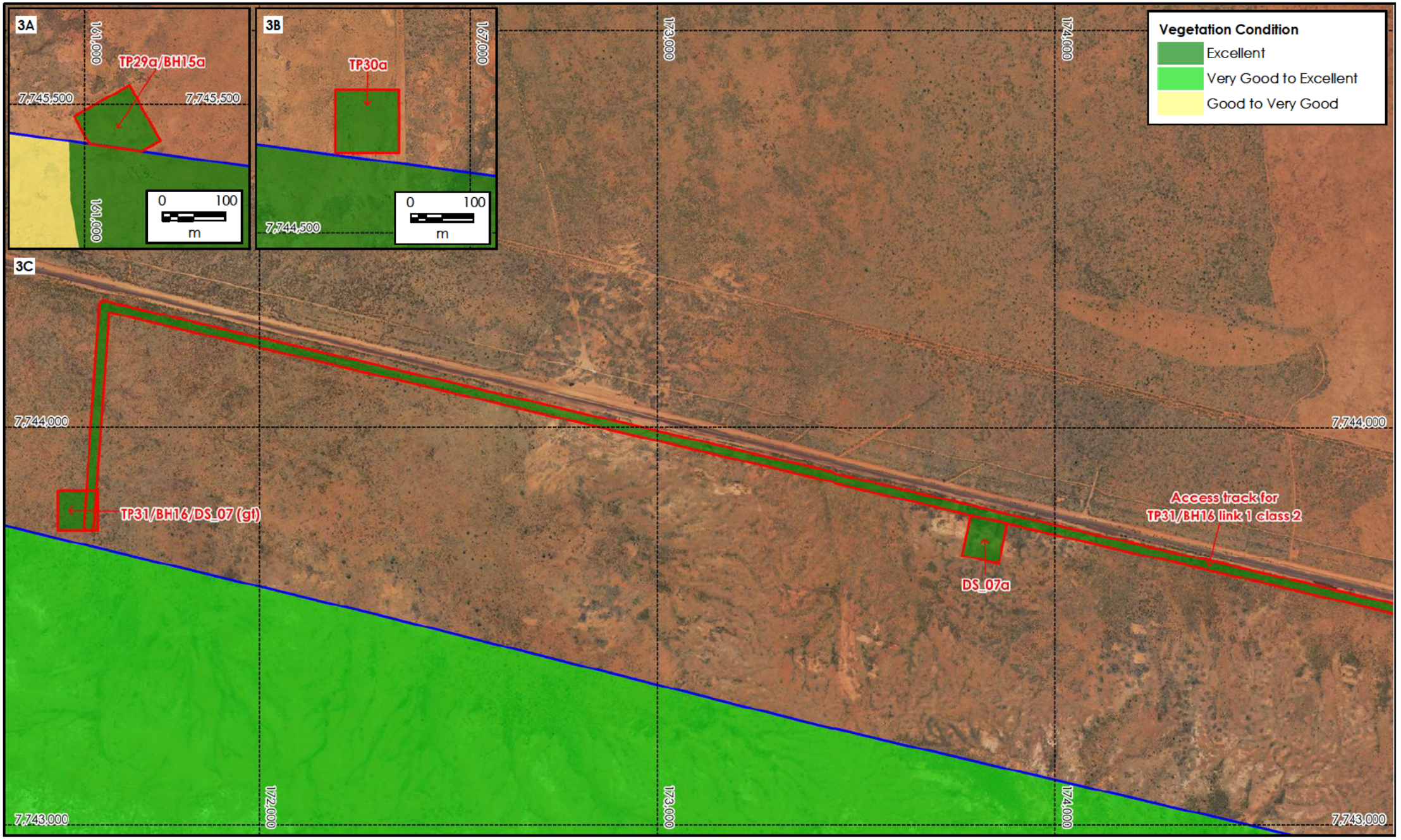
0 400

metres

PGL Project Gap Areas Vegetation Condition Map 2

Biota Environmental Sciences

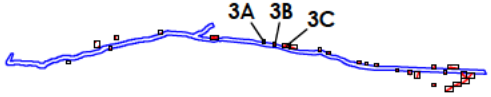
Author: M Maier	Drawn: M Robinson	Job No.: 1822	Date: 08 Apr 2025	Revised: 28 May 2025	Projection: MGA Z50 (GDA2020)	Scale: 1:10,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

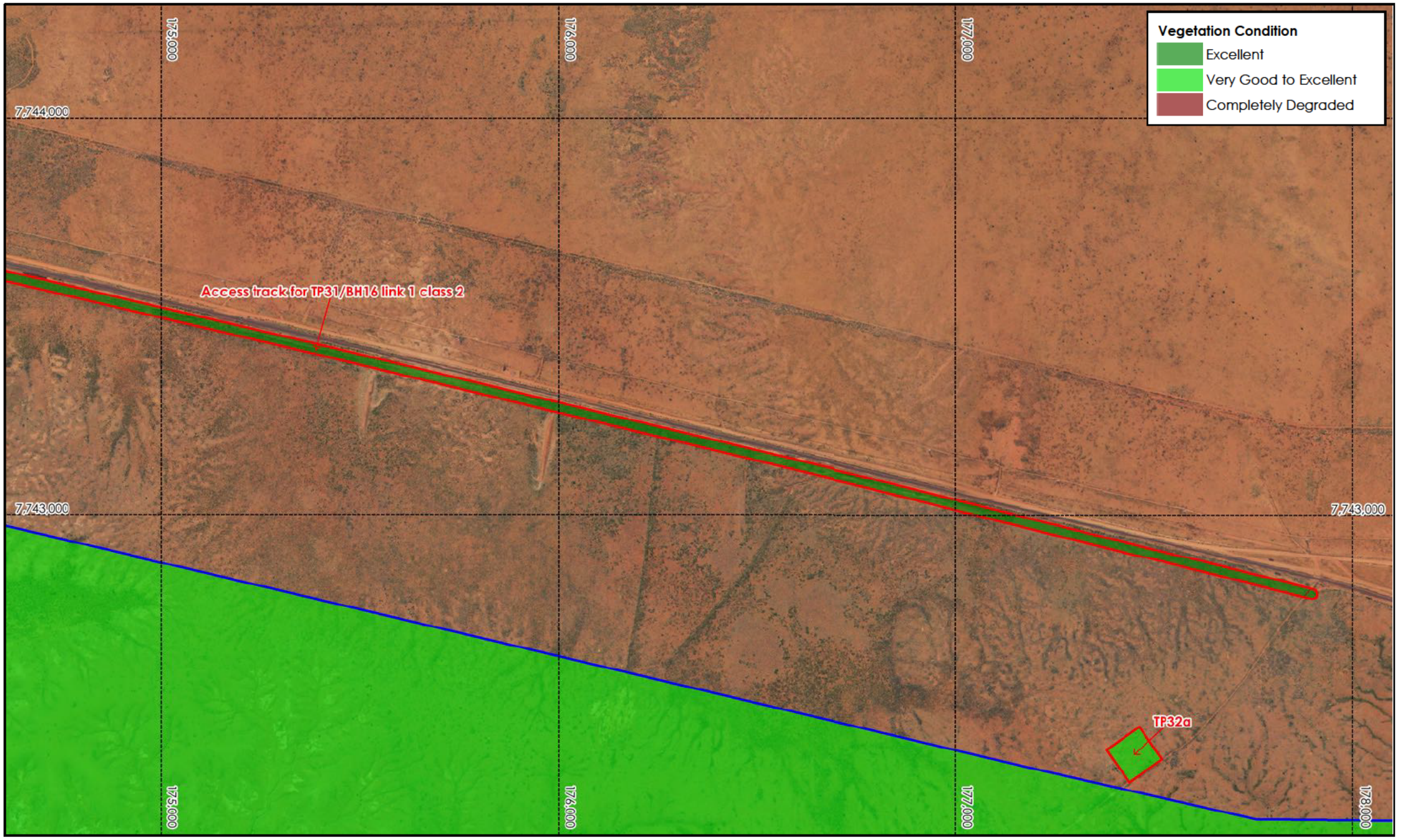
0 500

metres

PGL Project Gap Areas Vegetation Condition Map 3

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:12,000

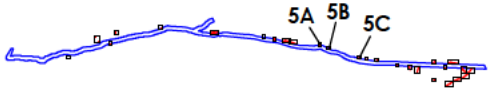

Vegetation Condition
Excellent
Very Good to Excellent
Completely Degraded
7,744,000
7,743,000
Access track for TP31/BH16 link 1 class 2
TP32a
Location Map
PORT HEDLAND
Map Area
PERTH
KALGOORLIE
Index to Maps
Map 4
Gap areas survey area
PGL corridor survey area
N
0
500
metres
PGL Project Gap Areas
Vegetation Condition Map 4
Biota Environmental Sciences
Author: M Maier
Drawn: M Robinson
Job No.: 1822
Date: 08 Apr 2025
Revised: 28 May 2025
Projection: MGA Z51 (GDA2020)
Scale: 1:12,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

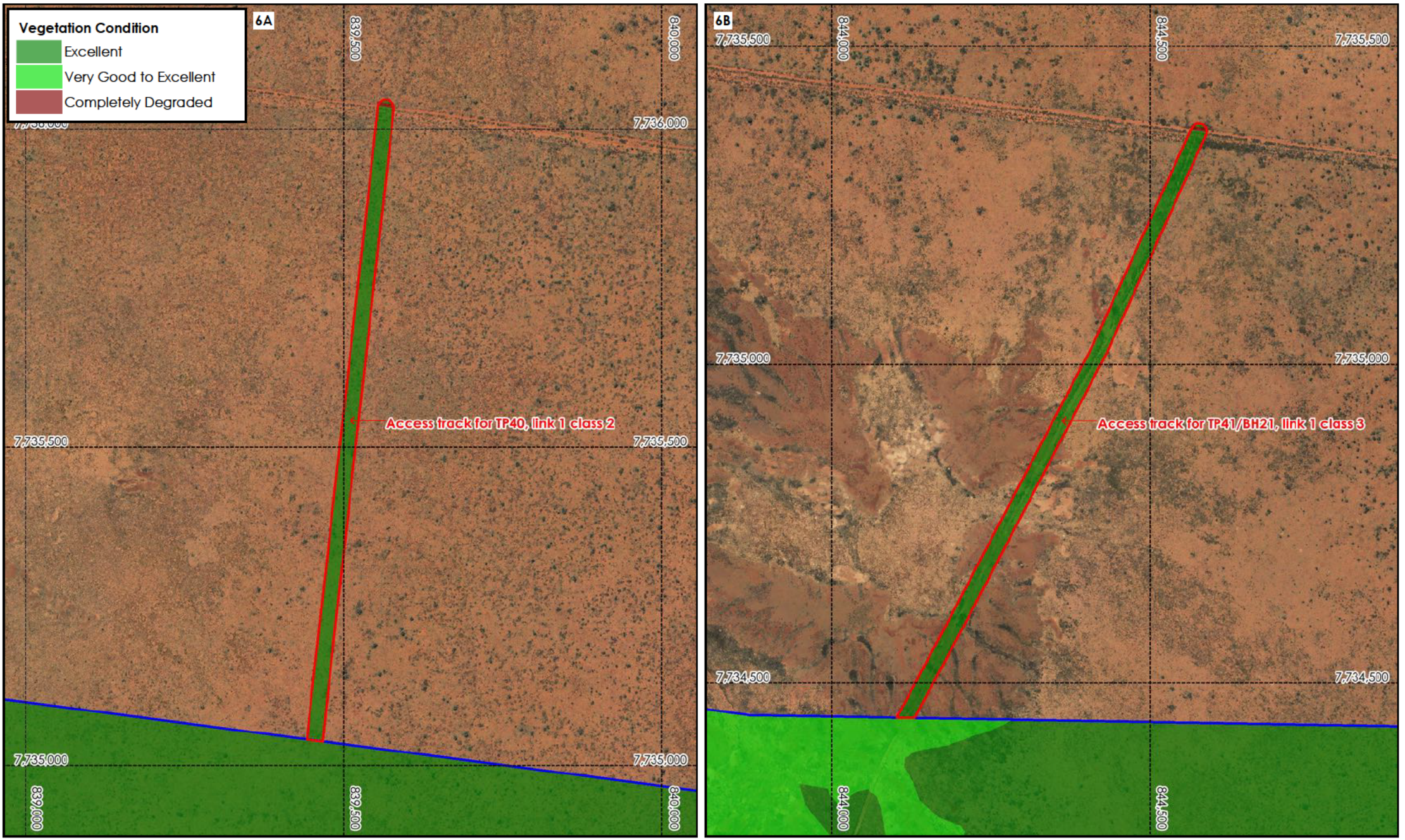
0 300

metres

PGL Project Gap Areas Vegetation Condition Map 5

Biota Environmental Sciences

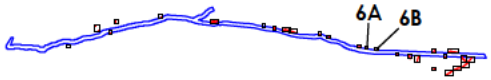
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

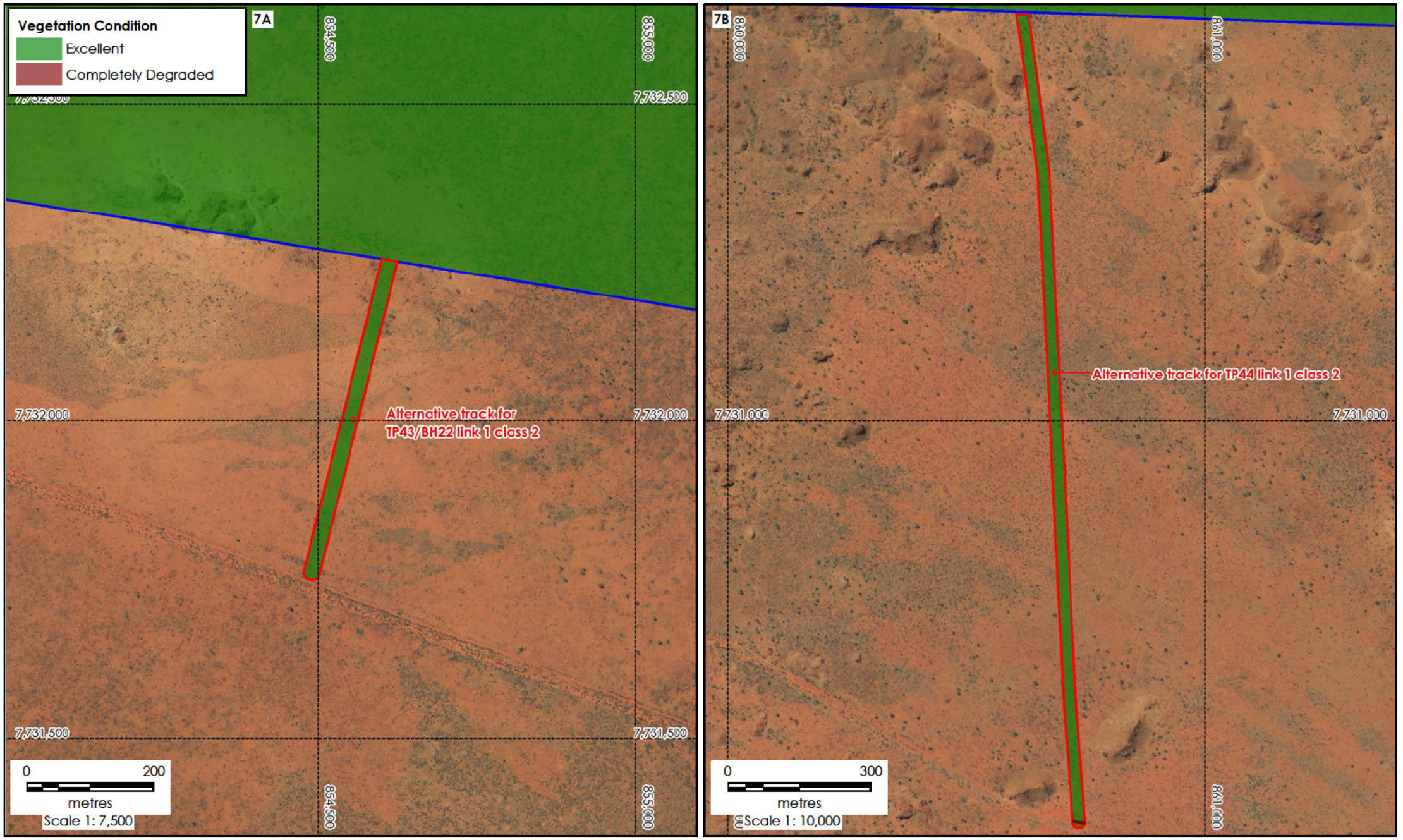
0 300

metres

PGL Project Gap Areas Vegetation Condition Map 6

Biota Environmental Sciences

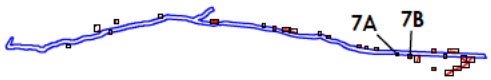
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

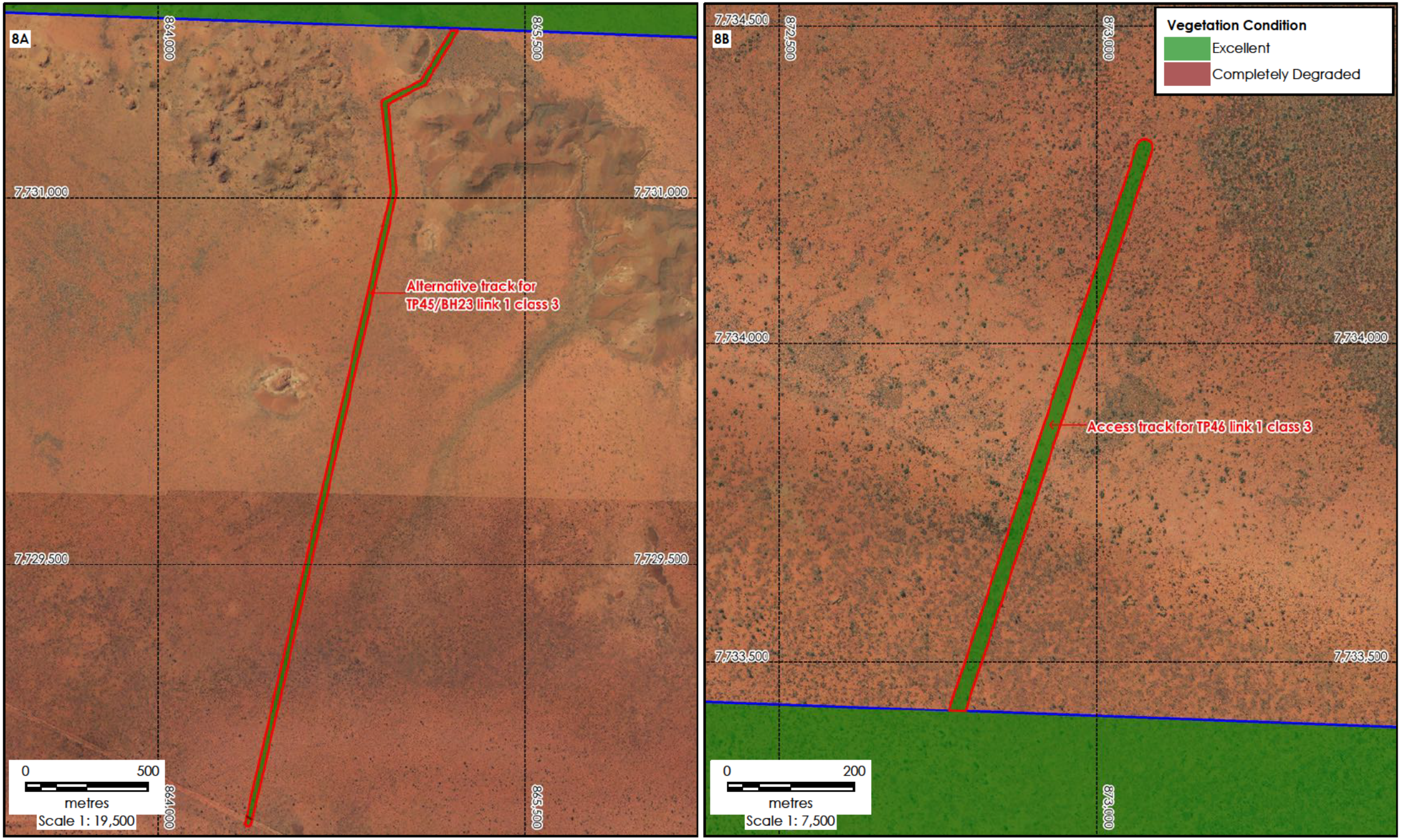
PGL corridor survey area

N

PGL Project Gap Areas Vegetation Condition Map 7

Biota Environmental Sciences

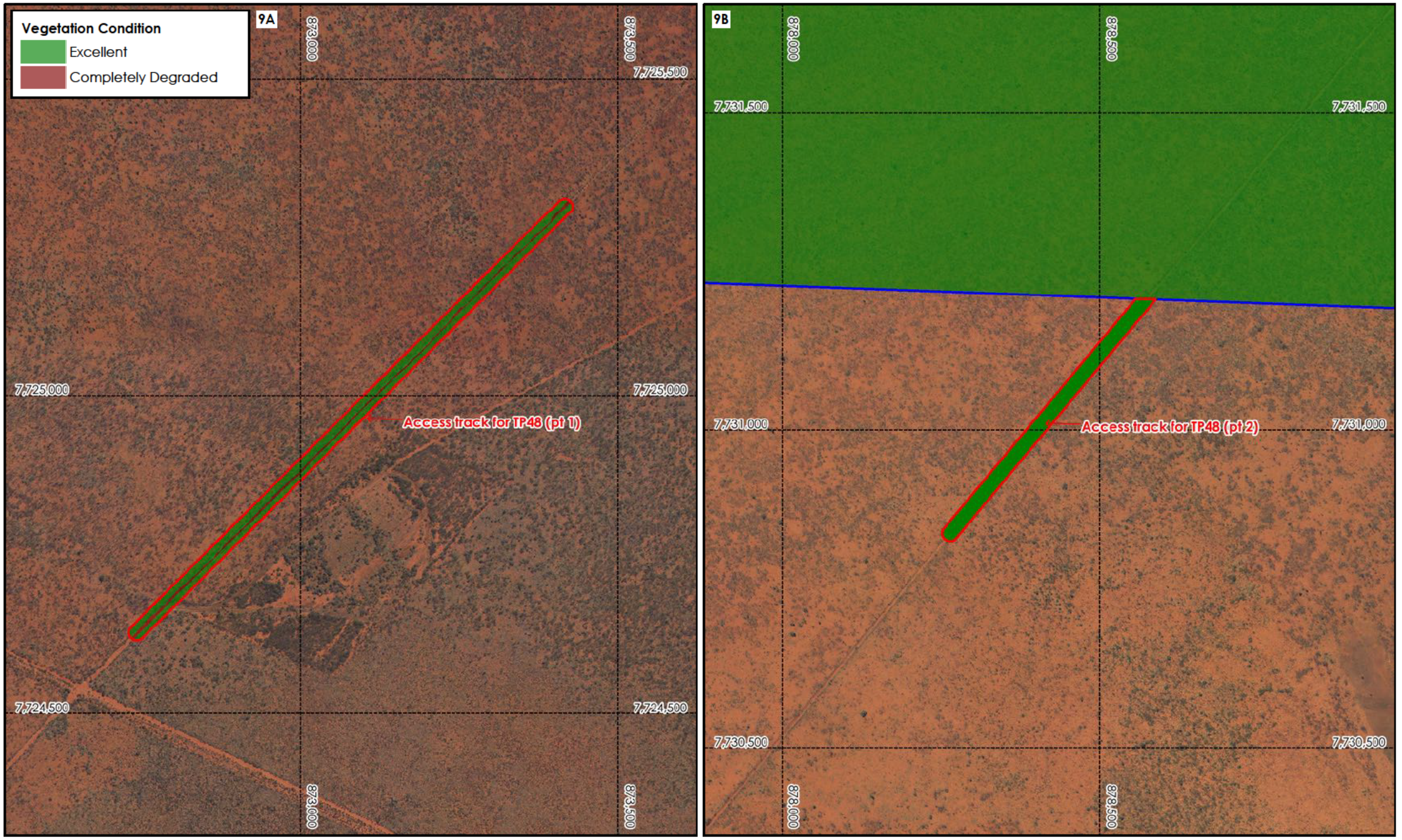
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: various



PGL Project Gap Areas
Vegetation Condition Map 8

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: various



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

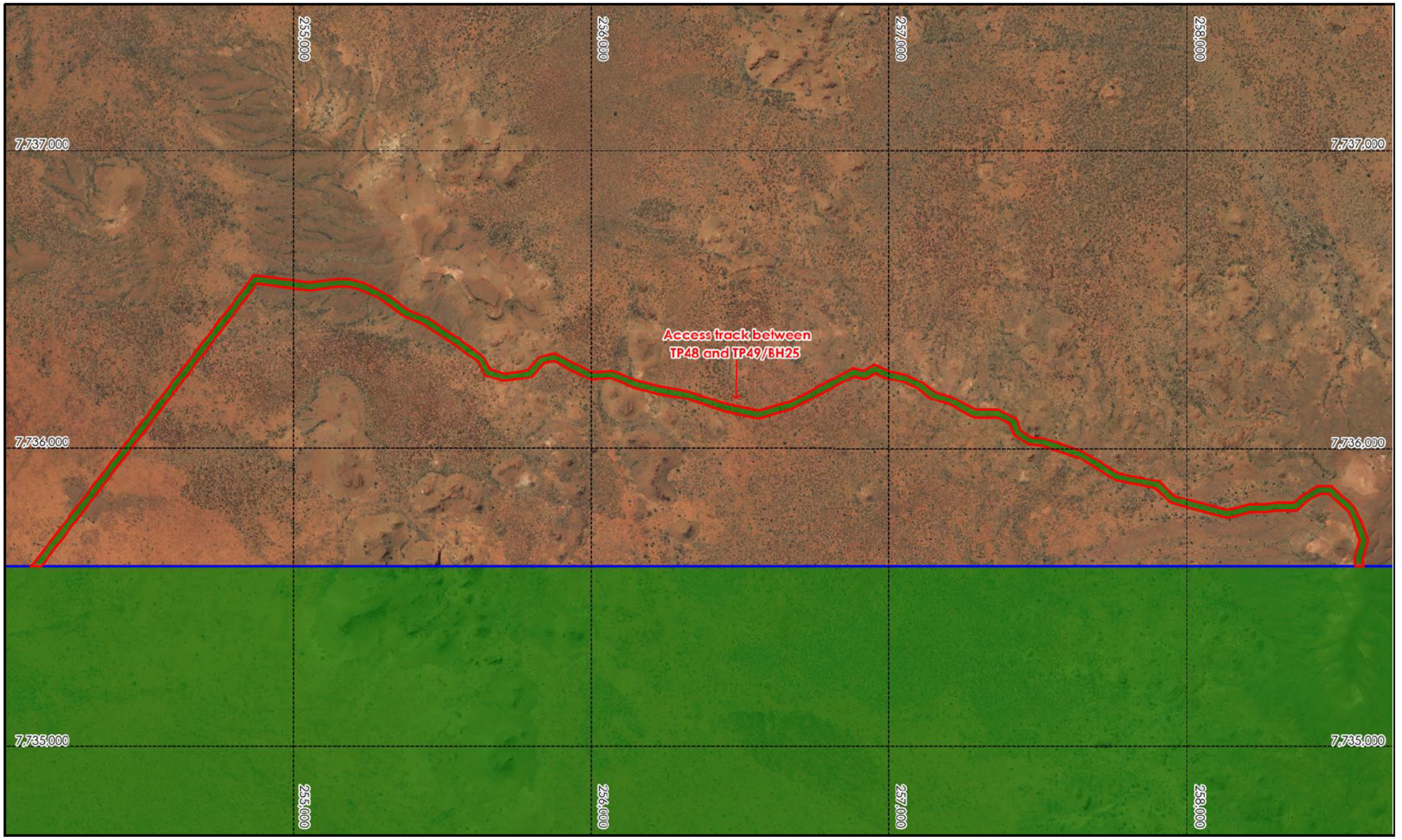
0 300

metres

PGL Project Gap Areas Vegetation Condition Map 9

Biota Environmental Sciences

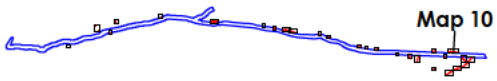
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA 51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Vegetation Condition

Excellent

N

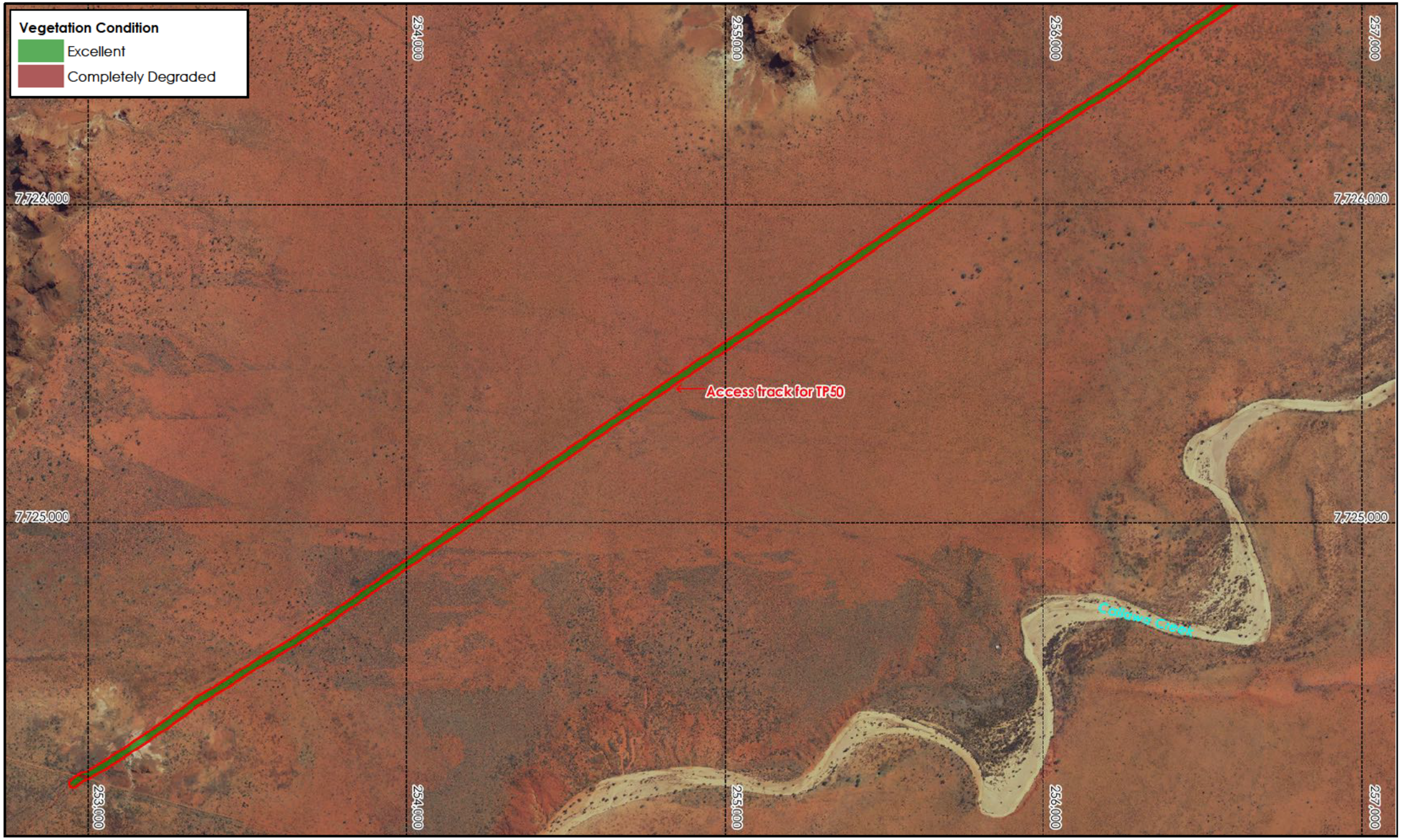
0 800

metres

PGL Project Gap Areas Vegetation Condition Map 10

Biota Environmental Sciences

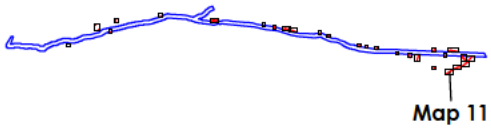
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 15 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:16,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

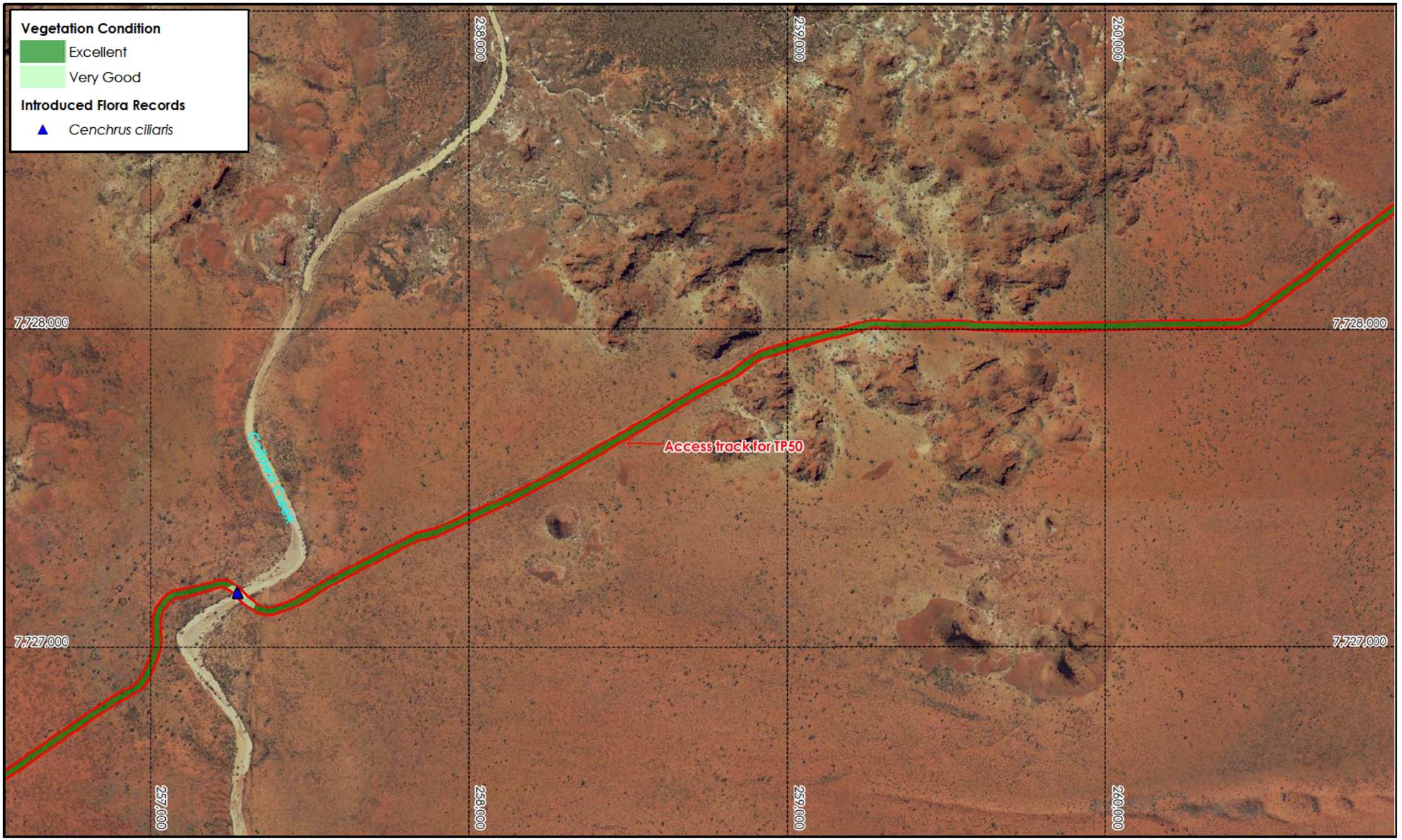
0 600

metres

PGL Project Gap Areas
Vegetation Condition Map 11

Biota Environmental Sciences

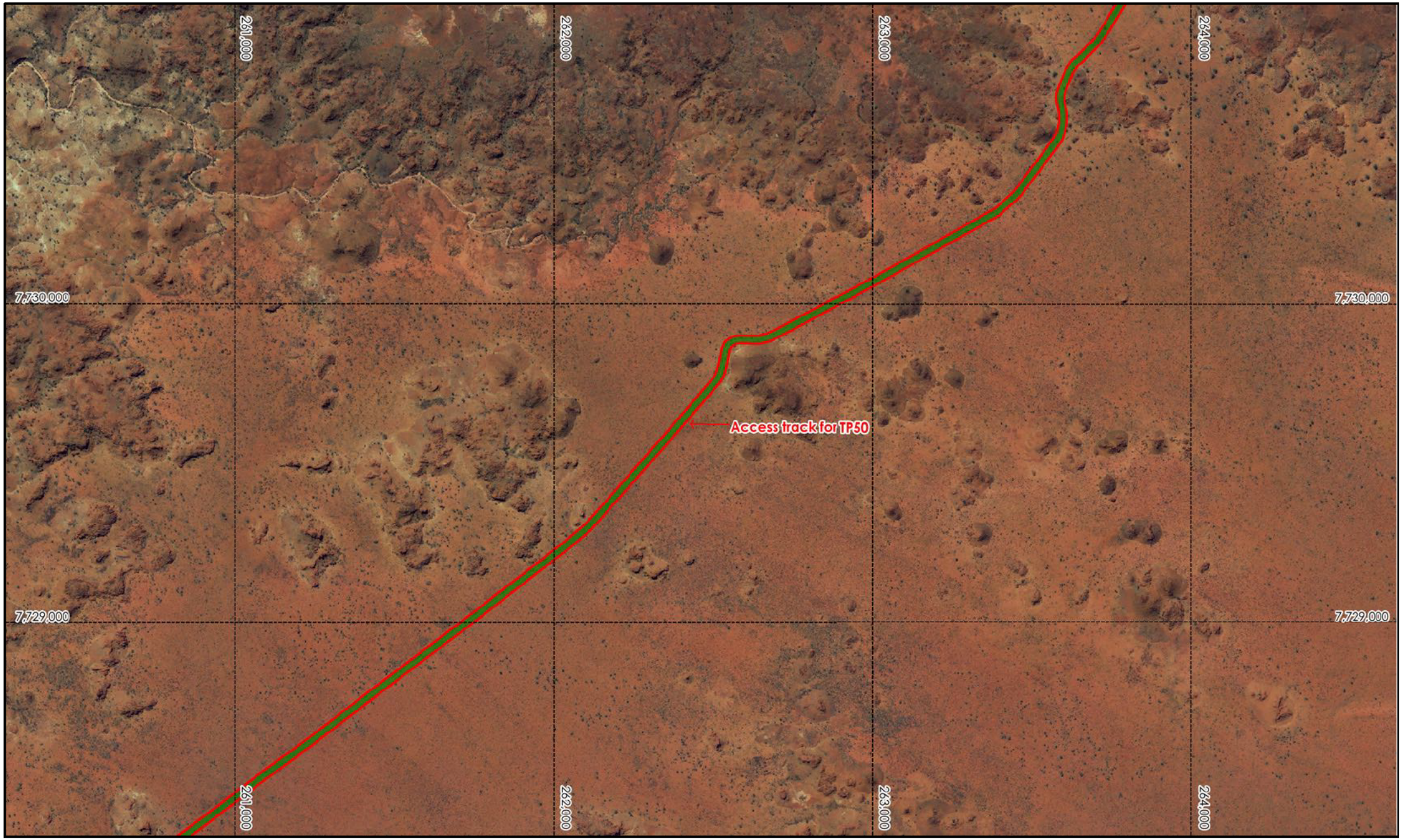
Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



PGL Project Gap Areas Vegetation Condition Map 12

Biota Environmental Sciences

Author: M Maier	Drawn: M Robinson	Job No.: 1822	Date: 08 Apr 2025	Revised: 28 May 2025	Projection: MGA Z51 (GDA2020)	Scale: 1:15,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Vegetation Condition

Excellent

N

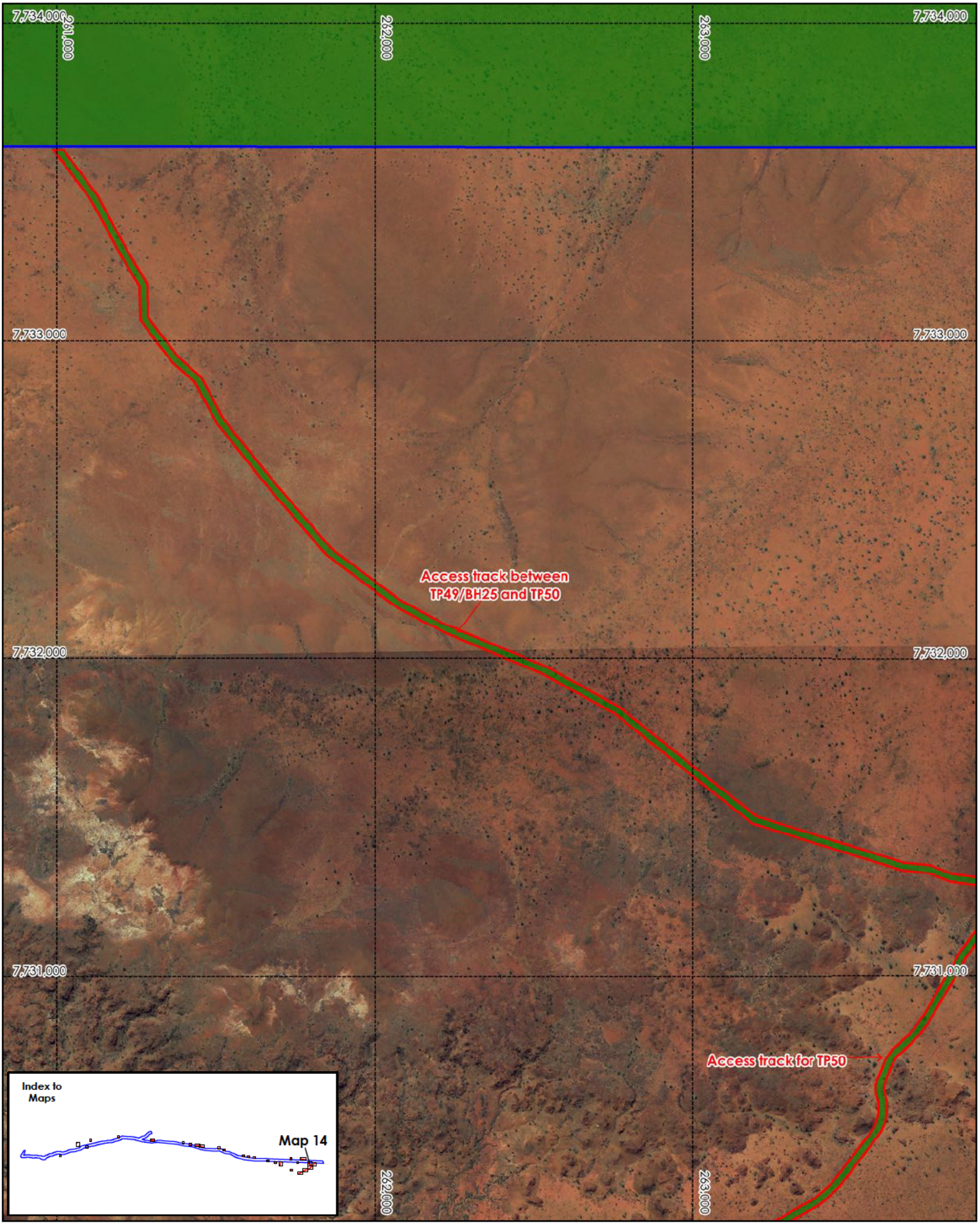
0 600

metres

PGL Project Gap Areas Vegetation Condition Map 13

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map

KARRATHA

Map Area

KALGOORLIE

PERTH

Gap areas survey area

PGL corridor survey area

Vegetation Condition

Excellent

N

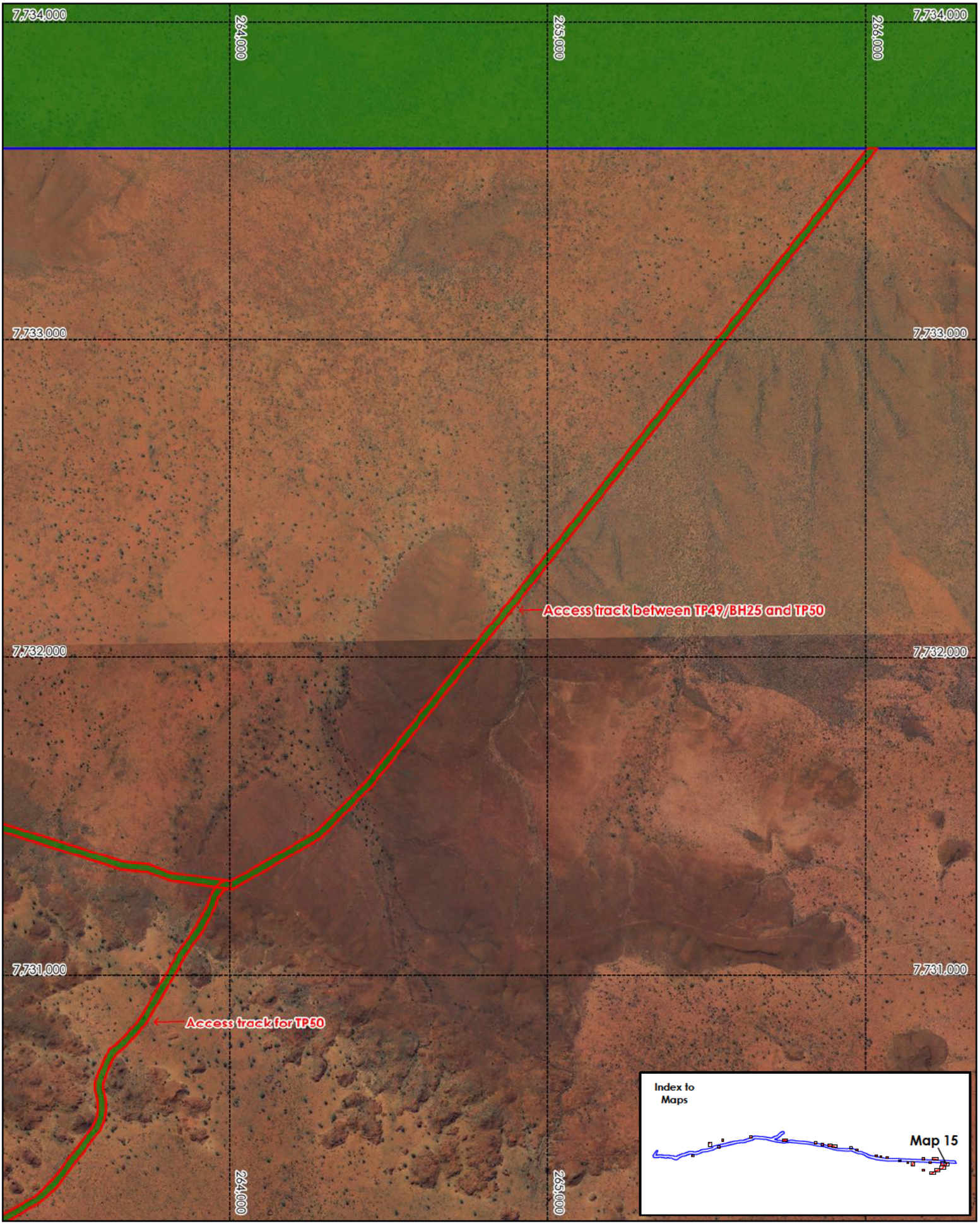
0 600

metres

PGL Project Gap Areas Vegetation Condition Map 14

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map

KARRATHA
Map Area
KALGOORLIE
PERTH

Gap areas survey area

PGL corridor survey area

Vegetation Condition

Excellent

N

0 600

metres

PGL Project Gap Areas Vegetation Condition Map 15

Biota Environmental Sciences

Author: M Maier | Drawn: M Robinson | Job No.: 1822 | Date: 08 Apr 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000

Appendix 9

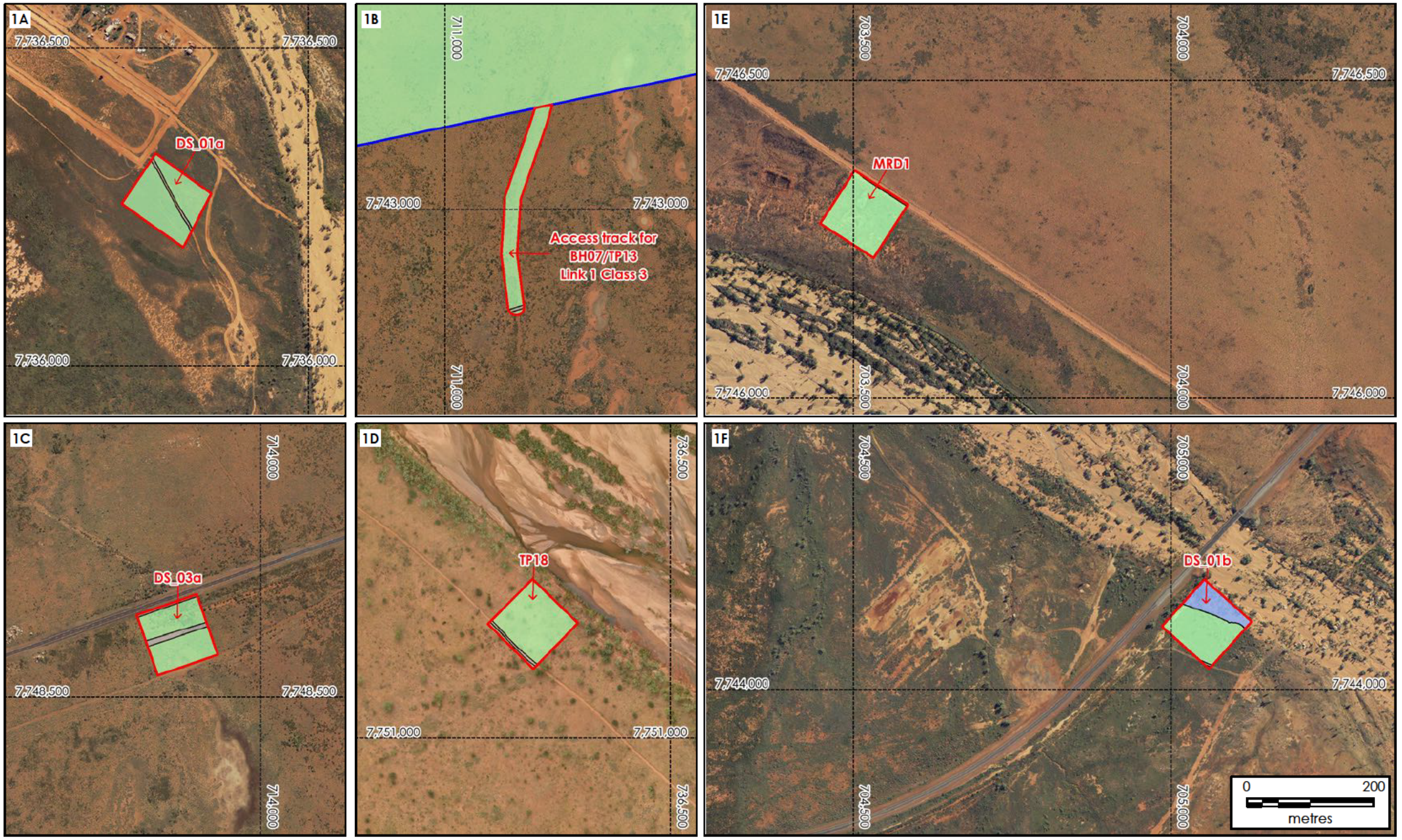
List of Vascular Flora from the Survey Area

Family	Species	Status
Amaranthaceae	**Aerva javanica*	Weed
	Ptilotus astrolasius	
	Ptilotus calostachyus	
	Ptilotus exaltatus	
	Ptilotus obovatus	
Apocynaceae	**Calotropis procera*	Declared Pest
Araliaceae	*Trachymene oleracea* subsp. *oleracea*	
Asteraceae	*Pluchea dentex*	
	Pluchea ferdinandi-muelleri	
Bignoniaceae	*Dolichandrone occidentalis*	
Boraginaceae	*Euploca diversifolia*	
	Euploca ? foliata (inadequate material)	
	Heliotropium ? crispatum (inadequate material)	
Cleomaceae	*Arivela viscosa*	
Commelinaceae	*Commelina ensifolia*	
Convolvulaceae	*Bonamia erecta*	
	Evolvulus alsinoides var. *decumbens*	
	Ipomoea muelleri	
Cyperaceae	*Bulbostylis barbata*	
	Fimbristylis depauperata	
Droseraceae	*Drosera finlaysoniana*	
Euphorbiaceae	*Croton aridus*	Priority 3
	Euphorbia psilosperma	
Fabaceae	*Acacia acradenia*	
	Acacia adoxa var. *adoxa*	
	Acacia ancistrocarpa	
	Acacia bivenosa	
	Acacia colei (sterile; var. not determined)	
	Acacia colei var. *colei*	
	Acacia dictyophleba	
	Acacia eriopoda	
	Acacia hilliana	
	Acacia inaequilatera	
	Acacia monticola	
	Acacia pyrifolia var. *pyrifolia*	
	Acacia sericophylla	
	Acacia sphaerostachya	
	Acacia stellaticeps	
	Acacia trachycarpa	
	Acacia tumida (var. not determined)	
	Acacia tumida var. *kulparn*	
	Acacia tumida var. *pilbarensis*	
	Erythrophleum arenarium	
	Indigofera monophylla	
	Indigofera trita subsp. *trita*	
	Jacksonia aculeata	
	Lysiphyllum cunninghamii	
	Petalostylis labicheoides	
	Rhynchosia minima	

Family	Species	Status
Fabaceae (continued)	*Senna notabilis*	
	**Vachellia farnesiana*	Weed
Goodeniaceae	*Goodenia stobbsiana*	
Lauraceae	*Cassytha capillaris*	
Malvaceae	*Sida cardiophylla*	
	Waltheria indica	
Menispermaceae	*Tinospora smilacina*	
Molluginaceae	*Trigastrotheca molluginea*	
Montiaceae	*Calandrinia strophiolata*	
Myrtaceae	*Corymbia flavescens*	
	Corymbia hamersleyana	
	Corymbia zygophylla	
	Eucalyptus victrix	
Nyctaginaceae	*Boerhavia coccinea*	
Oleaceae	*Jasminum didymum* subsp. *lineare*	
Poaceae	*Aristida holathera* var. *holathera*	
	**Cenchrus ciliaris*	Weed
	**Cenchrus setiger*	Weed
	Chrysopogon fallax	
	Digitaria brownii	
	Eriachne mucronata	
	Paspalidium rarum	
	Themeda triandra	
	Triodia epactia	
	Triodia schinzii	
	Triodia scintillans	
Proteaceae	*Grevillea wickhamii* (sterile; subsp. not determined)	
	Hakea lorea subsp. *lorea*	
Santalaceae	*Santalum lanceolatum*	
Sapindaceae	*Dodonaea coriacea*	
Surianaceae	*Stylobasium spathulatum*	
Violaceae	*Afrohybanthus aurantiacus*	
Zygophyllaceae	*Tribulopis marliesiae*	Priority 3
	Tribulus hirsutus	

Appendix 10

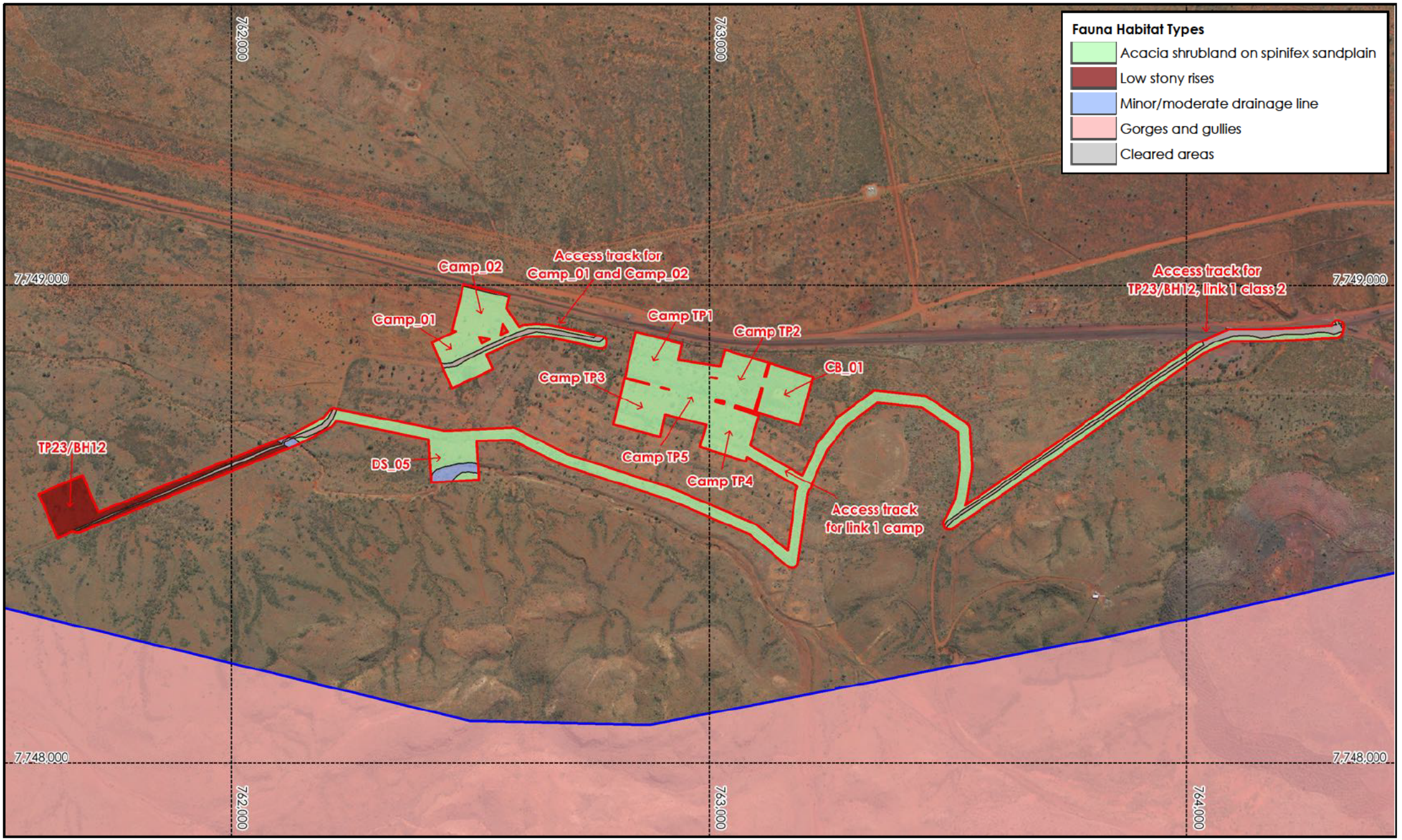
Fauna Habitat Mapping for the Survey Area



PGL Project Gap Areas
Fauna Habitat Map 1

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA 750 (GDA2020) | Scale 1: 7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

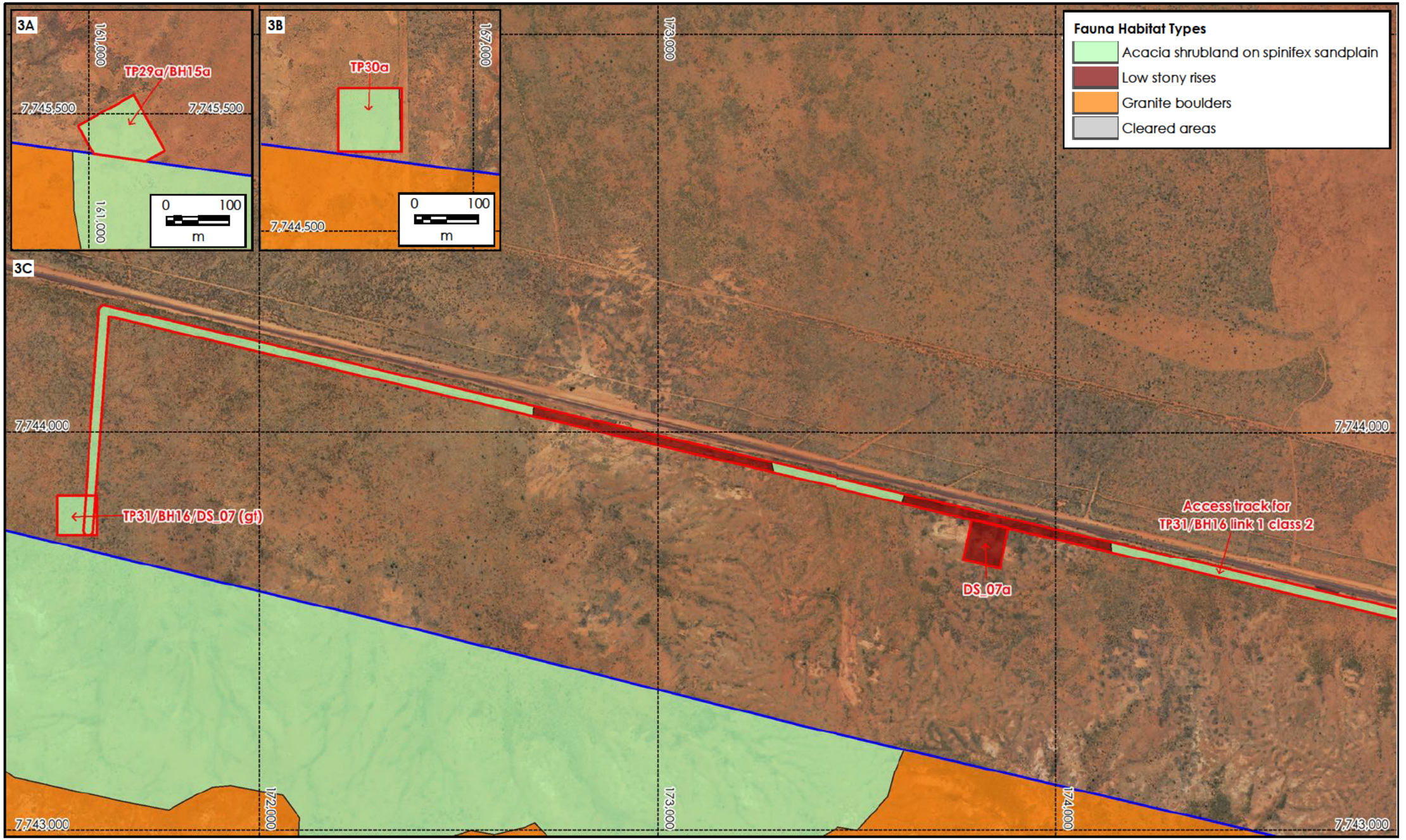
0 400

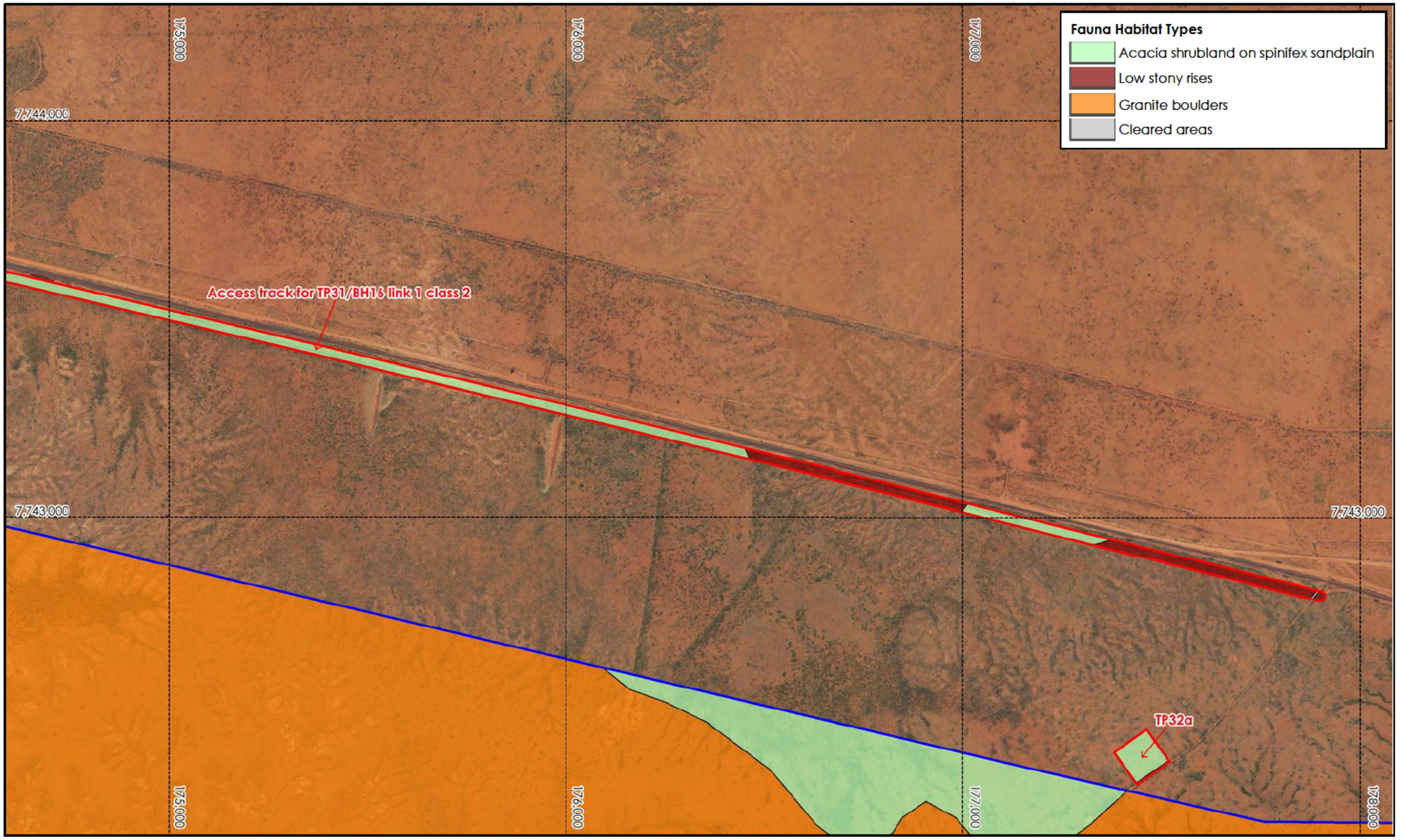
metres

PGL Project Gap Areas Fauna Habitat Map 2

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z50 (GDA2020) | Scale: 1:10,000


3A
3B
3C
TP29a/BH15a
TP30a
TP31/BH16/DS_07 (gl)
DS_07a
Access track for TP31/BH16 link 1 class 2
Fauna Habitat Types
Acacia shrubland on spinifex sandplain
Low stony rises
Granite boulders
Cleared areas
161,000
167,000
173,000
172,000
174,000
7,745,500
7,744,500
7,744,000
7,743,000
0
100
m
Location Map
PORT HEDLAND
Map Area
KALGOORLIE
PERTH
Index to Maps
3A 3B 3C
Gap areas survey area
PGL corridor survey area
N
0
500
metres
PGL Project Gap Areas
Fauna Habitat Map 3
Biota Environmental Sciences
Author: R de Vos
Drawn: M Robinson
Job No.: 1822
Date: 27 Mar 2025
Revised: 28 May 2025
Projection: MGA Z51 (GDA2020)
Scale: 1:12,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

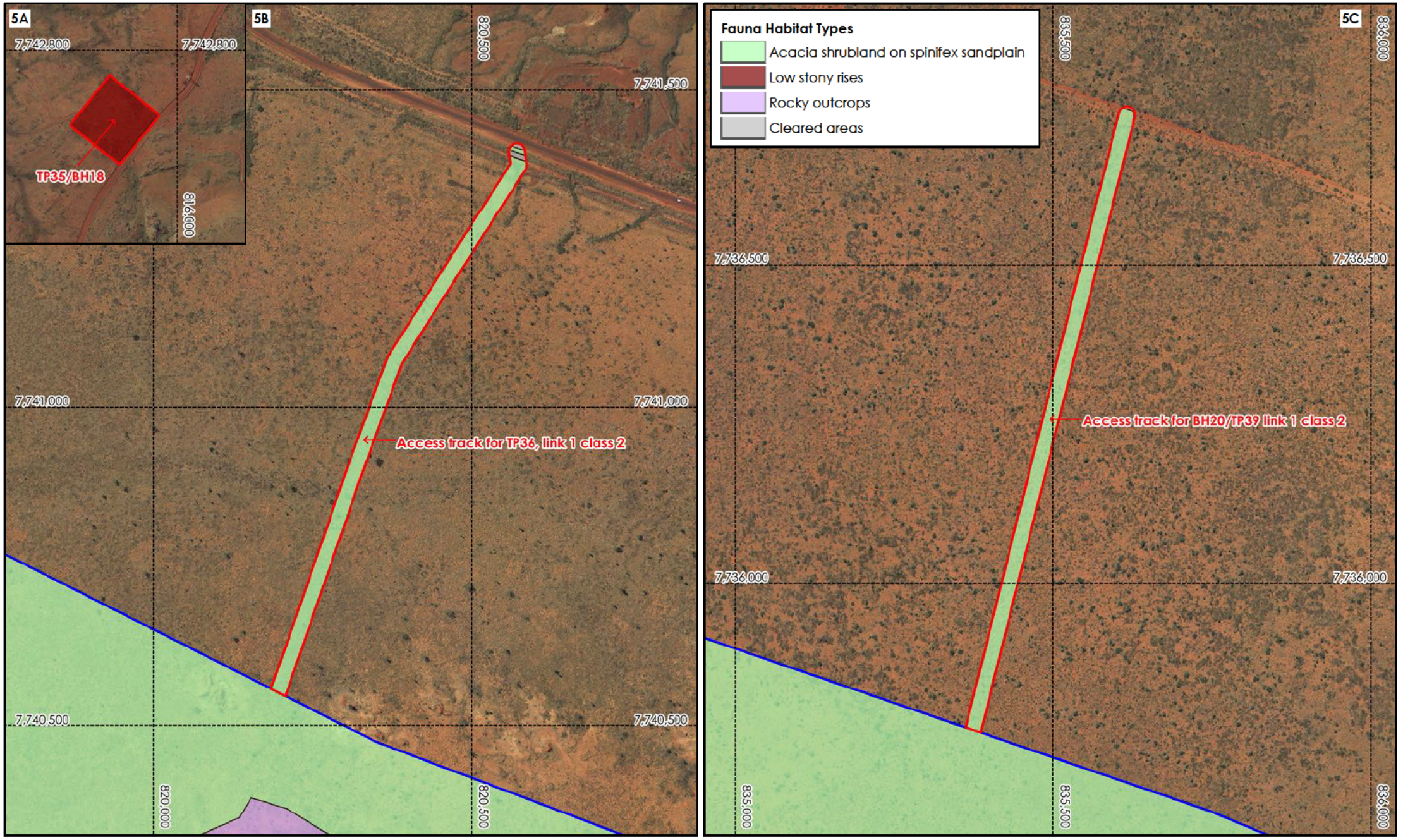
0 500

metres

PGL Project Gap Areas Fauna Habitat Map 4

Biota Environmental Sciences

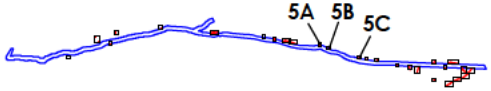
Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:12,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

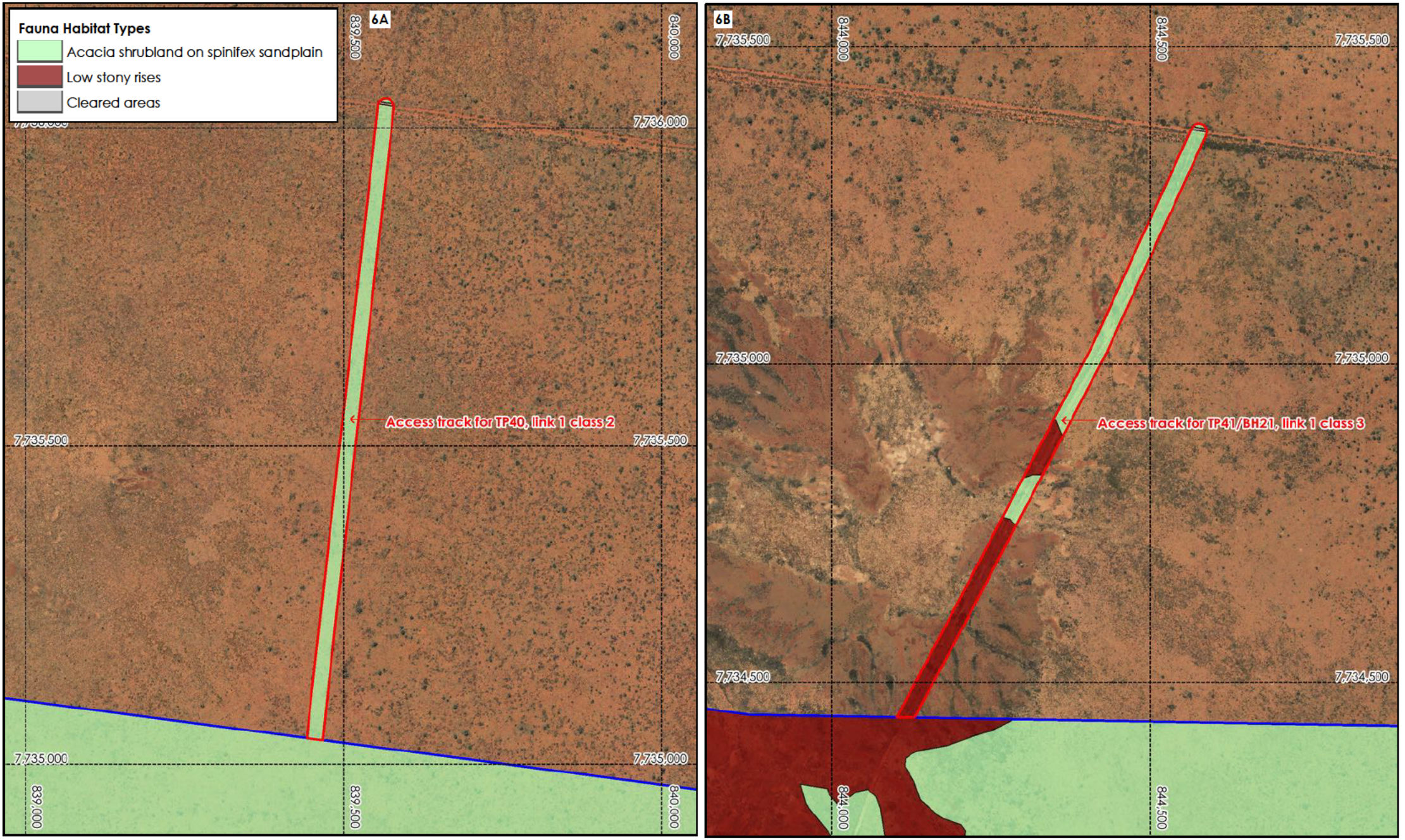
0 300

metres

PGL Project Gap Areas
Fauna Habitat Map 5

Biota Environmental Sciences

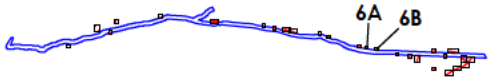
Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

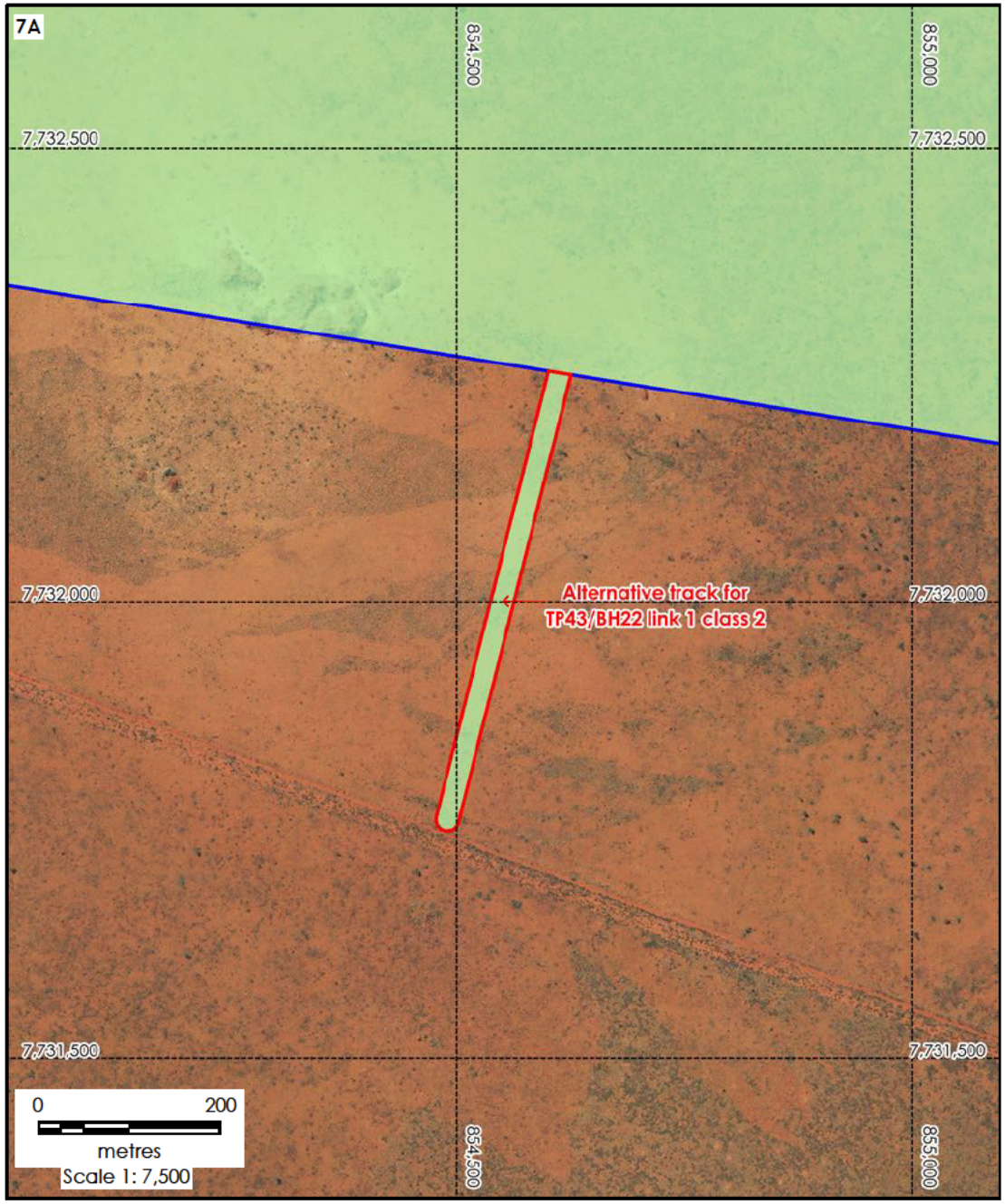
0 300

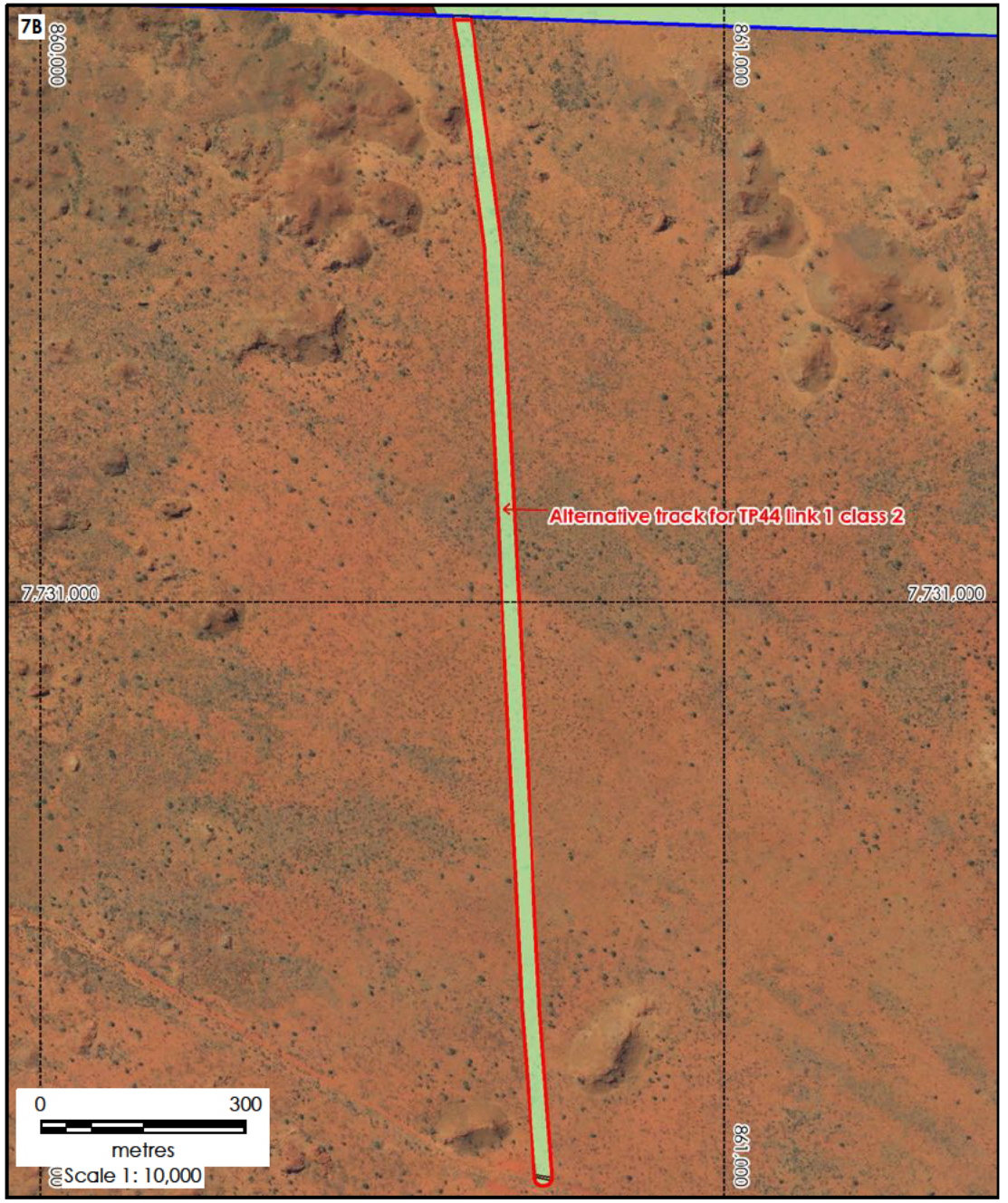
metres

PGL Project Gap Areas
Fauna Habitat Map 6

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500

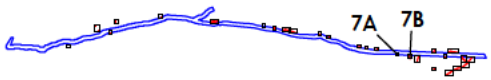




Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Fauna Habitat Types

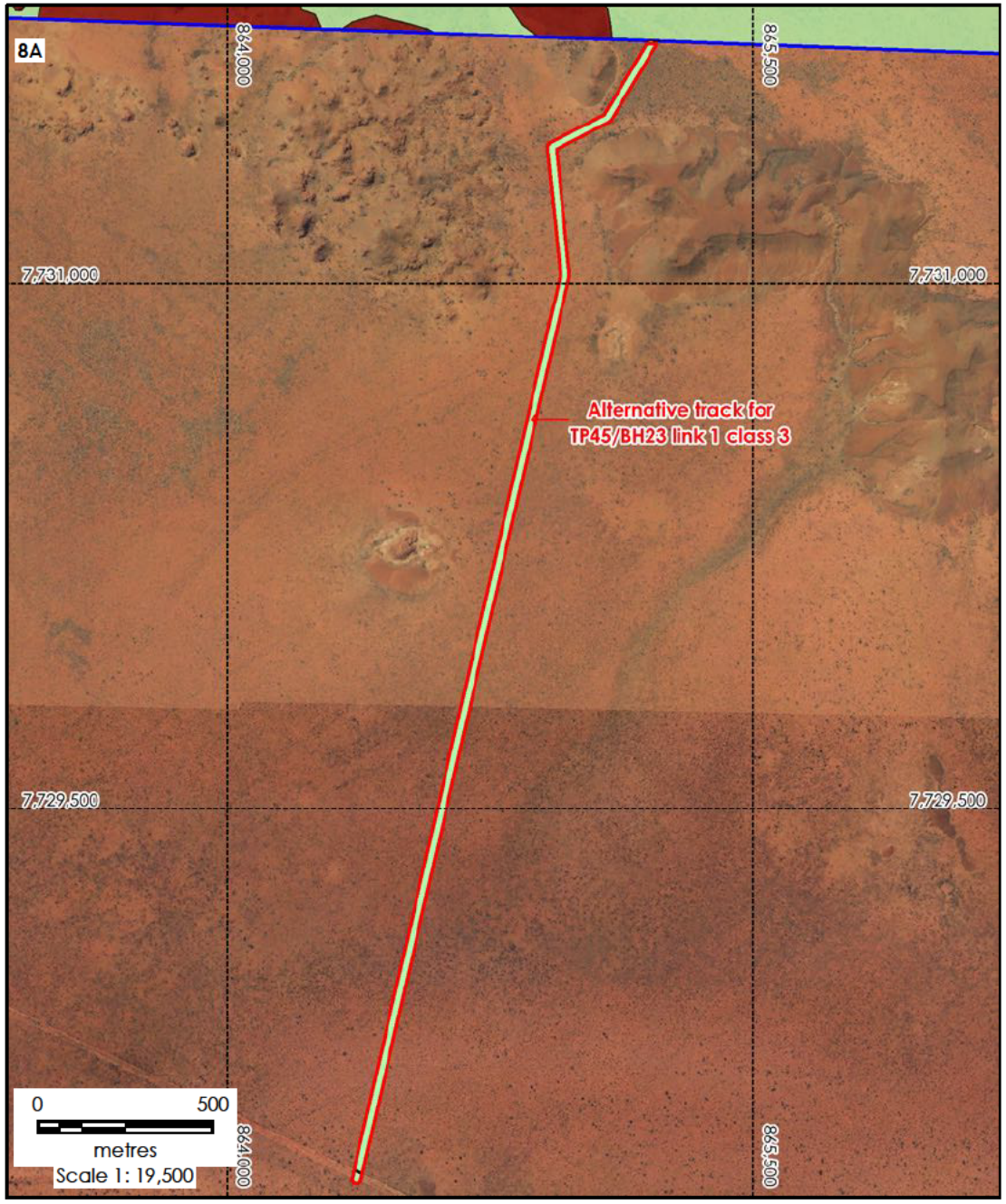
- Acacia shrubland on spinifex sandplain
- Low stony rises
- Cleared areas

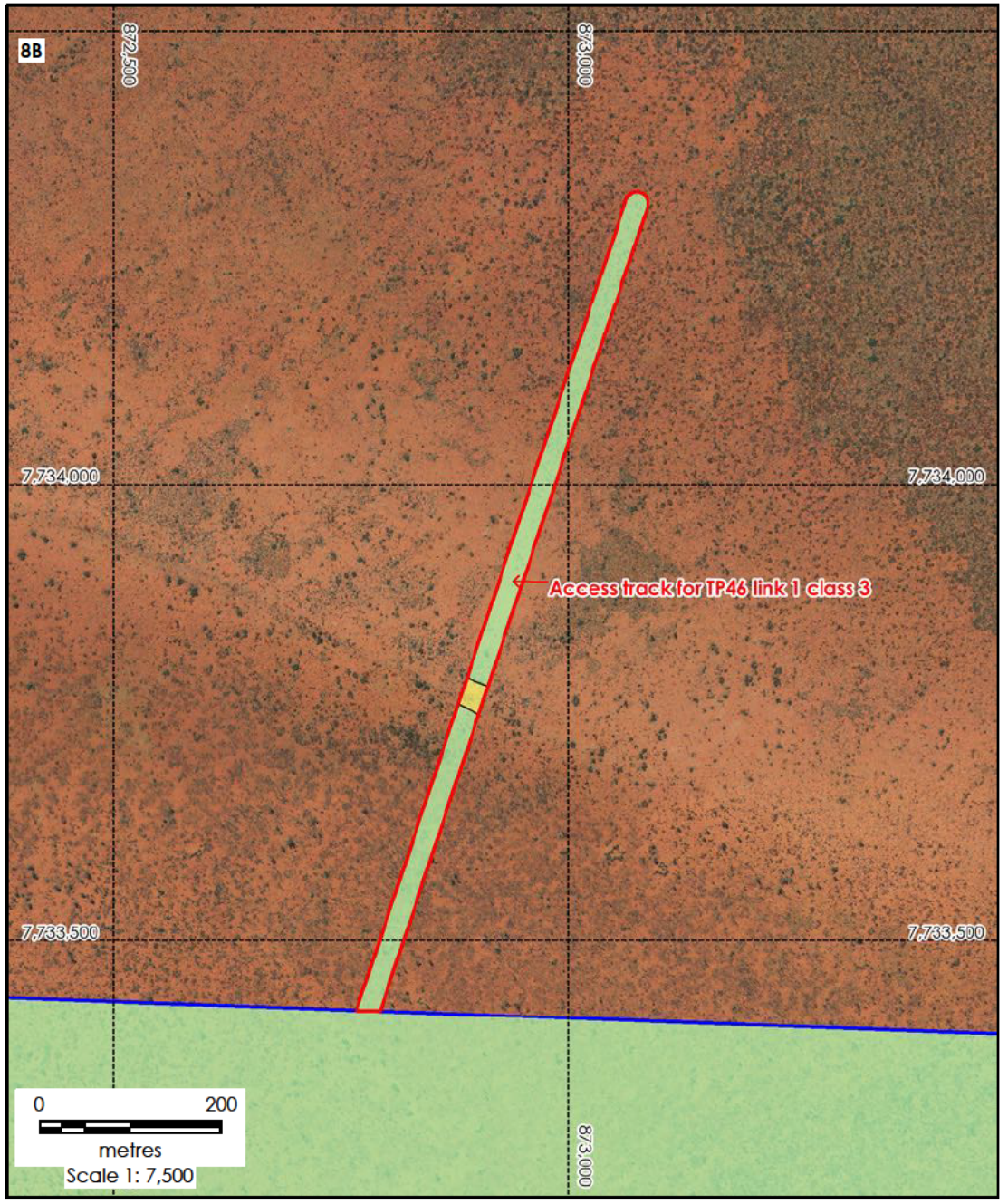
N

PGL Project Gap Areas Fauna Habitat Map 7

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA 51 (GDA2020) | Scale: various





Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

Fauna Habitat Types

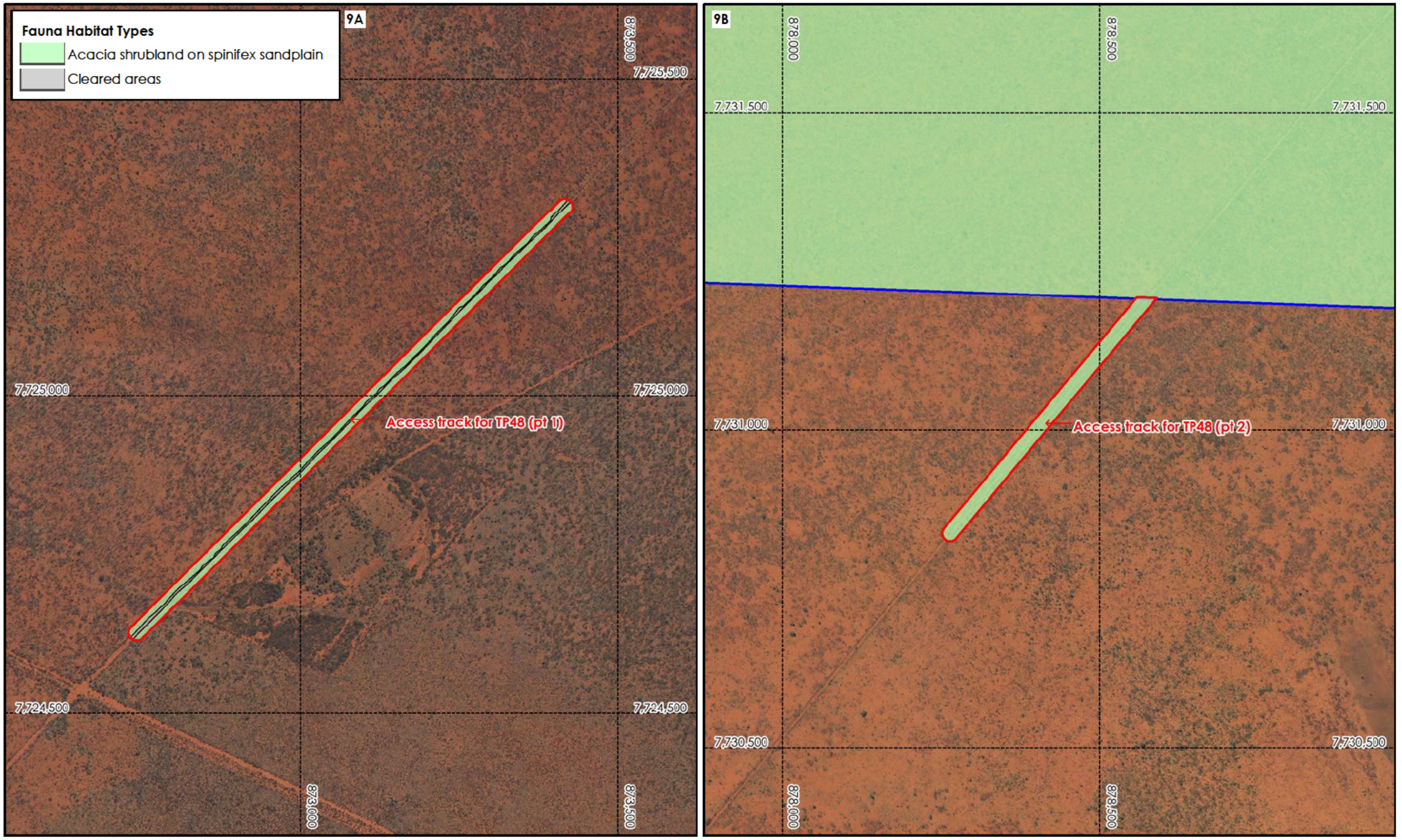
- Acacia shrubland on spinifex sandplain
- Low stony rises
- Sand dunes
- Cleared areas

N

PGL Project Gap Areas
Fauna Habitat Map 8

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: various



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

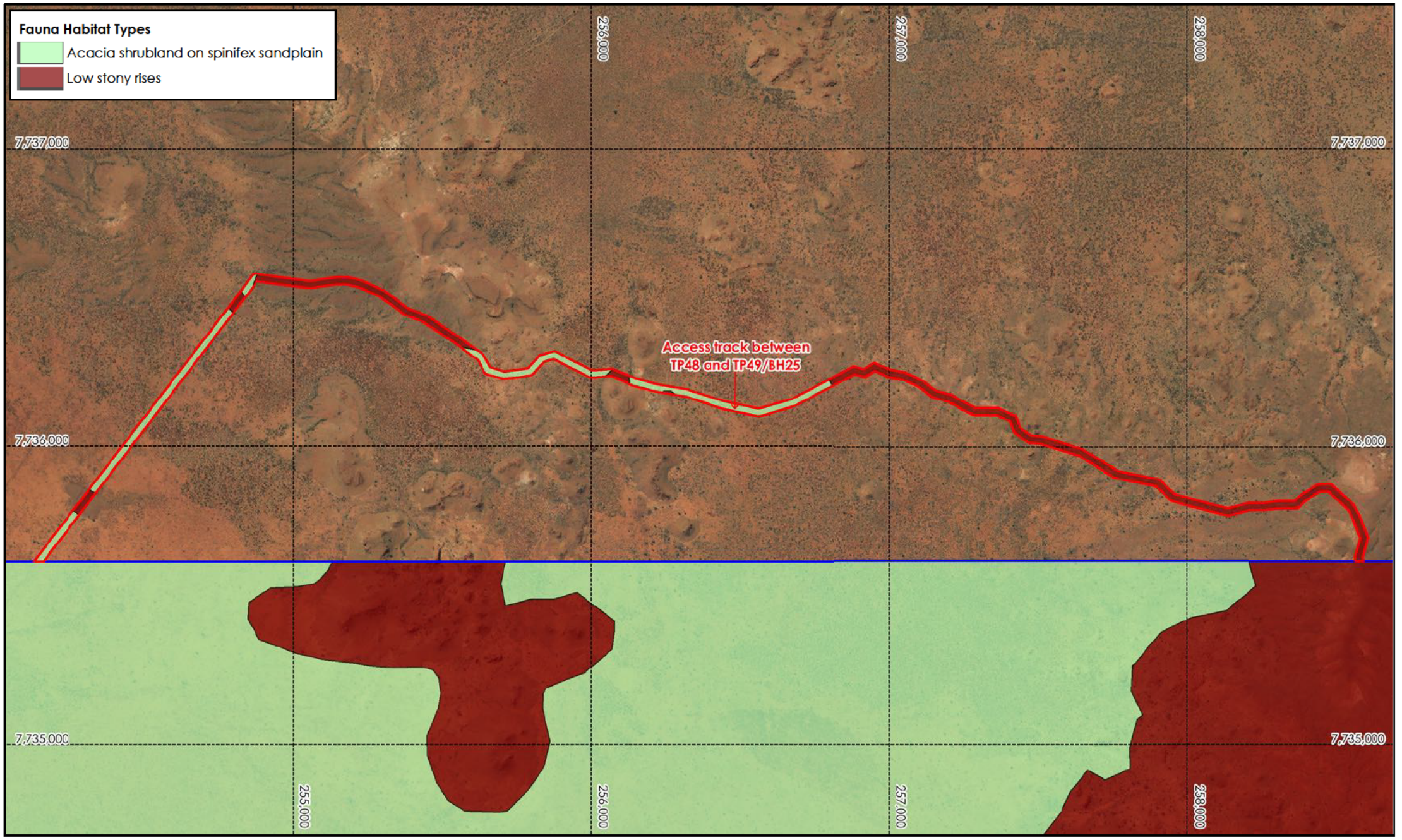
0 300

metres

PGL Project Gap Areas Fauna Habitat Map 9

Biota Environmental Sciences

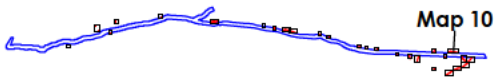
Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:7,500



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

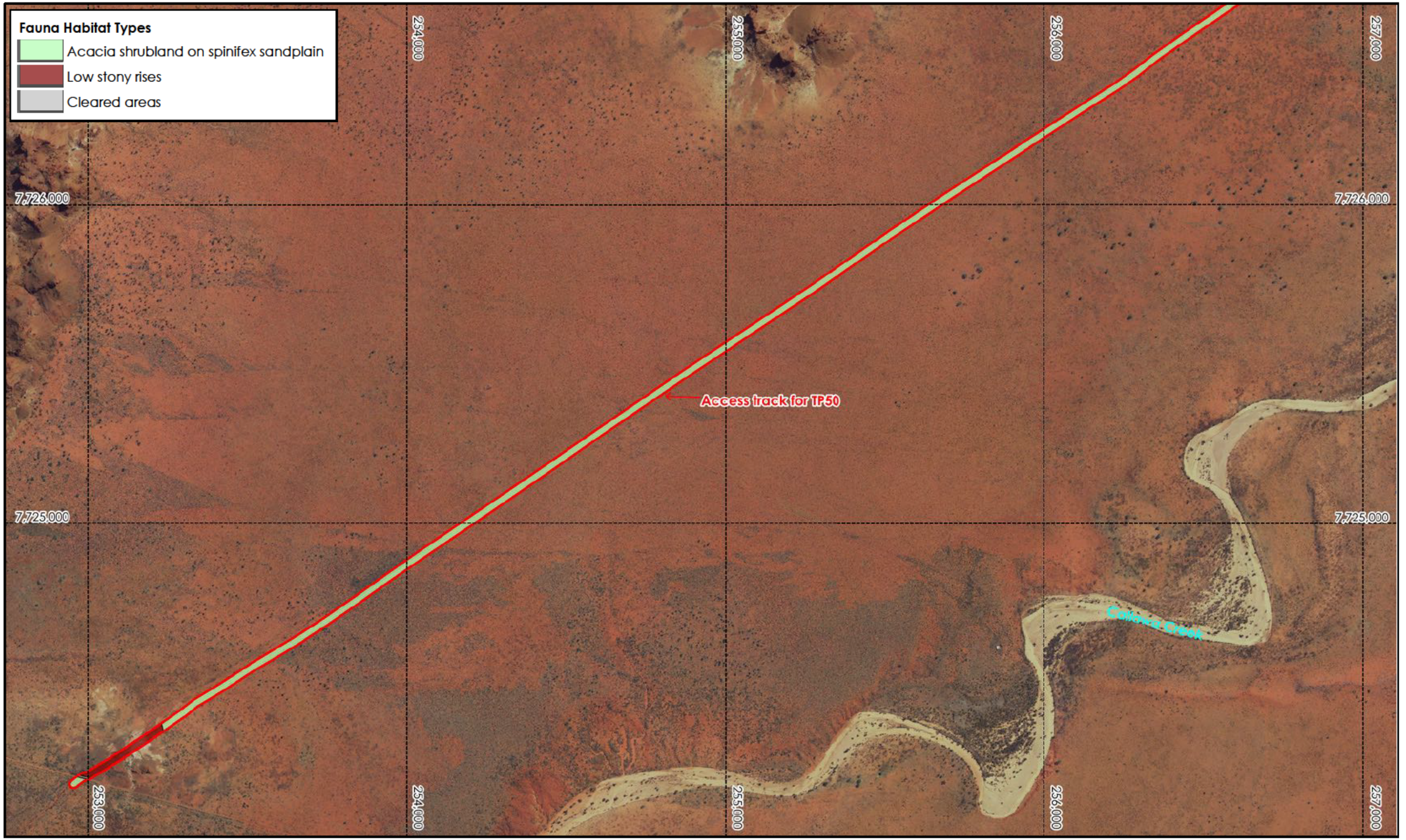
0 800

metres

PGL Project Gap Areas
Fauna Habitat Map 10

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 14 May 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:16,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

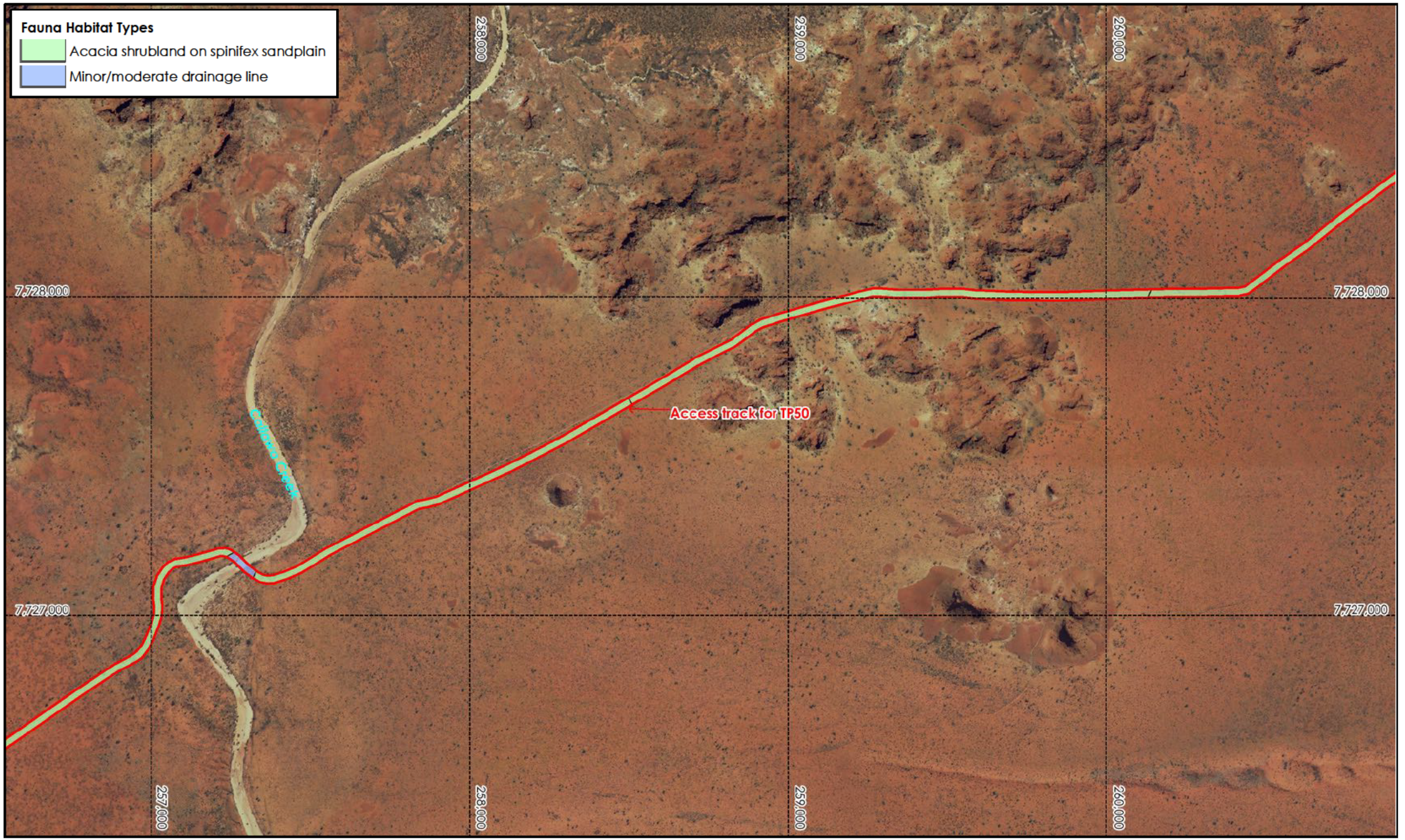
0 600

metres

PGL Project Gap Areas Fauna Habitat Map 11

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

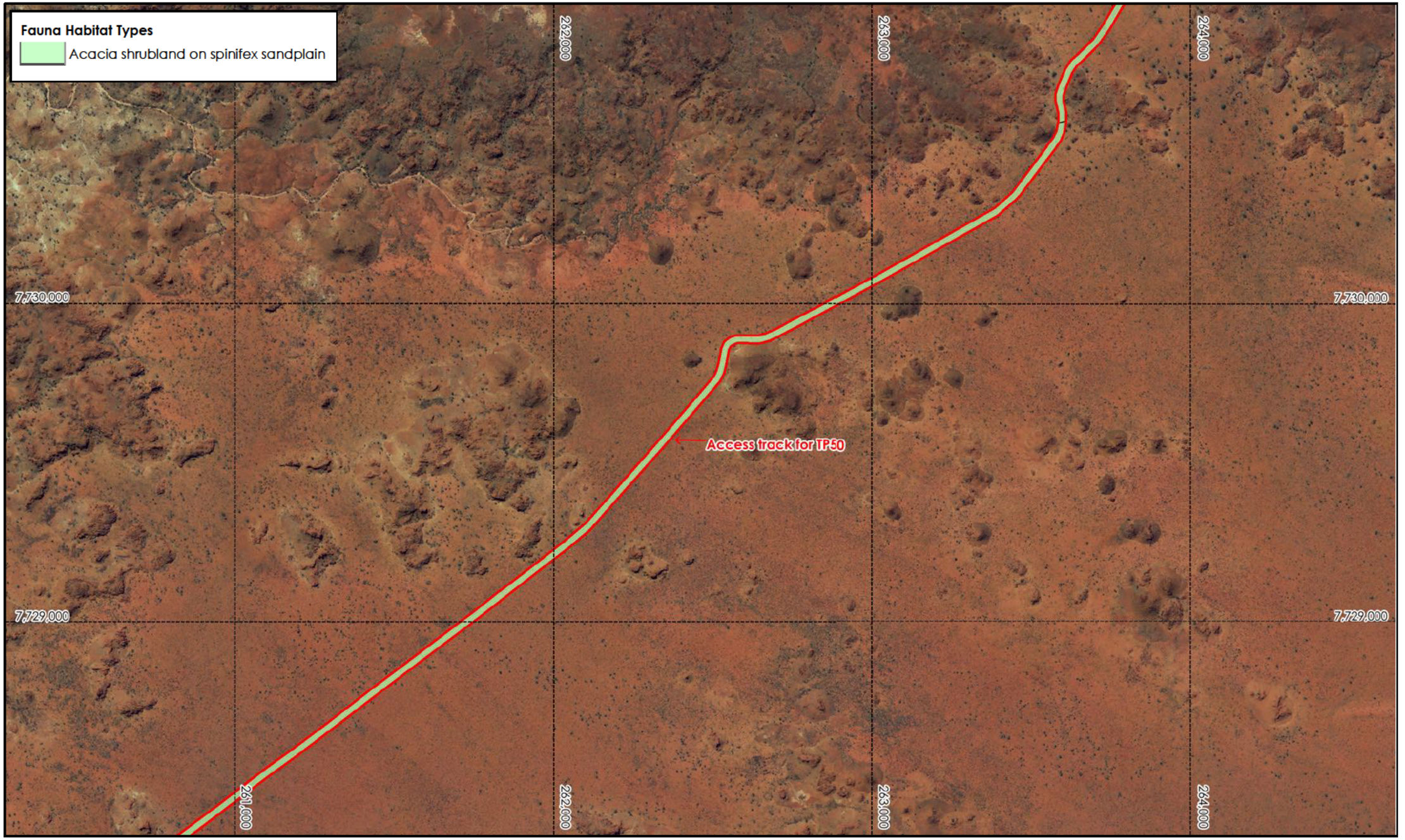
0 600

metres

PGL Project Gap Areas Fauna Habitat Map 12

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map



Index to Maps



Gap areas survey area

PGL corridor survey area

N

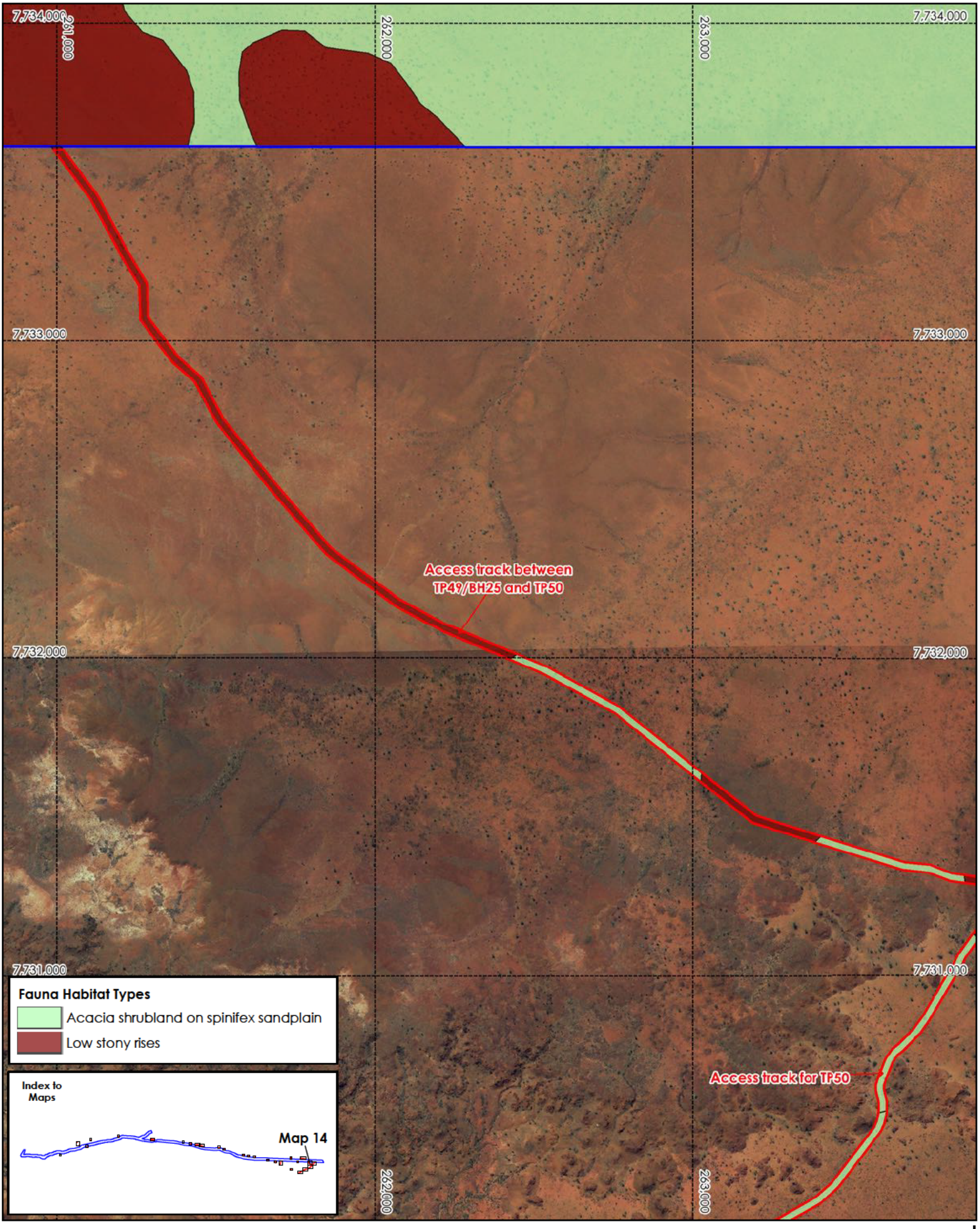
0 600

metres

PGL Project Gap Areas Fauna Habitat Map 13

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 27 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map



Gap areas survey area

PGL corridor survey area

N

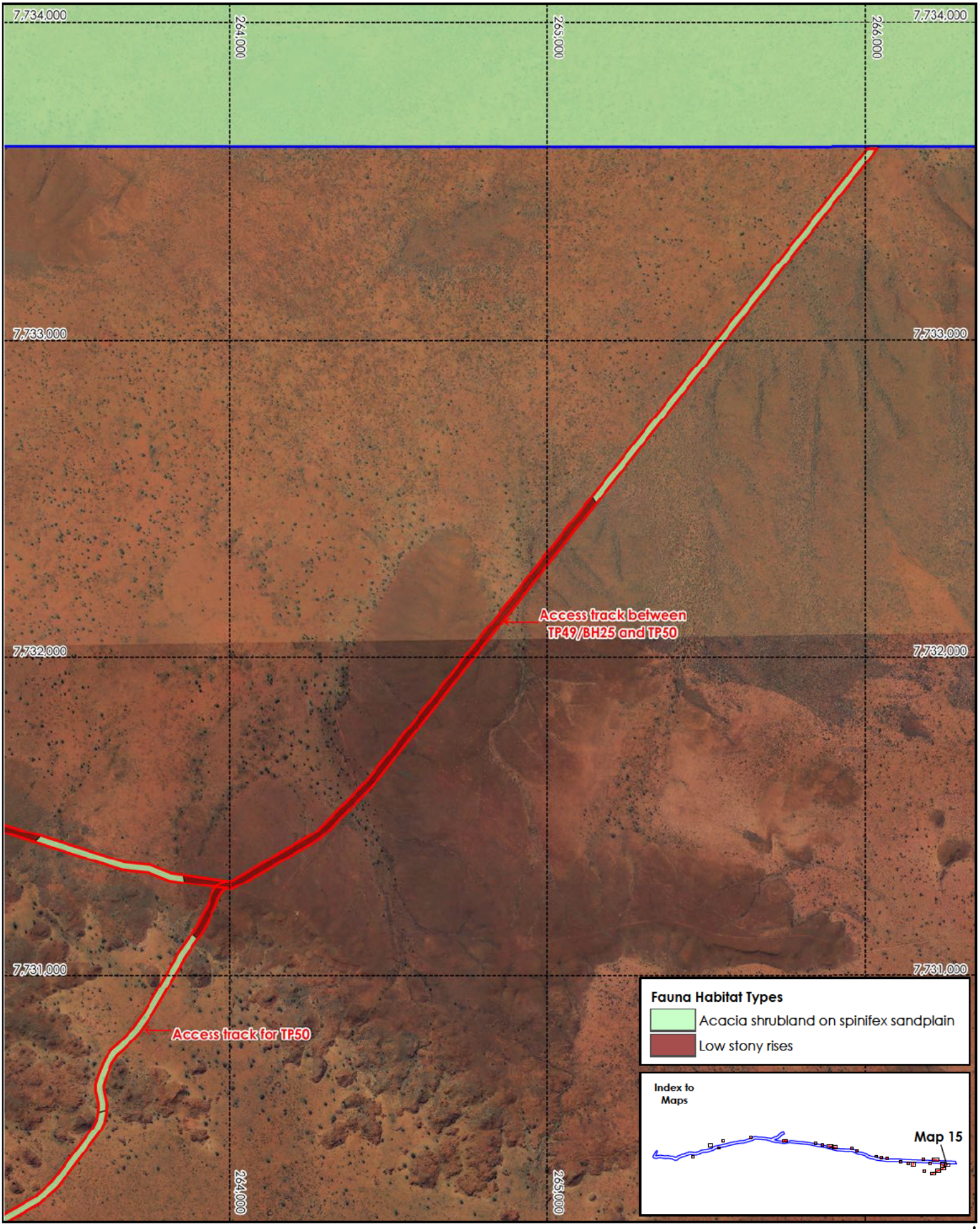
0 600

metres

PGL Project Gap Areas Fauna Habitat Map 14

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 28 Mar 2025 | Revised: 28 May 2025 | Projection: MGA Z51 (GDA2020) | Scale: 1:15,000



Location Map

KARRATHA

Map Area

KALGOORLIE

PERTH

Gap areas survey area

PGL corridor survey area

N

0 600

metres

PGL Project Gap Areas
Fauna Habitat Map 15

Biota Environmental Sciences

Author: R de Vos | Drawn: M Robinson | Job No.: 1822 | Date: 28 Mar 2025 | Revised: 28 May 2025 | Projection: MGA 51 (GDA2020) | Scale: 1:15,000

Appendix 11

Fauna Species Recorded from the Survey Area

Species Name	Common Name	Status	
		State	C'wealth
Mammals			
Osphranter robustus	Euro, Biggada	-	-
Camelus dromedarius	Dromedary, Camel	-	-
Birds			
Dromaius novaehollandiae	Emu	-	-
Eurostopodus argus	Spotted Nightjar	-	-
Apus pacificus	Pacific Swift	MI	MI
Ardeotis australis	Australian Bustard	-	-
Chalcites basalis	Horsfield's Bronze Cuckoo	-	-
Ocyphaps lophotes	Crested Pigeon	-	-
Geophaps plumifera	Spinifex Pigeon	-	-
Geopelia cuneata	Diamond Dove	-	-
Turnix velox	Little Buttonquail	-	-
Glareola maldivarum	Oriental Pratincole	MI	MI
Threskiornis spinicollis	Straw-necked Ibis	-	-
Todiramphus sanctus	Sacred Kingfisher	-	-
Todiramphus pyrrhopygius	Red-backed Kingfisher	-	-
Falco cenchroides	Nankeen Kestrel	-	-
Falco berigora	Brown Falcon	-	-
Falco hypoleucos	Grey Falcon	VU	VU
Eolophus roseicapilla	Galah	-	-
Melopsittacus undulatus	Budgerigar	-	-
Malurus leucopterus	White-winged Fairywren	-	-
Epthianura tricolor	Crimson Chat	-	-
Lichmera indistincta	Brown Honeyeater	-	-
Gavicalis virescens	Singing Honeyeater	-	-
Ptilotula keartlandi	Grey-headed Honeyeater	-	-
Ptilotula penicillata	White-plumed Honeyeater	-	-
Artamus personatus	Masked Woodswallow	-	-
Artamus minor	Little Woodswallow	-	-
Cracticus nigrogularis	Pied Butcherbird	-	-
Lalage tricolor	White-winged Triller	-	-
Colluricincla harmonica	Grey Shrikethrush	-	-
Mirafra javanica	Singing Bush Lark	-	-
Petrochelidon nigricans	Tree Martin	-	-
Cincloramphus mathewsi	Rufous Songlark	-	-
Emblema pictum	Painted Finch	-	-
Taeniopygia castanotis	Australian Zebra Finch	-	-
Reptiles			
Ctenophorus caudicinctus	Ring-tailed Dragon	-	-
Ctenophorus isolepis	Military Dragon	-	-
Ctenotus pantherinus	Leopard Ctenotus	-	-