Application form: Works Approval / Licence / Renewal / Amendment / Registration

Part V Division 3, *Environmental Protection Act 1986*
Environmental Protection Regulations 1987

Part 1: Application type

INSTRUCTIONS:

- **Completion of this form is a statutory requirement under s.54(1)(a) of the *Environmental Protection Act 1986* (WA) (EP Act) for works approval applications; s.57(1)(a) for licence and licence renewal applications; s.59B(1)(a) for applications for an amendment; and under r.5B(2)(a) of the Environmental Protection Regulations 1987 (WA) (EP Regulations) for applications for registration of premises.**
- **The instructions set out in this application form are general in nature.**
- **A reference to 'you' in these instructions is a reference to the applicant.**
- **The information provided to you by the Department of Water and Environmental Regulation (DWER) in relation to making applications does not constitute legal advice. DWER recommends that you obtain independent legal advice.**
- **Applicants seeking further information relating to requirements under the EP Act and/or EP Regulations are directed to the Parliamentary Counsel's Office website (www.legislation.wa.gov.au). Schedule 1 of the EP Regulations contains the categories of prescribed premises.**
- **For prescribed premises where activities fall within more than one category, ALL applicable categories must be identified. This applies for existing prescribed premises seeking renewal or amendment, as well as new prescribed premises.**
- **The application form must be completed with all relevant information attached. Attachments can be combined and submitted as one or more consolidated documents if desired, provided it is clear which section of the application form the information / attachments relate to. Where attachments are submitted separately, avoid duplicating information. Ensure that any cross-references between the application form and the supporting document(s) are accurate.**
- **If an application form has been submitted which is incomplete or materially incorrect, the Chief Executive Officer of DWER (CEO) will decline to deal with the application and advise the applicant accordingly.**
- **On completing this application form, please submit it to DWER in line with the instructions in Part 15 of the form.**

1.1	**This is an application for:** *[Select one option only. Your application may be returned if multiple options are selected.]* under Part V, Division 3 of the EP Act. Please see the: • *Guideline: Industry Regulation Guide to Licensing* • *Procedure: Prescribed premises works approvals and licences* for more information to assist in understanding DWER's regulatory regime for prescribed premises.	☐ Works approval ☐ Licence Existing registration number(s): [ ] Existing works approval number(s): [ ] ☐ Renewal Existing licence number: [ ] ☒ Amendment Number of the existing licence or works approval to be amended: [L9207/2019/1] ☐ Registration (works approval already obtained) Existing works approval number(s): [ ]
1.2	**For a works approval amendment or licence amendment, are there less than 90 business days until the expiry of the existing works approval or licence?** Only active instruments can be amended. Applications to amend a works approval or licence must be made 90 business days or more prior to the existing works approval or licence expiring to ensure there is adequate time to assess the amendment.	**Yes** ☐
1.3	**This application is for the following categories of prescribed premises:** *(specify all prescribed premises category numbers)*	[Category 13] ☒ All activities that meet the definition of a prescribed premises as set out in Schedule 1 of the EP Regulations have been specified above (tick, if yes).

Completion Matrix

The matrix below explains what sections are required to be completed for different types of applications.

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

Key:

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

Part 2: Applicant details

INSTRUCTIONS:

- **The applicant (the occupier of the premises) must be an individual(s), a company, body corporate, or public authority, but not a partnership, trust, or joint-venture name. Applications made by or on behalf of business names or unincorporated associations will not be accepted.**
- **If applying as an individual, your full legal name must be provided.**
- **If applying as a company, body corporate, or public authority, the full legal entity name must be inserted.**
- **Australian Company Number's (ACN) must be provided for all companies or body corporates.**
- **DWER prefers to send all correspondence electronically via email. We request that you consent to receiving all correspondence relating to instruments and notices under Part V of the EP Act (Part V documents) electronically via email, by indicating your consent in Section 2.3.**
- **Companies or body corporates making an application must nominate an authorised representative from within their organisation. Proof of authorisation must be submitted with the application (see Section 2.10). If you are applying as an individual, you are the representative.**
- **Details of a contact person must be provided for DWER enquiries in relation to your application. This contact person can be a consultant if authorised to represent the applicant. Written evidence of this authorisation must be provided.**
- **Details of the occupier of the premises must be provided. One of the options must be selected and if you have been asked to specify, please provide details. For example, if 'lease holder' has been selected, please specify the type of lease (for example, pastoral lease, mining lease, or general lease) and provide a copy of the lease document(s). Note that contracts for sale of land will not be sufficient evidence of occupancy status.**

2.1	**Applicant name/s (full legal name/s):** The proposed holder of the works approval, licence or registration.	Buckski Holdings Pty Ltd
	ACN (if applicable):	155400669
2.2	**Trading as (if applicable):**	Brookdale Contracting
2.3	**Authorised representative details:** The person authorised to receive correspondence and Part V documents on behalf of the applicant under the EP Act. Where 'yes' is selected, all correspondence will be sent to you via email, to the email address provided in this section. Where 'no' has been selected, Part V documents will be posted to you in hard copy to the postal / business address specified in Section 2.4, below. Other general correspondence may still be sent to you via email.	Name Position Telephone Email [redacted]
		I consent to all written correspondence between myself (the applicant) and DWER, regarding the subject of this application, being exclusively via email, using the email address I have provided above. — **Yes** ☒ **No** ☐
2.4	**Registered office address, as registered with the Australian Securities and Investments Commission (ASIC):** This must be a physical address to which a Part V document may be delivered.	Lot 101 Great Northern Highway Port Hedland WA 6721
2.5	**Postal address for all other correspondence:** If different from Section 2.4.	

Part 2: Applicant details			
2.6	**Contact person details for DWER enquiries relating to the application (if different from the authorised representative):** For example, could be a consultant or a site-based employee.	Name Position Organisation Address Telephone Email	[redacted]
2.7	**Occupier status:** Occupier is defined in s.3 of the EP Act and includes a person in occupation or control of the premises, or occupying a different part of the premises whether or not that person is the owner. Note: if a lease holder, the applicant must be the holder of an executed lease, not just an agreement to lease.	Registered proprietor on certificate of title.	☐
		Lease holder (please specify, including date of expiry of lease). M47/226 (Expiry 25.07.2032) and M47/293 (Expiry 08.07.2034) and L47/546 (Expiry 14.07.2036)	☒
		Public authority that has care, control, or management of the land.	☐
		Other evidence of legal occupation or control (please specify – for example, joint venture operating entity, contract, letter of operational control, or other legal document or evidence of legal occupation).	☐

Attachments			N/A	Yes
2.8	**Attachment 1A: Proof of occupier status**	Copies of certificate of title, lease, or other instruments evidencing proof of occupier status, including the expiry date or confirmation that there is no expiry date, have been provided and labelled as Attachment 1A.	☐	☒
2.9	**Attachment 1B: ASIC company extract**	A current company information extract (not the company information summary) purchased from the ASIC website(s) for all new applications / registrations has been provided and labelled as Attachment 1B.	☐	☒
2.10	**Attachment 1C: Authorisation to act as representative of the occupier**	A copy of the documentation authorising the applicant to act on the occupier's behalf as their authorised agent/representative has been provided and labelled as Attachment 1C.	☒	☐

Part 3: Premises details				
3.1	**Premises description (whole or part to be specified):** Include the land description (volume and folio number, lot, or location number/s); Crown lease or reserve number; pastoral lease number; or mining tenement number (as appropriate), of all properties, as shown on title details registered with Landgate.	Mining Tenement M47/226, M47/293 and L47/546		
	Premises street address Include the suburb.			
	Premises name (if applicable):	Bardies Well Quarry		
3.2	**Local Government Authority area:** City, Town, or Shire.	City of Karratha		
3.3	**GPS (latitude and longitude) coordinates:** GPS coordinates determined using the GDA 2020 (Geographic latitude / longitude) coordinate system and datum must be provided for all points around the proposed premises boundary, where the entirety of the cadastre (land parcel) or mining tenements are not used as the premises boundary.	Boundary of Mining Tenements M47/226, M47/293 and L47/546		
Attachments			**N/A**	**Yes**
3.4	**Attachment 2: Premises map(s)**	You must provide as an attachment to this application form, labelled Attachment 2, either: 1. an aerial photograph, map, and site plan of sufficient scale showing the proposed prescribed premises boundary *or* 2. where available, a map of the proposed premises boundary and site plan as an ESRI shapefile (accepted file types include .dbf, .shp, .prj, and .shx) with the following properties (provided on a suitable portable digital storage device, if submitting application in hard copy form): • Geometry type: Polygon Shape • Coordinate system: GDA 2020 (Geographic latitude / longitude) • Datum: GDA 2020 (Geocentric Datum of Australia 2020). You must also provide a map or maps of the prescribed premises, clearly identifying and labelling: • layout of key infrastructure and buildings, clearly labelled; • the premises boundary (where the premises boundary does not align with the entirety of the cadastral boundary, identify the Lot Number for which the premises is part of); • emission and discharge points (with precise GPS coordinates where available); • monitoring points (with precise GPS coordinates where available); • sensitive receptors and land uses • all areas proposed to be cleared (if applicable). Maps must contain a north arrow, clearly marking the area in which the activities are carried out. The map or maps must be of reasonable clarity and have a visible scale.	☐	☒

Part 4: Proposed activities

INSTRUCTIONS:

- **You must provide a description and the scope, size and scale of all prescribed activities of Schedule 1 to the EP Regulations including the maximum production or design capacity of each prescribed activity.**
- **If applying for a works approval or licence amendment involving the construction of new infrastructure, you must provide information on infrastructure to be constructed and how long construction is expected to take. You must confirm if commissioning is to occur and how long it will take.**
- **If applying for a works approval or licence amendment *not* involving the construction of new infrastructure, provide details of the proposed amendment.**
- **You must identify all emission sources on the premises map/s.**
- **You must also provide information on activities which directly relate to the prescribed premises category which have, or are likely to result in, an emission or discharge.**
- **If clearing activities are proposed provide a description and details. If a relevant exemption under Schedule 6 of the EP Act or r.5 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA) (Clearing Regulations) may apply, provide details.**
- **Note that in some cases, DWER may require that the clearing components of a works approval or licence (or amendment) application be submitted separately through the clearing permit application process. Refer to the *Procedure: Prescribed premises works approvals and licences* for further guidance.**
- **Please note that the requested information is critical to DWER's understanding of the proposed activities. The more accurate, specific, and complete the information provided in the application, the less uncertainty that DWER may identify in the application, therefore facilitating completion of the assessment in a more efficient and timely manner.**

4.1 Prescribed premises infrastructure and equipment

In Table 4.1 (below), provide a list of all items of infrastructure and equipment within the boundary of the prescribed premises relevant to this application, and include the following details for each:

- **relevant categories (if known) –** the categories of prescribed premises (as listed under Schedule 1 of the EP Regulations) that relate to that infrastructure or equipment;
- **site plan reference –** the location of that infrastructure or equipment (with reference to the site plan map or maps provided above in Section 3.4 and labelled as Attachment 2 – e.g. use GPS coordinates or a clear description such as *"labelled as [label on premises map] on Map A"*);
- **is it critical containment infrastructure (CCI)? –** indicate if the identified infrastructure or equipment would be categorised as CCI. Refer to the *Guideline: Industry Regulation Guide to Licensing* for further information on CCI; and
- **is environmental commissioning required? –** indicate if environmental commissioning is intended to be undertaken for that item of infrastructure or equipment. Refer to the *Guideline: Industry Regulation Guide to Licensing* for further information on environmental commissioning.

Add additional rows to Table 4.1 (below) as required.

Table 4.1: Infrastructure and equipment

	Infrastructure and equipment	Relevant categories (if known)	Site plan reference	CCI? (mark if yes)	Environmental commissioning? (mark if yes)
1.	**Mobile Crushing Unit LT3054**	12 and 13	Figure 1	☐	☐
2.	**Mobile Crushing Unit LT110**	12 and 13	Figure 1	☐	☐
3.	**XA750 Jaw Crusher**	12 and 13	Figure 1	☐	☐
4.	**Person 1300 Cone Crusher**	12 and 13	Figure 1	☐	☐
5.	**QA 440 Mobile Incline Screen**	12 and 13	Figure 1	☐	☐
6.				☐	☐
7.				☐	☐
8.				☐	☐
9.				☐	☐
10.				☐	☐

Part 4: Proposed activities		
4.2	**Detailed description of proposed activities or proposed changes (if an amendment):** You must provide details of proposed activities relevant to this application within the boundary of the prescribed premises, identifying: • scope, size, and scale of the project, including details as to production or design capacity (and/or frequency, if applicable); • key infrastructure and equipment; • description of processes or operations (a process flow chart may be included as an attachment); • emission / discharge points; • locations of waste storage or disposal • activities occurring during construction, environmental commissioning, and operation (if applicable). If assessment and imposition of conditions to allow environmental commissioning to be undertaken are requested, please provide an environmental commissioning plan as Attachment 3A (see 4.11 below). Additional information relating to the proposed activities may be included in Attachment 3B (see 4.12 below).	
	Construction activities (if applicable):	
	Bardies Well Quarry is located on Mining Lease M47/226 and M47/293 approximately 12 km southeast of Karratha. The tenure is accessed via the Water Corporation private Harding Dam Access Road. Bardies Well Quarry has an in force Prescribed Premise Licence L9207/2019/1 that currently is authorised as a Category 12 with a design capacity of up to 350,000 tonnes per annum. Bardies Well Pty Ltd who are the tenement and licence holder wish to amend the current licence L9207/2019/1 to include Category 13 crushing of building material including concrete, with a design capacity of 50,000t per annum. This will enable Bardies Well Pty Ltd to service the Karratha community with the recycling of this waste product. There are no changes to the Presrcribed Premise Boundary, key infrastructure and equipment, emission and discharge points and location of waste storage or disposal. No additional construction activities are required for this amendment.	
	Environmental commissioning activities (if applicable): Refer to the *Guideline: Industry Regulation Guide to Licensing* for further guidance.	
	N/A	
	Time limited operations activities (if applicable): Different elements of the premises may require time limited operations to commence at different times. In these circumstances, please specify the infrastructure and/or equipment for which time limited operations authorisation is being applied for. If time limited operations are expected to differ from future licensed operations, specify how and why this would be the case. Refer to the *Guideline: Industry Regulation Guide to Licensing* for further guidance.	
	N/A	
	Operations activities (for a licence):	
	It is proposed that the mobile crushing and screening plants outlined in Table 4.1 will process the building material including concrete and stockpile it within the approved stockpile locations on M47/226, M47/293 and L47/546. A maximum total of 50,000tonnes of concrete is expected to be crushed and screened on an annual basis. The screened material is then transported offsite for use as rail ballast, and other construction aggregates.	
4.3	**Estimated operating period of the project / premises (e.g. based on estimated infrastructure life):**	5 years
4.4	**Proposed date(s) for commencement of works (if applicable):**	N/A

Part 4: Proposed activities		
4.5	**Proposed date(s) for conclusion of works construction (if applicable):** This date should coincide with the submission to DWER of an Environmental Compliance Report(s) and/or a Critical Containment Infrastructure Report(s) as required. Refer to the *Guideline: Industry Regulation Guide to Licensing*.	N/A
4.6	**Proposed date(s) for environmental commissioning of works (if applicable):** Refer to the *Guideline: Industry Regulation Guide to Licensing*.	N/A
4.7	**Proposed date/s for commencement of time limited operations under works approval (if applicable):** Refer to the *Guideline: Industry Regulation Guide to Licensing*.	N/A
4.8	**Maximum production or design capacity for each category applied for (based on infrastructure operating 24 hours a day, 7 days a week):** Provide figures for all categories listed in Section 1.2. Units of measurement must be the same as the units of measurement associated with the relevant category as identified in Schedule 1 of the EP Regulations.	50,000 tonnes
4.9	**Estimated / actual throughput for each category applied for:** Provide figures for all categories listed in Section 1.2. Units of measurement must be the same as the units of measurement associated with the relevant category as identified in Schedule 1 of the EP Regulations.	50,000 tonnes

Attachments			N/A	Yes
4.10	**Attachment 2: Premises map**	Emission/discharge points are clearly labelled on the map/s required for Part 3.4 (Attachment 2).	☐	☒
4.11	**Attachment 3A: Environmental commissioning plan**	If applying to construct works or install equipment, and environmental commissioning of the works or equipment is planned, an environmental commissioning plan has been included in Attachment 3A. The environmental commissioning plan is expected to include, at minimum, identification of: • the sequence of commissioning activities to be undertaken, including details on whether they will be done in stages; • a summary of the timeframes associated with the identified sequence of commissioning activities; • the inputs and outputs that will be used in the commissioning process; • the emissions and/or discharges expected to occur during commissioning; • the emissions and/or discharges that will be monitored and/or confirmed to establish or test a steady-state operation (e.g. identifying emissions surrogates, etc.), including a detailed emissions monitoring program for the measurement of those emissions and/or discharges; • the controls (including management actions) that will be put in place to address the expected emissions and/or discharges; • any contingency plans for if emissions exceedances or unplanned emissions and/or discharges occur • how any of the above would differ from standard operations once commissioning is complete. Note that DWER will not include conditions on a granted instrument that authorise environmental commissioning activities where it is not satisfied that the risks associated with environmental commissioning can be adequately addressed.	☒	☐

Part 4: Proposed activities				
4.12	**Attachment 3B: Proposed activities**	Additional information relating to the proposed activities has been included in Attachment 3B (if required).	☒	☐

Clearing activities 4.13 to 4.19 are only required if the application includes clearing of native vegetation.		
4.13	**Proposed clearing area (hectares and/or number of individual trees to be removed):**	N/A
4.14	**Details of any relevant exemptions:** Refer to DWER's *A guide to the exemptions and regulations for clearing native vegetation*.	N/A
4.15	**Proposed method of clearing:**	N/A
4.16	**Period within which clearing is proposed to be undertaken:** For example, May 2020 – June 2020.	N/A
4.17	**Purpose of clearing:**	
	N/A	

Clearing activities – Attachments			**N/A**	**Yes**
4.18	**Attachment 3C: Map of area proposed to be cleared**	You must provide: an aerial photograph or map of sufficient scale showing the proposed clearing area and prescribed premises boundary *OR* if you have the facilities, a suitable portable digital storage device of the area proposed to be cleared as an ESRI shapefile with the following properties: • Geometry type: Polygon Shape • Coordinate system: GDA 2020 (Geographic latitude / longitude) • Datum: 2020 1994 (Geocentric Datum of Australia 2020).	☒	☐
4.19	**Attachment 3D: Additional information for clearing assessment**	Additional information to assist in the assessment of the clearing proposal may be attached to this application (for example, reports on salinity, fauna or flora studies or other environmental reports conducted for the site).	☒	☐

Part 5: Index of Biodiversity and Marine Surveys for Assessments (IBSA and IMSA)
INSTRUCTIONS: • **Biodiversity surveys should be submitted through the IBSA Submissions Portal at ibsasubmissions.dwer.wa.gov.au** • **Biodiversity surveys submitted to support this application must meet the requirements of the EPA's *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)*.** • **Marine surveys submitted to support this application must meet the requirements of the EPA's Instructions for the preparation of data packages for the Index of Marine Surveys for Assessments (IMSA).** • **If these requirements are not met, DWER will decline to deal with the application.**

Attachments			**N/A**	**Yes**
5.1		All biodiversity surveys submitted with this application meet the requirements of the EPA's *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)*.	☒	☐
		Submission number(s)		

Part 5: Index of Biodiversity and Marine Surveys for Assessments (IBSA and IMSA)				
INSTRUCTIONS: • **Biodiversity surveys should be submitted through the IBSA Submissions Portal at ibsasubmissions.dwer.wa.gov.au** • **Biodiversity surveys submitted to support this application must meet the requirements of the EPA's *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA)*.** • **Marine surveys submitted to support this application must meet the requirements of the EPA's Instructions for the preparation of data packages for the Index of Marine Surveys for Assessments (IMSA).** • **If these requirements are not met, DWER will decline to deal with the application.**				
	Biodiversity surveys Please provide the IBSA number(s) (or submission number(s) if IBSA number has not yet been issued) in the space provided. Note that a submission number is not confirmation of acceptance of a biodiversity survey and is not the same as an IBSA number. IBSA numbers are only issued once a survey has been accepted. Once an IBSA number is issued, please notify the department.	IBSA number(s)		
5.2	**Attachment 4:** **Marine surveys**	All marine surveys submitted with this application meet the requirements of the EPA's *Instructions for the preparation of data packages for the Index of Marine Surveys for Assessments (IMSA)*.	☒	☐

Part 6: Other DWER approvals

INSTRUCTIONS:

- **If you have applied, or intend to apply, for other approvals within DWER that may be relevant to this application, you must provide relevant details.**
- **If you have referred, or intend to refer, your proposal to the Environmental Protection Authority (EPA), you must provide the requested details.**

Pre-application scoping

6.1	**Have you had any pre-application / pre-referral / scoping meetings with DWER regarding any planned applications?**	☐ No ☒ Yes – provide details: Email Correspondence to DWER requesting advice on requirement of additional supporting documentation for this amendment.

Environmental impact assessment (Part IV of the EP Act)

6.2	**Have you referred or do you intend to refer the proposal to the EPA?** Section 37B(1) of the EP Act defines a 'significant proposal' as *"a proposal likely, if implemented, to have a significant effect on the environment"*. If DWER considers that the proposal in this application is likely to constitute a 'significant proposal', DWER is required under s.38(5) of the EP Act to refer the proposal to the EPA for assessment under Part IV, if such a referral has not already been made. If a relevant Ministerial Statement already exists, please provide the MS number in the space provided.	☐ Yes (referred) – reference (if known): [ ] ☐ Yes – intend to refer (proposal is a 'significant proposal')☐ Yes – intend to refer (proposal will require a s.45C amendment to the current Ministerial Statement): MS [ ] ☐ No – a valid Ministerial Statement applies: MS [ ] ☒ No – not a 'significant proposal'

Clearing of native vegetation (Part V Division 2 of the EP Act and *Country Area Water Supply Act 1947*)

6.3	**Have you applied or do you intend to apply for a native vegetation clearing permit?** In accordance with the *Guideline: Industry Regulation Guide to Licensing* and *Procedure: Native vegetation clearing permits*, where clearing of native vegetation: • is exempt under Schedule 6 of the EP Act or the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA) (refer to *A guide to the exemptions and regulations for clearing native vegetation*) • is being assessed by a relevant authority which would lead to an exemption under Schedule 6 of the EP Act, or • has been referred under s.51DA of the EP Act and a determination made that a clearing permit is not required (refer to the *Guideline: Native vegetation clearing referrals*), the clearing will not be reassessed by DWER or be subject to any additional controls by DWER. If the proposed clearing action is to be assessed in accordance with, or under, an *Environment Protection and Biodiversity Conservation Act* (Cth) (EPBC Act) accredited process, such as the assessment bilateral agreement, the clearing permit application *Form Annex C7 – Assessment bilateral agreement* must be completed and attached to your clearing permit application.	☐ Yes – clearing application reference (if known): CPS [ ] ☐ Yes – a valid EP Act clearing permit already applies: CPS [ ] ☐ No – this application includes clearing (please complete Sections 4.13 to 4.19 above) ☒ No – permit not required (no clearing of native vegetation) ☐ No – permit not required (clearing referral decision): CPS [ ] ☐ No – an exemption applies (explain why):

Part 6: Other DWER approvals		
6.4	**Have you applied or do you intend to apply for a *Country Area Water Supply Act 1947* licence?** If a clearing exemption applies in a *Country Area Water Supply Act 1947* (CAWS Act) controlled catchment, or if compensation has previously been paid to retain the subject vegetation, a CAWS Act clearing licence is required. If yes, contact the relevant DWER regional office for a Form 1 *Application for licence*. Map of CAWS Act controlled catchments	☐ Yes – application reference (if known): [ ] ☐ No – a valid licence applies: [ ] ☒ No – licence not required
Water licences and permits (*Rights in Water and Irrigation Act 1914*)		
6.5	**Have you applied, or do you intend to apply for:** **1. a licence or amendment to a licence to take water (surface water or groundwater); or** **2. a licence to construct wells (including bores and soaks); or** **3. a permit or amendment to a permit to interfere with the bed and banks of a watercourse?** For further guidance on water licences and permits under the *Rights in Water and Irrigation Act 1914*, refer to the *Procedure: Water licences and permits*.	☐ Yes –application reference (if known): [ ] ☐ No – a valid licence / permit applies: [ ] ☐ No – an exemption applies (explain why): ☒ No – licence / permit not required

Part 7: Other approvals and consultation				
INSTRUCTIONS: • **Please provide copies of all relevant documentation indicated below, including any conditions, exclusions, or expiry dates.** • **"Major Project" means:** ➢ **A State Development Project, where the lead agency is the Department of Jobs, Tourism, Science and Innovation (including projects to which a State Agreement applies); or** ➢ **A Level 2 or 3 proposal, as defined in the Department of Premier and Cabinet's *Lead Agency Framework*.**				
		N/A	**No**	**Yes**
7.1	**Is the proposal a Major Project?**		☒	☐
7.2	**Is the proposal subject to a State Agreement Act?**		☒	☐
	If yes, specify which Act:			
7.3	**Has the proposal been allocated to a "Lead Agency" (as defined in the *Lead Agency Framework*)?**		☒	☐
	If yes, specify Lead Agency contact details:			
7.4	**Has the proposal been referred and/or assessed under the EPBC Act (Commonwealth)?**	☐	☒	☐
	If yes, please specify referral, assessment and/or approval number:			
7.5	**Has the proposal obtained all relevant planning approvals?**	☒	☐	☐
	If planning approval is necessary but has not been obtained, please provide details indicating why:			
	If planning approval is not necessary, please provide details indicating why:			
	This project is authorised under the Mining Act 1972			

Part 7: Other approvals and consultation				
7.6	**For renewals or amendment applications, are the relevant planning approvals still valid (that is, not expired)?**	☒	☐	☐
7.7	**Has the proposal obtained all other necessary statutory approvals (not including any other DWER approvals identified in Part 6 of this application)?**	☐	☐	☒
	If no, please provide details of approvals already obtained, outstanding approvals, and expected dates for obtaining these outstanding approvals:			
	Mining Proposal Reg ID 129229			
		N/A	**No**	**Yes**
7.8	**Has consultation been undertaken with parties considered to have a direct interest in the proposal (that is, interested parties or persons who are considered to be directly affected by the proposal)?** DWER will give consideration to submissions from interested parties or persons in accordance with the *Guideline: Industry Regulation Guide to Licensing*.	☒	☐	☐
Attachments			**N/A**	**Yes**
7.9	**Attachment 5: Other approvals and consultation documentation** — Details of other approvals specified in Part 7 of this application, including copies of relevant decisions and any consultation undertaken with direct interest stakeholders have been provided and labelled Attachment 5.		☒	☐

Part 8: Applicant history				
Note: • **DWER will undertake an internal due diligence of the applicant's fitness and competency based on DWER's compliance records and the responses to Part 8 of the form.** • **If you wish to provide additional information for DWER to consider in making this assessment, you may provide that information as a separate attachment (see Part 11).**				
		N/A	**No**	**Yes**
8.1	If the applicant is an individual, has the applicant previously held, or do they currently hold, a licence or works approval under Part V of the EP Act?	☒	☐	☐
8.2	If the applicant is a corporation, has any director of that corporation previously held, or do they currently hold, a licence or works approval under Part V of the EP Act?	☐	☐	☒
8.3	If yes to 8.1 or 8.2 above, specify the name of company and/or licence or works approval number:			
	PPL 9207/2019/1 and PPL 9405/2023/1			
8.4	If the applicant is an individual, has the applicant ever been convicted, or paid a penalty, for an offence under a provision of the EP Act, its subsidiary legislation, or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☒	☐	☐
8.5	If the applicant is a corporation, has any director of that corporation ever been convicted, or paid a penalty, for an offence under a provision of the EP Act, its subsidiary legislation, or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.6	If the applicant is a corporation, has any person concerned in the management of the corporation, as referred to in s.118 of the EP Act, ever been convicted of, or paid a penalty, for an offence under a provision of the EP Act, its subsidiary legislation, or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.7	If the applicant is a corporation, has any director of that corporation ever been a director of another corporation that has been convicted, or paid a penalty, for an offence under a provision of the EP Act, its subsidiary legislation, or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐

Part 8: Applicant history				
8.8	With regards to the questions posed in 8.4 to 8.7 above, have any legal proceedings been commenced, whether convicted or not, against the applicant for an offence under a provision of the EP Act, its subsidiary legislation, or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.9	Has the applicant had a licence or other authority suspended or revoked due to a breach of conditions or an offence under the EP Act or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.10	If the applicant is a corporation, has any director of that corporation ever had a licence or other authority suspended or revoked due to a breach of conditions or an offence under the EP Act or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.11	If the applicant is a corporation, has any director of that corporation ever been a director of another corporation that has ever had a licence or other authorisation suspended or revoked due to a breach of conditions or an offence under the EP Act or similar environmental protection or health-related legislation in Western Australia or elsewhere in Australia?	☐	☒	☐
8.12	If yes to any of 8.4 to 8.11 above, you must provide details of any charges, convictions, penalties paid for an offence, and/or licences or other authorisations suspended or revoked:			

Part 9: Emissions, discharges, and waste			
INSTRUCTIONS: • **Please see *Guideline: Risk Assessments* and provide all information relating to emission sources, pathways and receptors relevant to the application.** • **You must provide details on sources of emissions (for example, kiln stack, baghouses or discharge pipelines) including fugitive emissions (for example, noise, dust or odour), types of emissions (physical, chemical, or biological), and volumes, concentrations and durations of emissions.** • **The potential for emissions should be considered for all stages of the proposal (where relevant), including during construction, commissioning and operation of the premises.**			
		No	**Yes**
9.1	**Are there potential emissions or discharges arising from the proposed activities?**	☐	☒
	If yes, identify all potential emissions and discharges arising from the proposed activities and complete Table 9.1: Emissions and discharges (below).		

Part 9: Emissions, discharges, and waste

☐ Gaseous and particulate emissions (e.g. emissions from stacks, chimneys or baghouses)

☒ Dust (e.g. from equipment, unsealed roads and/or stockpiles, etc.)

☐ Wastewater discharges (e.g. treated sewage, wash water, or process water discharged to lands or waters)

☒ Waste and leachate (e.g. emissions through seepage, leaks and spills of waste from storage, process and handling areas, etc.)

☒ Noise (e.g. from machinery operations and/or vehicle operations)

☐ Odour (e.g. from wastes accepted at putrescible landfills, storage or processing of waste or other odorous materials, etc.)

☐ Contaminated or potentially contaminated stormwater (e.g. stormwater with the potential to come into contact with chemicals or waste materials, etc.)

☐ Electromagnetic radiation[1]

☐ Other (please specify): [ ]

[1] Note that for electromagnetic radiation, copies/details of other relevant approvals (such as from the Department of Mines, Industry Regulation and Safety or the Radiological Council) must be provided where applicable.

Part 9: Emissions, discharges, and waste

Details of any pollution control equipment or waste treatment system, including any control mechanisms used to ensure proper operation of this equipment, must be included in the proposed controls column of the 'Emissions and discharges table' below. Details of management measures employed to control emissions should also be included. Please provide / attach any relevant documents (e.g. management plans, etc.).

Additional rows may be added as required and/or further information may be included as an attachment (see Section 9.3).

Table 9.1: Emissions and discharges

	Source of emission or discharge	Emission or discharge type	Volume and frequency	Proposed controls (include in Attachment 6A if extensive or complex)	Location (on site layout plan – see 3.4)
1.	Mobile Crushing/Screening Equipment	Dust	Minimal/during operations	Dust suppression sprays and extractors on mobile equipment Water Cart Dust Management Plan	Figure 1
2.	Mobile Crushing/Screening Equipment	Noise	Minimal/during operations	Nearest sensitive receptor 8km NW - Karratha Industrial Estate Maintain equipment to manufacture specifications All mobile crushing and screening plants are enclosed to provide acoustic screening.	Figure 1
3.	Mobile Crushing/Screening Equipment	Hydrocarbon Spills	Minor Equipment Spills	Spill Kits available at mobile plant locations Biopad established for contaminated soil remediation	Figure 1
4.	Mobile Crushing/Screening Equipment Working Floor	Contaminated Rainfall Runoff	Minimal/during heavy rain events	Bunded working floor Runoff diverted to several site sumps, water reused for dust suppression	Figure 1
5.	Transport and Vehicle Movements	Dust	Minimal/during operations	Water Cart used extensively on site for all dust management through the regular watering of all access and haul roads, stockpiles and hardstands as required	Figure 1
6.					
7.					
8.					
9.					
10.					
11.					
12.					

9.2	**Waste-related activities at the premises[2]** Answer "yes" or "no" for the following questions and complete Table 9.2 (below).	**No**	**Yes**

Part 9: Emissions, discharges, and waste

(a)	Is waste accepted at the premises?	☐	☒
(b)	Is waste produced on the premises?	☒	☐
(c)	Is waste processed on the premises?	☐	☒
(d)	Is waste stored on the premises?	☐	☒
(e)	Is waste buried on the premises?	☒	☐
(f)	Is waste recycled on the premises?	☐	☒
(g)	Is any of the waste listed in Table 9.2 (below) also considered a 'dangerous good' for the purposes of the Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007?[3]	☒	☐
	Specify, if yes:		

[2] Copies / details of any other relevant approvals (e.g. from the Department of Health) must be provided where applicable.

[3] Wastes derived from the storage, handling, and use of dangerous goods may be considered hazardous and may need to be handled with the same precautions. Please refer to the Department of Mines, Industry Regulation and Safety's *Dangerous Goods Safety information sheet* for more information.

Solid waste types must be described with reference to *Landfill Waste Classification and Waste Definitions 1996* (as amended from time to time) and the Environmental Protection (Controlled Waste) Regulations 2004 (Controlled Waste Regulations).

Liquid waste types must be described with reference to the Controlled Waste Regulations.

For further guidance on the definition of waste, refer to *Fact Sheet: Assessing whether material is waste*.

Detail must be provided on storage type (for example, hardstand and containment infrastructure), capacity, likely storage volumes, and containment features (for example, lining and bunding).

Additional rows may be added as required and/or further information may be included as an attachment (see Section 9.4).

Table 9.2 Waste types

	Waste type	Quantity (e.g. tonnes, litres, cubic metres)	Waste activity infrastructure (including specifications)	Monitoring (if applicable)	Location (on site layout plan – see 3.4)
1.	Used Oils/Greases	<5000	Bunded containment	Visual Inspection	Figure 1
2.	Used Tyres	<100	Hardstand	Visual inspection	Figure 1
3.	Concrete	50,000t	Bunded Hardstand	Dust and visual monitoring	Figure 1
4.					
5.					

Attachments			N/A	Yes
9.3	**Attachment 6A: Emissions and discharges** (if required)	If required, further information for Section 9.1 has been included as an attachment labelled Attachment 6A.	☐	☒
9.4	**Attachment 6B: Waste acceptance** (if required)	If required, further information for Section 9.2 has been included as an attachment labelled Attachment 6B.	☒	☐

Part 10: Siting and location

10.1	**Sensitive land uses** What is/are the distance(s) to the nearest sensitive land use(s)? A sensitive land use is a residence or other land use which may be affected by an emission or discharge associated with the proposed activities.	8km North West – Karratha Industrial Estate

10.2 **Nearby environmentally sensitive receptors and aspects**

Identify in Table 10.2 (below):

- all instances of environmentally sensitive receptors that are known or suspected to be present within, or within close proximity to, the proposed prescribed premises boundary;
- the nature of the sensitive receptors (e.g. type of Threatened Ecological Community, species or threatened flora or fauna, etc.);
- their actual or approximate known distance and direction from the premises boundary (at the closest point/s); and
- if applicable, what measures have been or will be taken to ensure that sensitive receptors are not adversely impacted by any emissions or discharges from the premises.

Refer to the *Guideline: Environmental siting* for further guidance.

Table 10.2: Nearby environmentally sensitive receptors and aspects

Type / classification	Description	Distance + direction to premises boundary	Proposed controls to prevent or mitigate adverse impacts (if applicable)
Environmentally Sensitive Areas [1]	No Environmentally Sensitive Areas identified within the Bardies Well Quarry Premise Boundary	-	-
Threatened Ecological Communities	No Threatened Ecological Communities identified within the Bardies Well Quarry Premise Boundary	-	-
Threatened and/or priority fauna	Significant fauna within the local area include: • Northern Quoll • Western Pebble Mound Mouse	Identified within the Premise Boundary	Ground disturbance activities will be limited to approved areas and limits to ensure risk to fauna habitat remains low. Crushing activities will only occur in daylight hours, reducing the impact to this nocturnal species.
Threatened and/or priority flora	No Threatened Flora Populations identified within the Bardies Well Quarry Premise Boundary	-	-
Aboriginal and other heritage sites [2]	Two heritage sites identified NAC2307-NCA01 and NAC2307-NCA02 within the norther section of the Premise Boundary	Located within L47/546	Buffer zones established and Bardies Well Pty Ltd will maintain all activities outside of the approved Buffer Zones.
Public drinking water source areas [3]	Harding Dam PDWSA	23km South East	-

Part 10: Siting and location				
	Rivers, lakes, oceans, and other bodies of surface water, etc.	Nickol River – Ephemeral	2.5km east	Surface water runoff is currently collected and stored in sedimentation dams for use in dust suppression. Water is also collected within the quarry pit and used for dust suppression
	Acid sulfate soils	No identified ASS	N/A	N/A
	Other			

[1] Environmentally Sensitive Areas are as declared under the *Environmental Protection (Environmentally Sensitive) Notice 2005*. Refer to DWER's website ("Environmentally Sensitive Areas") for further information.

[2] Refer to the Department of Planning, Lands and Heritage website for further information about Aboriginal heritage and other heritage sites.

[3] Refer to *Water Quality Protection Note No.25: Land use compatibility tables for public drinking water source areas* for further information.

10.3	**Environmental siting context details** Provide further information including details on topography, climate, geology, soil type, hydrology, and hydrogeology at the premises.	As per attached document

Attachments			N/A	Yes
10.4	**Attachment 7: Siting and location**	You must provide details and a map describing the siting and location of the premises, including identification of distances to sensitive land uses and/or any specified ecosystems.	☐	☒

Part 11: Submission of any other relevant information				
Attachments			**No**	**Yes**
11.1	**Attachment 8: Additional information submitted**	Applicants seeking to submit further information may include information labelled Attachment 8. If submitting multiple additional attachments, label them 8A, 8B, etc. Where additional documentation is submitted, please specify the name of documents below.	☒	☐
	List title of additional document(s) attached:			

Part 12: Category checklist(s)				
Attachments			**N/A**	**Yes**
12.1	**Attachment 9: Category checklist(s)**	DWER has developed category checklists to assist applicants with preparing their application. These checklists are available on DWER's website. The relevant category-specific checklist(s) must be completed and included with the application, labelled as Attachment 9. If attaching multiple category checklists, label them 9A, 9B, etc. Do not select "N/A" unless: • a relevant category checklist is not yet published on DWER's website, or • the application is for an amendment that does not propose changes to the method of operation, or change the inputs, outputs, infrastructure, equipment, emissions, or discharges of / from the premises. Note that that a category checklist(s) may still be required for renewal applications. You will be advised in your renewal notification letter (sent approximately twelve months before the licence expiry date) if you are required to provide the information identified in a category checklist. Where a category checklist is submitted, please specify which checklist(s) in the space below.	☒	☐
	List title(s) of category checklists attached:			

Part 13: Proposed fee calculation

INSTRUCTIONS:

Please calculate the prescribed fee using the relevant online fee calculator linked below.

- **Licence: www.der.wa.gov.au/LicenceFeeCalculator**
- **Works approval: www.der.wa.gov.au/WorksApprovalFeeCalculator**
- **Amendment: https://www.wa.gov.au/government/publications/works-approval-and-licence-amendment-fee-calculator**

Different fee units apply for different fee components. Fee units may also have different amounts depending on the period in which the calculation is made.

Once DWER has confirmed that the application submitted meets the relevant requirements of the EP Act, you will be issued an invoice with instructions for paying your application fee.

Further information on fees can be found in the *Fact Sheet: Industry Regulation fees*, and on DWER's website.

13.1	Only the relevant fee calculations are to be completed as follows: *[mark the box to indicate sections completed]*	☐ Section 13.3 for works approval applications ☐ Section 13.4 for licence / renewal applications ☐ Section 13.5 for registration applications ☒ Section 13.6 for amendment applications ☐ Section 13.7 for applications requiring clearing of native vegetation
13.2	All information and data used for the calculation of proposed fees has been provided in accordance with Section 13.8.	☐

13.3 Proposed works approval fee

Proposed works approval fee (see Schedule 3 of the EP Regulations)

Fees relate to the cost of the works, including all capital costs (inclusive of GST) associated with the construction and establishment of the works proposed under the works approval application. This includes, for example, costs associated with earth works, hard stands, drainage, plant hire, equipment, processing plant, relocation of equipment and labour hire.

Costs exclude:

- the cost of land
- the cost of buildings to be used for purposes unrelated to the purposes in respect of which the premises are, or will become, prescribed premises
- costs for buildings unrelated to the prescribed premises activity or activities
- consultancy fees relating to the works.

Fee component	Proposed fee
Cost of works: $	$

13.4 **Proposed licence fee (new licences and licence renewals)**

Detailed licence fee calculations

Part 1 Premises component (see r.5D and Part 1 of Schedule 4 of the EP Regulations)

The production or design capacity should be the maximum capacity of the premises. For most categories, the production or design capacity refers to an annual rate. The figure should be based on 24 hour operation for 365 days, unless there is another regulatory approval or technical reason that restricts operation.

The premises component fee applies to the category in Part 1, Schedule 4 incurring the higher or highest amount of fee units in accordance with r.5D(2) of the EP Regulations.

List all categories (insert additional rows as required). Use only the higher or highest amount of fee units to determine the Part 1 fee component.

Category	Production or design capacity	Fee units
Using the higher or highest amount of fee units, Part 1 component subtotal		

Part 2 Waste (see r.5D(1a)(b) and Part 2 of Schedule 4 of the EP Regulations)

If your premises includes one or more of the following categories specify any applicable Part 2 waste amounts. Do not include Part 3 waste components of these discharges in the below calculations.

Categories: 5, 6, 7, 8, 9, 12, 14, 44, 46, 53, 54A, 70, 80, or 85B

Part 2 waste means waste consisting of –

(a) tailings; or
(b) bitterns; or
(c) water to allow mining of ore; or
(d) flyash; or
(e) waste water from a desalination plant.

If the premises does not fall into one of the categories listed above, or there are no applicable Part 2 waste amounts, the sub total for this section will be $0.

Insert additional rows as required. Sum all Part 2 waste fees to determine the sub total.

Discharge quantity (tonnes/year)	Fee units
	NA
Part 2 component subtotal	

Part 3 Waste – Discharges to air, onto land, into waters (see Part 3 of Schedule 4 of the EP Regulations)

Choose the appropriate location of the discharge and enter the discharge amount(s) in the units specified in the EP Regulations. This should be the amount of waste expected to be discharged over the next 12 months, expressed in the units and averaging period applicable for that waste kind (for example, g/minute or kg/day). Amounts can be measured, calculated, or estimated and can be based on data acquired over the previous 12 months, but should be based on the maximum premises capacity and not the forecast operating hours.

Where there are discharges, all prescribed waste types must be considered in the fee calculation. If a specified waste type is not present in the discharge, this must be justified using an appropriate emission estimation technique (for example, sampling data, industry sector guidance notes, National Pollution Inventory guides and emission factors).

Discharges to air			
Discharges to air	Discharge rate (g/min)	Discharges to air	Discharge rate (g/min)
Carbon monoxide		Nickel	
Oxides of nitrogen		Vanadium	
Sulphur oxides		Zinc	
Particulates (Total PM)		Vinyl chloride	
Volatile organic compounds		Hydrogen sulphide	
Inorganic fluoride		Benzene	
Pesticides		Carbon oxysulphide	
Aluminium		Carbon disulphide	
Arsenic		Acrylates	
Chromium		Beryllium	
Cobalt		Cadmium	
Copper		Mercury	
Lead		TDI (toluene-2, 4-di-iso-cyanate)	
Manganese		MDI (diphenyl-methane di-iso-cyanate)	
Molybdenum		Other waste	
Part 3 component subtotal		$ NA	

Discharges onto land or into waters		Discharge rate
1. Liquid waste that can potentially deprive receiving waters of oxygen (for each kilogram discharged per day) —	(a) biochemical oxygen demand (in the absence of chemical oxygen demand limit)	
	(b) chemical oxygen demand (in the absence of total organic carbon limit)	
	(c) total organic carbon	
2. Bio-stimulants (for each kilogram discharged per day) —	(a) phosphorus	
	(b) total nitrogen	
3. Liquid waste that physically alters the characteristics of naturally occurring waters —	(a) total suspended solids (for each kilogram discharged per day)	
	(b) surfactants (for each kilogram discharged per day)	
	(c) colour alteration (for each platinum cobalt unit of colour above the ambient colour of the waters in each megalitre discharged per day)	
	(d) temperature alteration (for each 1°C above the ambient temperature of the waters in each megalitre discharged per day) — (i) in the sea south of the Tropic of Capricorn (ii) in other waters	

4. Waste that can potentially accumulate in the environment or living tissue (for each kilogram discharged per day) —	(a) aluminium	
	(b) arsenic	
	(c) cadmium	
	(d) chromium	
	(e) cobalt	
	(f) copper	
	(g) lead	
	(h) mercury	
	(i) molybdenum	
	(j) nickel	
	(k) vanadium	
	(l) zinc	
	(m) pesticides	
	(n) fish tainting wastes	
	(o) manganese	
5. *E. coli* bacteria as indicator species (in each megalitre discharged per day) —	(a) 1,000 to 5,000 organisms per 100 ml	
	(b) 5,000 to 20,000 organisms per 100 ml	
	(c) more than 20,000 organisms per 100 ml	
6. Other waste (per kilogram discharged per day) —	(a) oil and grease	
	(b) total dissolved solids	
	(c) fluoride	
	(d) iron	
	(e) total residual chlorine	
	(f) other	
Part 3 component subtotal		$ NA

Summary – Proposed licence fee	
Part 1 Component	[redacted]
Part 2 Component	
Part 3 Component	
Total proposed licence fees:	

13.5 **Prescribed fee for registration**	
A fee of 24 units applies for an application for registration of premises, unless the occupier of the premises holds a licence in respect of the premises, in accordance with r.5B(2)(c) of the EP Regulations.	☐ (Tick to acknowledge)

13.6 **Amendment fee (works approval or licence)**	
The fee prescribed for an application for an amendment to a works approval or licence is calculated in accordance with r.5BB(1)(a) of the EP Regulations: • for a single category of prescribed premises to which the works approval or licence relates, by using the fee unit number corresponding to the prescribed premises category and relevant design capacity threshold in Schedule 4 Part 1 of the EP Regulations. • for multiple categories of prescribed premises to which the works approval or licence relates, by using the highest fee unit number corresponding to the prescribed premises categories and design capacity threshold in Schedule 4 Part 1 of the EP Regulations.	
Fee Units	Proposed fee
[redacted]	

13.7 **Prescribed fee for clearing permit**	
In accordance with the *Guideline: Industry Regulation Guide to Licensing* and *Procedure: Native vegetation clearing permits*, where approval to clear native vegetation is sought as part of an application for a works approval or licence, DWER may elect to either jointly or separately determine the clearing component of the application. Where DWER separately determines the clearing component of an application, the application will be deemed to be an application for a clearing permit under s.51E of the EP Act and processed accordingly. Note: If a clearing permit application has been separately submitted and accepted by DWER, a refund for the clearing permit application will not be provided where DWER determines to address clearing requirements as part of a related works approval application.	☒ (Tick to acknowledge)

13.8 **Information and data used to calculate proposed fees**	
The detailed calculations of fee components, including all information and data used for the calculations are to be provided as attachments to this application, labelled as **Attachment 10**, with an appropriate suffix (for example 10A, 10B etc.). Please specify the relevant attachment number in the space/s provided below.	
Proposed fee for works approval	Attachment No.
Details for cost of works	N/A existing facility
Proposed fee for licence	Attachment No.
Part 1: Premises	10A
Part 2: Waste types	N/A
Part 3: Discharges to air, onto land, into waters	N/A

Part 14: Commercially sensitive or confidential information

NOTE:
Information submitted as part of this application will be made publicly available. If you wish to submit commercially sensitive or confidential information, please identify the information in Attachment 11, and include a written statement of reasons why you request each item of information be kept confidential.

Information submitted later in the application process may also be made publicly available at DWER's discretion. For any commercially sensitive or confidential information, please follow the same process as described above.

DWER will take reasonable steps to protect genuinely confidential or commercially sensitive information. However, please note that DWER cannot commit to redacting all personal information from all supporting documents. You are advised to ensure that all personal information, including signatures, are removed from supporting documents prior to submitting them to the department. Please note that all submitted information may be the subject of an application for release under the *Freedom of Information Act 1992*.

	Attached	**N/A**
All information which you would propose to be exempt from public disclosure has been separately placed in a redacted version of the application form and its supporting documentation. Note that this is in addition to the unredacted version(s) provided to DWER for its assessment. Grounds for claiming exemption in accordance with Schedule 1 to the *Freedom of Information Act 1992* must be specified in **Attachment 11** (located at the end of this form).	☐	☒

Part 15: Submission of application	
INSTRUCTIONS: **Check one of the boxes below to nominate how you will submit your application.** **Files larger than 50MB cannot be received via email by DWER. Files larger than 50MB can be sent via File Transfer. Alternatively, email DWER to make other arrangements.**	
A full, signed, electronic copy of the application form including all attachments has been submitted via email to info@dwer.wa.gov.au; **OR**	☒
A signed, electronic copy of the application form has been submitted via email to info@dwer.wa.gov.au and attachments have been submitted via File Transfer, or electronically by other means as arranged with DWER; **OR**	☐
A full, signed hard copy has been sent to: APPLICATION SUBMISSIONS Department of Water and Environmental Regulation Locked Bag 10 Joondalup DC WA 6919	☐

Part 16: Declaration and signature

General

I / We confirm and acknowledge that:

- the information contained in this application is true and correct;
- I / we have legal authority to sign on behalf of the applicant (where authorisation provided);
- I / we have not altered the requirements and instructions set out in this application form;
- I / we have provided a valid email address in Section 2.3 for receipt of correspondence electronically via email from DWER in relation to this application;
- that successful delivery to my / our server constitutes receipt of correspondence sent electronically via email from DWER in relation to this application; and
- I / we have provided a valid postal and/or business address in Section 2.4 for the service of all Part V documents.
- giving or causing to be given information that to my knowledge is false or misleading is an offence under s.112 of the EP Act and may incur a penalty of up to $100,000.

Publication

I / We confirm and acknowledge:

- this application (including all attachments apart from the sections identified in Attachment 11) is a public document and may be published;
- marine surveys provided in accordance with Part 5 will be published and used, for the purposes of the IMSA project, in accordance with your declaration made in the *Metadata and Licensing Statement*;
- all necessary consents for the publication of information have been obtained from third parties;
- information considered exempt from public disclosure has been noted by redaction of a separately provided copy of the completed application form and its supporting documentation (in accordance with Part 14), with reasons as to why the information should be exempt in accordance with the grounds specified in Schedule 1 to the *Freedom of Information Act 1992* (WA) being provided in Attachment 11;
- subsequent information provided in relation to this application will be a public document and may be published unless written notice has been given to DWER by the applicant, at the time the information is provided, claiming that the information is considered exempt from public disclosure; and
- the decision to not publish information will be at the discretion of the CEO of DWER and will be made consistently with the provisions of the *Freedom of Information Act 1992* (WA).

[redacted]

13/10/2025

Date:

Date:

NOTE: This form may be signed:

- **if the applicant is an individual, by the individual;**
- **if the applicant is a corporation, by:**
  - **the common seal being affixed in accordance with the *Corporations Act 2001* (Cth); or**
  - **two directors; or**
  - **a director and a company secretary; or**
  - **if a proprietary company has a sole director who is also the sole company secretary, by that director; and**

- **by a person with legal authority to sign on behalf of the applicant.**

ATTACHMENT 11 – Confidential or commercially sensitive information

Request for exemption from publication			
Information which you consider should not be published, on the grounds of a relevant exemption found in Schedule 1 to the *Freedom of Information Act 1992* (WA), must be specified in this Attachment. Add additional rows as required.			
NOT FOR PUBLICATION IF GROUNDS FOR EXEMPTION ARE DETERMINED TO BE ACCEPTABLE			
Section of this form:	Attachment 1A	Grounds for claiming exemption:	Private and Confidential
Section of this form:		Grounds for claiming exemption:	
Section of this form:		Grounds for claiming exemption:	
_____ Full Name _____ _____ Signature Date			

Attachment 1A: Proof of Occupier Status - M47/226, M47/293 and L47/546 Tenement Summary

Department of **Mines, Petroleum and Exploration**

GOVERNMENT OF WESTERN AUSTRALIA

eMiTS MINERAL TITLES ONLINE

MINING TENEMENT SUMMARY REPORT

MISCELLANEOUS LICENCE 47/546

Status: Live

TENEMENT SUMMARY

Area: 27.10000 HA
Mark Out : 13/08/2011 10:45:00
Received : 22/08/2011 11:20:00
Term Granted : 21 Years
Death Reason :
Death Date :
Commence : 15/07/2015
Expiry : 14/07/2036

CURRENT HOLDER DETAILS

Name and Address
BARDIES WELL PTY LTD
C/- M & M WALTER CONSULTING, PO BOX 8197, SUBIACO EAST, WA, 6008

DESCRIPTION

Locality: Bardies Well, southerly of Karratha
Datum: Datum situated at GDA (Zone 50) co-ordinates 491098.907 mE 7696925.968 mN
Boundary: Then to 491277.574 mE, 7696961.148 mN Then to 490475.466 mE, 7697569.250 mN Then to 490473.259 mE, 7696921.824 mN Then to 491098.907 mE, 7696925.968 mN back to Datum

Area :

Type	Dealing No	Start Date	Area
Granted		15/07/2015	27.10000 HA
Applied For		13/08/2011	27.10000 HA

SHIRE DETAILS

Shire	Shire No	Start	End	Area
KARRATHA CITY	4310	13/08/2011		27.10000 HA

RENT STATUS

Due For Year End 14/07/2026: PAID IN FULL
Due For Year End 14/07/2027: $756.00

EXPENDITURE STATUS

Expended Year End : NO EXPENDITURE REQUIRED
Current Year Commitment :

Department of **Mines, Petroleum and Exploration**

GOVERNMENT OF WESTERN AUSTRALIA

eMiTS MINERAL TITLES ONLINE

MINING TENEMENT SUMMARY REPORT

MINING LEASE 47/226

Status: Live

TENEMENT SUMMARY

Area:	31.19000 HA	**Death Reason :**	
Mark Out :	31/08/1989 16:20:00	**Death Date :**	
Received :	18/09/1989 08:30:00	**Commence :**	26/07/1990
Term Granted :	21 Years (Renewed)	**Expiry :**	25/07/2032

CURRENT HOLDER DETAILS

Name and Address
BARDIES WELL PTY LTD
C/- M & M WALTER CONSULTING, PO BOX 8197, SUBIACO EAST, WA, 6008

DESCRIPTION

Locality: NICKOL RIVER
Datum: DATUM PEG SITUATED 700 METRES BEARING 147 DEGREES FROM BARDIES WELL
Boundary: THENCE: 500 METRES BEARING 180 DEGREES ALONG FENCELINE 600 METRES BEARING 220 DEGREES 500 METRES BEARING 360 DEGREES 600 METRES BEARING 90 DEGREES BACK TO DATUM GROUND IDENTICAL TO P 47/339

Area :

Type	Dealing No	Start Date	Area
Surveyed		25/05/2010	31.19000 HA
Granted		26/07/1990	30.00000 HA
Applied For		31/08/1989	30.00000 HA

SHIRE DETAILS

Shire	Shire No	Start	End	Area
KARRATHA CITY	4310	31/08/1989		31.19000 HA

RENT STATUS

Due For Year End 25/07/2026: PAID IN FULL
Due For Year End 25/07/2027: $937.60

EXPENDITURE STATUS

Expended Year End 25/07/2025: EXPENDED IN FULL
Current Year Commitment : $10,000.00

Department of **Mines, Petroleum and Exploration**

GOVERNMENT OF WESTERN AUSTRALIA

eMiTS MINERAL TITLES ONLINE

MINING TENEMENT SUMMARY REPORT

MINING LEASE 47/293

Status: Live

TENEMENT SUMMARY

Area: 22.98500 HA
Mark Out : 20/12/1991 11:30:00
Received : 31/12/1991 16:15:00
Term Granted : 21 Years (Renewed)
Death Reason :
Death Date :
Commence : 08/07/1992
Expiry : 07/07/2034

CURRENT HOLDER DETAILS

Name and Address
BARDIES WELL PTY LTD
C/- M & M WALTER CONSULTING, PO BOX 8197, SUBIACO EAST, WA, 6008

DESCRIPTION

Locality: Nickol River
Datum: Datum situated 1152 metres bearing 161 degrees from Bardies Well(south eastern corner unsurveyed M47/226)
Boundary: thence 200 metres bearing 180 degrees thence 671 metres bearing 243 degrees 26 minutes thence 500 metres bearing 360 degrees thence 600 metres bearing 90 degrees along south boundary of unsurveyed M47/226

Area :

Type	Dealing No	Start Date	Area
Surveyed		30/06/2015	22.98500 HA
Granted		08/07/1992	21.00000 HA
Applied For		20/12/1991	21.00000 HA

SHIRE DETAILS

Shire	Shire No	Start	End	Area
KARRATHA CITY	4310	20/12/1991		22.98500 HA

RENT STATUS

Due For Year End 07/07/2026: PAID IN FULL
Due For Year End 07/07/2027: $673.90

EXPENDITURE STATUS

Expended Year End 07/07/2025: EXPENDED IN FULL
Current Year Commitment : $10,000.00

Attachment 1B: ASIC Company Extract – Bardies Well Pty Ltd

ASIC
Australian Securities & Investments Commission

Forms Manager
Registered Agents

Company: BARDIES WELL PTY LTD ACN 152 566 633

Company details

Date company registered	09-08-2011
Company next review date	09-08-2026
Company type	Australian Proprietary Company
Company status	Registered
Home unit company	No
Superannuation trustee company	No
Non profit company	No

Registered office

GLOBE BD, UNIT 6 , 78-84 CATALANO CIRCUIT , CANNING VALE WA 6155

Principal place of business

[redacted]

Officeholders

[redacted]

Office(s) held: Director, appointed 10-05-2023
Secretary, appointed 10-05-2023

Company share structure

Share class	Share description	Number issued	Total amount paid	Total amount unpaid
ORD	ORDINARY	96	96.00	0.00

Members

[redacted] [redacted]

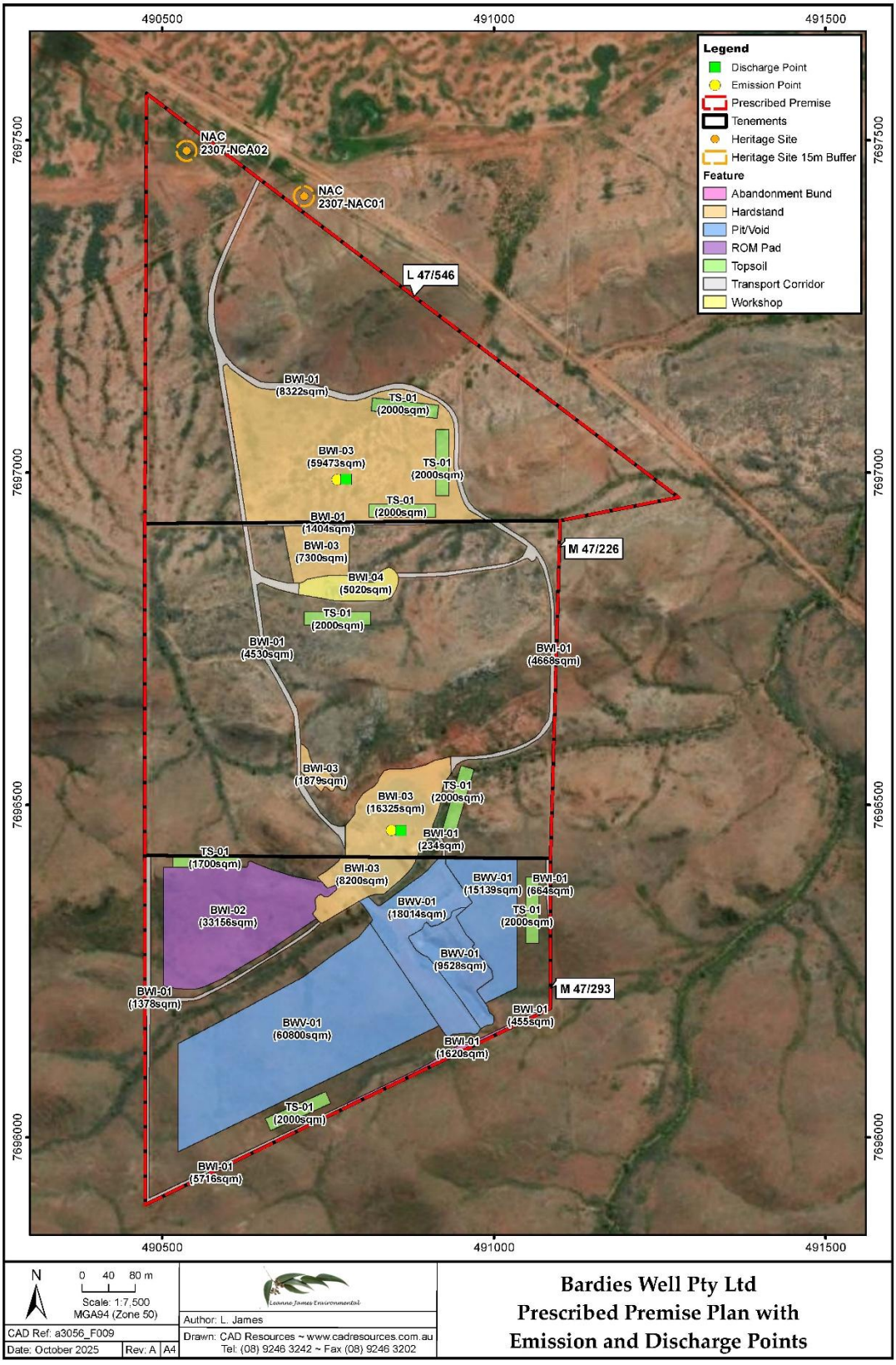
Share class	Total number held	Fully paid	Beneficially held
ORD	96	Yes	No

Document history

These are the documents most recently received by ASIC from this organisation.

Received	Number	Form	Description	Status
07-06-2023	5EHT35729	484	CHANGE TO COMPANY DETAILS	Processed and imaged
10-05-2023	7ECD74762	484	CHANGE TO COMPANY DETAILS	Processed and imaged
10-05-2023	7ECD74701	484	CHANGE TO COMPANY DETAILS	Processed and imaged

Attachment 2: Site Plan and Prescribed Premise Boundary



Attachment 6A: Supporting Documentation

September 2025

PPL 9207/2019/1 Amendment Application Crushing and Screening Category 13

Bardies Well Quarry – M47/226, M47/293 and L47/546

Lot 101

Great Northern Hwy
Port Hedland WA 6721

T: 0427963922

E: office@brookdale.com.au

Table of Contents

FIGURES

TABLES

ABBREVIATIONS

Abbreviation	Definition
ARI	Average Recurrence Interval
BOM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DoW	Department of Water
DWER	Department of Water and Environment Regulation
IBRA	Interim Biogeographic Regionalisation for Australia
MNES	Matters of National Environmental Significance
NOI	Notice of Intent
P1	Priority 1
PDWSA	Public Drinking Water Source Area
PMST	Protected Matters Search Tool
PPM	Parts Per Million
TDS	Total Dissolved Solids

1 Introduction

Bardies Well Pty Ltd, is the tenement holder of M47/226, M47/293 and L47/546. In May 2025 Buckski Holding Pty Ltd, trading as Brookdale Contracting purchased Bardies Well Pty Ltd and the associated tenements and Prescribed Premise Licence L9207/2019/1 which authorizes up to 350,000 tonne of rock to be screened under Category 12.

The Bardies Well Hard Rock Quarry is located within the City of Karratha, approximately 12km south east of Karratha on the Indegenous owned Karratha Pastoral Lease and is accessed via the Water Corporation Harding Dam Access Road and existing station tracks. Bardies Well Quarry has been in operation since 1995, extracting construction materials for various civil infrastructure projects in the region, under Notice of Intent and MP Reg Id 36942.

Previous operators Mobile Concreting Solutions managed and operated the Project with two mobile crushing and screening plants under Prescribed Premise Licence L9207/2019/1 and ceased operations in March 2022 when the Project was placed into Care and Maintenance.

In May 2025 Bardies Well Pty Ltd received approval to recommence mining at the Bardies Well Quarry, Reg Id 129229.

The Bardies Well Quarry currently has approval for the following disturbances and supporting infrastructure

- Bardies Well Quarry Pit
- Laydown area
- Stockpiling areas for aggregates and overburden
- Mobile Workshop including a hydrocarbon storage facility
- Magazine
- Water Storage Tanks
- Refueling facility and generator
- Administration Buildings
- Mobile screening and crushing plant

Since the purchase of the tenure Bardies Well Pty Ltd have recommenced screening of hard rock material under PPL 9207/2019/1. This document provides supporting information for the application of a Prescribed Premise Licence, under Part V, Division 3 of the *Environmental Protection Act* from the Department of Water and Environment and Regulation (DWER) for the crushing and screening of building material including concrete for use in general construction.

1.1 Ownership

Tenement Holder	Contractor - Site
Bardies Well Pty Ltd Lot 101 Great Northern Highway Port Hedland WA 6721	Brookdale Contracting Lot 101 Great Northern Highway Port Hedland WA 6721
[redacted] E: office@brookdale101.com.au	[redacted] E: office@brookdale101.com.au

All correspondence and enquiries pertaining to this Prescribed Premise Licence Application should be addressed to:

[redacted]

1.2 Prescribed Premises Category

This amendment application to PPL 9207/2019/1 seeks to include an additional Prescribed Premise Category relevant to the Crushing and Screening of the construction material, concrete, within the already existing Bardies Well PPL and is provided in Table 1.

Table 1: Prescribed Premises Category from Schedule 1 of the Environmental Protection Regulations 1987.

Category Number	Description of Category	Production or Design Capacity
12	Crushing and Screening	350,000 tonnes per annum
13	Crushing and Screening	50,000 tonnes per annum

The Premises Boundary is provided in Figure 1.

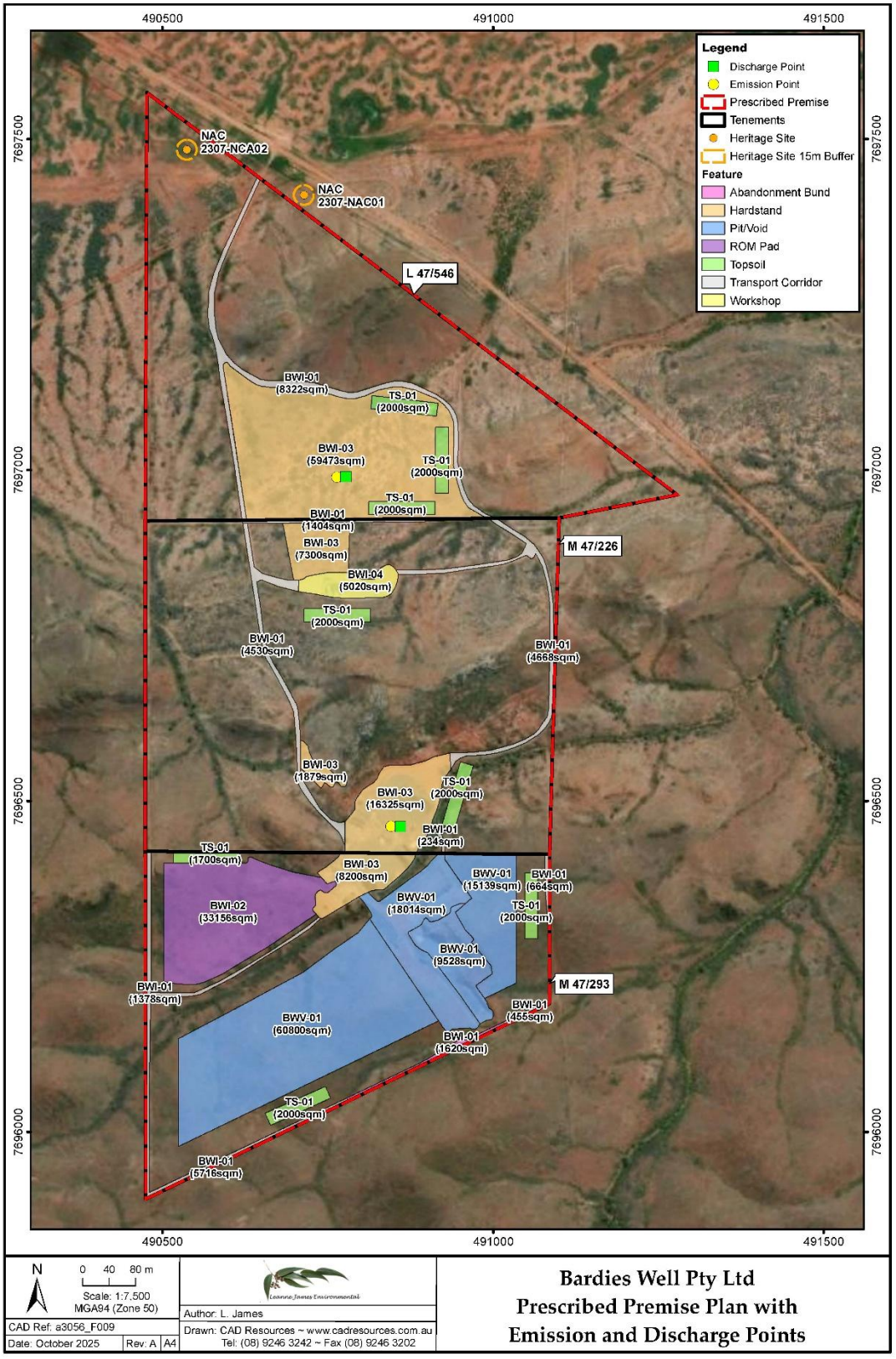


Figure 1: Premise Location Plan and Prescribed Premise Boundary

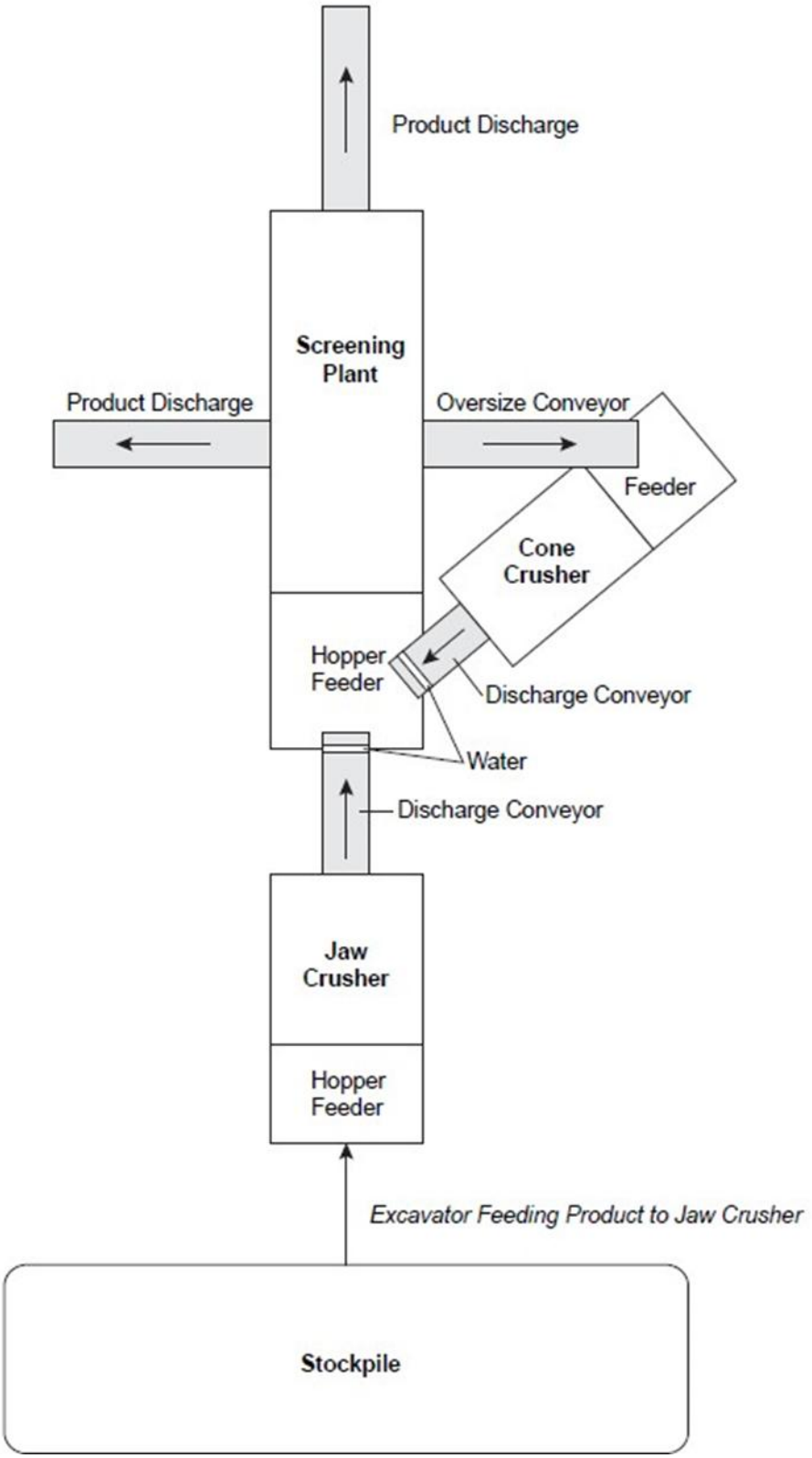


Figure 2: Existing Crushing Circuit PPL 9207/2019/1

2 Existing Environment

2.1 Regional Setting

The Bardies Well Quarry is located in the southern Pilbara in the north-west of Western Australia. The Project Area lies within the Pilbara Biogeographic region in the Interim Biogeographic Regionalisation for Australia (IBRA) and the IBRA subregions, PIL01 – Chichester and PIL04 - Roeburne (Thackway and Cresswell, 1995).

The Chichester sub region is dominated by undulating Archean granite and basalt plains supporting shrub steppe characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grasslands. Snappy Gum tree steppes occur on ranges. Semi-desert-tropical (300mm); drainage to north via numerous rivers (e.g. De Grey, Oakover).

The Roebourne sub region is described as Quaternary alluvial and older colluvial coastal and subcoastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of Acacia stellaticeps or *A. pyrifolia* and *A. inaequilatera.* Uplands of this sub-region are dominated by Triodia hummock grasslands; ephemeral drainage lines inhabited by Eucalyptus victrix or Corymbia hamersleyana woodlands; and marine alluvial flats and river deltas populated by Samphire, Sporobolus and mangal (Kendrick and McKenzie, 2001).

The climate is Semi-desert-tropical and receives 300mm of rainfall annually. Drainage occurs to the north via numerous rivers (e.g. Nickol River).

The Bardies Well Quarry infrastructure is located in the border between the Nickol River and Lulu Creek catchments and is not located within a Public Drinking Water Source Area.

2.2 Climate

Karratha's climate is characterised by a hot semi-arid climate. Temperatures often reach over 40C in summer; however, winters are warm with daytime temperatures around 25C. Rain is most likely to fall between January and July, usually associated with monsoonal showers and storms, from January to April and from the northern edges of cold fronts in May, June and July. The area is occasionally traversed by tropical cyclones during the northern cyclone season from November to April. The period from August to December is usually dry.

Rainfall is unreliable with higher rainfall occurring in the summer months. The average annual rainfall for the Karratha Aerodrome Weather Station (4083) which is located 12km from the project is 294.6 mm (1972 to 2025). Figure 3 shows the mean maximum and minimum temperatures for the Karratha Aerodrome BOM station.

Evaporation exceeds rainfall in all months of the year, with June having the lowest daily evaporation and January having the highest daily evaporation (Figure 4).

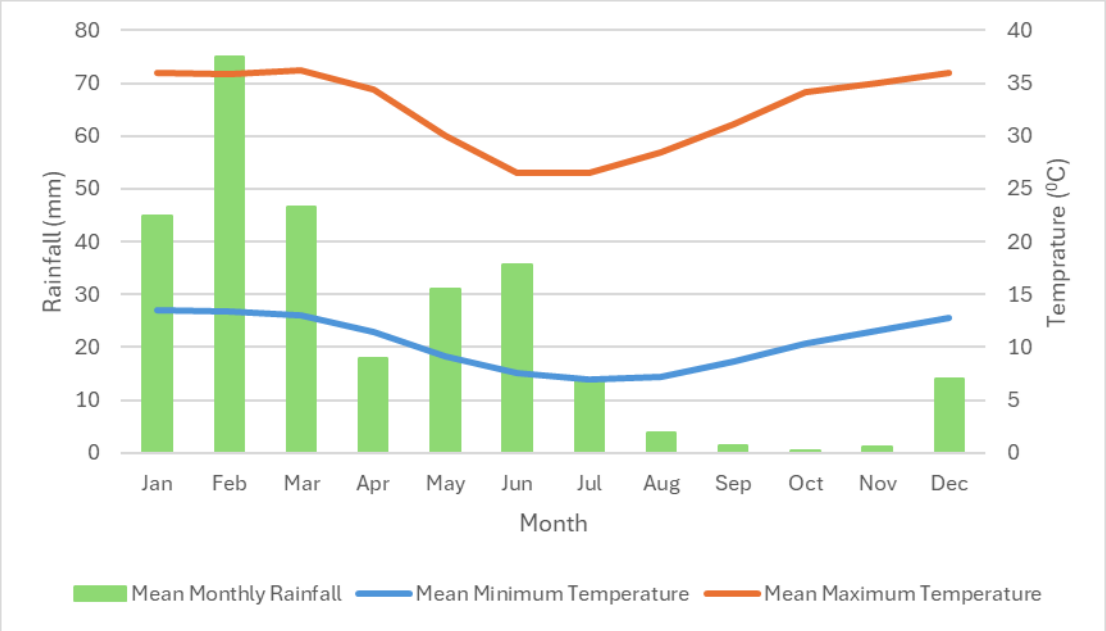


Figure 3: Karratha Aerodrome Climate Data (BOM Station 4083, 2025)

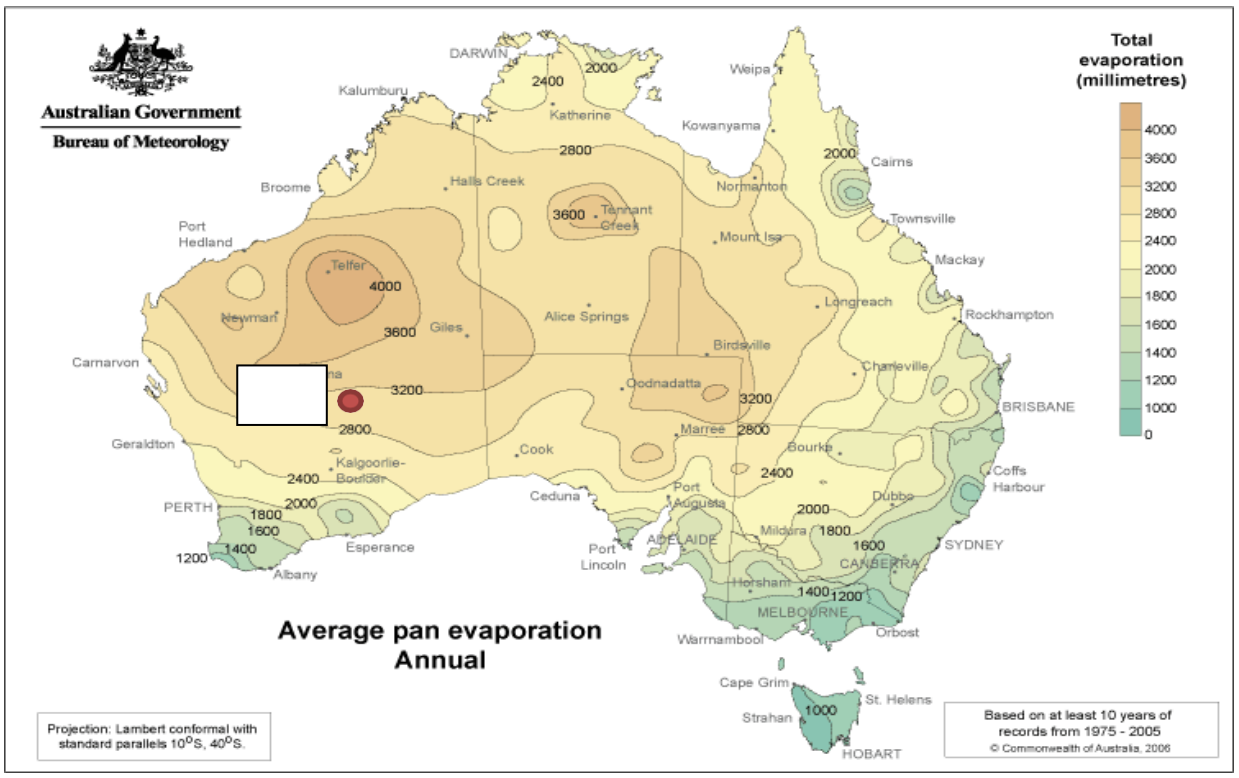


Figure 4: Annual Evaporation

2.3 Geology, Geomorphology

The Project area is situated within the Fortescue Province which occupies approximately 160,000km2 or 6.3% of the Western Australian land mass.

Landforms in the mine areas and corridors are described using the Land Systems approach defined by Pringle et. al. (1994). The Bardies Well Hard Rock Quarry Project is located within 2 Land Systems. The majority of the project is located within the Ruth Land System. There is also small section in the western part of the tenure that is located within the Boolgeeda Land System (Figure 9). The topography of the Project area ranges between 40 and 60 metres above Australian Height Datum (m AHD).

Ruth Land System

This Land System is extensive in the Bardies Well Study Area covering 346km2 and consists of hills and ridges of volcanic and other rocks that support hard spinifex grasslands with isolated and scattered Acacia and Senna spp. The area is not prone to erosion; however, the hills are rounded, and the lower slopes are restricted in size with stony interfluves and moderately to wide spaced drainage patterns. The Bardies Well Hard Rock Quarry is located within the lower slopes and stony plains with a narrow drainage channel dissecting the quarry from the stockpile area. (Pringle et. al. 1994).

Soils in the mine infrastructure areas are typically red shallow loams. In some locations, the shallow loams are intersected by channels of reiver bed soils and are susceptible to erosion when the cover is removed.

Boolgeeda Land System

The Boolgeeda Land System extends for 7,748km2 and is 4.3% of the Pilbara Survey Area. The area is dominated by predominately depositional surfaced, very gently included stony slopes and plains below hill systems with a low 20m relief. The Land System is dominated by hard and soft spinifex grasslands and mulga shrublands. The Project laydown and stockpile stockpiles on L47/546 are located within this Land System.

The soils are dominated by red shallow loams.

2.4 Soils

Payne and Tille (1992) in their Inventory and Condition Survey of Roebourne Plains and Surrounds identified 4 Land Systems occurring within the Bardies Quarry tenure - the Ruth Land System include the main operational areas, and the Horseflat and the Boolgeeda Systems are associated with access corridors. The Bardies Well Quarry occurs primarily in the Ruth Land System. This System is described as rounded basalt hills and ridges with restricted lower slopes, stony interfluves and exhibiting low erosion hazards.

Drainage patterns are dendritic with narrow drainage floors, of moderate relief varying from 20-80m and supporting a hard spinifex cover.

The Ruth Land System merges to the northwest with the Boolgeeda L.S. consisting of stony lower slopes and gently inclined plains of colluvium with subparallel and dendritic drainage pattern with a relief up to 20m. Pasture potential is poor consisting predominately of hard hummock grasslands with occasional tall shrubs. Infrastructure associated with this Land System consists of roads and laydown(stockpile) areas.

Primary soil types in the Ruth and Boolgeeda Land Systems consist of:

- Rounded hills - subcrop basalt materials with pockets of stony skeletal clays with a profile Uf 6.12 and slopes with dense surface mantles over shallow reddish brown sandy clays, and
- Isolated hills and stony plains with reddish brown sandy clays with colluvial stony mantles.

Previous Test Work

The Project site has been associated with campaign operations for several years with no identified deleterious mineralogy and no substantial volumes of residual waste rock materials requiring rehabilitation. Geochemical ASS characterization test work was undertaken in 2012 (ALS EP1206819) on a representative site soil sample.

The Bardies Well quarry surface material was analysed to determine if acid forming potential exists within the chemical structure of the growth medium or alteration products within the quarry environs. Based on the Net Acid Production Potential (NAPP); Net Acid Generation (NAG) and the Acid Neutralising Capacity (ANC) values, the soil will not readily generate acid rock (metalliferous) drainage.

2.5 Water Resources

2.5.1 Surface Water

There are no permanent rivers, creeks or lakes within the region although there are numerous ephemeral drainage systems that flow infrequently and for short periods of time after heavy rains. The more prominent drainage systems are Nickol River located approximately 2.5km east of the Project and Lulu Creek upper tributaries located approximately 3km to the west. Both systems flow north towards entering the Indian Ocean in Karratha. Although the creeks in the region are generally ephemeral, they have the ability to carry extreme flood flows and may potentially cause flooding events within the Bardies Well Quarry low lying areas such as the Quarry itself and several sumps within the project tenure. These surface water catchments are utilized for dust suppression.

No significant ground water has been intercepted in the historic Quarry Pit Operations and no analytical data is available. No impacts to pastoral ground water resources have been identified as they occur in a different geological domain.

2.5.2 Groundwater

The Project area lies within the Pilbara Groundwater Allocation Plan (DOW 2013). Groundwater occurs in limited quantities throughout the Plan area in the Cainozoic deposits north of the quarry and most likely Archean to Lower Proterozoic basement rocks of the Regal Formation. Groundwater is derived from direct rainfall recharge into basement rock outcrops and indirect recharge into the sediments via streamflow infiltration. The basement rocks in which the Bardies Well Quarry is established are documented as massive basalts and competent dolerite sills, metamorphosed to amphibolite facies (Hickman, A. H, and Strong, C.A.

(2003). These finely crystallized mafic rocks are structurally tight and hydraulic storage capacity is confined to joint planes and shear zones. There is insufficient bore data to identify regional flow directions.

The Bardies Well quarry has been in operation intermittently since the early 1990's and no evidence of significant water inflows from fractured rock aquifers (FRA) are recorded. There is no evidence to suggest this situation will change and the risk of unmanageable inflows occurring is considered low. Risk strategies for managing mixed pit groundwaters and rainfall include utilization of floor collection sumps following storm events, coupled with planned reuse strategies for dust suppression and allowance for seasonal high evaporation. Storm water runoff will be diverted around pit infrastructure to avoid contamination.

A search of the DWER Water Register (April 2025) recorded one Stock Well (Bardies Well in alluvials) and no other groundwater bores within the Regal Formation within a 15km radius. The quantity and quality of the groundwater held in the various aquifers vary considerably. Shallow regional groundwaters for pastoral use are typically fresh to brackish when located near drainage lines (DOW 2009) and saline to hypersaline at depth in structural traps (WRC 1999, DOW 2009).

2.6 Flora and Vegetation

SLR Consulting Australia completed a detailed Flora and Vegetation survey of the Bardies Well tenure that is proposed for clearing, staged Project expansion and rehabilitation, as part of the recommencement of Quarry operations at the Bardies Well Hard Rock Quarry. The study area covered 115.66ha and recorded a total of 106 taxa from 63 genera across 28 families. No Threatened or Priority flora taxa were recorded in the Survey Area.

Nine vegetation communities were described and mapped, of one which was considered analogues to a Threatened or Priority Ecological Community. Vegetation type VT3 is analogous to the Roebourne Plains gilgai grassland Priority One ecological community was mapped in several locations of the northern linear haulroad corridor (SLR, 2024). VT3 was considered to be in a degraded condition due to the heavy impact of cattle on the clays. Conservation significant flora could potentially be found in this vegetation type following optimal weather conditions.

Vegetation condition within the Survey Area ranged from Degraded to Very Good with the majority considered to be in Very Good condition. There was evidence of pastoral disturbances such as cattle and previous mining activities, however the terrain unit retains the basic structure/ability to regenerate after cyclonic rainfall events.

2.7 Weeds

Four introduced taxa were recorded during the survey, Kapok Bush (Aerva javanica), Buffel Grass (Cenchrus ciliaris), Spiked Malvastrum (*Malvastrum americanim)* and Mimosa Bush (*Vachellia farnesiana*). None of these species are listed as Declared Plants species pursuant to Section 22 of the Biosecurity and Agriculture Management Act (2007) according to the Western Australian Department of Primary Industries and Regional Development or considered Weeds of National Significance (WoNS).

Recommendations in respect to the management of weed spread, minimisation of disturbance to natural runoff flow patterns, and confirmation of taxa suitable for use in minesite rehabilitation trials, were identified in the recent field work and these will be incorporated, where appropriate, into the proposed Site Environmental Management Plan. Further flora and vegetation information is referenced in Detailed Flora and Vegetation, Basic and Targeted Fauna Survey, Bardies Well (SLR, 2024) referenced in Appendix A.

2.8 Fauna

SLR was commissioned in 2024 to undertake a desktop and field study of the Project Tenure in accordance with the requirements documented in EPA Guidance Statement No 56 and Position Statement No. 3. The terrestrial vertebrate fauna survey was conducted using a variety of detection methods including camera trapping, ARU deployment, active searches, and opportunistic observations. The SLR (2024) report is referenced in Appendix A.

The focus of this study was to investigate the likelihood of Threatened and Priority species that may occur within the disturbance envelope and the value of the vegetation delineated for clearing, to this species. Seven fauna habitats were mapped within the survey area. The Drainage Line, Minor Drainage Depressions and Rocky Outcrops and Breakaways habitats provide the most value to significant fauna within the Survey Area and support the local fauna assemblage with linear dispersal corridors connecting to the wider region.

A total of 33 fauna species were recorded during the April 2024 field survey which included 15 birds, 11 mammals and 2 reptiles. Two significant fauna species were recorded during the field survey, the Northern Quoll (*Dasyurus hallucatus)* listed as Endangered (BC Act and EPBC) and the Western Pebble-mound Mouse (*Pseudomys chapmani*) listed as Priority 4 (BC Act 2016).

The desktop assessment undertaken prior to the field assessment identified a total of 80 Threatened, Priority and Migratory fauna species that have the potential to occur within the Project Tenure. Species listed as Marine only under the EPBC Act, as well as marine dependent species were excluded from the likelihood of occurrence list as there is no marine habitat present within the Survey Area.

Northern Quoll (Dasyurus hallucatus)

The targeted Northern Quoll was recorded within high quality habitat in the Stony Hills, Rocky Outcrops and Breakaway habitat north of the existing (and planned expansion) quarry location and across the centre of the survey area by utlising camera traps. One individual was identified at 3 locations using image spot analysis during the field survey. Due to the limited number of Northern Quoll individuals captured in the camera traps during the survey, relative measures of abundance could not be estimated, however the species appears to be in low abundance through the central part of the Project tenure. The majority of the available preferred habitat for Northern Quolls is not part of the proposed disturbance area, and similar habitat is present to the east and west, outside mining tenure on pastoral lands. Therefore, the recommencement/expansion of quarry activity is unlikely to have a significant impact to the Northern Quoll population of the region who will relocate.

Western Pebble-mound mouse (*Pseudomys chapmani*)

Two historic/inactive Western Pebble-mound Mouse mounds was recorded at locations within the Stony Hills habitat during the recent survey. This habitat is widespread throughout the tenure and within the region, therefore the recommencement of mining within the Hard Rock Quarry is unlikely to have a significant impact on this species.

3 Existing Facilities

The Bardies Well Quarry has an existing mobile crushing and screening plant that is operated under PPL 9207/2019/1 with an existing open pit, haul road, mine support infrastructure including an office, workshop, refueling bay, generator pads and laydown areas including a ROM, stockpile and crushing and screening areas.

3.1 New Facilities

No new facilities are proposed for this amendment as all crushing and screening of concrete material will utilize the existing approved facilities.

4 Potential Environmental Impacts

4.1 Dust Emissions

Dust is a non-point source emission which cannot be accurately quantified. The emissions of dust may occur as a result of light vehicles, plant equipment, and heavy haulage vehicles associated with the removal of the crushed material.

The environmental risks associated with the emission of dust to the atmosphere is low. Dust will be managed by the following:

- Minimising the area requiring vegetation removal (no vegetation removal required);
- When required, water will be applied to roads and trafficked surfaces to minimise dust according to prevailing environmental conditions.
- When required waste stockpiles will be periodically wetted during windy periods.
- Dust control equipment is fitted to all mobile plant.
- Application of speed limits within the quarry area and access roads

Dust associated with mining/construction activities in the Project area is considered a localised emission issue with little or no appreciable impact on surrounding communities, flora or fauna.

4.2 Noise Emissions

Sources of noise may be associated with the operation of the mobile plant, light vehicles and diesel generators. The noise emissions are not considered to be a significant environmental issue due to the remote location of the Bardies Well Quarry. The nearest sensitive receptor is the Karratha Industrial Estate approximately 8km north west of the project.

Noise is not considered an issue due to the lack of sensitive receptors and the licence operator will act in accordance with the *Environmental Protection (Noise) Regulations 1997.*

4.3 Hydrocarbon Storage and Disposal

Hydrocarbons may be used to fuel the plant on site.

Hydrocarbon spills may contaminate the soil, surface water and groundwater and consequently pose a risk to fauna and flora reliant on those resources for survival. Risk associated with large hydrocarbon spills will be minimised by storing diesel fuel and other hydrocarbons in self-bunded fuel storage tanks which will be connected to fuel bowsers for truck and light vehicle refueling. Lubricants and waste oil will also be contained within portable bunding. All refueling and vehicle maintenance will occur within a bunded area sufficiently large enough to prevent uncontrolled releases into drainage lines.

Hydrocarbons will be managed by the following:

- Lubricants and waste oil will be contained within portable bunding.
- All refueling and vehicle maintenance will occur within a bunded area sufficiently large enough to prevent uncontrolled releases into drainage lines
- Spill kits will be placed at the refueling area and in-service vehicles and staff will be trained in the proper use of the kits

4.4 Discharges to Land

4.4.1 Water

There is little to no risk to groundwater as the dolerite basement rock is impermeable, and the average groundwater depth of greater than 20m. All surface runoff will be contained within the premise boundary and diverted to the surface water sediment dam within the quarry footprint, where water will be used for dust suppression.

If required, water carts will apply water to unsealed haul roads and road networks associated with the Bardies Well Quarry in order to reduce the generation of dust from the mobile plant, light vehicles and haulage vehicles (road trains). Each water cart holds approximately 30,000 litres (L) however the number of loads a water cart may apply to an area over a given period of time cannot be accurately quantified as application rates will vary on a seasonal as required basis.

The risk of environmental contamination from dust suppression activities is low as water carts apply water to the road surfaces on an as-needed basis via a dribble bar to prevent contamination of roadside vegetation which would otherwise occur if using a spray bar. Should the health of roadside vegetation deteriorate the application of water for dust suppression will be reviewed. All standpipes will be fitted with flowmeters to allow the volume of water drawn by watercarts to be calculated and recorded on a monthly basis or as required.

4.4.2 Waste Rock By-product/Sludge

No waste by product is expected with the crushing and screening concrete material, as all size aggregates are saleable.

4.4.3 Landfill facilities

All general waste will be removed from site and disposed of at an appropriately licensed landfill.

5 Risk Assessment and Management

5.1 Risk Assessment

Bardies Well Pty Ltd has carried out a three-step risk management process (i.e. identify hazards, assess risks and control risks) for the proposed crushing and screening program at the Bardies Well Quarry Site

Consistent with Australian Standards (AS/NZS 31000:2009), risk categories have been determined using a five by five risk matrix grid, with consequences defined for environmental, health and safety and community aspects (Table 2). Risks have been assessed according to these categories. The potential risks identified, and proposed management and mitigation measures are summarised in Table 4.

Table 2: Emissions Risk Matrix

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High

Table 3: Risk Definitions

Likelihood	Consequences				
	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	**5 - Catastrophic**
Environment	No detectable impact to fauna / flora, habitat, soil, and land ecosystems and / or beneficial water uses. Requires very minor or no management.	Detectable but minor impact to fauna / flora, habitat, and soil and land ecosystems and / or water uses. Requires some management.	Change exceeds natural variation with moderate impact on fauna / flora, habitat, and soil and land ecosystems and / or water uses. Requires a moderate level of management	Change exceeds natural variation with major impact on fauna / flora, habitat, and soil and land ecosystems and / or water uses. Requires a significant level of management.	Severe impact on fauna / flora, habitat, and soil and land ecosystems and / or water uses. Serious, irreversible long-term impact on valued ecosystem and its function. Requires major levels of ongoing management.
Health and Safety	Minor injury – typically first aid and no medical treatment.	Typically, a medical treatment.	Reversible injury or moderate irreversible damage or impairment to one or more persons.	Fatality and / or severe irreversible disability or impairment to one or more persons.	Multiple fatalities or permanent health impacts to multiple persons.

Likelihood	Consequences				
	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	**5 - Catastrophic**
Community	Isolated community complaint resolved via existing site procedures. No damage to reputation or relationships with stakeholders.	Unresolved low-level community dissatisfaction. Short- term damage to relationship with one or more stakeholders.	Community dissatisfaction and / or social harm with business implications. Reversible damage to relationship with stakeholders and reputation.	Significant social harm. Regional / state media interest. Significant damage to stakeholder relationships and reputation.	Permanent or irreversible social harm. National media interest. Irreversible damage to stakeholder relationships and reputation.

Likelihood		Consequences				
		1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Catastrophic
1	Rare The event is extremely unlikely, only a slight chance of occurring.	Low	Low	Medium	High	High
2	Unlikely The event could occur, but it is very improbable.	Low	Low	Medium	High	Extreme
3	Possible The event could occur but there is a higher percentage chance that it will not occur.	Low	Medium	High	High	Extreme
4	Likely The event should occur and there is a higher percentage chance that it will occur.	Medium	Medium	High	Extreme	Extreme
5	Almost Certain The event is expected to occur in most circumstances.	Medium	High	High	Extreme	Extreme

Table 4: Summary of the Risk Assessment

Prior to Management / Mitigation Measures					After Management / Mitigation Measures Implemented				
Risk	Consequence Description	Consequence	Likelihood Rating	Risk Ranking	Management practices implemented to reduce risk	Consequence	Likelihood Rating	Residual Risk	Responsibility
Surface Water Pollution	Pollution of localised runoff	Moderate (3)	Likely (4)	High	Control plant runoff by diverting into catch sumps within the quarry environs Areas containing chemicals / hydrocarbons to be bunded.	Minor (2)	Unlikely (2)	Low	Site Manager Environment Team
Groundwater Pollution	Pollution of local aquifer	Moderate (3)	Likely (4)	High	Control plant runoff by diverting into catch sumps within quarry environs Areas containing chemicals / hydrocarbons to be bunded.	Minor (2)	Unlikely (2)	Low	Site Manager Environment Team
Visible Dust	Vegetation deaths Community Complaints	Moderate (3)	Unlikely (2)	Medium	Plant equipment is fitted with dust suppression Local community is 12km away and no closer sensitive receptors Water cart will be used as required on roads and stockpiles.	Minor (2)	Unlikely (2)	Low	Site Manager Environment Team

Prior to Management / Mitigation Measures					After Management / Mitigation Measures Implemented				
Risk	Consequence Description	Consequence	Likelihood Rating	Risk Ranking	Management practices implemented to reduce risk	Consequence	Likelihood Rating	Residual Risk	Responsibility
					Monthly visual inspections of haul roads and access tracks assessing vegetation conditions Quarry, crushing or screening activities should not occur during high wind conditions Regular visual monitoring of dust generation. Activities halted or control methods implemented if dust exceeds acceptable level				
Noise	Community Complaints	Moderate (3)	Unlikely (2)	Medium	Local community is 12km away and no closer sensitive receptors	Minor (2)	Unlikely (2)	Low	Site Manager Environment Team
Heritage Management	Impacts to registered cultural heritage and physical	Moderate (3)	Possible	High	Site heritage surveys conducted by Heritage Consultants and NTA – two sites identified in Bardies Well Tenure,	Moderate	Unlikely	Low	Site Manager

Prior to Management / Mitigation Measures					After Management / Mitigation Measures Implemented				
Risk	Consequence Description	Consequence	Likelihood Rating	Risk Ranking	Management practices implemented to reduce risk	Consequence	Likelihood Rating	Residual Risk	Responsibility
	heritage items				buffer zones maintained. Site Heritage Register maintained All personnel to complete environmental inductions, education and training No impacts to identified Heritage Sites/Items by maintaining the designated buffer zone				
Weed Management	Introduction/spread of weed species may result in the reduction of native vegetation quality, vigour and composition	Minor	Possible	Medium	All vehicles entering site will follow the Brookdale Contracting Equipment Hygiene Procedure Quarry staff trained in the identification of known local weed species Weed identification and management details included in Environmental Inductions Annual Weed Inspections of growth medium	Minor (2)	Unlikely (2)	Low	Site Manager Environment Team

Prior to Management / Mitigation Measures					After Management / Mitigation Measures Implemented				
Risk	Consequence Description	Consequence	Likelihood Rating	Risk Ranking	Management practices implemented to reduce risk	Consequence	Likelihood Rating	Residual Risk	Responsibility
					stockpiles Weed eradication programs carried out if weed popultations become unmangageable.				

6 Social Environment

The Bardies Well Quarry is located within the City of Karratha. Karratha is sparsely populated, with a large community of fly-in-fly-out workers along with the longer-term residents. Gold and nickel mining, pastoralism and tourism are the principal economic activities in the area.

6.1 Land use and Community

Quarry activities is an established economic industry in the Karratha region and has occurred historically in the general area since the early 1900's the demand for construction materials increased with the development of the Town of Karratha, and the Port infrastructure. Numerous historic quarry sites are located across the Pilbara region that are driven by economic demand for construction materials.

The Bardies Well Quarry is located within the Karratha Pastoral Lease and the post mining landuse is considered to be pastoral. Therefore rehabilitation and closure will target the establishment of self-sustaining vegetation communities with similar species composition to the surrounding pastoral lease. The site will be left in a stable condition that minimizes long term environmental impacts such as erosion. The target end land use will be regularly reviewed throughout the life of the tenement, in consultation with key stakeholders.

The tenement holder and contractor continue to consult identified stakeholders on the operational and closure aspects of the Bardies Well Quarry.

6.2 Cultural Heritage and Native Title

A desktop review of the ACHIS confirmed that previous heritage surveys were recorded for parts of the Bardies Well tenure (ACHIS Surveys Identifer 901703), however there are no sites registered within L47/546, M47/226 and M47/293. Additionally, the desktop review identified 9 Heritage sites that occur at varying distances off tenure, and external to Bardies Well Operations area (ACHIS 2024). No impacts to any of these external sites from the Project is anticipated.

As the Proponent intends to expand mining operations on an existing quarry site within the Ngarluma Native Title determination area (WCD2005/001), the Proponent engaged the Ngarluma Aboriginal Corporation (NAC) and Heritage Consultant Terra Rosa Consulting, to conduct a heritage survey over leases L47/546, M47/226 and M 47/0293 in October 2023.

Two newly discovered ACH artifacts (grinding stone fragments) were documented, NAC2307-NCA01 and NAC2307-NCA02. These stone artifacts are not within planned development areas and the NAC Representatives have requested a that these two areas including the buffer zone are to be avoided. The location of the 2 artifact sites with a 15m buffer are shown on Figure 1.

7 REFERENCES

Beard J 1975, Vegetation Survey of Western Australia, 1:100,000 Vegetation Series, Map Sheet 5 –Pilbara.

Bureau of Meteorology 2023, Climate Statistics for Australian Locations, Port Hedland, Indee. Viewed September 2025 http://www.bom.gov.au/climate/data/

CSIRO 2012, Australian Soil Resource Information System National Acid Sulphate Soil Occurrence dataset, viewed March 2013, http://www.asris.csiro.au/index_other.html

Department of Parks and Wildlife. 2020. Flora Base. http://florabase.dpaw.wa.gov.au/ .

Kendrick, P and Stanley F, 2001, Pilbara 4 (PIL4 – Roebourne subregion), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. Department of Conservation and Land Management, Perth.

SLR (2024) Detailed Flora and Vegetation Basic and Targeted Fauna Survey. Bardies Well. A report prepared for Brookdale Contractors.

Terra Rosa (2023) Detailed archaeological and ethnographic heritage survey of the Bardies Well Project Area, with Ngarluma Traditional Owners. A report prepared for Brookdale Contractors.

Thackway, R, Cresswell, ID, 1995, 'An Interim Biogeographic Regionalisation for Australia: A framework for establishing the national system of reserves, Version 4.0', Australian Nature

Van Vreeswyk, AME, Payne, AL, Leighton, KA and Hennig, P 2004, An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture Technical Bulletin no. 92.

Appendix A: SLR (2024) Detailed Flora and Vegetation Basic and Targeted Fauna Survey. Bardies Well. A report prepared for Brookdale Contractors.

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

Lot 101 Great Northern Highway, Port Hedland
WA 6721

Prepared by:

SLR Consulting Australia

Level 1, 500 Hay Street, Subiaco WA 6008,
Australia

SLR Project No.: 675.072378.00001

28 June 2024

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	28 June 2024	[redacted]		

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Brookdale Contractors (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Executive Summary

Brookdale Contractors commissioned SLR Consulting Australia to undertake a detailed flora and vegetation, basic and targeted fauna Survey for the proposed Bardies Well Quarry. The Survey Area covers approximately 115.66 hectares and is located approximately 12 km southeast of the Karratha townsite, in the Pilbara bioregion of Western Australia.

The objective of the survey was to identify key flora, vegetation and fauna values within the Survey Area as part of the environmental impact assessment process. This report presents the findings of the survey.

Flora and Vegetation

The detailed flora and vegetation survey recorded the floristic composition and vegetation types from 19 quadrats, 9 relevés, 49 mapping notes, and opportunistic observations. A total of 106 taxa were recorded from 63 genera across 28 families.

No Threatened or Priority flora taxa were recorded within the Survey Area.

No significant flora taxa had been recorded within the Survey Area during previous surveys. A post survey likelihood of occurrence identified that five significant flora taxa retained a high likelihood. No significant flora taxa were assessed as having a medium likelihood, and 26 significant flora taxa were assessed as having a low likelihood of occurring within the Survey Area.

A total of 17 specimens could not be identified to species level as they were sterile at the time of survey. Four introduced (weed) taxa were recorded during the survey. Weed abundance was considered low for the region. None of the introduced taxa represent Declared Pests under the BAM Act or listed as a WoNS.

Nine vegetation types were described and mapped across five broad landforms (Cracking Clays, Dolerite outcrops, Drainages, Plains and Hills) of which one was considered analogous to Threatened or Priority Ecological Communities.

Vegetation condition within the Survey Area ranged from Degraded to Very Good, with the majority considered to be in Very Good condition. Evidence of disturbance included cattle, previous mining activity, and weeds.

Vertebrate Fauna

The basic and targeted terrestrial vertebrate fauna survey recorded fauna using a variety of detection methods including camera trapping, ARU deployment, active searches, and opportunistic observations. Fauna habitat mapping was based on a combination of field observations, vegetation mapping, fauna habitat assessment data, and aerial imagery. Seven fauna habitats were mapped within the Survey Area. The Drainage Line, Minor Drainage Depressions and Rocky Outcrops and Breakaways habitats provide the most value to significant fauna and the overall fauna assemblage within the Survey Area. These are core habitats for the targeted fauna, the Northern Quoll, and for providing the local fauna assemblage with linear dispersal corridors connecting to the wider region, with dense vegetation for shelter and foraging. Rocky Outcrops and Breakaways provide important rock crevice refuge and feeding opportunities, vital for a wide array of fauna species, particularly herpetofauna and small mammals.

A total of 33 fauna taxa from 22 families were recorded, comprising 15 birds, 11 mammals and two reptiles. Two significant taxa were recorded during the fauna survey, the Northern

Quoll (*Dasyurus hallucatus*) listed as Endangered (BC Act and EPBC), and the Western Pebble-mound Mouse (*Pseudomys chapmani*) listed as Priority 4 (BC Act).

One significant fauna taxon was assessed as having a high likelihood, six significant fauna taxon was assessed as having a medium likelihood, and 69 significant fauna taxa were assessed as having have a low likelihood of occurring within the Survey Area.

Two introduced taxa were recorded during the survey, European Cattle (**Bos primigenius taurus*) and Black Rat (**Rattus rattus*).

The basic and targeted significant fauna survey was undertaken in April which falls within the primary survey periods for reptiles and mammals. The primary survey period for amphibians and birds during this time is dependent on rain events.

Table of Contents

Tables in Text

Figures in Text

Maps

Appendices

Acronyms and Abbreviations

°C	Degree Celsius
ARU	Autonomous Recording Unit
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
CISS	Centre for Invasive Species Solutions
CR	Critically Endangered
DAWE	Department of Agriculture Water and Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of the Environment and Energy
Desktop Study Area	The area that was studied during the desktop assessment encompassing the Survey Area and surrounds
DoE	Department of the Environment
DPIRD	Department of Primary Industries and Regional Development
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection Biodiversity and Conservation Act 1999*
ESA	Environmentally Sensitive Area
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
km	Kilometres
Lat	Latitude
Long	Longitude
m	Metres
MA	Marine
MI	Migratory
mm	Millimetres

MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected Fauna
P	Priority
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
SLR	SLR Consulting Australia
Survey Area	The area that was surveyed
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
TPFRF	Threatened and Priority Flora Report Form
VU	Vulnerable
WA	Western Australia
WAH	Western Australian Herbarium
WAM	Western Australian Museum
WoNS	Weeds of National Significance

1.0 Introduction

1.1 The Project

Brookdale Contractors commissioned SLR Consulting Australia to undertake a detailed flora and vegetation, basic and targeted fauna survey for the proposed Bardies Well Quarry (the Project). The survey was undertaken within a defined area (the Survey Area) that covers 115.66 hectares and is located 12 km southeast of the Karratha townsite, in the Pilbara bioregion of Western Australia (**Map 1**). The Survey Area consists of a linear road corridor that extends southeast into a larger active quarry area. All maps are provided in **Appendix A**.

1.2 Objective and Scope

The objective of the survey was to identify key flora, vegetation, and fauna values within the Survey Area as part of the environmental approvals process for the Project.

The following scope of work was completed:

- A desktop assessment including relevant database searches and a literature review to compile and summarise existing records of flora, vegetation, and fauna in the vicinity of the Survey Area.
- A targeted flora survey searching for significant flora within the Survey Area.
- A basic and targeted terrestrial vertebrate fauna survey using a variety of detection methods including camera trapping, ARUs, active searches, and opportunistic observations.
- A technical biological report.
- A geospatial data package prepared in accordance with IBSA data standard requirements.

2.0 Background

2.1 Statutory and Regulatory Framework

Western Australian flora, vegetation and fauna is protected by the following legislative measures:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). (Commonwealth of Australia, 1999).
- *Biodiversity Conservation Act 2016* (WA) (BC Act) (Government of Western Australia, 2016).
- *Environmental Protection Act 1986* (WA) (EP Act) (Government of Western Australia, 1986).
- *Biosecurity and Agriculture Management Act 2007* (WA) (BAM Act) (Government of Western Australia, 2007).

In addition to these legislative measures, the following non-legislative lists are considered on a case-by-case basis:

- WA Department of Biodiversity Conservation and Attractions (DBCA) Priority lists for fauna, flora, and ecological communities.
- Weeds of National Significance (WoNS).
- Recognition of locally significant populations by DBCA.

The EIA process is supported by guidance documents published by the Environmental Protection Authority (EPA), DBCA and the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

Western Australia

- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA, 2016c).
- *Environmental Factor Guideline - Flora and Vegetation* (EPA, 2016a)
- *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).
- *Environmental Factor Guideline – Terrestrial Fauna* (EPA, 2016b)
- *Guidelines for surveys to detect the presence of bilbies and assess the importance of habitat in Western Australia* (DBCA, 2017).
- *Interim Guideline for Preliminary Surveys of Night Parrot (Pezoporus occidentalis) in Western Australia* (DPAW, 2017).

Commonwealth

- *Matters of National Environmental Significance – Significant Impact Guidelines 1.1* (DoE, 2013).
- *EPBC Act Referral guideline for the endangered northern quoll Dasyurus hallucatus* (DoE, 2016).
- *Survey guidelines for Australia's threatened bats* (DEWHA, 2010a).

- *Survey guidelines for Australia's threatened birds* (DEWHA, 2010b).
- *Survey guidelines for Australia's threatened mammals* (DSEWPaC, 2011a).
- *Survey guidelines for Australia's threatened reptiles* (DSEWPaC, 2011b).

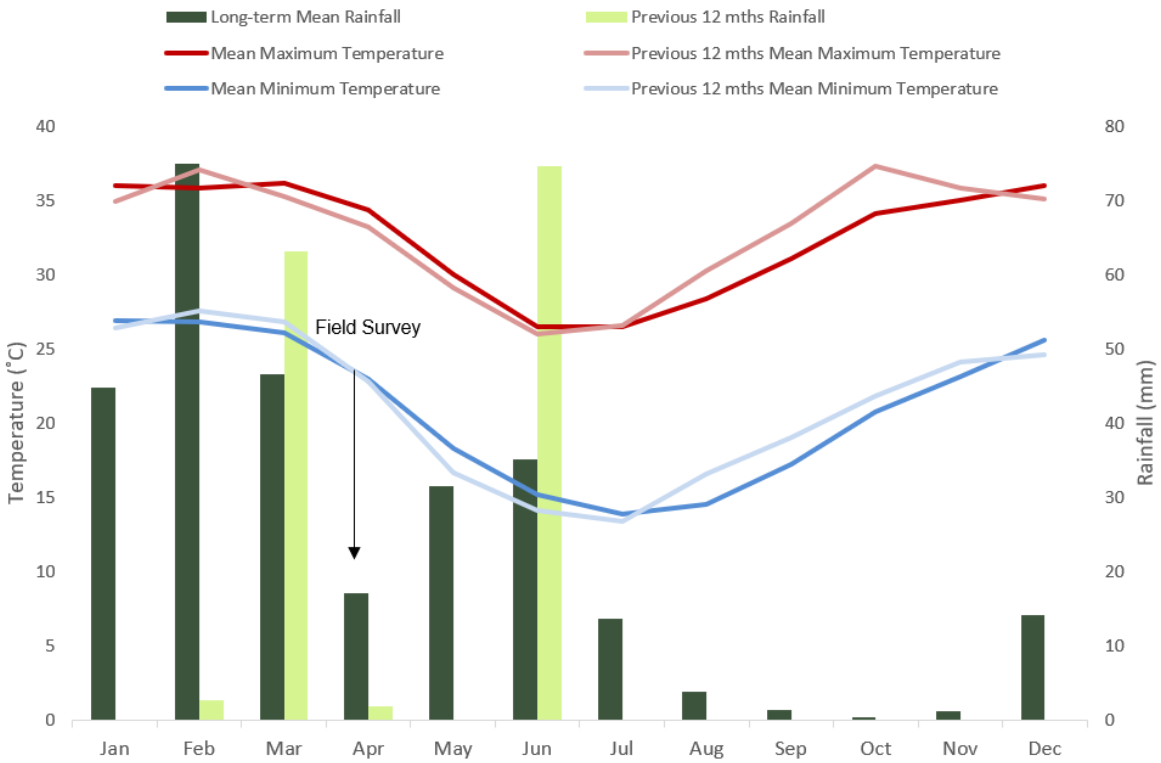
2.2 Existing Environment

2.2.1 Climate

The closest long-term Bureau of Meteorology weather station with a complete dataset is Karratha Aero Weather Station (Station 4083), located approximately 19.5 km northwest of the Survey Area.

The long-term (1993 to 2024) mean minimum temperature for Karratha Aero Weather Station ranges from 13.9˚C (July) to 26.9˚C (January) and the long-term mean maximum temperature ranges from 26.5˚C (July) to 36.2˚C (March) (**Graph 1**) (BoM, 2024).

The Karratha Aero Weather Station recorded 142.2 mm of rainfall in the 12 months prior to the survey (April 2023 to March 2024), which is 142.7 mm below the long-term (1972 to 2024) average of 284.9 mm (BoM, 2024). In the three months prior to the survey (January 2024 to March 2024), 65.8 mm of rainfall was recorded, which is 100.5 mm below the long-term average of 166.3 mm for the same period (BoM, 2024).



Graph 1: Climate Summary of Karratha Aero Weather Station

2.2.2 Interim Biogeographic Regionalisation of Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical, and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (DEE, 2016). The Survey Area occurs within the Pilbara bioregion and the Chichester (PIL01) and Roebourne (PIL04) subregion (**Map 2**).

The Chichester (PIL01) subregion is characterised by undulating Archaean granite and basalt plains. The vegetation of the subregion is broadly represented by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick and McKenzie, 2001).

The Roebourne (PIL04) subregion is described as Quaternary alluvial and older colluvial coastal and subcoastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf shrub steppe of *Acacia stellaticeps* or A. *pyrifolia* and A. *inaequilatera*. Uplands of this sub-region are dominated by *Triodia* hummock grasslands; ephemeral drainage lines inhabited by *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands; and marine alluvial flats and river deltas populated by Samphire, Sporobolus and mangal (Kendrick and McKenzie, 2001).

2.2.3 Soil Landscape Mapping

Soil landscape mapping of Western Australia consists of a compilation of various surveys at different scales varying between 1:20,000 and 1:3,000,000 (DPIRD, 2022). The mapping comprises a nested hierarchy of levels, with each level a subdivision of the preceding level. Soil landscape mapping has been described below to the highest level of detail available for the Survey Area.

The Survey Area occurs across two soil landscape systems (**Table 1**; **Map 3**).

Table 1: Soil landscape systems within the Survey Area

Systems		Description
Name	Code	
Boolgeeda System	289Bg	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.
Ruth System	289Rt	Hills and ridges of volcanic and other rocks supporting shrubby hard spinifex and occasionally soft spinifex grasslands.

2.2.4 Hydrography

Hydrographic features that either intersect or occur in the vicinity of the Survey Area are described in **Table 2** and shown in **Map 4** (DWER, 2018). No hydrological features intersect the Survey Area.

Table 2: Hydrographical features in the vicinity of the Survey Area

Hydrographical feature	Description
Nickol River	Significant stream located 2.4 km east of the Survey Area.
Major tributary	Major tributary of the Maitland River located 9.2 km Southwest of the Survey Area.

2.2.5 Vegetation

2.2.5.1 Pre-European Vegetation

The major source of data for pre-European vegetation mapping in Western Australia is the published and unpublished mapping of J. S. Beard at 1:250,000 scale. These vegetation types were later refined by Shepherd, Beeston, and Hopkins (2002), resulting in 819 Vegetation Association-level units, and a subsequent reclassification resulted in the creation of over 2,175 finer-scale System Associations (Beard *et al.*, 2013). Representation of vegetation associations at a state, regional, and local level is shown in (**Map 5**). (Government of Western Australia, 2019).

Two broad vegetation system association occurs over the Survey Area:

- **Abydos Plain - Chichester 157**: Grass-steppe: Hummock grassland Triodia spp.
- **Abydos Plain - Roebourne 589**: Short bunch-grass savanna / Grass-steppe.

Representation of the system association at a local, regional, and state level is shown in Table 3.

Table 3: Representation of Vegetation Associations within the Survey Area at a state, regional, and local level

Vegetation Association	Extent			
	Pre-European (ha)	Current (ha)	Remaining (%)	Managed in DBCA lands (%)*
Representation across Western Australia				
157	502,728.56	499,311.84	99.32	18.24
589	807,698.58	802,713.40	99.38	1.91
Representation across the Pilbara Bioregion				
157	199,832.17	198,409.23	99.29	5.84
589	728,768.20	724,695.82	99.44	2.11
Representation across the Chichester (PIL01) Subregion				
157	73,276.35	72,429.76	98.84	0.00
589	53,376.40	53,368.34	99.98	1.78
Representation across the Roebourne (PIL04) Subregion				
157	14,972.09	14,451.45	96.52	1.56
589	675,391.80	671,327.48	99.40	2.14
Representation across the City of Karratha				
157	73,039.72	71,600.83	98.03	0.31
589	312,813.64	310,512.32	99.26	0.78

*as a portion of the current extent

2.2.6 Conservation Areas

Conservation areas consist of areas protected for the purpose of conservation, including but not limited to National Parks, Nature Reserves, Conservation Parks, and Regional Parks. The Survey Area does not occur within a conservation area (DBCA, 2023a, 2023b). Nearby conservation areas are listed below.

- Un-named Arboretum, vested under Section 5(1)(h) Reserve, is located 8.4 km to the Northwest of the Survey Area.
- Murujuga National Park, located 22.8 km to the northwest of the Survey Area and is vested under DBCA.

2.2.7 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, Threatened Ecological Communities (TECs), or significant wetlands. The Survey Area does not occur within a mapped ESA (DWER, 2021). The nearest ESAs are listed below and shown in **Map 6**.

- Un-named Environmentally Sensitive Area, located approximately 24.7 km Northeast of the Survey Area.

3.0 Methods

The surveys documented in this report were undertaken in accordance with relevant EPA and DAWE guidelines (see **Section 2.1**).

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the Survey Area and surrounds (the Desktop Study Area) was compiled prior to the field survey (see **Section 2.2**). The literature review also considered a selection of relevant reports detailing assessments undertaken in the region that were either publicly available or provided by the client. These reports are listed below and summarised in **Appendix B**.

- Flora and Vegetation Assessment, Bardies Well (ENV, 2012) previous flora and vegetation assessment of the Survey Area.
- Karratha and Boodarie Biological Surveys (360 Environmental, 2021), 10 km Northwest of the Survey Area.
- Report for Karratha Land Release - Amendment 21 Flora and Fauna Assessment (GHD, 2011), 11 km Northwest of the Survey Area.
- Horizon Power 124-KRT-DMP 132kV Line Upgrade Project Flora and Fauna Survey (GHD, 2019), 15 km Northwest of the Survey Area.
- Terrestrial Vertebrate Fauna Survey for Anketell Point Rail Alignment and Port Projects (Phoenix Environmental Sciences, 2010), 25 km Northeast of the Survey Area.
- Maitland to Karratha Terminal Flora and Fauna Survey (GHD, 2022), 26 km North-northwest of the Survey Area.
- Anketell Port Proposal, Level 2 Flora and Vegetation Assessment (Aecom, 2011), 26 km Northeast of the Survey Area.
- Targeted Flora Survey of the Naturebank Envelope in Millstream Chichester National Park (DBCA, 2013), 65 km Southeast of the Survey Area.
- Terrestrial fauna survey for the Balla Balla Magnetite Project barge loading facility (Phoenix Environmental Sciences, 2013), 72 km East of the Survey Area.
- Terrestrial fauna surveys for the Balla Balla Railway Project (Phoenix Environmental Sciences, 2014), 82 km East of the Survey Area.

3.1.2 Database Searches

Database searches were undertaken to compile a list of potential flora and fauna and identify previously recorded significant flora, fauna, and ecological communities within the Desktop Study Area (**Table 4**).

Table 4: Database search details

Database name	Date received	Search target	Buffer around the Survey Area
Threatened and Priority Ecological Communities database search (DBCA, 2024c)	January 2024	TECs and PECs	50 km
Threatened and Priority Flora (TPFL) database search (DBCA, 2024e)	January 2024	Threatened and Priority flora	50 km
Western Australian Herbarium Flora database search (DBCA, 2024f)	January 2024	Threatened and Priority flora	50 km
Threatened and Priority Fauna database search (DBCA, 2024d)	January 2024	Threatened and Priority fauna	50 km
Protected Matters Search Tool (PMST) (DCCEEW, 2024)	January 2024	Threatened flora, fauna, and ecological communities	50 km
NatureMap (DBCA, 2024b)	January 2024	Flora and fauna	50 km

3.1.3 Likelihood of Occurrence

Significant flora and fauna taxa identified during the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area before and after the field survey. The assessment used the likelihood of occurrence criteria presented in **Table 5**.

Taxa listed as Marine only under the EPBC Act were not considered to be significant taxa because the Marine listing does not constitute MNES under the EPBC Act. Additionally, erroneous records (i.e. records that occur well outside a taxon's known distribution) were excluded from consideration. Only taxa that have been recorded within the Survey Area or were assessed as having a high or medium likelihood of occurrence are discussed in detail.

Table 5: Likelihood of occurrence criteria

Rank	Criteria
Recorded	The taxon was recorded within the Survey Area during the current survey.
Previously Recorded	The taxon has been previously recorded within the Survey Area according to database search or literature review results.
High (Likely to occur)	There are existing records of the taxon near the Survey Area (within 20 km), suitable habitat is present within the Survey Area, and, for fauna, the taxon has been recorded within the Desktop Study Area in the last 15 years.
Medium (May occur)	There are existing records of the taxon within the Desktop Study Area, however, the taxon does not meet the criterion for high likelihood, or suitable habitat within the Survey Area is marginal or limited in extent, or, for fauna, the taxon has not been recorded within the Desktop Study Area in the last 15 years.
Low (Unlikely to occur)	Suitable habitat is not present within the Survey Area, or the taxon is very infrequently recorded in the locality despite reasonable previous search effort, or the taxon is believed to be extinct or locally extinct.

3.2 Field Surveys

3.2.1 Survey Timing

The field surveys were undertaken across one field trips as shown in **Table 6**.

Table 6: Survey timing

Survey trip	Tasks completed	Dates	Person field days
1	Detailed flora and vegetation, targeted flora and basic and targeted terrestrial vertebrate fauna survey	3rd – 9th April 2024	12

3.2.2 Field Personnel and Licences

Details of field personnel, including their level of experience, role for each field trip, and flora collection licence numbers are detailed in **Table 7**.

Fauna fieldwork was completed under Fauna Taking (Biological Assessment) License – Regulation 27 (BA27000998) and an authorisation to take or disturb threatened species under Section 40 of the BC Act (TFA 2324-0202) (**Appendix C**). Animal ethics approval was obtained under scientific use licence number U336 / 2023 - 2025 and permit number WAEC 24-02-11.

Table 7: Field personnel

Personnel	Experience	Licence	Role
[redacted]	2.5 years	FB62000389-2	Botanist
[redacted]	4.5 years	FB62000691	Associate Ecologist

3.2.3 Weather Conditions

Weather conditions during the fauna survey are presented in **Table 8**. Daily temperature and rainfall data is from the Karratha Aero Weather Station (Station 4083) (BoM, 2024). Weather conditions can impact potential detection of fauna taxa during a survey.

Table 8: Field survey weather conditions

Date	Temperature (°C)		Rainfall (mm)
	Min	Max	
03/04/2024	28.0	-	0
04/04/2024	27.9	37.7	0
05/04/2024	23.7	35.2	0
06/04/2024	21.0	34.1	0
07/04/2024	21.3	34.5	0
08/04/2024	20.8	36.6	0
09/04/2024	25.1	34.4	0

3.3 Flora and Vegetation

3.3.1 Establishment of Flora Sites

Indicative site selection was undertaken prior to the survey based on aerial photography and available literature. The number and locations of flora sites were then adjusted on site to achieve sites most representative of the vegetation present. Where possible, at least three flora sites were established in each vegetation type within the Survey Area. In instances where vegetation types were not large enough to accommodate three flora sites, one or two sites were established.

Flora sites consisted of either quadrats or relevés. Quadrats were 50 x 50 m with corners aligned to northwest, northeast, southeast and southwest, and were measured out using measuring tapes. As a minimum, the northwest corner of each quadrat was demarcated with an aluminium fence dropper and where possible a fence dropper was also installed in the southeast corner. Relevés comprised unbounded sites of approximately 50 x 50 m where possible, or alternate configurations approximating 2500 m^2 (as required in linear areas such as drainage lines, gullies, and narrow ridge lines). A comprehensive list of the flora present at the time of sampling was recorded for both quadrat and relevé sites.

Flora site locations were recorded using a GPS-enabled handheld device, with points recorded at each corner of a quadrat, the start and finish point of linear relevés, and the central point of circular relevés. The following information was recorded at each flora site:

- Site code.
- Date and personnel.
- Landform and soil description.
- Relevant site descriptors including slope, aspect, and fire history.
- Inventory of vascular flora including the approximate average height and percentage foliar cover for each taxon.
- Vegetation description in accordance with the National Vegetation Information System (NVIS) Level 5 ‘association’ whereby the dominant growth form, height, cover, and species (three species) for the three traditional strata (upper, mid, and ground) are described.
- Vegetation condition in accordance with the Eremaean and Northern Botanical Provinces vegetation condition scale.
- Evidence of disturbance (for example clearing, rubbish, feral animals, weed incursion, and evidence of feral animals and dieback) where present.
- Photograph of the vegetation occurring within the site.

A total of 28 flora sites (comprising 19 quadrats and 9 relevés) were established within the Survey Area. An additional 49 mapping notes were completed to aid vegetation mapping. Flora site locations are shown on **Map 7**.

3.3.2 Opportunistic Flora

Flora taxa observed outside flora sites were recorded opportunistically. When significant flora, Declared Pests (DPs), or WoNS were encountered opportunistically, a GPS location and count of the individuals present was recorded.

3.3.3 Targeted Searching

Prior to the survey a list of significant flora taxa with the potential to occur within the Survey Area was compiled (see **Section 3.1.3**). Field personnel familiarised themselves with photographs, reference samples, and descriptions of these taxa before conducting the survey.

Targeted searching was undertaken within habitat suitable for Threatened, P1, and P2 flora as per standard practice in the Pilbara. The entire Survey Area was not systematically searched, however areas likely to contain conservation significant species such as clay pans and drainages were intensively searched.

Vegetation analogous to threatened and priority ecological communities were extensively searched within the Survey Area.

3.3.4 Vegetation Type and Condition Mapping

Vegetation type and condition mapping was initially conducted in the field with boundaries delineated over aerial photography at a scale of 1:5,000. Vegetation types were refined based on taxonomic identification of flora collections and mapping notes taken during the field survey. Further validation of vegetation types was undertaken using multivariate analysis of data collected from the quadrats and relevés. Vegetation condition mapping was refined based on site data and mapping notes. Finalised polygons were digitised using GIS software.

3.3.5 Extrapolated Vegetation Mapping

Extrapolated Vegetation mapping was conducted in accordance with EPA technical guidelines (EPA, 2016c). As the Survey Area includes sections of linear infrastructure a 500m buffer was applied to both sides of the 50m corridor and was mapped using aerial imagery, survey data and mapping notes recorded in the field (**Map 10**).

3.3.6 Taxonomy and Nomenclature

Where field identification of plant taxa was not possible, specimens were collected for identification using WAH resources. Identification of flora collections was completed by experienced taxonomist Pierre-Louis de Kock.

FloraBase (DBCA, 2024a) was used to determine the conservation status and known distribution of each taxon. The control status of introduced flora was sourced from the WoNS list and declared plants list (CISS, 2024; DPIRD, 2024).

Any significant flora taxa, including potential Threatened and Priority taxa, range extensions, and potential new taxa, were submitted to the WAH for verification and lodgement. Where relevant, Threatened and Priority Flora Report Forms (TPFRFs) were submitted to DBCA.

3.3.7 Statistical Analyses

3.3.7.1 Vegetation Type Validation

Multivariate analysis to validate vegetation types was undertaken using PRIMER v7. A comparison of the similarity of floristic composition between flora sites based on species presence or absence was undertaken using the Bray-Curtis similarity index. Vegetation types were defined based on approximately 40-80% similarity and distinguished visually in a dendrogram cluster analysis. The analysis was undertaken on a data matrix comprising 46 vascular flora taxa and 28 flora sites. Quadrats and relevés were included in the analysis as comprehensive species presence or absence was recorded at both site types. Singletons (flora taxa recorded at only one site) were excluded from the analysis as they can result in bias due to the Bray-Curtis coefficient and grouping properties. Unidentified or partially identified flora taxa were removed based on their ambiguity; exceptions were made for taxa that could not be identified but were confirmed to be the same across multiple sites. Introduced taxa were also excluded as their presence is typically associated with a disturbance rather than representative of a vegetation type.

3.3.7.2 Species Accumulation Curve

A species accumulation curve was plotted using Primer v7 to determine the adequacy of the survey. The treatments comprised Sobs (Mao Tao), which effectively smooths the curve of observed species by simulating an infinite number of randomisations of the sample order, and richness estimators Chao 1, Chao 2, Jacknife 1, Bootstrap, and Michaelis-Menton to predict the theoretical maximum number of species that could potentially be recorded. The species accumulation curve was calculated using systematic sampling data from flora sites and does not include opportunistic flora records. All identified flora taxa, including annual and perennial, within each flora site was used to generate the species accumulation curve. Unknown flora taxa that could not be identified to a species level was excluded.

3.4 Fauna

3.4.1 Habitat Assessment

Habitat assessments were undertaken in representative areas of fauna habitat within the Survey Area to record habitat values. Where possible, at least one habitat assessment was recorded within each habitat type. Habitat assessment locations are shown in **Map 13**.

The following information was collected at each habitat assessment location using a GPS-enabled handheld device:

- Site photo.
- Landform.
- Soil type and colour.
- Rock types, surface stone cover, and size classes.
- Key habitat and microhabitat features including leaf litter, logs, burrows, rocky outcrops, rock crevices, hollows, and water sources.
- Habitat quality, fire history, and evidence of disturbance.
- General description of vegetation structure.

Fauna habitat mapping was based on a combination of field observations, habitat assessment data, aerial imagery, and, if available, vegetation type mapping.

3.4.2 Camera Traps

Twenty-two motion sensitive camera traps were deployed throughout the Survey Area in habitat considered to be suitable for use by the Northern Quoll. Cameras were baited with universal bait (rolled oats, peanut butter, and sardines). **Table 9** shows the total camera trap survey effort, and camera trap locations are shown in **Map 14**.

Table 9: Camera trap survey effort

Habitat	Site name	Lat/long (WGS84)	Number of camera traps	Total camera trap nights
Drainage Line	2378-CAM-08	-20.7999, 116.8685	1	5
Minor Drainage Depressions	2378-CAM-09	-20.8345, 116.9088	1	5
Stony Hills	2378-CAM-10	-20.8325, 116.9087	1	5
Rocky Outcrops/Breakaways	2378-CAM-11	-20.8306, 116.9116	1	5
Rocky Outcrops/Breakaways	2378-CAM-12	-20.8303, 116.9116	1	5
Rocky Outcrops/Breakaways	2378-CAM-13	-20.8306, 116.9115	1	5
Rocky Outcrops/Breakaways	2378-CAM-14	-20.8105, 116.8874	1	5
Drainage Line	2378-CAM-15	-20.8178, 116.9004	1	5
Minor Drainage Depressions	2378-CAM-16	-20.8275, 116.9139	1	5
Rocky Outcrops/Breakaways	2378-CAM-17	-20.8295, 116.9132	1	5
Triodia Flats	2378-CAM-18	-20.8297, 116.9128	1	5
Triodia Flats	2378-CAM-19	-20.8298, 116.9120	1	5
Minor Drainage Depressions	2378-CAM-20	-20.8309, 116.9137	1	5
Stony Hills	2378-CAM-21	-20.8317, 116.9102	1	5
Stony Hills	2378-CAM-22	-20.8245, 116.9120	1	5
Total			**15**	**75**

3.4.3 Northern Quoll Spot Analysis

Unique spot patterns of Northern Quoll are used to determine the number of individuals recorded by camera trap. Photographs where spot patterns were clearly visible were examined and distinguishable groupings of spots were noted. Where possible, new individuals were differentiated from recaptures.

3.4.4 Acoustic Surveys

Autonomous recording units (ARUs) were used to passively record animal calls during the field survey.

3.4.4.1 Bats

Song Meter SM4BAT ultrasonic ARUs were used target bats with a particular focus on the Pilbara Leaf-nosed Bat and Ghost Bat. SM4BAT ARUs were deployed in habitats likely to be used by significant bat species, such as water sources or rocky areas, for a minimum of four nights at each location. The number and time of significant bat species calls was documented, whereas non-significant bat species were simply recorded as present or absent per night at each location. **Table 10** shows the total SM4BAT ARU survey effort, and locations are shown in **Map 14**.

Table 10: SM4BAT ARU survey effort

Habitat	Site number	Lat/long (WGS84)	Trap nights
Drainage Line	2378-BAT-01	-20.7998, 116.8685	5
Minor Drainage Depressions	2378-BAT-02	-20.8344, 116.9089	5
Minor Drainage Depressions	2378-BAT-03	-20.8241, 116.9088	5
Cleared	2378-BAT-05	-20.8339, 116.9126	5
Stony Hills	2378-BAT-06	-20.8302, 116.9103	5
Total			**25**

3.4.4.2 Night Parrot

Song Meter SM4 ARUs were used to target Night Parrot (*Pezoporus occidentalis*). SM4 ARUs were deployed in habitats likely to be used by Night Parrot, such as water sources or long unburnt spinifex, for a minimum of five nights at each location. **Table 11** shows the total SM4 ARU survey effort, and locations are shown in **Map 14**.

Table 11: SM4 ARU survey effort

Habitat	Site number	Lat/long (WGS84)	Trap nights
Rocky Outcrops/Breakaways	2378-BIR-07	-20.8107, 116.8879	5
Minor Drainage Depressions	2378-BAT-04	-20.8260, 116.9121	5
Total			**10**

3.4.5 Opportunistic Observations

Opportunistic observations of fauna were recorded throughout the Survey Area, including primary evidence (direct sightings, calls) and secondary evidence (tracks, scats, diggings, remains).

3.4.6 Identification and Taxonomy

Terrestrial vertebrate fauna taxa were identified in the field and released on site. Bat calls and bird calls were analysed by Robert Bullen from Bat Call WA.

Where there was doubt on a species name (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. Taxonomy and nomenclature in this report follows the *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (WAM, 2024) where relevant.

3.5 Limitations

Limitations and constraints of the flora, vegetation, and fauna survey are detailed below in **Table 12**.

Table 12: Limitations and constraints associated with the survey

Variable	Degree of limitation	Potential constraints on survey outcomes
Availability of data and information	No	Sufficient data and information, including regional and local contextual information, was available to complete the scope of the survey.
Competency and experience of the survey team	No	The survey was undertaken by a team with extensive experience undertaking similar scopes within the bioregion. • Associate Ecologist Lukas Geidans – 4.5 years' experience • Botanist Jack Hardie – 2.5 years' experience
The proportion of flora and fauna identified, recorded, or collected	No	Of the 106 flora taxa recorded, 17 taxa (16.04%), could not be identified to species level because they were sterile at the time of the survey. One species *Neptunia sp.* is potentially analogous to priority 2 taxa *Neptunia longipila, however* was sterile at the time of collection. Of the 29 fauna taxa recorded, one taxon (3.4%), could not be identified to species level due to distance from camera traps and over exposure. The unidentified fauna taxa were not analogous to significant fauna taxa.
Scope of the survey	No	The scope of the survey was limited to vascular plants and terrestrial vertebrate fauna. No further exclusions were made within these groups.
Adequacy of the survey intensity and proportion of survey achieved	No	Six of the Nine vegetation types had a minimum of three quadrats/relevés installed. The remaining three vegetation types were found to be either isolated or restricted In the Survey Area. Additional survey effort may yield additional flora and fauna taxa; however, sufficient time and effort was allocated to the survey given the size and complexity of the Survey Area and the expected level of survey intensity.

Variable	Degree of limitation	Potential constraints on survey outcomes
Access problems	No	The Survey Area was sufficiently accessed by vehicle and on foot.
Timing, weather, and season	Partial	The recommended primary survey period for flora and vegetation within the Eremaean Botanical Province occurs 6-8 weeks post wet season (March – June). The flora and vegetation survey (3rd – 9th April) was undertaken within the recommended primary survey period. Rainfall in the three months prior to the survey was significantly lower than the average recorded in the same timeframe. This is likely to reduce the overall species diversity in the area by reducing annual and ephemeral flora. The recommended primary survey periods for the Pilbara broad climatic regions are: • Amphibians – Immediately following significant rain events • Birds – Immediately following rain events • Mammals – No preferred time • Reptiles – September - April The fauna survey (3rd – 9th April) was undertaken within the recommended primary survey period.
Disturbance that may have affected the results of survey	Partial	Areas of disturbance associated with cattle were present within the Survey Area. This is a partial limitation as cattle disturbance was abundant in areas associated with the Roebourne Plains gilgai grasslands which is known to support conservation significant flora.
Problems with data and analysis, including sampling biases	No	Survey effort for significant flora and fauna taxa was concentrated in cpreferred habitats. This may introduce a bias where the use of non-preferred habitat is underrepresented, however, this is not considered a limitation on the survey outcomes.

4.0 Results

4.1 Flora and Vegetation

4.1.1 Desktop Assessment

The database searches and literature review identified 31 significant flora taxa occurring within the Desktop Study Area, comprising:

- No Threatened taxa
- Four Priority 1 taxa
- Four Priority 2 taxa
- 22 Priority 3 taxa
- One Priority 4 taxa

Key findings of the literature review are summarised in **Appendix B,** and database search results are summarised in **Appendix D** and presented in **Map 8**.

Seven PECs were identified within the Desktop Study Area:

- Burrup Peninsula rock pile communities (Priority 1) is located 20 km north of the Survey Area.
- Burrup Peninsula rock pool communities (Priority 1) is located 20 km north of the Survey Area.
- Chenopod vegetation associations of the Roebourne Plains (Priority 1) is located 30 km east of the Survey Area.
- Four plant assemblages of the Wona Land System (previously 'Cracking clays of the Chichester and Mungaroona Range') (Priority 1) is located 42 km southeast of the Survey Area.
- Roebourne Plains coastal grasslands with gilgai microrelief on cracking clays (Roebourne Plains gilgai grasslands) (Priority 1) intersects the Survey Area.
- Coastal dune tussock grassland dominated by *Whiteochloa airoides* (Priority 3) is located 8 km north of the Survey Area.
- Horseflat land system of the Roebourne Plains (Priority 3) intersects the Survey Area.

The PECs identified by database searches are presented in **Map 8**.

4.1.2 Floristic Composition

The field survey recorded a total of 106 taxa from 63 genera across 28 families **Appendix E**. The most abundant genus was Acacia (13 taxa). The most diverse families were Fabaceae (30 taxa), Poaceae (11 taxa), and Malvaceae (11 taxa).

4.1.3 Significant Flora

4.1.3.1 Threatened and Priority Flora Recorded Within the Survey Area

No Threatened or Priority flora taxa were recorded during the field survey.

4.1.3.2 Significant Flora Potentially Occurring Within the Survey Area

No significant flora taxa have been recorded within the Survey Area during previous surveys.

Five significant flora taxa were assessed as having a high likelihood of occurring within the Survey Area:

- *Euphorbia inappendiculata* var*. inappendiculata* (Priority 2)
- *Neptunia longipila* (Priority 2)
- *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (Priority 3)
- *Eragrostis crateriformis* (Priority 3)
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (Priority 3).

These taxa occur on cracking clays, claypans and drainages which were considered degraded in the Survey Area due to poor seasonal conditions combined with heavy grazing pressure from cattle. Due to this, these species could potentially occur within the survey area under optimal conditions.

No significant flora taxa were assessed as having a medium likelihood of occurring within the Survey Area.

A further 26 significant flora taxa were assessed as having a low likelihood of occurring within the Survey Area.

The complete results of the pre-survey and post-survey significant flora likelihood of occurrence assessment are provided in **Appendix D**.

4.1.4 Introduced Flora

A total of four introduced taxa were recorded within the Survey Area, representing 3.77% of the total taxa recorded (**Table 13**; **Map 11**). None are listed as Declared Pests under the BAM Act or listed as a WoNS.

Table 13: Introduced flora taxa recorded within the Survey Area

Taxon	Common name	Status under BAM Act	WoNS
**Aerva javanica*	Kapok Bush	Permitted – s11	No
**Cenchrus ciliaris*	Buffel Grass	Permitted – s11	No
**Malvastrum americanum*	Spiked Malvastrum	Permitted – s11	No
**Vachellia farnesiana*	Mimosa Bush	Permitted – s11	No

4.1.5 Unconfirmed Flora

A total of 17 specimens (16.04 % of the taxa recorded) could not be identified to species level because the taxa were sterile at the time of the survey (**Appendix E**). Of these specimens 13 were identified to genus level, and four were tentatively identified to species level.

One unconfirmed flora taxon was analogous to significant flora taxa identified by the desktop assessment. *Neptunia* sp. is analogous to the significant flora *Neptunia longipila* as it is known to occur on cracking clays and within 7.2 km from the Survey Area. Due to poor seasonal conditions and heavy cattle disturbance the *Neptunia* sp. specimen had insufficient material to confirm a species level identification.

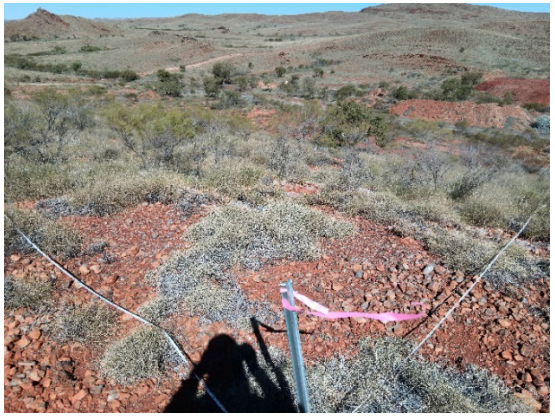
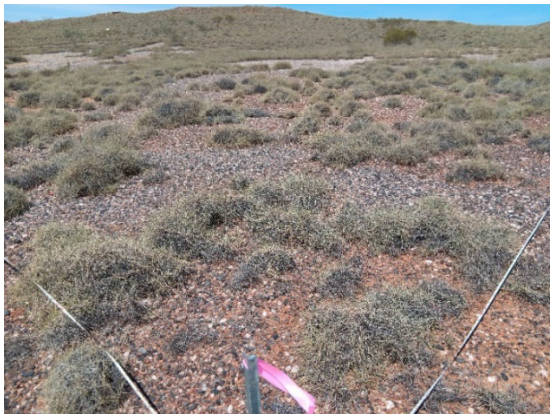
4.1.6 Vegetation Types

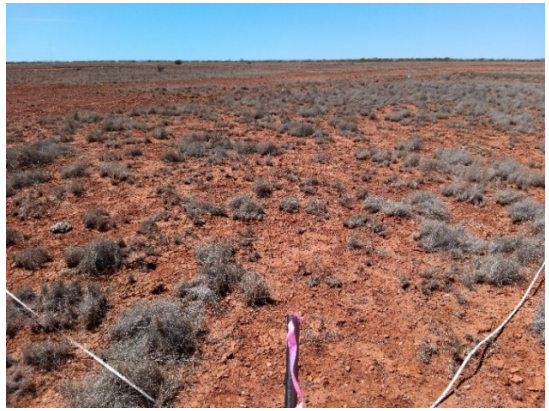
Nine vegetation types were described and mapped across five broad landforms in the Survey Area (**Table 14**; **Map 9**). Extrapolated mapping along the linear corridor of the Survey Area added an additional vegetation type (**Table 14; Map 10).**

Detailed site sheets for each quadrat are provided in **Appendix F**.

Table 14: Vegetation types recorded within the Survey Area

Vegetation type and description*	Local landform	Total area, percentage of Survey Area	Total area, percentage of Extrapolated Buffer	Sites	Vegetation condition	Representative photograph
Hills Landform						
VT1: *Acacia ancistrocarpa, A. bivenosa* and *A. pyrifolia* var. *pyrifolia* mid sparse shrubland over *Triodia epactia* and *T. wiseana* low open hummock grassland.	Undulating quartz hills and rises on brown clay loam soils	31.19 ha, 26.97%	18.36 ha, 2.79%	BWQ09, BWQ11, BWQ13, BWQ16, BWR21	Very Good	
VT5: *Ficus brachypoda* low open woodland over *Ehretia saligna* and *Grevillea pyramidalis* subsp. *leucadendron* tall sparse shrubland over **Cenchrus ciliaris* and *Eriachne mucronata* low open tussock grassland.	Quartz and granite ridge with brown clay soils	0.61 ha, 0.53%	N/A	BWR01, BWR02	Very good	

Vegetation type and description*	Local landform	Total area, percentage of Survey Area	Total area, percentage of Extrapolated Buffer	Sites	Vegetation condition	Representative photograph
VT8: *Corymbia hamersleyana* low isolated trees over *Acacia arida* and *Grevillea pyramidalis* subsp. *Leucadendron* (*Acacia ancistrocarpa*) mid open shrubland over *Triodia epactia* (*T. wiseana*) low open hummock grassland.	Moderately steep, south facing quartz hillside with clay loam soil	3.03 ha, 2.62%	N/A	BWQ14, BWR27	Good to Very Good	
Plains Landform						
VT2: *Acacia ancistrocarpa, A. bivenosa* and *A. pyrifolia* var. *pyrifolia* over *Triodia angusta* and *T. wiseana* low open hummock grassland.	Low foothills and plains with exposed quartz over sandy clay soils	19.98 ha, 17.28%	22.19 ha, 3.38%	BWQ15, BWQ18, BWR19, BWQ20, BWQ28	Good to Very Good	

Vegetation type and description*	Local landform	Total area, percentage of Survey Area	Total area, percentage of Extrapolated Buffer	Sites	Vegetation condition	Representative photograph
Cracking Clays Landform						
VT3: *Eriachne benthamii* and *Eragrostis xerophila* low open tussock grassland over mixed herbs.	Roebourne Plains gilgai grasslands on gilgaied Cracking clay soils	16.91 ha, 14.62%	387.29 ha, 58.97%	BWQ03, BWQ04, BWQ05	Degraded	
VT7: *Acacia inaequilatera*, *A. pyrifolia* var. *pyrifolia* and *A. xiphophylla* tall open shrubland over *Rhagodia eremaea* and *Sclerolaena densiflora* mid sparse shrubland over *Triodia epactia* low sparse hummock grassland over *Eragrostis xerophila* low sparse tussock grassland.	Flat claypans	8.72 ha, 7.54%	152.62 ha, 23.24%	BWQ07, BWQ22, BWQ23, BWQ24	Poor to Good	

Vegetation type and description*	Local landform	Total area, percentage of Survey Area	Total area, percentage of Extrapolated Buffer	Sites	Vegetation condition	Representative photograph
EXVT1 (extrapolated Mapping): *Chrysopogon spp over Eragrostis spp and Eriachne spp* low closed tussock grassland over mixed herbs.	Horseflat land system of the Roebourne Plains on non-gilgaied red clay loam	N/A	27.66 ha, 4.21%	No Sites (Outside Survey Area)	N/A	No photo available
Drainages Landform						
VT4: *Corymbia hamersleyana* low open woodland over *Acacia ancistrocarpa*, *A. bivenosa* and *A. pyrifolia* var. *pyrifolia* tall sparse shrubland over *Triodia epactia* low sparse hummock grasslands over mixed herbs.	Minor drainages and mixed *Acacia* thickets with clay loam soils	9.74 ha, 8.42%	3.05 ha, 0.46%	BWR10, BWR17, BWR26	Poor to Very Good	

Vegetation type and description*	Local landform	Total area, percentage of Survey Area	Total area, percentage of Extrapolated Buffer	Sites	Vegetation condition	Representative photograph
VT6: *Corymbia hamersleyana* and *Eucalyptus victrix* low open woodland over *Acacia coriacea* subsp. *pendens*, *A. pyrifolia* var. *pyrifolia* and *A. trachycarpa* tall sparse shrubland over **Cenchrus ciliaris*, *Eulalia aurea* and *Eriachne benthamii* low open tussock grassland.	Minor drainages and shoulders with brown sandy clay soil	1.1 ha, 0.95%	27.88 ha 4.24%	BWR08, BWR12, BWR25	Degraded to Poor	
Dolerite Outcrop Landform						
VT9: *Ficus aculeata* var. *indecora* low open woodland over *Ehretia saligna* tall sparse shrubland over *Triodia epactia* low open hummock grassland.	Dolerite outcrop amongst clay flats	0.55 ha, 0.47%	N/A	BWR06	Good	
Cleared		23.84 ha, 20.61%	17.75 ha, 2.70%			

Brackets indicate species that may or may not be present, but were observed as dominant at some of the sites that make up the vegetation type

4.1.7 Vegetation Condition

Vegetation condition within the Survey Area ranged from Degraded to Very Good, with the majority (49.66%) being in Very Good condition (**Table 15**; **Map 11**).

Evidence of disturbance was primarily associated with cattle, previous mining activity, and Weeds.

Table 15: Summary of vegetation condition within the Survey Area

Vegetation condition	Area (ha)	Percentage of Survey Area
Cleared	23.84	20.61%
Degraded	18.96	16.40%
Poor	3.04	2.63%
Good	12.39	10.71%
Very Good	57.43	49.66%

4.1.8 Significant Vegetation

4.1.8.1 Threatened and Priority Ecological Communities

One vegetation type within the Survey Area and one vegetation type within the extrapolated buffer were considered analogous to PECs.

- VT3 is analogous to the 'Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands)' Priority One ecological community. VT3 occurs exclusively on the linear road corridor of the survey area and covers 16.91 ha (14.62 % of the Survey Area). The ecological community is defined as:

  'grasslands that occur on microrelief on strongly gilgaied self-mulching cracking clays, and emergent depositional surfaces. The grasslands are surrounded by non-gilgaied clay plains/flats and sandy coastal and alluvial plains. The gilgai depressions support ephemeral and perennial tussock grasslands dominated by *Sorghum* sp. and *Eragrostis xerophila* (Roebourne Plains grass) along with other native species including *Eriachne benthamii* (swamp wanderrie grass), *Chrysopogon fallax* (golden beard grass) and *Panicum decompositum* (native millet). Restricted to the Karratha area, where it has been largely removed. This community differs from the surrounding non-gilgaied clay flats of the Horseflat land system which are dominated by *Eragrostis xerophila* and other perennial tussock grass species (*Eragrostis* mostly)' (DBCA, 2023c).

- EXVT1 is analogous to the 'Horseflat Land System of the Roebourne Plains' Priority Three ecological community. EXVT1 does not occur within the Survey Area but within the extrapolated buffer applied to the linear corridor section of the Survey Area. The Horseflat Land System is defined as:

  'Extensive clay plains dominated by tussock grasslands on mostly alluvial, red clay loams gilgaied and non-gilgaied for this community. The community is dominated by perennial tussock grasses include *Eragrostis xerophila* (Roebourne Plains grass), *Chrysopogon fallax* (ribbon grass) and other *Eragrostis* spp. and *Eriachne* spp. The community also supports a suite of annual grasses including *Dichanthium* spp. and

Sorghum spp.. The community extends from Peedamulla to Balla Balla surrounding the towns of Karratha and Roebourne' (DBCA, 2023c).

4.1.9 Statistical Analysis

The following observations were made from the analysis:

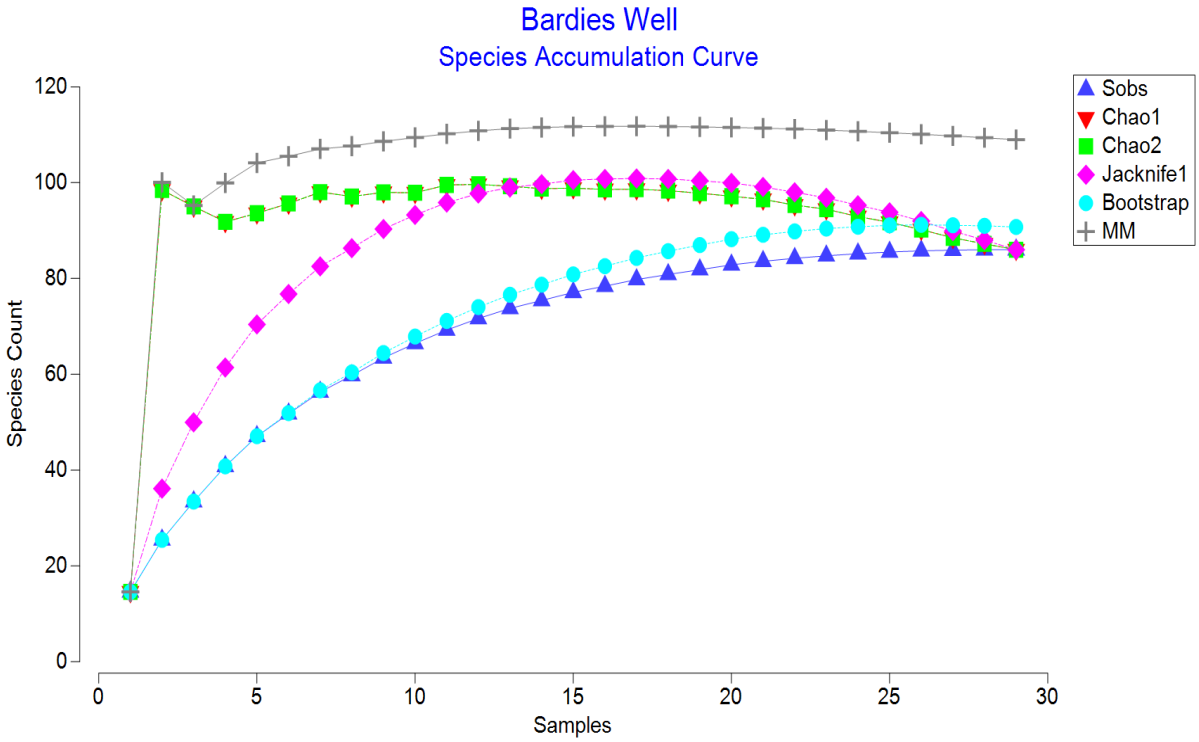
- BWR21 grouped with sites in VT2 due to the absence of species *Acacia pyrifolia* var. *pyrifolia,* however was still retained as VT1 due to similar landforms, remaining dominant species and absence of *Triodia angusta* which was found on the lower foothills of the Survey Area.
- BWQ16 grouped with sites in VT4 due to its ecotonal nature and proximity to the minor drainages. A larger emphasis was placed on the drainage dominant species that occurred sparsely in site BWQ16, however due to its contrasting landform being on undulating hills and overall similar dominant species it was retained as VT1.
- Sites in VT1 had an average similarity of 49.35%.
- Sites in VT2 had an average similarity of 43.68%.
- Sites in VT3 had an average similarity of 53.76%.
- Sites in VT4 had an average similarity of 76.27%.
- Sites in VT5 had an average similarity of 76.19%.
- Sites in VT6 had an average similarity of 52.02%.
- Sites in VT7 had an average similarity of 65.88%
- Sites in VT8 had an average similarity of 47.62%
- VT9 was represented by a single site, therefore was not included in the analysis.

Selected inputs and outputs of the floristic analysis are presented **Appendix G.**

4.1.10 Survey Adequacy

The species accumulation curve for the Survey Area produced a smooth Sobs curve steadily increasing towards and reaching asymptote (**Graph 2**).

Estimated species richness for the Survey Area ranged from 86 to 109, with an observed value of 86 taxa (**Table 16**). Richness estimators indicated that the survey was approximately 79% to 100% adequate in recording the full complement of vascular flora taxa within the Survey Area (**Table 16**).



Graph 2: Flora Species Accumulation Curve

Table 16: Species Richness Indicators

Treatment	Expected Species Richness	Percentage Adequate
Chao 1	86	100%
Chao 2	86	100%
Jacknife 1	86	100%
Bootstrap	91	95%
Michaelis-Menton	109	79%

The data used to produce the species accumulation curve was conservative because opportunistic species (which are not associated with a site), and unconfirmed flora were not included. With opportunistic and unconfirmed flora included, the number of flora taxa recorded during the survey was 106, which is 97% of the highest expected species richness, and 123% of the lowest expected species richness.

4.2 Fauna

4.2.1 Desktop Assessment

The database searches and literature review identified 470 terrestrial vertebrate fauna taxa occurring within the Desktop Study Area, comprising:

- 12 amphibians, of which none are significant.
- 259 birds, of which 62 are significant.
- 61 mammals, of which 11 are significant.
- 138 reptiles, of which seven are significant.

Key findings of the literature review are summarised in **Appendix B**, a complete list of fauna taxa recorded within the Desktop Study Area is presented in **Appendix H**, and database search results are displayed in **Map 13**.

Species listed as Marine only under the EPBC Act, as well as marine dependant species have been excluded from the likelihood of occurrence list as there is no marine habitat present within the Survey Area.

4.2.2 Fauna Habitat

Seven fauna habitats (excluding cleared areas) were identified and mapped within the Survey Area. Fauna habitats are presented in **Map 13**, described below in **Table 17**, and site sheets for each habitat assessment are provided in **Appendix I**. Small discrepancies in fauna habitat extents (i.e., not adding up to the exact area extent of the Survey Area) are due to rounding.

Table 17: Fauna habitats recorded within the Survey Area

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Stony Hills	34.21 ha 29.6%	Stony hills with granite, calcrete, laterite and quartz scree over laterite rock. Vegetation consists of isolated *Acacia* shrubland and *Ehretia saligna* over sparse *Triodia* and *Cenchrus* grassland. Microhabitats present within this habitat include rock piles, rock crevices and leaf litter, which may provide suitable habitat for the significant Western Pebble-mound Mouse. The significant Northern Quoll may also traverse through this habitat whilst accessing the Outcrops and Breakaways habitat. The habitat condition ranges from disturbed due to weeds to very good with little to no fire evidence.	

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Triodia Flats	19.98 ha, 17.3%	Open *Triodia* plains with sandy clay substrate. Vegetation consists of sparse *Triodia* hummocks and mixed sp. tussock grasses. The prevalence of *Triodia* hummocks and the clay substrate may provide value to the significant Northern Short-tailed Mouse. The habitat is highly degraded due to overgrazing, weeds, vehicle tracks and infrastructure.	
Degraded Grassland	16.90 ha 14.6%	Open degraded grassland with stony quartz and clay substrate. Vegetation consists of open tussock mixed sp. grassland. The habitat condition is highly degraded and disturbed due to overgrazing, weeds, vehicle tracks and infrastructure, with little to no fire evidence. Microhabitats include tussocks.	

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Minor Drainage Depressions	9.74 ha 8.4%	Areas of minor drainage depressions over sandy loam. Vegetation consists of isolated areas of open *Corymbia hamerslyana* woodland, with open Acacia shrubland midstory consisting of *Acacia bivenosa, Acacia pyrifolia, Acacia ancistrocarpa* and *Acacia coriacea pendens* over *Triodia* hummock grassland. Microhabitats include hummocks, leaf litter, peeling barks, woody debris and rock crevices. The significant Northern Quoll, Grey Falcon and Peregrine Falcon may utilise this particular habitat. The habitat has been disturbed and highly degraded due to overgrazing, weeds, vehicle tracks and infrastructure, with little to no fire evidence.	
Scattered Acacia Plains	8.72 ha, 7.5%	Undulating *Acacia* plains with granite outcropping and red sand. Vegetation consists of low, open shrubland dominated by *Acacia* sp. and *Hakea* sp. over open *Triodia* hummock grassland providing microhabitats. The habitat condition is disturbed and highly degraded in areas due to overgrazing, weeds, vehicle tracks and infrastructure, with little to no evidence of fire.	

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Rocky Outcrops and Breakaways	1.15 ha, 1%	Outcropping and breakaways with thin sandy soils over calcrete and granite rock. Vegetation consists of low, isolated *Acacia* sp. and *Ehretia saligna* over sparse *Triodia* sp., and **Cenchrus ciliaris*. Microhabitats include rock crevices, rocky outcrops, rock piles *Triodia* hummocks and leaf litter. This habitat is suitable for use by the significant Northern Quoll and the Western Pebble-mound Mouse. The habitat condition ranges from disturbed and highly degraded due to vehicle tracks and infrastructure to very good with little to no fire evidence observed.	
Drainage Line	1.10 ha, 1%	Areas of drainage over sandy loam soils and granite rock. Vegetation consists of isolated *Eucalyptus victrix* with sparse *Acacia* shrubland midstory consisting of *Acacia bivenosa*, *Acacia ancistrocarpa*, *Acacia pyrifolia* var. *pyrifolia, Acacia coriacea* subsp. *pendens* and *Corymbia hamersleyana,* over *Triodia* hummocks and mixed sp. of tussock grassland. Microhabitats present within this habitat include *Triodia* hummocks, peeling bark and woody debris, with little to no fire evidence. The significant Northern Quoll, Grey Falcon, and Peregrine Falcon may utilise this habitat. The habitat has been highly degraded due to overgrazing, weeds, vehicle tracks and infrastructure.	

Fauna habitat	Total area, percentage of Survey Area	Habitat description	Representative photograph
Cleared	23.87 ha, 20.6%	Cleared land for existing tracks/roads and infrastructure. Low/negligible fauna habitat value.	
Total	115.66 ha, 100%		

4.2.3 Fauna Records

The fauna survey recorded a total of 33 fauna taxa from 22 families. The fauna diversity within each habitat type is summarised in **Table 18** and a full inventory of fauna taxa recorded during the field survey is provided in **Appendix J**.

Table 18: Fauna diversity by habitat type

Fauna habitat	Birds	Mammals	Reptiles	Total
Stony Hills	1	7	1	**9**
Triodia Flats	4	-	-	**4**
Degraded Grasslands	3	2	-	**5**
Minor Drainage Depressions	6	2	1	**9**
Scattered Acacia Plains	3	-	-	**3**
Rocky Outcrops and Breakaways	1	3	2	**6**
Drainage Line	6	1	-	**7**
Cleared	14	1	2	**17**

Birds

A total of 15 native birds from 12 families were recorded within the Survey Area. The most abundant bird taxa were the Black-faced Woodswallow (*Artamus cinereus*), Galah (*Eolophus roseicapilla*) and Little Corella (*Cacatua sanguinea*). The most diverse bird families were Cacatuidae (two taxa), Columbidae (two taxa), and Falconidae (two taxa).

No significant birds and no introduced birds were recorded.

Mammals

A total of 12 native mammals from seven families were recorded within the Survey Area, comprising two non-volant (non-flying) mammals and six volant mammals (bats). The most abundant mammal taxa were the Common Sheath-tailed Bat (*Taphozous georgianus*), Finlayson's Cave Bat (*Vespadelus finlaysoni*), and Gould's Wattled Bat (*Chalinolobus gouldii*). The most diverse mammal family was Vespertilionidae (four taxa).

Two significant mammals (see **Section 4.2.4.1**) and two introduced mammals were recorded, European Cattle (**Bos primigenius taurus*) and Black Rat (**Rattus rattus*).

Reptiles

Four native reptiles were recorded within the Survey Area, the Ring-tailed Dragon (*Ctenophorus caudicinctus*), Centralian Blue-tongued Skink (*Tiliqua multifasciata*), Goldfields Crevice-skink (*Egernia formosa*) and *Varanidae* sp.

No significant reptiles and no introduced reptiles were recorded.

4.2.4 Significant Fauna

4.2.4.1 Recorded Within the Survey Area

Two significant fauna taxa were recorded within the Survey Area, the Northern Quoll (*Dasyurus hallucatus*) listed as Endangered under the BC Act and EPBC Act and the Western Pebble-mound mouse (*Pseudomys chapmani*), listed as P4 by the DBCA.

The presence of Northern Quoll was detected by camera traps within the central Stony Hills and Rocky Outcrops and Breakaways habitats of the Survey Area. These habitats provide high quality denning and hunting opportunities.

Spot analysis of images confirmed at least one identifiable individual with three locations capturing unidentifiable individuals due to body positioning and distance from the camera traps preventing clear analysis of spots. It is presumed to be the same single individual present in the area given camera locations and timings. Locations this taxon was detected at are indicated on **Map 13**.

The presence of the Western Pebble-mound Mouse was detected by evidence of characteristic mounds within Stony Hills habitat to the east and west of the Survey Area (-20.8325, 116.9138 and -20.8302, 116.9087). Stony Hills, Scattered Acacia Plains, *Triodia* Flats and Degraded Grassland mapped within the Survey Area are high quality core habitats for this taxon, providing suitable burrow sites with preferred pebble sizes and foraging habitats. Similar habitats were detailed in literature within 10 km of the Survey Area also recording the presence Western Pebble-mound Mouse (GHD, 2011).

Significant fauna locations are presented in **Map 13**.

Figure 1: Northern Quoll recorded by camera trap within Rocky Outcrops and Breakaways (-20.8325, 116.9087).

Figure 2: Western Pebble-mound Mouse recorded by mound within Stony Hills habitat (-20.8325, 116.9138).

4.2.4.2 Potentially Occurring Within the Survey Area

No significant fauna taxa have been recorded within the Survey Area during previous surveys.

One significant fauna taxon was assessed as having a high likelihood of occurring within the Survey Area, the Northern Short-tailed Mouse (*Leggadina lakedownensis*), listed as P4 (DBCA).

Six significant fauna taxa were assessed as having a medium likelihood of occurring within the Survey Area:

- Grey Falcon (*Falco hypoleucos*), listed as Vulnerable under the BC Act and EPBC Act.
- Pilbara Olive Python (*Liasis olivaceus barroni*), listed as Vulnerable under the BC Act and EPBC Act.
- Peregrine Falcon (*Peregrinus falco*), listed as Other Specially Protected Fauna under the BC Act.
- Lined Soil-crevice Skink (*Notoscincus butleri*), listed as Priority 4 by DBCA.
- Pacific Swift (*Apus pacificus*), listed as Migratory under the BC Act, and Migratory and Marine under the EPBC Act.
- Oriental Plover (*Charadrius veredus*), listed as Migratory under the BC Act, and Migratory and Marine under the EPBC Act.

A further 69 significant fauna taxa were assessed as having a low likelihood of occurring within the Survey Area.

The complete results of the significant fauna likelihood of occurrence assessment are provided in **Appendix K**.

5.0 Discussion

5.1 Flora and Vegetation

5.1.1 Floristic Composition

Floristic diversity of annual species was considered lower than average due to dry conditions. Despite higher than average rainfall in the month prior to the survey there was no on ground effect, with plant life and soils still dry. There is potential for an increased floristic diversity with a better season, particularly on the clays in VT3 which are known to host many annual and ephemeral taxa.

Due to the relatively small size of the Survey Area, it did not cover a large variety of landforms, and this was represented in the number of vegetation types described. Some of these vegetation types were limited in distribution within the Survey Area, which may also contribute to reduced floristic diversity within those vegetation types, although these were not restricted locally or regionally.

5.1.2 Significant Flora

No Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened Flora pursuant to the BC Act 2016 were recorded within the Survey Area.

No Priority DBCA listed flora were recorded within the Survey Area.

Five species retained a high likelihood of occurrence within the Survey Area (*Euphorbia inappendiculata* var. *inappendiculata* (P2), *Neptunia longipila* (P2), *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3), *Eragrostis crateriformis* (P3), *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) (P3)). These taxa occur on cracking clays, claypans and drainages. The potential occurrence of these species within the Survey Area cannot be discounted given the poor seasonal conditions combined with heavy grazing pressure from cattle.

5.1.3 Introduced Flora

Four introduced (weed) flora taxa were recorded in the Survey Area none of which are considered to be Declared Pests or Weeds of National Significance. All four species **Aerva javanica*, **Cenchrus ciliaris*, **Malvastrum americanum* and **Vachellia farnesiana* are considered to be common and widespread in the Pilbara, generally dispersed by wind, water, and cattle. Locations and numbers of the taxa were recorded when encountered, however all the introduced taxa should be considered to be more widespread than illustrated.

5.1.4 Vegetation Types and Condition

Mapping reliability is considered to be high across the Survey Area, with good on-ground coverage.

Nine vegetation types were described and mapped across five broad landforms in the Survey Area. The majority of these vegetation types occurred throughout the Survey Area and were large enough to accommodate the minimum three sites required. However, three vegetation types were found to be restricted in the Survey Area.

Vegetation type VT5 was found restricted to the larger hills in the Survey Area where rocky hillsides supporting species of *Ficus brachypoda* and *Ehretia saligna*. These occurred on one hill within the Survey Area which could only accommodate two sites. More of this

vegetation type can be seen on aerial imagery outside the Survey Area on other land tenements and is not considered significant floristically.

Vegetation type VT8 was similar to that of VT5 in that it only occurred on the larger hillside in the Survey Area. It was characterised by a moderately steep hillside with *Acacia arida* and *grevillea pyramidalis* subsp. *leucadendron.* As only one hillside supported this vegetation type in the Survey Area only two sites were installed due to its restricted nature. VT8 is not considered to be of significance.

Vegetation type VT9 comprised of a large dolerite outcrop with dominant species of *Ficus aculeata* var. *indecora* and *Ehretia saligna* and was found isolated within the Survey Area. No similar landforms were found within the Survey Area or within the extrapolated vegetation mapping buffer, therefore could only accommodate one site. VT9 is not considered to be of significance.

Vegetation condition in the Survey Area ranged from Degraded to Very good, with Very Good having the highest cover across the area. Areas with Very Good condition were exclusively found within the active quarry area on undulating hills which saw an absence of cattle and introduced taxa. The linear road corridor which joins the active quarry area to NW Coastal highway predominately consisted of vegetation type VT3 Roebourne Plains gilgai grasslands which was recorded as Degraded condition throughout the Survey Area.

5.1.5 Significant Vegetation

Vegetation type VT3 is considered analogous to the Roebourne Plains gilgai grasslands Priority One PEC as it contains strongly gilgaied depressions with dominant species of *Eragrostis xerophila* and *Eriachne benthamii*. DBCA Threatened and Priority search results also showed the PEC intersected the Survey Area. The vegetation type is degraded throughout the Survey Area due to historic grazing pressure from cattle, urban development and mining activity. In combination with the poor seasonal conditions limited herbs were found on this vegetation type, where usually in a good season with limited disturbances many herbs can be found on clays. In the Survey Area VT3 comprised 16.91 ha (14.62%) and 387.29 ha (58.97%) of the extrapolated vegetation mapping.

Extrapolated mapping captured vegetation type EXVT1 which is analogous to the Horseflat Land System Priority 3 PEC as it has weak to no gilgai depressions and dominate species of *Chryspogon* spp., *Eragrostis* spp and *Eriachne* spp on Cracking Clays. DBCA Threatened and Priority search results also showed the PEC intersected the extrapolated buffer of the Survey Area. This community differs from the Roebourne Plains gilgai grasslands by having weak to no gilgai depressions. No sites were installed in this vegetation type as it occurred outside the Survey Area, however notes were made about its extent and composition. Vegetation type EXVT1 comprised 27.66 (4.21%) of the extrapolated vegetation mapping.

5.1.6 Survey Adequacy

The flora and vegetation survey effort were in accordance with the scope of works, and appropriate for a detailed flora and vegetation survey in the Pilbara. Twenty-eight flora sites were sampled across the Survey Area, comprising 19 quadrats and 9 relevés. A minimum of three flora sites were sampled in each vegetation type, except for vegetation types VT5, VT8 and VT9, which were too small to accommodate three sites.

The inventory of vascular flora, and records of significant flora and weed species was compiled using site data and opportunistic observations made while traversing between sites and during systematic targeted searching.

The species accumulation curve was approaching asymptote following the survey analysis. When a curve approaches an asymptote, it indicates sampling effort has been sufficient to adequately collect the species comprising the floral assemblage at the locations sampled. The value at which the curve asymptotes can also be used as an approximate measure of the total size of the species complement at that location. The species accumulation curve and the richness estimators approached asymptote and plateaued in three tests, indicating additional survey effort may not record additional vascular flora taxa.

5.2 Fauna

5.2.1 Fauna Habitat

The seven broad habitats (excluding cleared areas) identified within the Survey Area are typical of the Pilbara region and consistent with habitats identified by previous studies in the region (**Appendix B**). All mapped fauna habitat types extend outside of the Survey Area and connect to larger ecosystems.

The Drainage Line and Minor Drainage Depressions habitats provide the most value to significant fauna and the overall fauna assemblage within the Survey Area. These are core habitats for the significant Northern Quoll, and for the local fauna assemblage as they provide ephemeral surface water which is a vital resource. A variety of fauna taxa will use this habitat as a dispersal corridor due the linear nature of the habitat and the presence of dense vegetation for shelter and foraging.

Rocky Outcrops and Breakaways and the Stony Hills habitats provide important rock crevice refuge and feeding opportunities for a wide array of fauna species, particularly herpetofauna and small mammals. The rock crevices and stony substrate of these habitat types are critical habitat for the significant Northern Quoll and the Western Pebble-mound Mouse, which were recorded at eight and two locations respectively.

Habitat condition throughout the Survey Area varied in its condition, with large areas cleared for infrastructure and access tracks, and Scattered Acacia Plains, Degraded Grassland and *Triodia* Flats dominant and widespread throughout the Survey Area. Disturbance and degradation caused by weeds, overgrazing by cattle and ground disturbance due to clearing were observed throughout all habitats.

5.2.2 Significant Fauna

5.2.2.1 Recorded within the Survey Area

Northern Quoll (*Dasyurus hallucatus*) – EN (BC Act; EPBC Act)

The range of the Northern Quoll has contracted across northern Australia since European settlement, and it now occurs as several disjunct populations (Braithwaite and Griffiths, 1994). The Northern Quoll can be locally common, but its former range has retracted considerably (Van Dyck and Strahan, 2008). The Northern Quoll is found in dissected rocky escarpments, utilising a variety of den sites, including rock crevices, tree hollows, logs, and termite mounds. It favours rocky areas, taking refuge in rock crevices, and utilises gullies and drainage lines.

It is important to note that much of the ecological information for the Northern Quoll comes from studies in the Top End of the Northern Territory (e.g. (Begg, 1981); (Oakwood, 2000). Much of their ecology is likely to be similar in the Pilbara; however, differences in genetic structure and some demographic parameters have been observed (How, Spencer and Schmitt, 2009).

The Northern Quoll has a relatively large home-range size of up to 150 ha for males (35 ha for females). Movements between den sites on consecutive nights can be up to 1.85 km for males (Oakwood, 2000). In the Northern Territory, mating occurs in late May to June and all males die after the mating season and females rear the young alone (Oakwood, 2000). The young spend about two months in the pouch and are then left in a succession of nursery dens for the next three months for periods at night while the mother forages (Oakwood, 2000). In the Kimberley region, Schmitt et al. (1989) found that breeding occurred in July and August. However, at Woodstock Station in the Pilbara, breeding occurred in September, a month later than the Kimberley (How, Spencer and Schmitt, 2009). This variation in time of breeding across three distinct populations indicates some reproductive flexibility in the species.

The Northern Quoll was recorded during the survey by camera traps. This taxon was recorded within Rocky Outcrops and Breakaways and Stony Hills which constitute core habitats for this fauna, providing valuable denning and hunting sites, and dispersal corridors. The Drainage Line habitat is of particular importance as it provides a vital water source and dense vegetation for dispersal and shelter.

Western Pebble-mound Mouse (*Pseudomys chapmani*) – P4 (DBCA)

The Western Pebble-mound Mouse is endemic to the Pilbara, where it builds pebble mounds from small stones. These pebble mounds typically cover areas from 0.5 – 9.0 m^2 and are characteristic of this species. Pebble mounds are restricted to suitable-class stones and are usually found on gentle slopes and spurs that are often vegetated by hard spinifex (Ford and Johnson, 2007; Van Dyck and Strahan, 2008). Active mounds are characterised by the conical shape of the mound with clear, distinct entrance holes (Anstee, 1996). Pebble mounds constructed by the Western Pebble-mound Mouse are found throughout the Pilbara; however, studies have shown that not all mounds in an area are occupied by a Pebble-mound Mouse at any one time (Anstee, 1996).

This taxon was identified within the Survey Area by characteristic mounds recorded within the Survey Area to the east. The mounds were within core Stony Hill habitat for this taxon, although the two mounds recorded were considered to be inactive due to no signs of recent use, the Western Pebble-mound Mouse cannot be discounted from the Survey Area, as not all mounds are occupied by this taxon at any one time.

5.2.2.2 High Likelihood of Occurrence within the Survey Area

Northern Short-tailed Mouse (*Leggadina lakedownensis*) - P4 (DBCA)

The Northern Short-tailed Mouse has a broad distribution across much of northern Australia and occurs in a range of habitat types. This includes spinifex and Acacia on seasonally inundated sandy-clay soils as well as sandy soils and cracking clays to build burrows which they shelter in during the day (Van Dyck and Strahan, 2008). In the Pilbara it occurs on stony hummock grassland. It is generally rare, with scattered populations, and very little is known of its biology (Van Dyck and Strahan, 2008).

The Northern Short-tailed Mouse was not recorded within the Survey Area during the survey; however, this species has previously been recorded 10 km south-southwest of the Survey Area in 2011 (DBCA, 2024d). The Stony Hills, *Triodia* Flats and Scattered Acacia Plains habitats present within the Survey Area are core burrowing and foraging habitats to support this species.

5.2.2.3 Medium Likelihood of Occurrence within the Survey Area

Grey Falcon (*Falco hypoleucos*) – VU (BC Act; EPBC Act)

The Grey Falcon is an elusive and endemic bird of the arid interior (Schoenjahn, Pavey and Walter, 2019). It distributed sparsely over Australia's arid and semi-arid zones and is absent from Cape York Peninsula, south of the Great Dividing Range in Victoria, and south of 26°S in Western Australia (Johnstone and Storr, 1998; BirdLife International, 2016). The Grey Falcon is restricted largely to areas of the highest annual average temperatures where there is average annual rainfall of less than 500 mm. It favours lightly timbered and untimbered lowland plains that are crossed by tree-lined watercourses, but frequents other habitats, including grassland and sand dune habitats (Johnstone and Storr, 1998; BirdLife International, 2016).

The Survey Area contains Degraded Grasslands, *Triodia* Flats, Stony Hills and Scattered Acacia Plains, providing suitable hunting habitat. The database search identified three records of Grey Falcon within 45 km of the Survey Area. Given this species is elusive resulting in populations potentially under recorded, it is conceivable that the Survey Area may support this species.

Pilbara Olive Python (*Liasis olivaceus barroni*) – VU (BC Act; EPBC Act)

The Olive Python occurs in the ranges of the Pilbara, typically in escarpments and gorges where water is present. It generally shelters under rock piles, or under spinifex and often basks on top of rocks (Pearson, 1993, 2003). This large python is threatened due to its relatively small distribution, low population densities and may be affected by habitat disturbance such as grazing and fire. This species is known to frequent water bodies where it ambushes prey (Pearson, 1993). During a systematic survey of a large series of quadrats in the Pilbara, the Olive Python was only recorded in one quadrat (Doughty *et al.*, 2011). This species is extremely cryptic given its method of hunting and nocturnality.

Records returned by the desktop search are associated with coastal areas 22 km north of the Survey Area, with no records of this taxon in previous nearby studies (DBCA, 2024d). The Survey Area does not contain a permanent water source which is preferred habitat for this taxon, though Stony Hills and *Triodia* Grasslands present within the Survey Area provides suitable hunting habitat.

Peregrine Falcon (*Falco peregrinus*) – OS (BC Act)

The Peregrine Falcon is an uncommon but wide-ranging bird across Australia (Barrett *et al.*, 2003). It occurs mainly along rivers and ranges as well as wooded watercourses and lakes. It nests primarily on cliffs, granite outcrops and quarries, although is also known to occupy existing raptor and corvid stick nests (Menkhorst *et al.*, 2017). The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as parrots, pigeons and on the east coast, European Starlings (Olsen and Fuentes, 2008).

The Survey Area contains Degraded Grasslands, *Triodia* Flats, Stony Hills and Scattered Acacia Plains, providing suitable hunting habitat to support this species. Though suitable cliff faces and large tree hollows for nesting habitat are absent within the Survey Area.

Lined Soil-crevice Skink (*Notoscincus butleri*) – P4 (DBCA)

The Lined Soil-crevice Skink has a restricted distribution to near coastal areas in the Dampier region of the Pilbara. Habitat includes stony areas dominated by spinifex near creek and river margins (Wilson and Swan, 2021).

Records returned by the desktop search are largely associated with waterbody margins and coastal areas. The Survey Area contains Stony Hills, *Triodia* Grasslands and Minor Drainage Depressions which provide some suitable habitat to support this taxon, though the drainage lines intersecting the Survey Area are ephemeral and do not provide a permanent water source preferred by the Lined Soil-crevice Skink. A record in drainage habitat 365 m from the northern boundary of the Survey Area corridor from 2004 is indicative that though preferred habitats are limited (DBCA, 2024d), this taxon cannot be discounted from utilising the Survey Area.

Pacific Swift (*Apus pacificus*) – MI (BC Act) and MI, MA (EPBC Act)

The Pacific Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. The Pacific Swift occupies a large airspace range (i.e. low to very high) over varied habitats, ranging from rainforests to semi-deserts, occurring over dry or open habitats, including riparian woodland and swamps, low scrub, heathland or saltmarsh (Morcombe, 2003).

Records of this taxon are largely associated with coastal habitats, although the Survey Area contains open habitat in the form of *Triodia* Flats, Degraded Grassland and Scattered Acacia Plains which it may utilise while they forage aerially inland.

Oriental Plover (*Charadrius veredus*), MI (BC Act) and MI, MA (EPBC Act)

The Oriental Plover typically prefers grasslands and thinly vegetated plains, and open areas such as recently burnt country and heavily grazed pastures. During the hottest times of the day large flocks can be found on areas of wet ground associated with wetlands (Menkhorst *et al.*, 2017). As this species breeds in China and Mongolia, the Survey Area would be used for foraging only**.**

Records of this taxon are associated with bays north of the Survey Area, although the Survey Area contains Degraded Grasslands and *Triodia* Flats, providing suitable inland foraging habitat to support this species.

6.0 Conclusion

6.1 Flora

No Threatened or priority flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened/Declared Rare Flora pursuant to the BC Act 2016 were recorded during the survey.

Four introduced species were recorded during the survey all are listed as Permitted – s11 under the BAM Act and are considered widespread throughout the Pilbara.

Nine vegetation types were described and mapped across Five broad landforms of which One was considered analogous to Threatened or Priority Ecological Communities.

Vegetation type VT3 is analogous to the Roebourne Plains gilgai grasslands Priority One ecological community. VT3 was considered to be in degraded condition due to the heavy impact of cattle on the clays. Conservation significant flora could potentially be found on this vegetation type following optimal weather conditions.

Vegetation condition within the Survey Area ranged from Degraded to Very Good with the majority considered to be in Very Good condition. Evidence of disturbance included cattle, previous mining activity, and Weeds.

6.2 Fauna

Seven fauna habitats were mapped within the Survey Area:

- Drainage Line
- Minor Drainage Depressions
- *Triodia* Flats
- Degraded Grasslands
- Stony Hill
- Rocky Outcrops and Breakaways
- Scattered Acacia Shrubland

These habitats are typical of the Pilbara bioregions and are widespread outside the Survey Area. The Drainage Line, Minor Drainage Depressions, Scattered Acacia Shrubland, Stony Hills and Rocky Outcrops and Breakaways habitats were considered to have microhabitats of value to significant fauna. The Rocky Outcrops and Breakaways and Drainage habitats are of most value to the targeted taxon, the Northern Quoll.

The targeted Northern Quoll was recorded within the Rocky Outcrops and Breakaways habitat across the centre of the Survey Area by eight camera traps and spot analysis identified one individual utilising the Survey Area at the time of the survey.

In addition, one other significant taxon was recorded during the fauna survey within the Stony Hills habitat which provides high value habitat for this taxon, the Western Pebble-mound Mouse (*Pseudomys chapmani*) listed as P4 by DBCA.

One significant taxon was assessed as having a high likelihood, the Northern Short-tailed Mouse (*Leggadina lakedownensis*) listed as P4 by DBCA.

Six significant fauna were assessed as medium likelihood:

- Grey Falcon (Falco hypoleucos), listed as VU (BC Act; EPBC Act).
- Pilbara Olive Python (Liasis olivaceus barroni), listed as VU (BC Act; EPBC Act).
- Peregrine Falcon (Falco peregrinus), listed as OS (BC Act).
- Lined Soil-crevice Skink (Notoscincus butleri), listed as P4 (DBCA).
- Pacific Swift (Apus pacificus), listed as MI (BC Act), MI, MA (EPBC Act).
- Oriental Plover (Charadrius veredus), listed as MI (BC Act), MI, MA (EPBC Act).

Two introduced species were recorded during the survey, European Cattle (**Bos primigenius taurus*) and Black Rat (**Rattus rattus*).

7.0 References

360 Environmental (2021) *Karratha and Boodarie Biological Surveys*.

Aecom (2011) *Anketell Port Proposal Level 2 Flora and Vegetation Assessment*. Available at: www.aecom.com.

Anstee, S. (1996) "Use of External Mound Structures as Indicators of the Presence of the Pebble-Mound Mouse," *Wildlife Research*, 23(4), pp. 429–434.

Barrett, G. *et al.* (2003) *The new atlas of Australian birds*. Melbourne, Australia: Royal Australasian Ornithologists Union.

Beard, J.S. *et al.* (2013) "The vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir. Second edition," *Conservation Science W. Aust.*, 9(1), pp. 1–152.

Begg, R.J. (1981) "The Small Mammals of Little Nourlangie Rock, N.T iii. Ecology of Dasyurus hallucatus, The Northern Quoll (Marsupialia: Dasyuridae)," *Wildlife Research* [Preprint]. Available at: https://doi.org/10.1071/WR9810073.

BirdLife International (2016) *Falco hypoleucos. The IUCN Red List of Threatened Species 2016*. Available at: https://www.iucnredlist.org/species/22696479/93566768#text-fields (Accessed: February 24, 2020).

BoM (2024) *Climate Data Online*. Available at: http://www.bom.gov.au.

Braithwaite, R.W. and Griffiths, A.D. (1994) "Demographic variation and range contraction in the northern quoll, Dasyurus hallucatus (Marsupialia: Dasyuridae)," *Wildlife Research* [Preprint]. Available at: https://doi.org/10.1071/WR9940203.

CISS (2024) *Government weed strategies and lists*. Available at: https://weeds.org.au/.

Commonwealth of Australia (1999) *Environment Protection and Biodiversity Conservation Act 1999*. Australia. Available at: www.legislation.gov.au.

DBCA (2013) *Targeted Flora Survey of the Naturebank Envelope in Millstream Chichester National Park*.

DBCA (2017) *Guidelines for surveys to detect the presence of bilbies and assess the importance of habitat in Western Australia*. Perth, Australia. Available at: https://www.dpaw.wa.gov.au.

DBCA (2023a) *DBCA - Lands of Interest (DBCA-012)*. Available at: https://catalogue.data.wa.gov.au.

DBCA (2023b) *DBCA - Legislated Lands and Waters (DBCA-011)*. Available at: https://catalogue.data.wa.gov.au.

DBCA (2023c) *PRIORITY ECOLOGICAL COMMUNITIES FOR WESTERN AUSTRALIA VERSION 35*.

DBCA (2024a) *Florabase - the Western Australian Flora*. Available at: https://florabase.dbca.wa.gov.au.

DBCA (2024b) *NatureMap Database Search*. Perth, Australia. Available at: flora.data@dbca.wa.gov.au.

DBCA (2024c) *Threatened and Priority Ecological Communities Database Search*. Perth, Australia. Available at: communities.data@dbca.wa.gov.au.

DBCA (2024d) *Threatened and Priority Fauna Database Search*. Perth, Australia. Available at: fauna.data@dbca.wa.gov.au.

DBCA (2024e) *Threatened and Priority Flora List (TPFL) Database Search*. Perth, Australia. Available at: flora.data@dbca.wa.gov.au.

DBCA (2024f) *Western Australia Herbarium Flora Database Search*. Perth, Australia. Available at: flora.data@dbca.wa.gov.au.

DCCEEW (2024) *Protected Matters Search Tool*. Canberra, Australia. Available at: https://www.dcceew.gov.au.

DEE (2016) *Interim Biogeographic Regionalisation for Australia, Version 7*. Canberra, Australia. Available at: www.environment.gov.au.

DEWHA (2010a) *Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Available at: https://www.dcceew.gov.au.

DEWHA (2010b) *Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, Australia. Available at: https://www.dcceew.gov.au.

DoE (2013) *Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999*. Canberra, Australia. Available at: https://www.environment.gov.au.

DoE (2016) *EPBC Act referral guideline for the endangered northern quoll Dasyurus hallucatus*. Available at: http://www.environment.gov.au.

Doughty, P. *et al.* (2011) "Herpetological assemblages of the Pilbara biogeographic region, Western Australia: ecological associations, biogeographic patterns and conservation.," *Records of the Western Australian Museum Supplement*, 78, pp. 315–341.

DPAW (2017) *Interim Guideline for Preliminary Surveys of Night Parrot (Pezoporus occidentalis) in Western Australia*. Perth, Australia. Available at: https://www.dpaw.wa.gov.au.

DPIRD (2022) *Soil Landscape Mapping - Best Available (DPIRD-027)*. Perth, Australia. Available at: https://catalogue.data.wa.gov.au.

DPIRD (2024) *Declared plants*. Available at: https://www.agric.wa.gov.au/.

DSEWPaC (2011a) *Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, Australia. Available at: https://www.dcceew.gov.au.

DSEWPaC (2011b) *Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999*. Canberra, Australia. Available at: https://www.dcceew.gov.au/.

DWER (2018) *Hydrography, Linear (Hierarchy) (DWER-031)*. Perth, Australia: Landgate. Available at: https://catalogue.data.wa.gov.au.

DWER (2021) *Clearing Regulations - Environmentally Sensitive Areas (DWER-046)*. Available at: https://catalogue.data.wa.gov.au/.

Van Dyck, S. and Strahan, R. (2008) *The mammals of Australia*. 3rd edn. Sydney, Australia: New Holland Publishers.

ENV (2012) *Flora and Vegetation Assessment, Bardies Well*.

EPA (2016a) *Environmental Factor Guideline - Flora and Vegetation*. Available at: https://www.epa.wa.gov.au.

EPA (2016b) *Environmental Factor Guideline - Terrestrial Fauna*. Perth. Available at: https://www.epa.wa.gov.au.

EPA (2016c) *Technical Guidance - Flora and vegetation surveys for environmental impact assessment*. Perth, Australia. Available at: https://www.epa.wa.gov.au/.

EPA (2020) *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment*. Perth, Australia. Available at: https://www.epa.wa.gov.au/policies-guidance/technical-guidance-terrestrial-vertebrate-fauna-surveys-environmental-impact.

Ford, F. and Johnson, C. (2007) "Eroding abodes and vanished bridges: historical biogeography of the substrate specialist pebble-mound mice (Pseudomys)," *Journal of Biogeography*, 34(3), pp. 514–523.

GHD (2011) *Report for Karratha Land Release - Amendment 21 Flora and Fauna Assessment*.

GHD (2019) *Horizon Power 124-KRT-DMP 132kV Line Upgrade Project Flora and Fauna Survey*.

GHD (2022) *Maitland to Karratha Terminal Flora and Fauna Survey*.

Government of Western Australia (1986) *Environmental Protection Act 1986*. Available at: www.legislation.wa.gov.au.

Government of Western Australia (2007) *Biosecurity and Agriculture Management Act 2007*. Available at: https://www.legislation.wa.gov.au.

Government of Western Australia (2016) *Biodiversity Conservation Act 2016*. Available at: www.legislation.wa.gov.au.

Government of Western Australia (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019.* Available at: https://catalogue.data.wa.gov.au.

How, R.A., Spencer, P.B.S. and Schmitt, L.H. (2009) "Island populations have high conservation value for northern Australia's top marsupial predator ahead of a threatening process," *Journal of Zoology* [Preprint]. Available at: https://doi.org/10.1111/j.1469-7998.2009.00569.x.

Johnstone, R.E. and Storr, G.M. (1998) *Handbook of Western Australian birds*. Edited by D. Louise. Perth, Australia: Western Australian Museum.

Kendrick, P. and McKenzie, N. (2001) *Pilbara 1 (PIL1 – Chichester subregion)*.

Menkhorst, P. *et al.* (2017) *The Australian Bird Guide*. Australia: CSIRO Publishing.

Morcombe, M. (2003) *Field Guide to Australian Birds*. Archerfield: Steve Parish Publishing Pty Ltd.

Oakwood, M. (2000) "Reproduction and demography of the northern quoll, Dasyurus hallucatus, in the lowland savanna of northern Australia," *Australian Journal of Zoology* [Preprint]. Available at: https://doi.org/10.1071/ZO00028.

Olsen, J. and Fuentes, E. (2008) "Dietary shifts based upon prey availability in Peregrine Falcons and Australian Hobbies breeding near Canberra, Australia," *Journal of Raptor Research*, 42, pp. 125–137.

Pearson, D. (1993) "'Distribution, status and conservation of pythons in Western Australia', in D Lunney, & D Ayers, (Eds), Herpetology in Australia: A Diverse Discipline," *Royal Zoological Society of NSW, Sydney*, pp. 383–395.

Pearson, D. (2003) "Giant Pythons of the Pilbara," *Landscope*, pp. 32–39.

Phoenix Environmental Sciences (2010) *Terrestrial Vertebrate Fauna Survey for Anketell Point Rail Alignment and Port Projects*.

Phoenix Environmental Sciences (2013) *Terrestrial fauna survey for the Balla Balla Magnetite Project barge loading facility*.

Phoenix Environmental Sciences (2014) *Terrestrial fauna surveys for the Balla Balla Railway Project*.

Schmitt, L.H. *et al.* (1989) “Ecology and physiology of the northern quoll, Dasyurus hallucatus (Marsupialia, Dasyuridae), at Mitchell Plateau, Kimberley, Western Australia,” *Journal of Zoology* [Preprint]. Available at: https://doi.org/10.1111/j.1469-7998.1989.tb02510.x.

Schoenjahn, J., Pavey, C.R. and Walter, G.H. (2019) “Ecology of the Grey Falcon Falco hypoleucos–current and required knowledge,” *Emu* [Preprint]. Available at: https://doi.org/10.1080/01584197.2019.1654393.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J. (2002) *Native vegetation in Western Australia: Extent, type and status. Resource Management Technical Report 249*. Perth, Australia. Available at: https://library.dpird.wa.gov.au.

WAM (2024) *Checklist of the Terrestrial Vertebrate Fauna of Western Australia*.

Wilson, S. and Swan, G. (2021) *A complete guide to reptiles of Australia*. 6th edn. New Holland Publishers.

Appendix A Maps

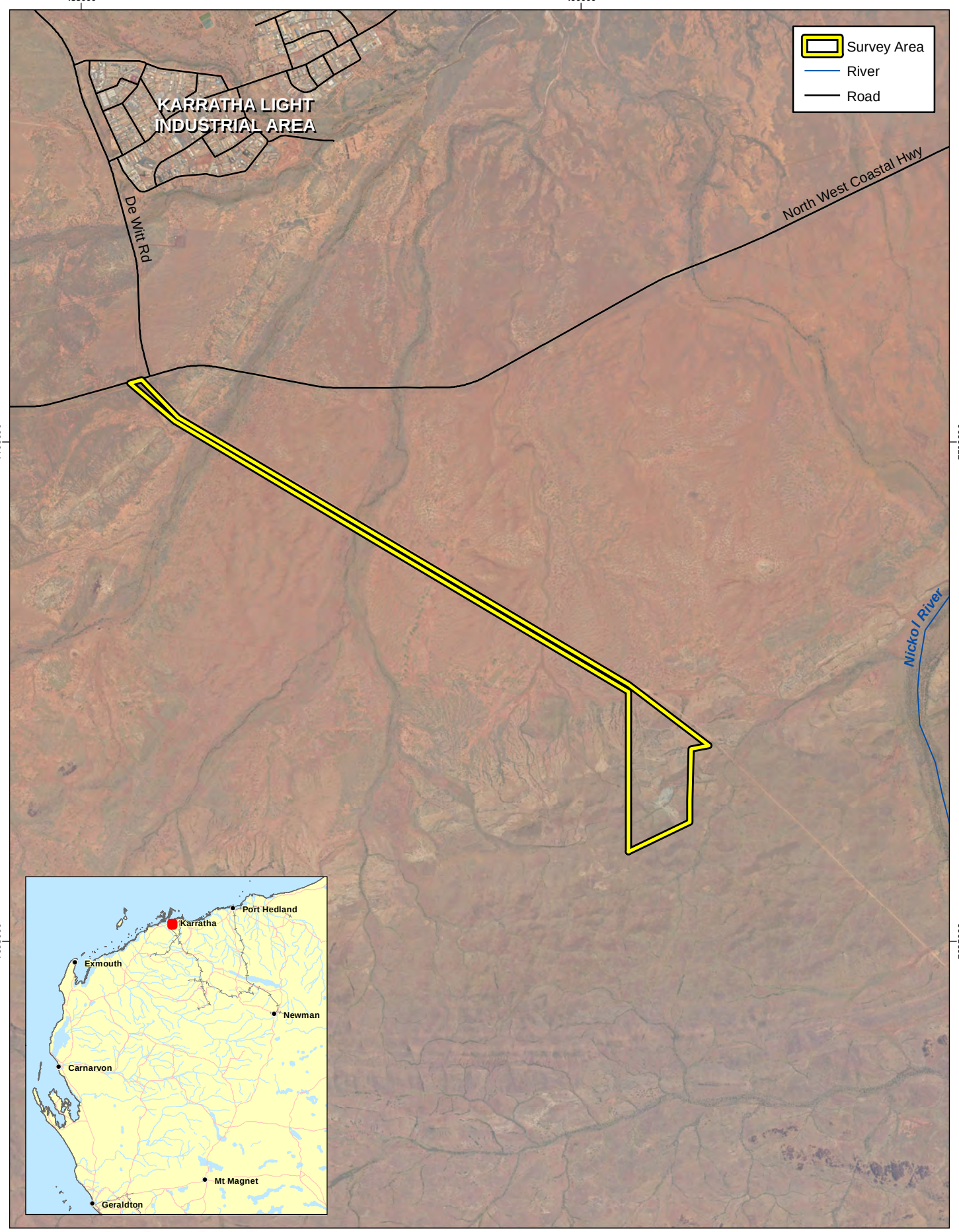
Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 0.5 1 2 km

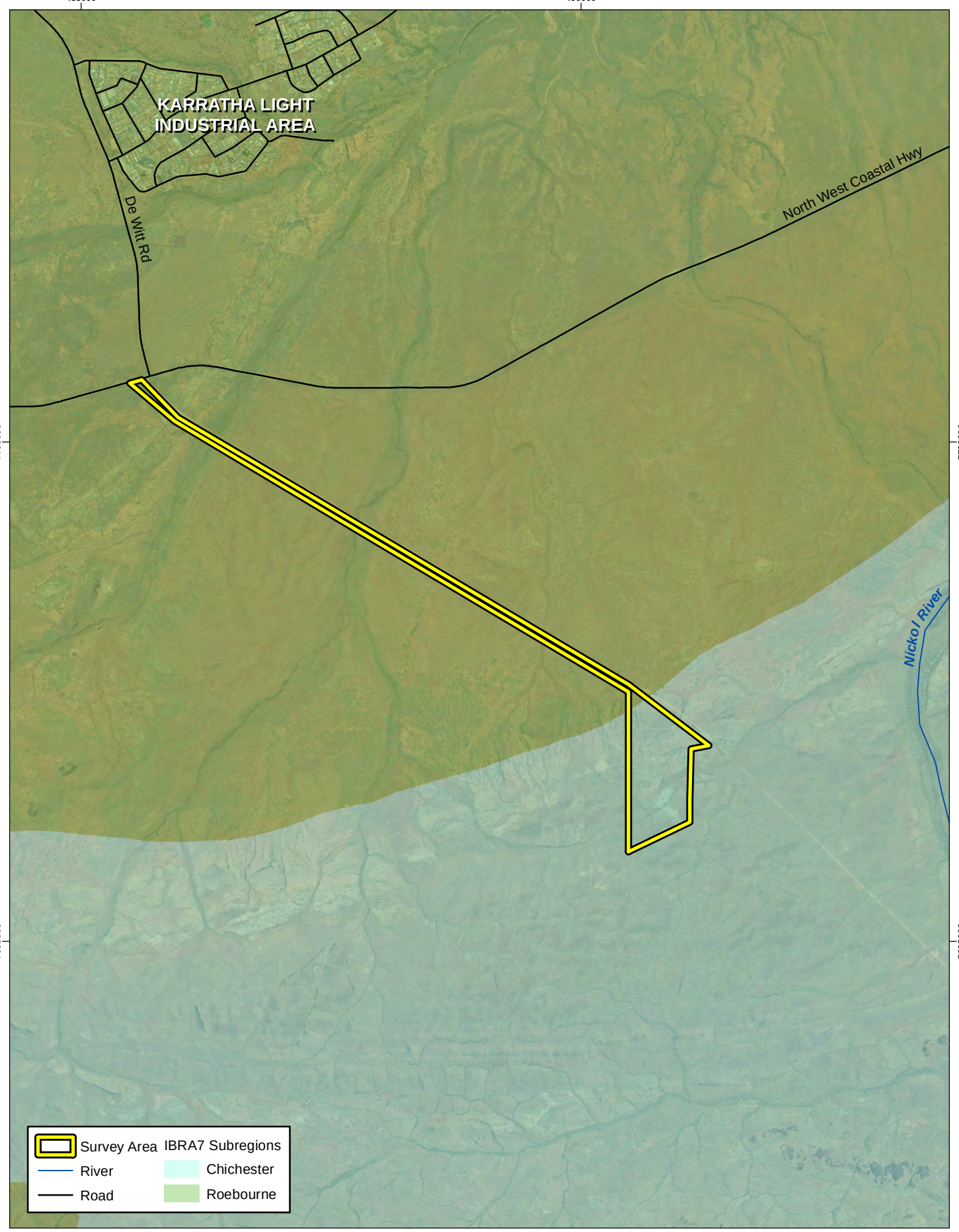
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:50,000 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Survey Area
MAP 1



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 0.5 1 2 km

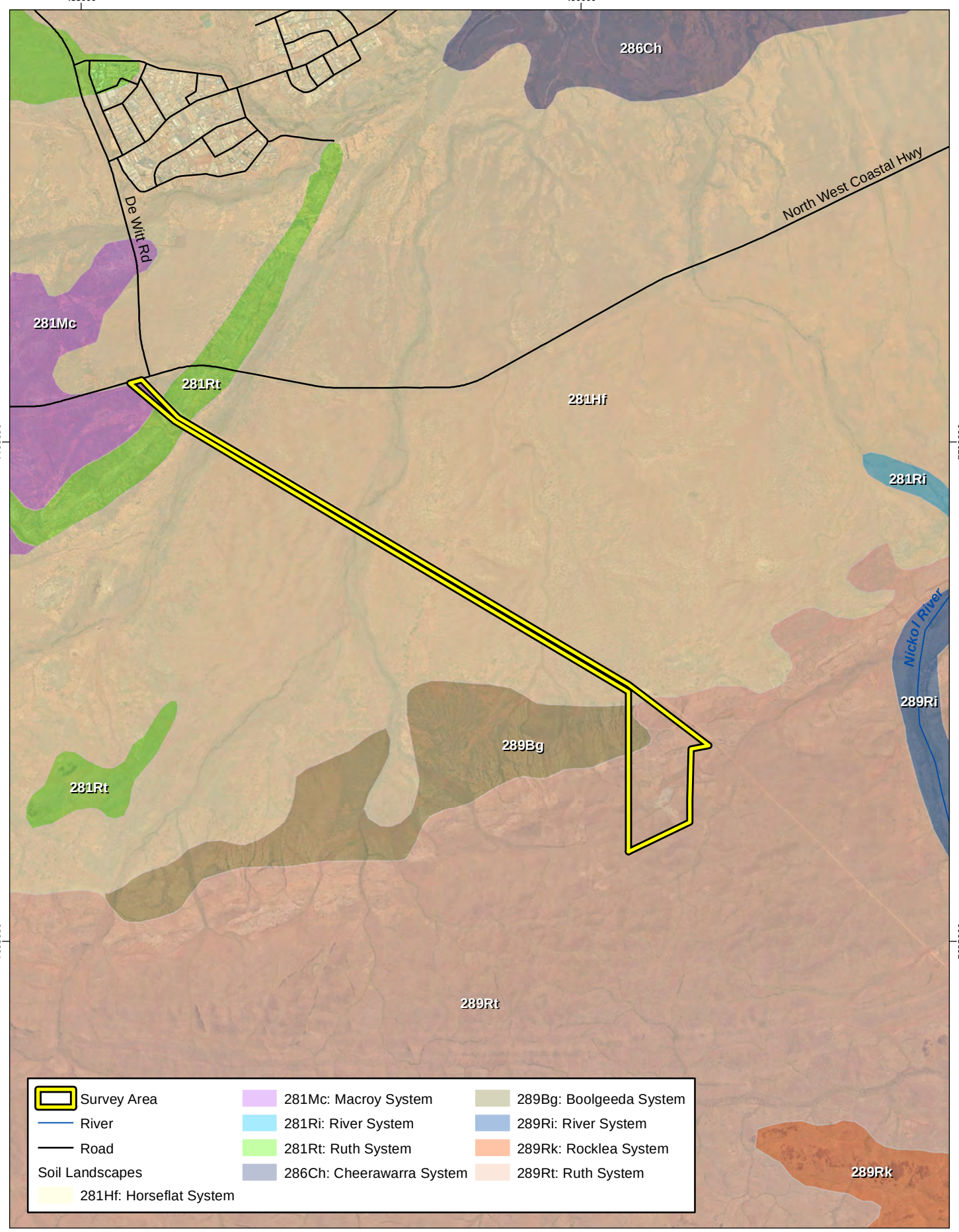
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:50,000 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

IBRA Subregions
MAP 2



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 0.5 1 2 km

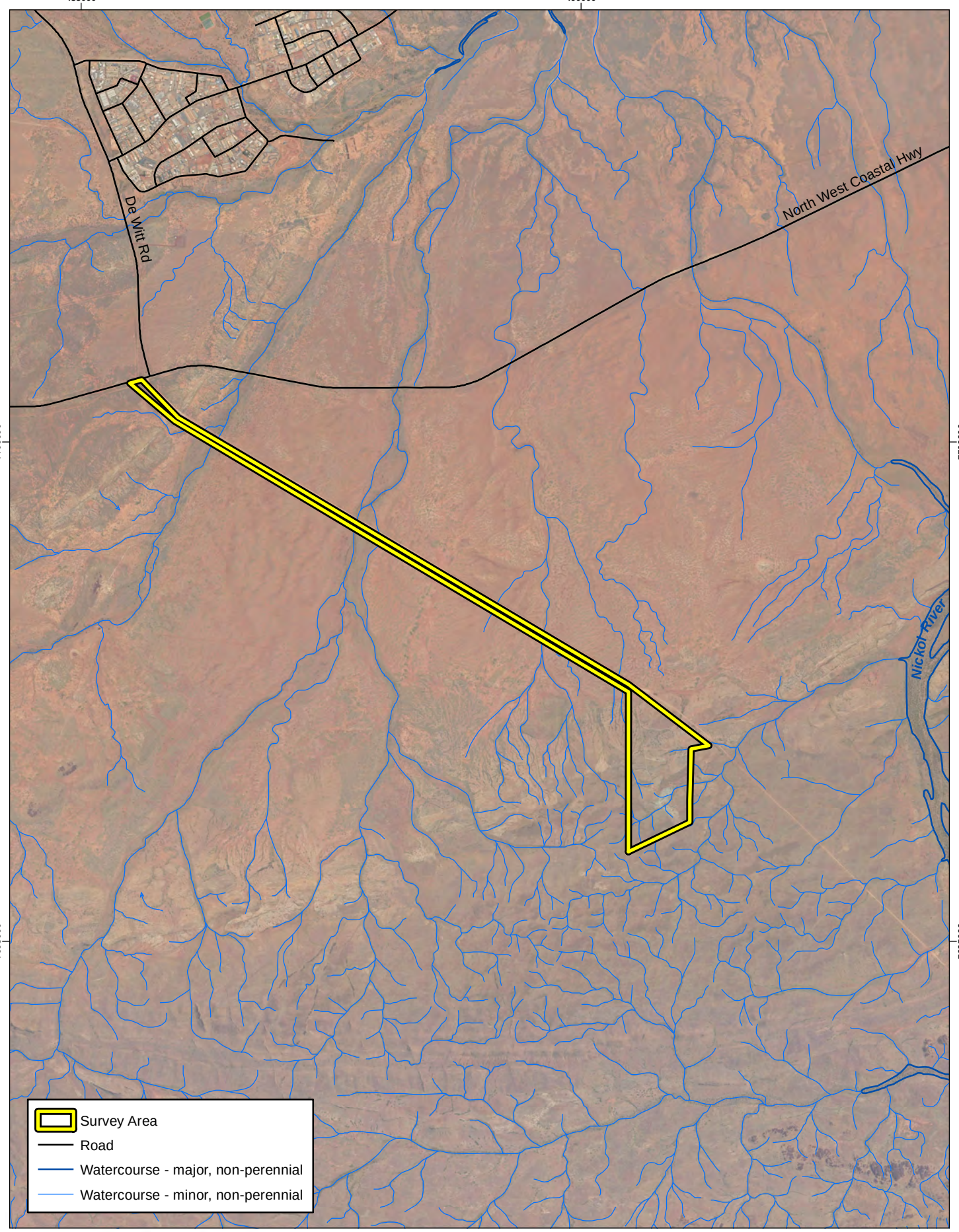
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:50,000 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Soil Landscapes
MAP 3



N 0 0.5 1 2 km

Service Layer Credits: Landgate / SLIP

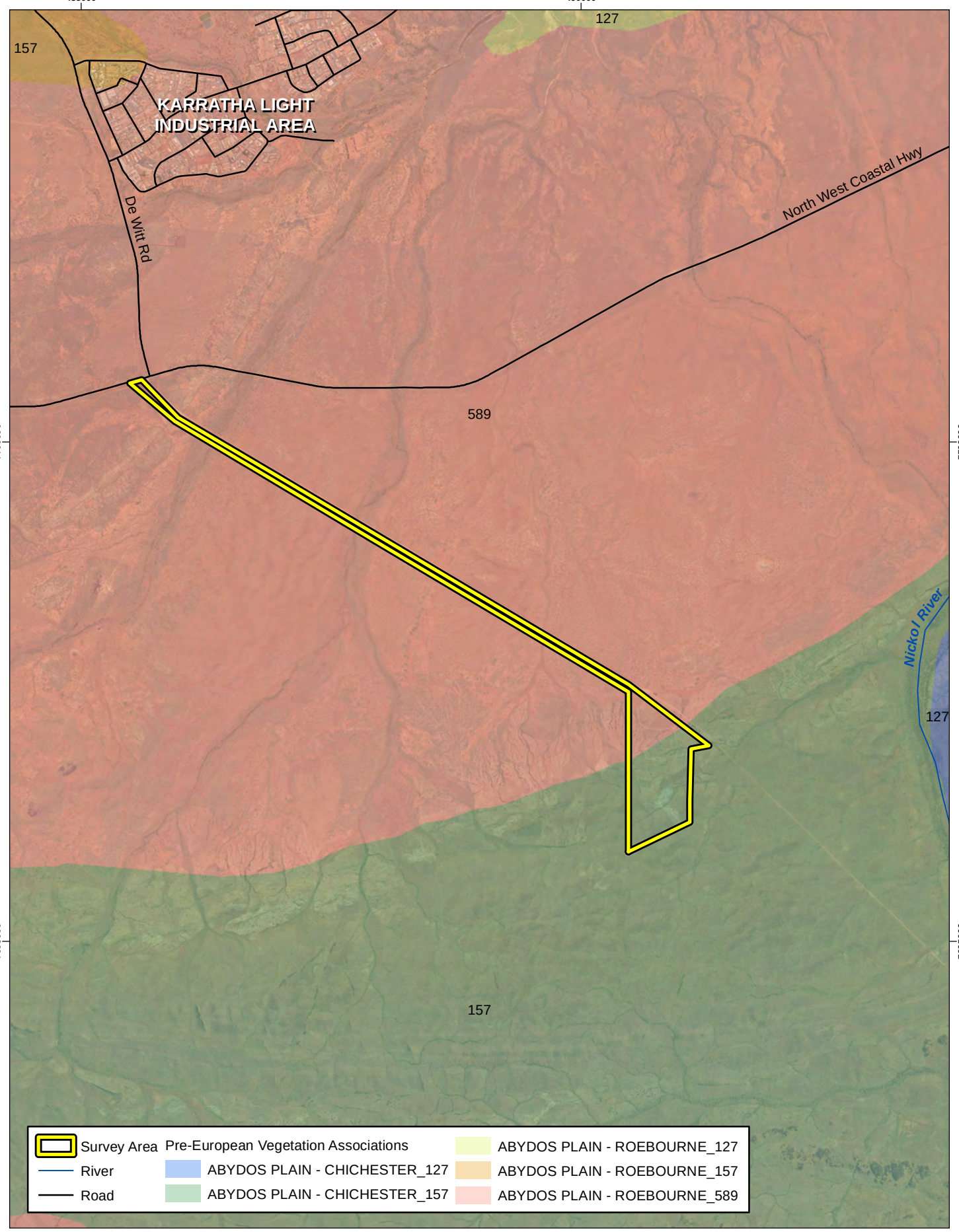
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:50,000 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Hydrography
MAP 4



N 0 0.5 1 2 km

Service Layer Credits: Landgate / SLIP

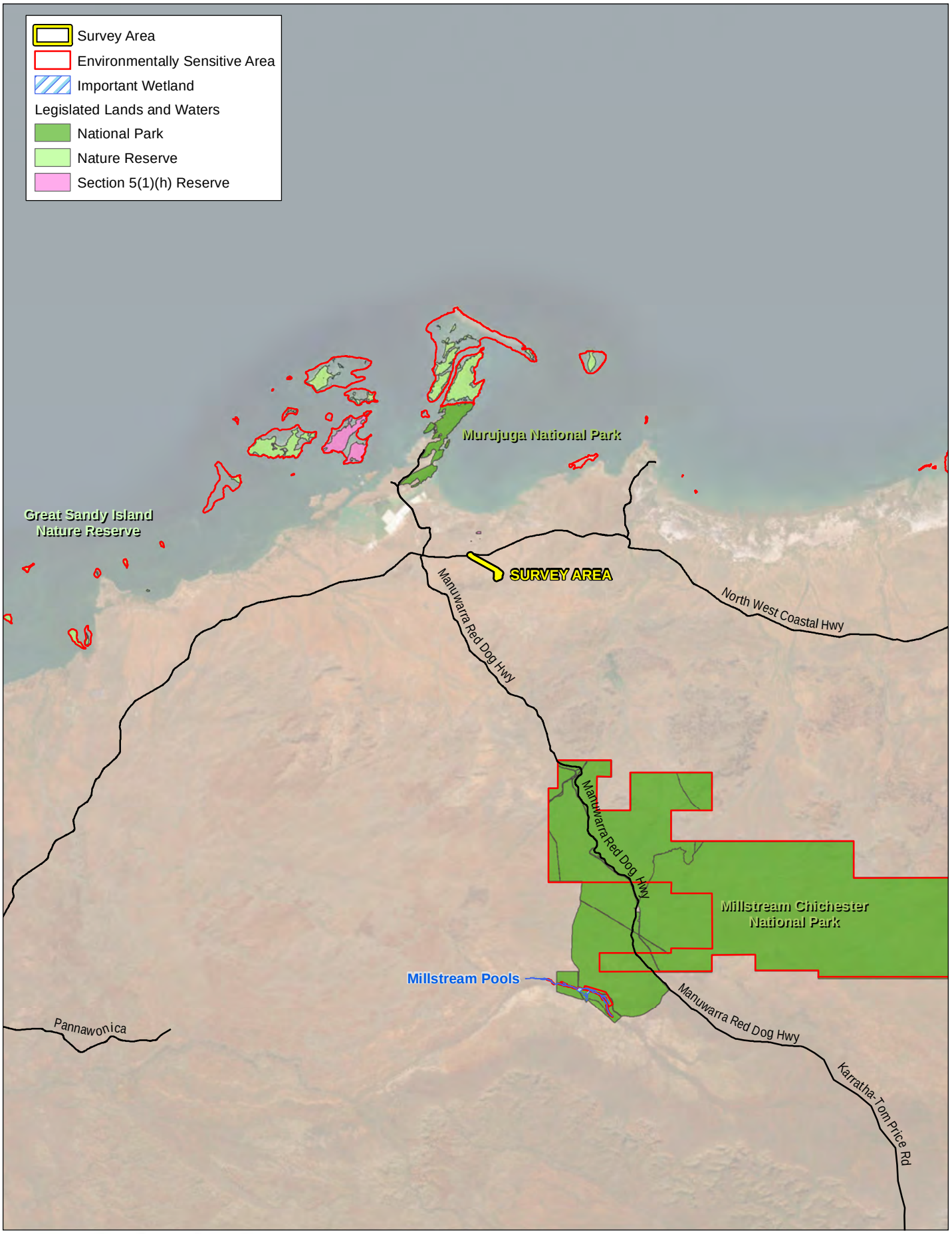
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:50,000 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Pre-European Vegetation Associations
MAP 5

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

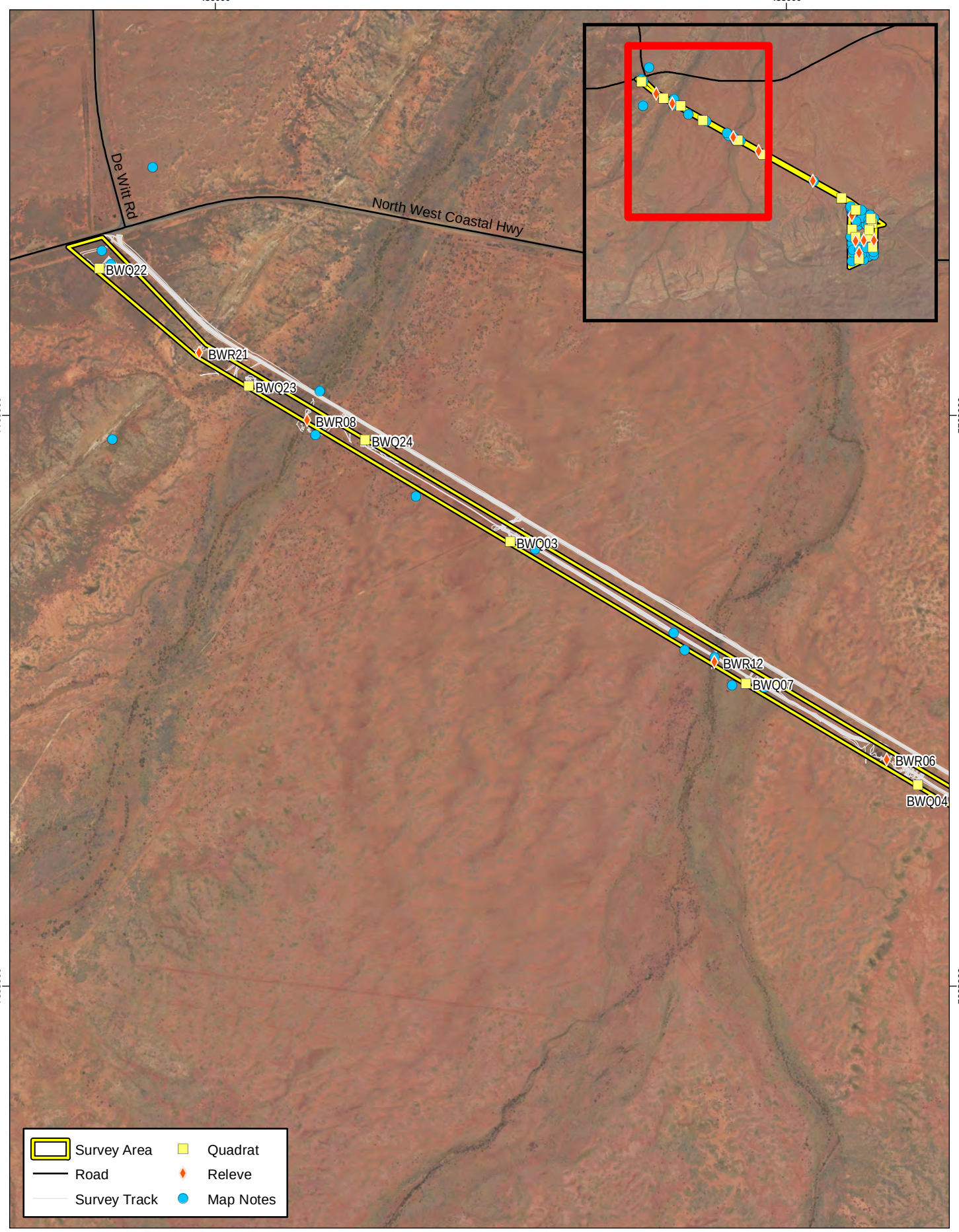
N 0 12.5 25 50 km

Service Layer Credits: Landgate / SLIP

Coordinate System: GCS GDA 1994 @ A4
Scale : 1:1,000,000 @ A4
Project Number : 675.072378.00001
Date Drawn : 14/06/2024
Drawn By : Environmaps
Reviewed By : JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Environmentally Sensitive Areas and Conservation Areas
MAP 6



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 200 400 800 m

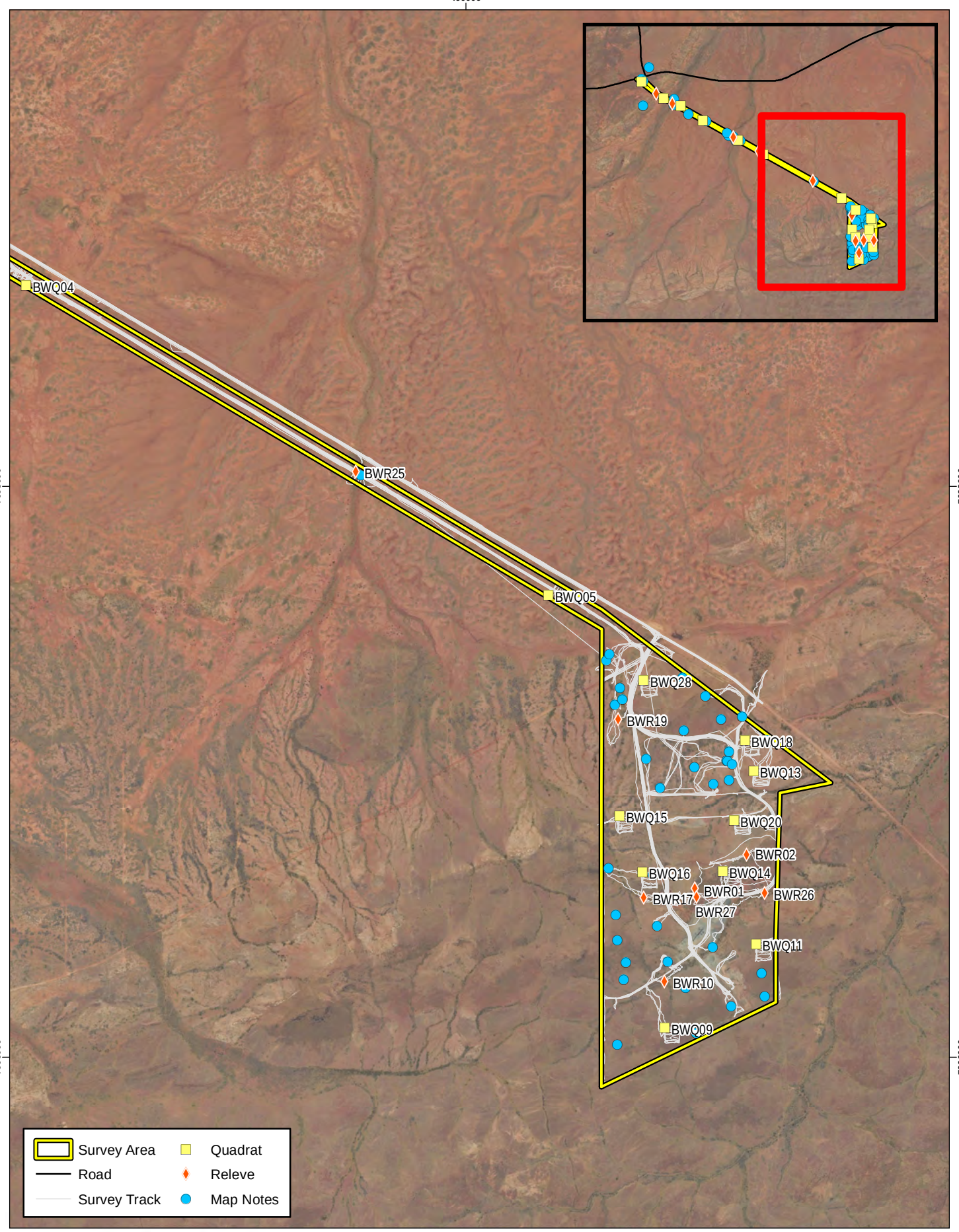
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:17,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Survey Effort
MAP 7A



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 200 400 800 m

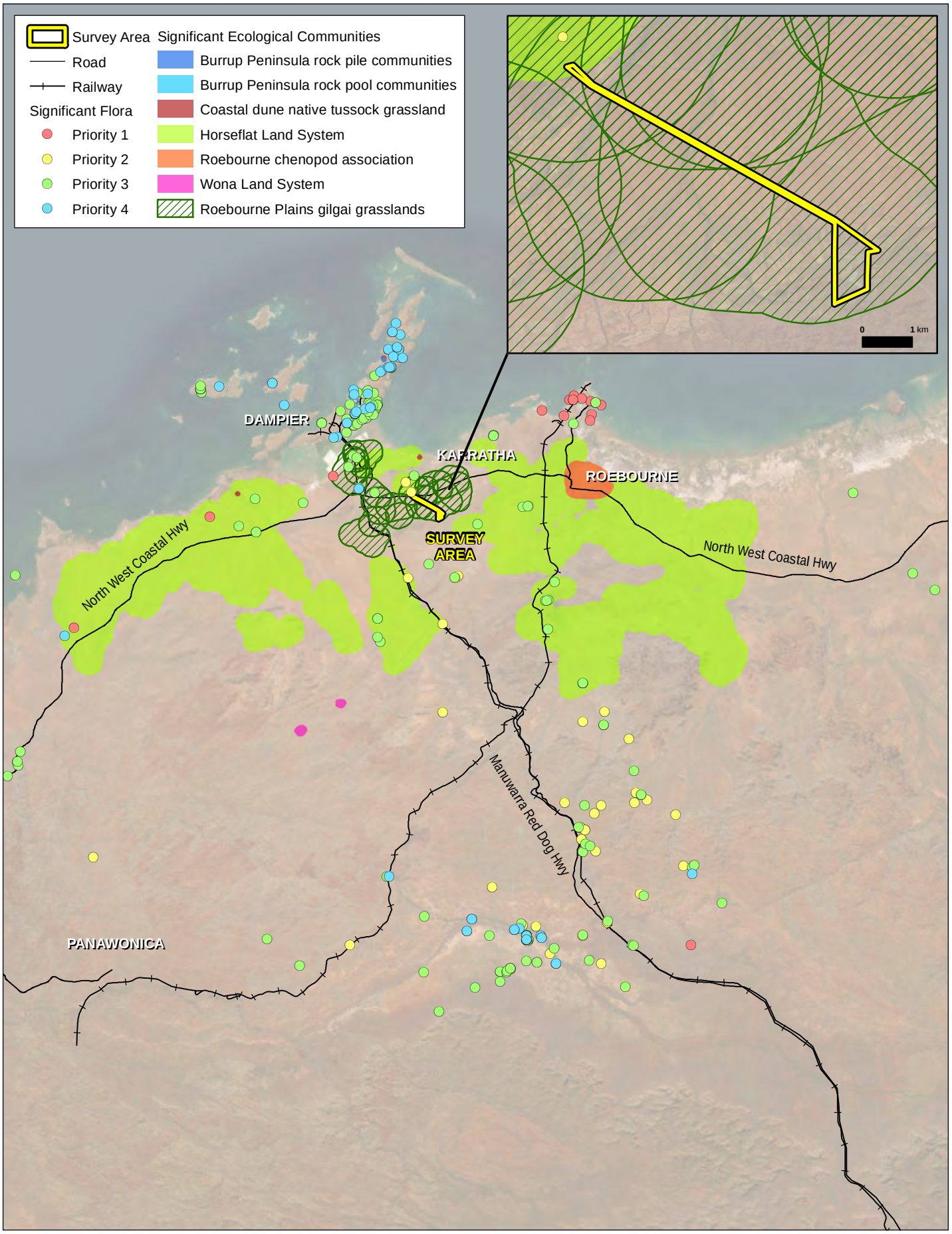
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:17,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Survey Effort
MAP 7B



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

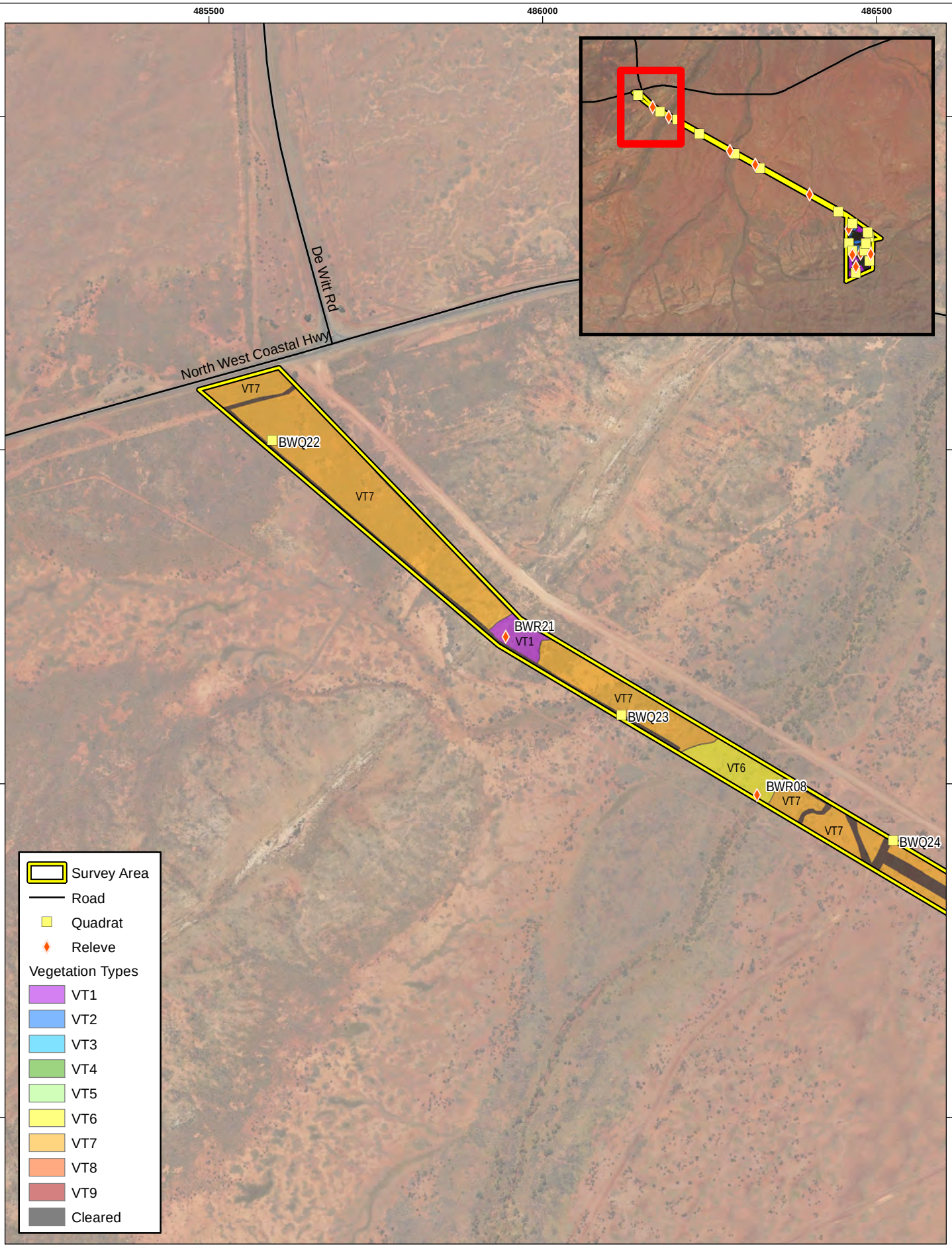
N 0 12.5 25 50 km

Service Layer Credits: Landgate / SLIP

Coordinate System: GCS GDA 1994 @ A4
Scale : 1:1,000,000 @ A4
Project Number : 675.072378.00001
Date Drawn : 14/06/2024
Drawn By : Environmaps
Reviewed By : JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Significant Flora and Ecological Community
MAP 8



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

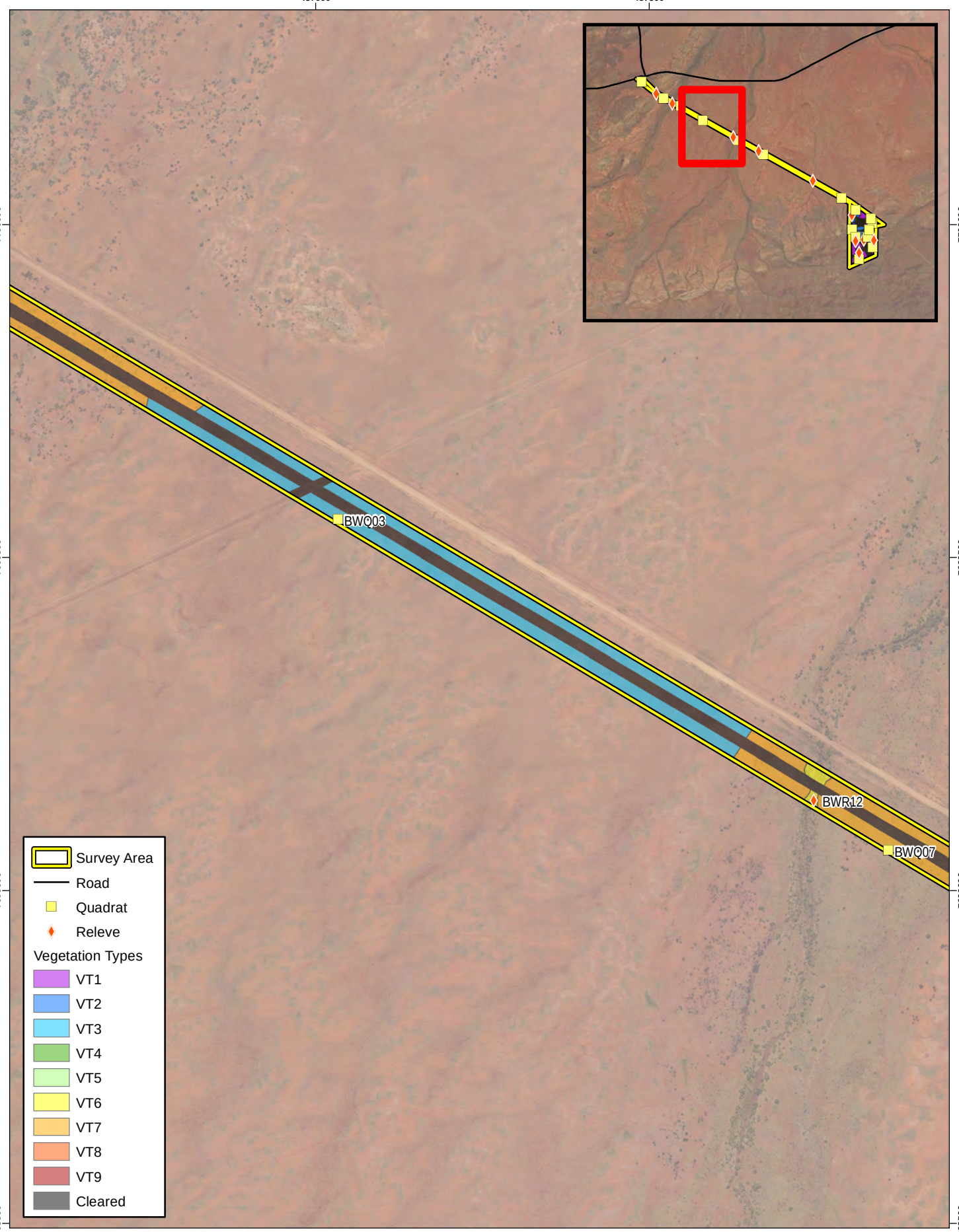
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Types
MAP 9A



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

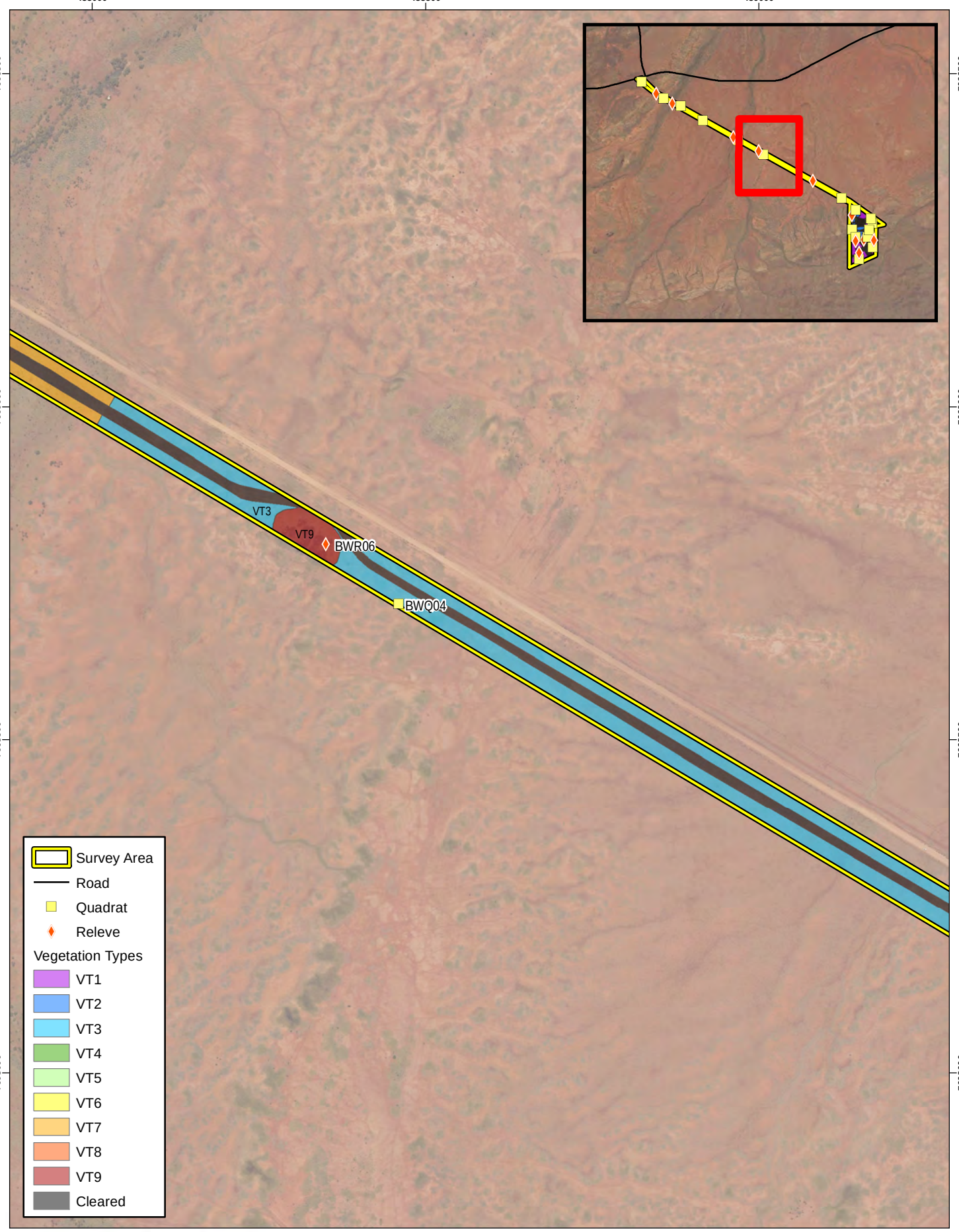
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Types
MAP 9B



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

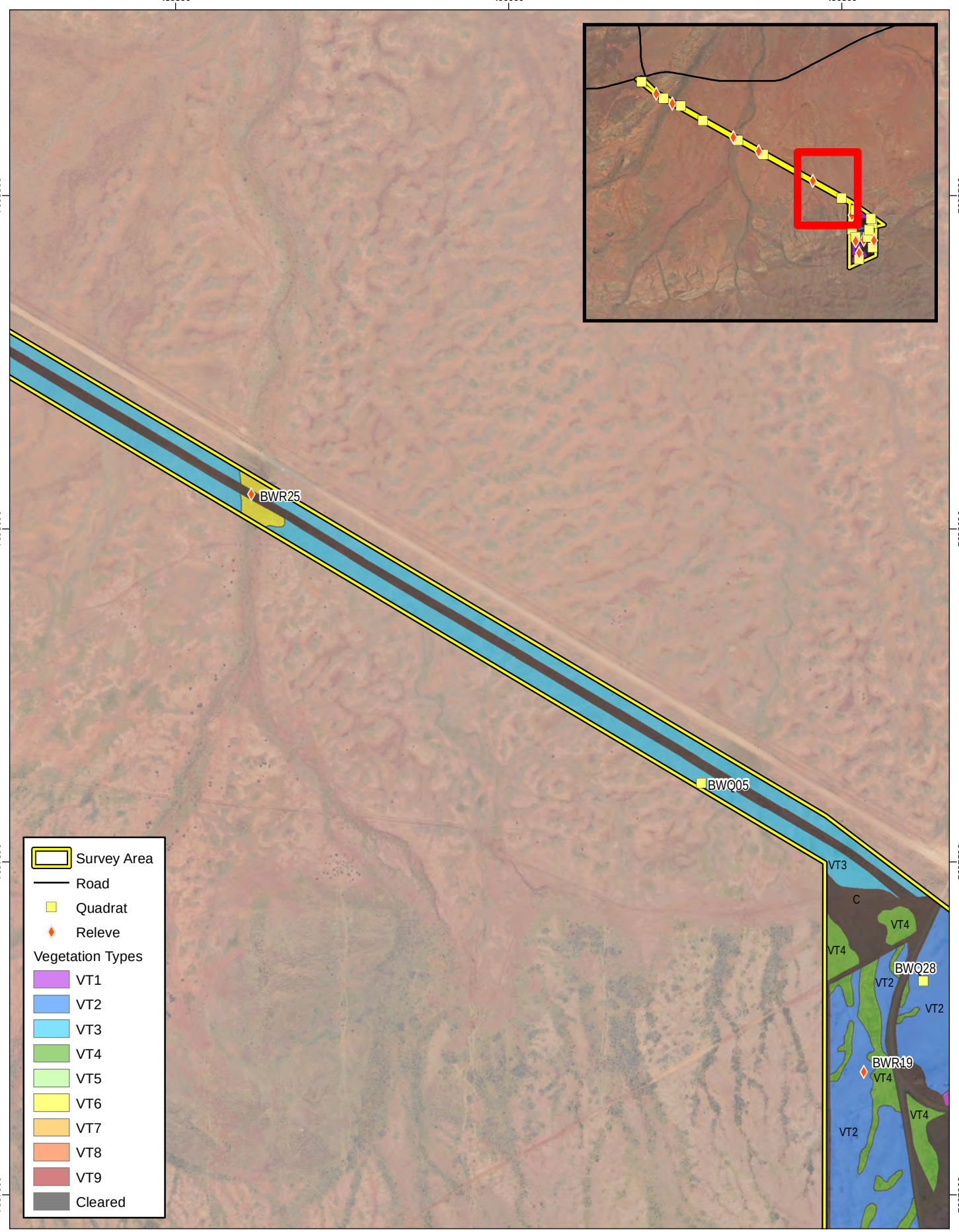
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Types
MAP 9C



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

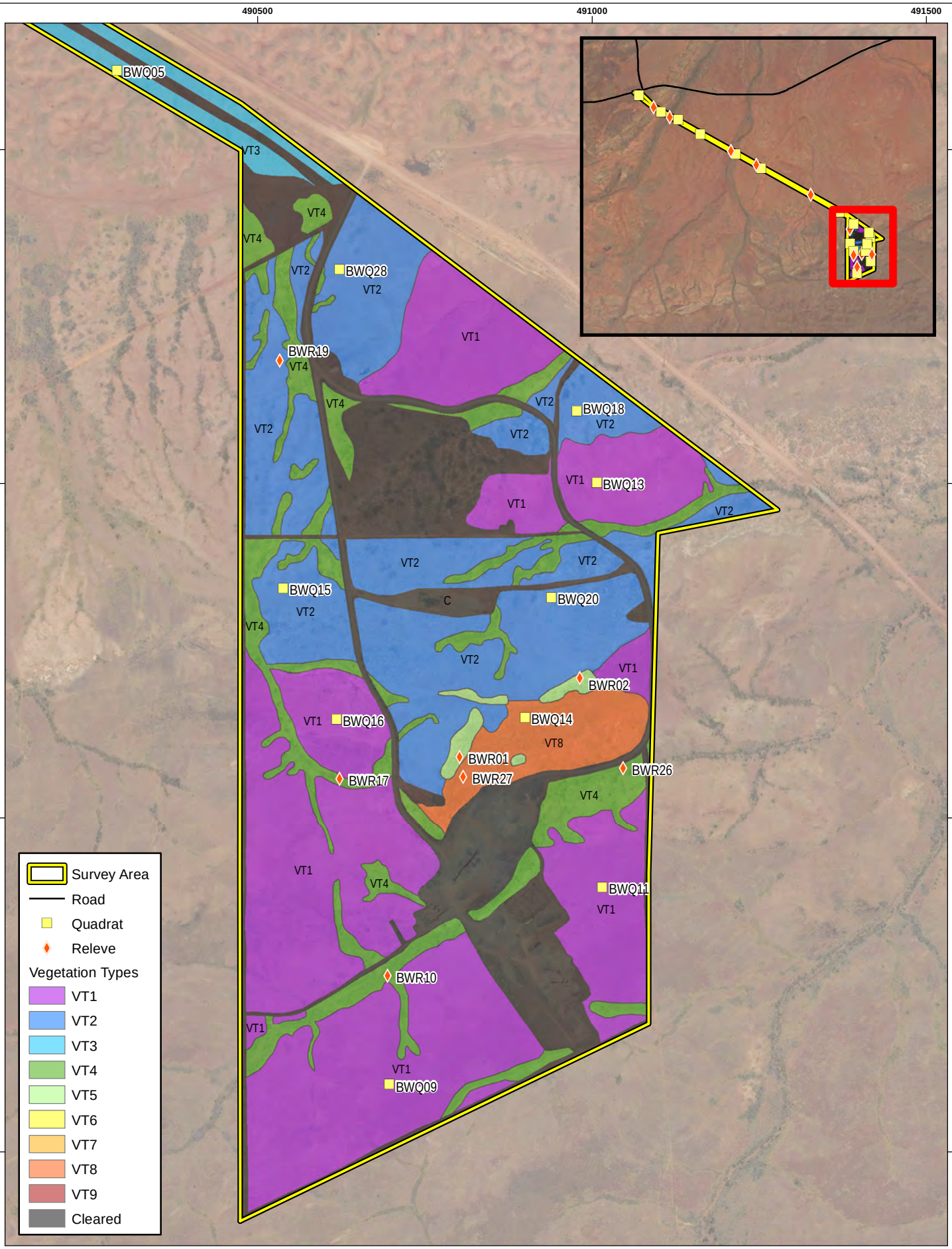
N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4
Scale : 1:7,500 @ A4
Project Number : 675.072378.00001
Date Drawn : 14/06/2024
Drawn By : Environmaps
Reviewed By : JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Types
MAP 9D



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

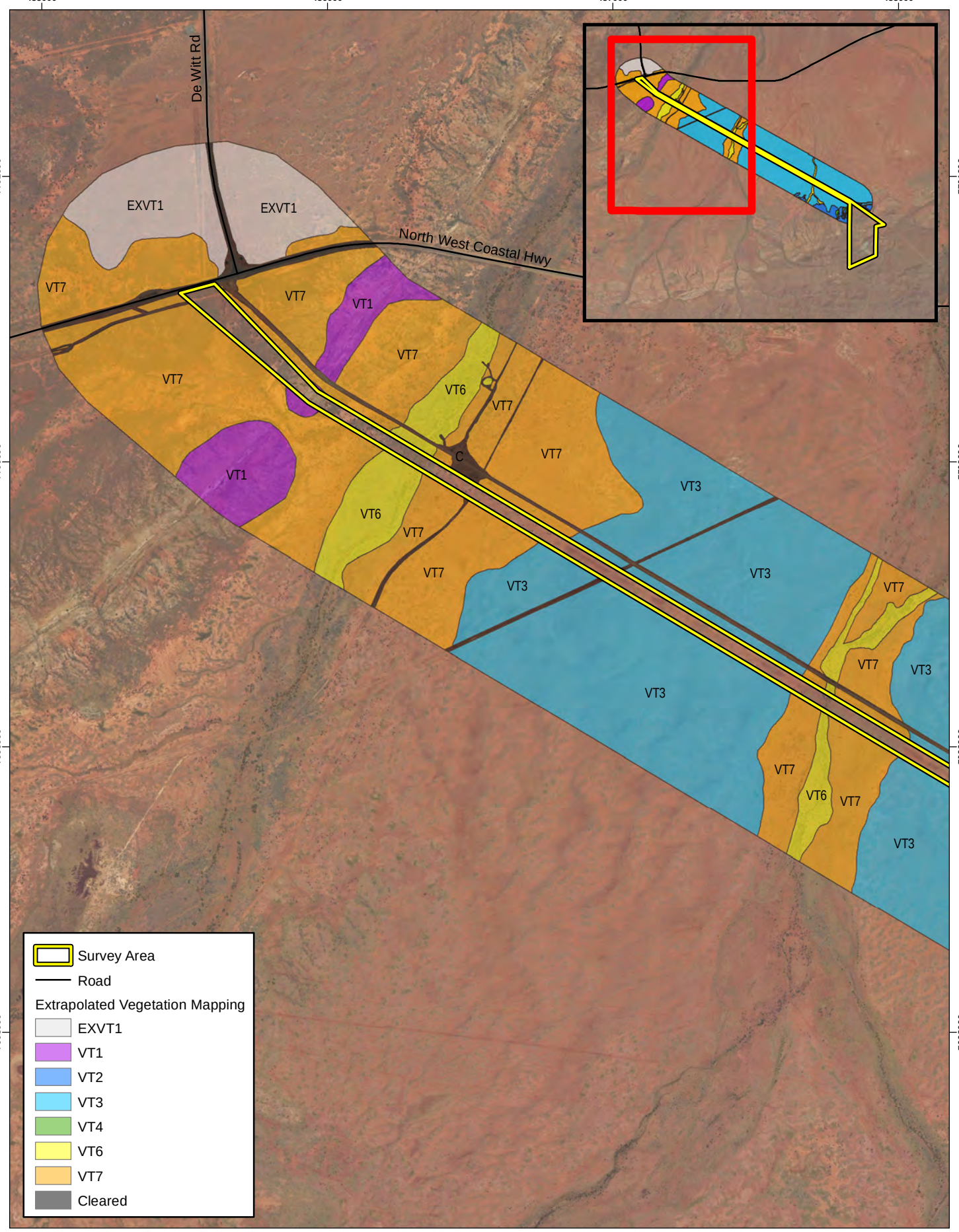
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Types
MAP 9E



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 200 400 800 m

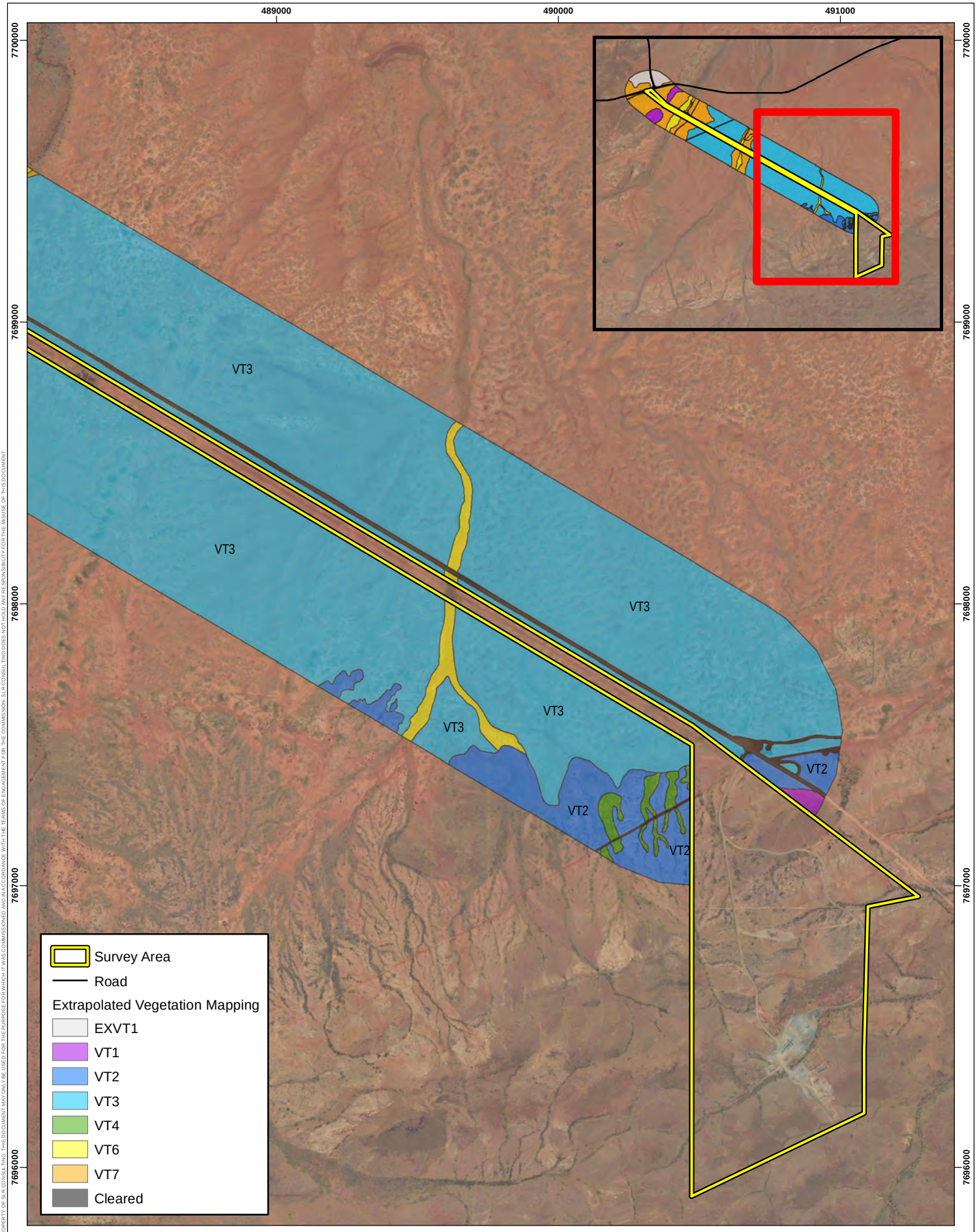
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:17,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Extrapolated Vegetation Mapping
MAP 10A



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 200 400 800 m

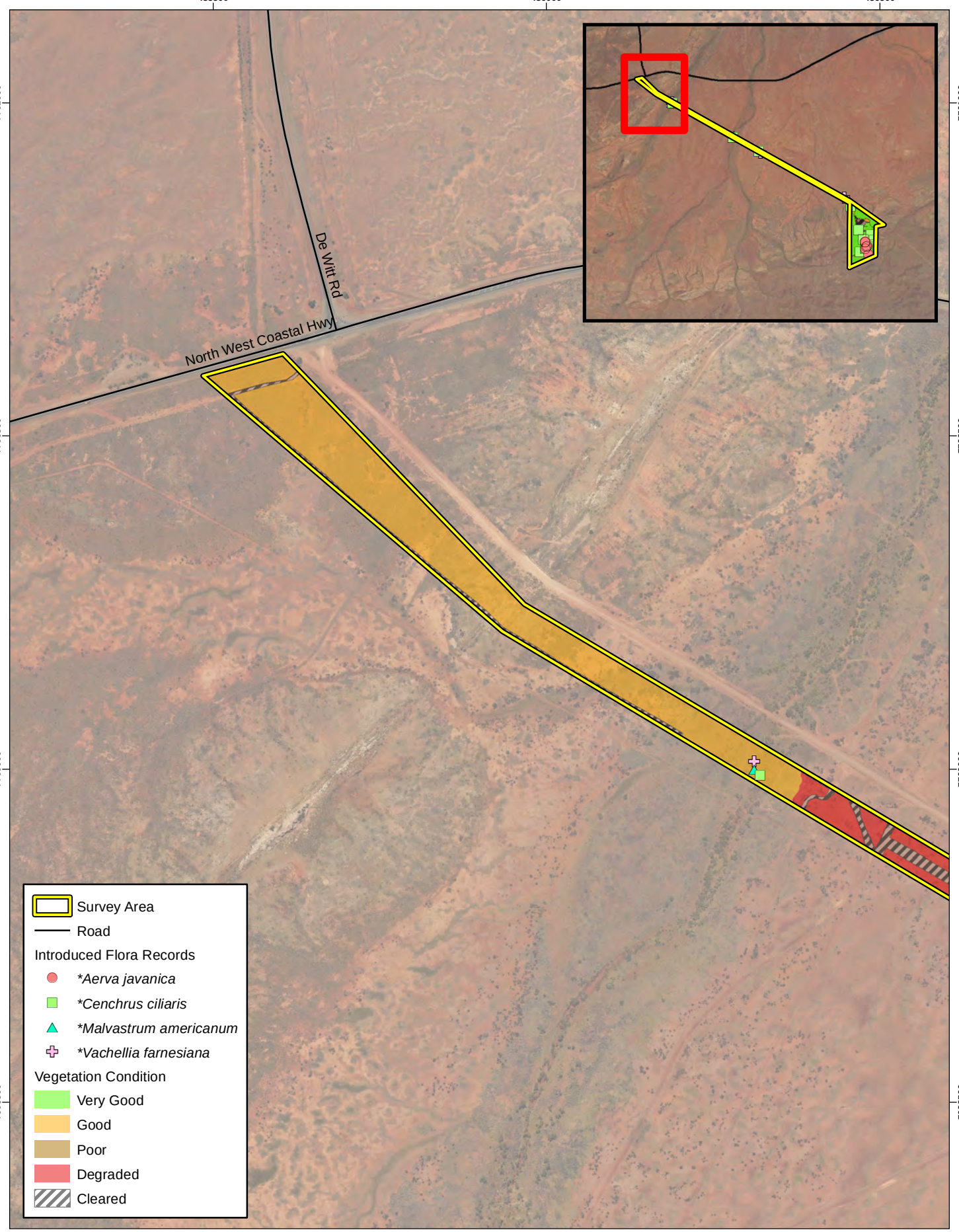
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:17,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Extrapolated Vegetation Mapping
MAP 10B



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

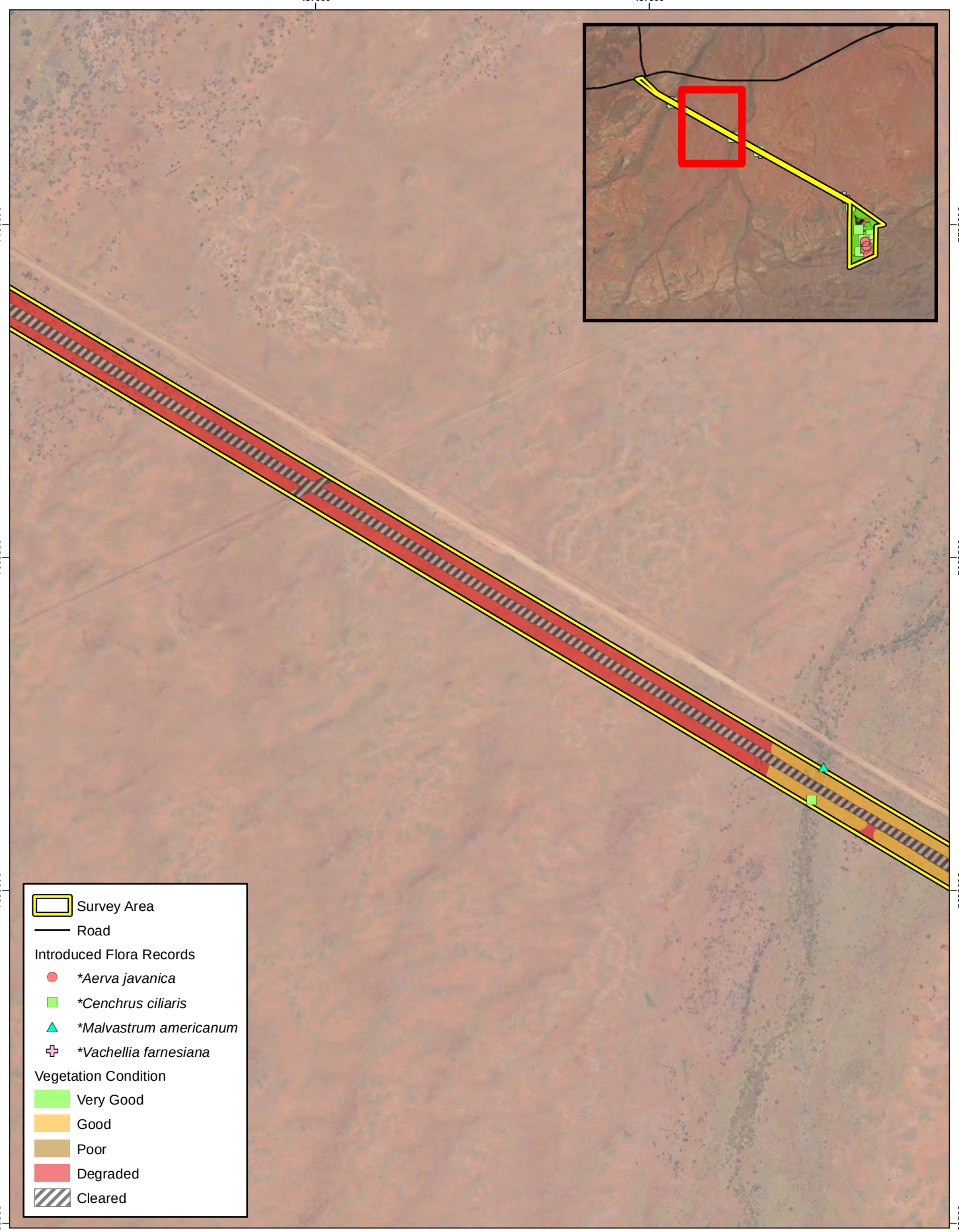
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Condition and Introduced Flora Records
MAP 11A



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

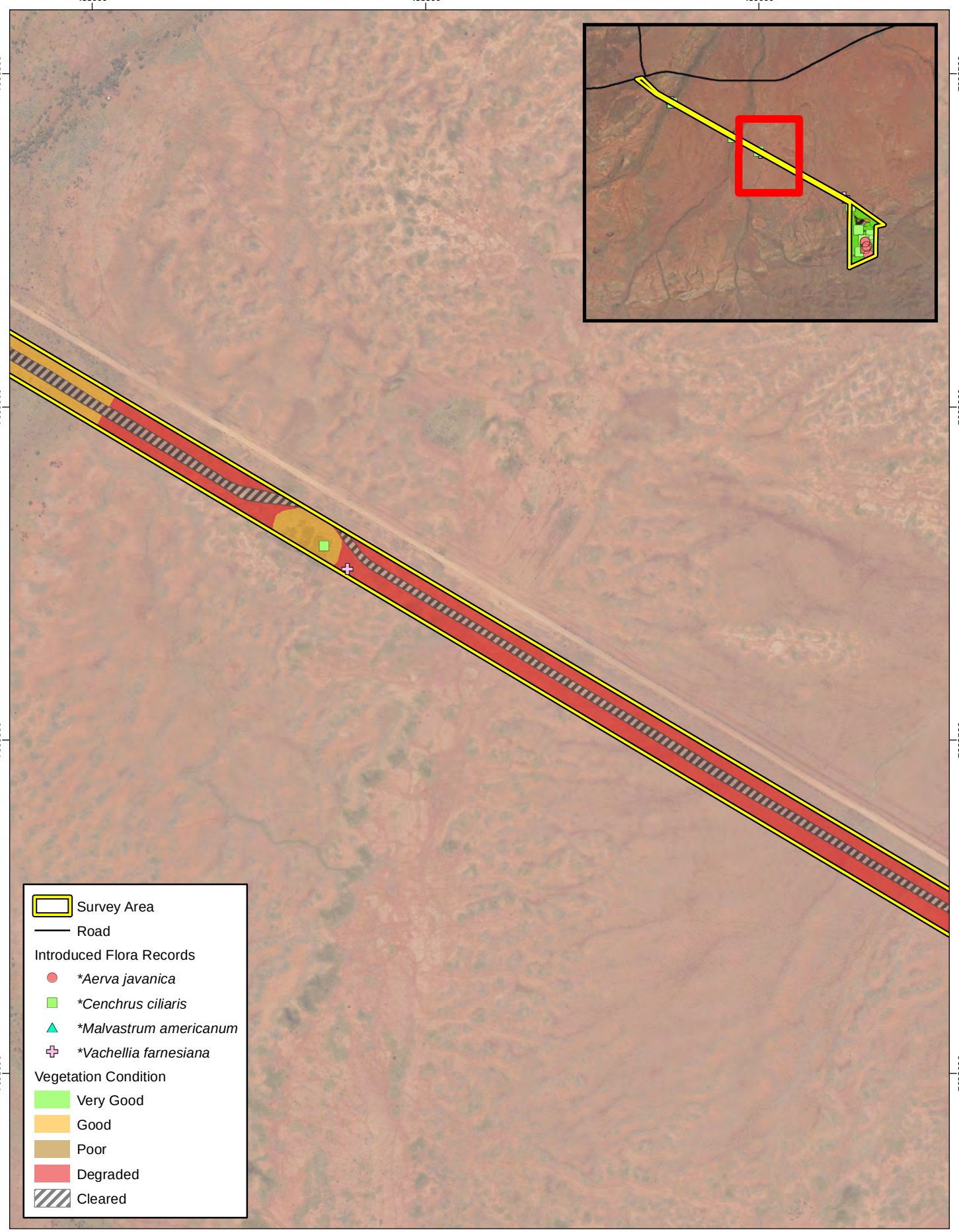
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Condition and Introduced Flora Records
MAP 11B



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

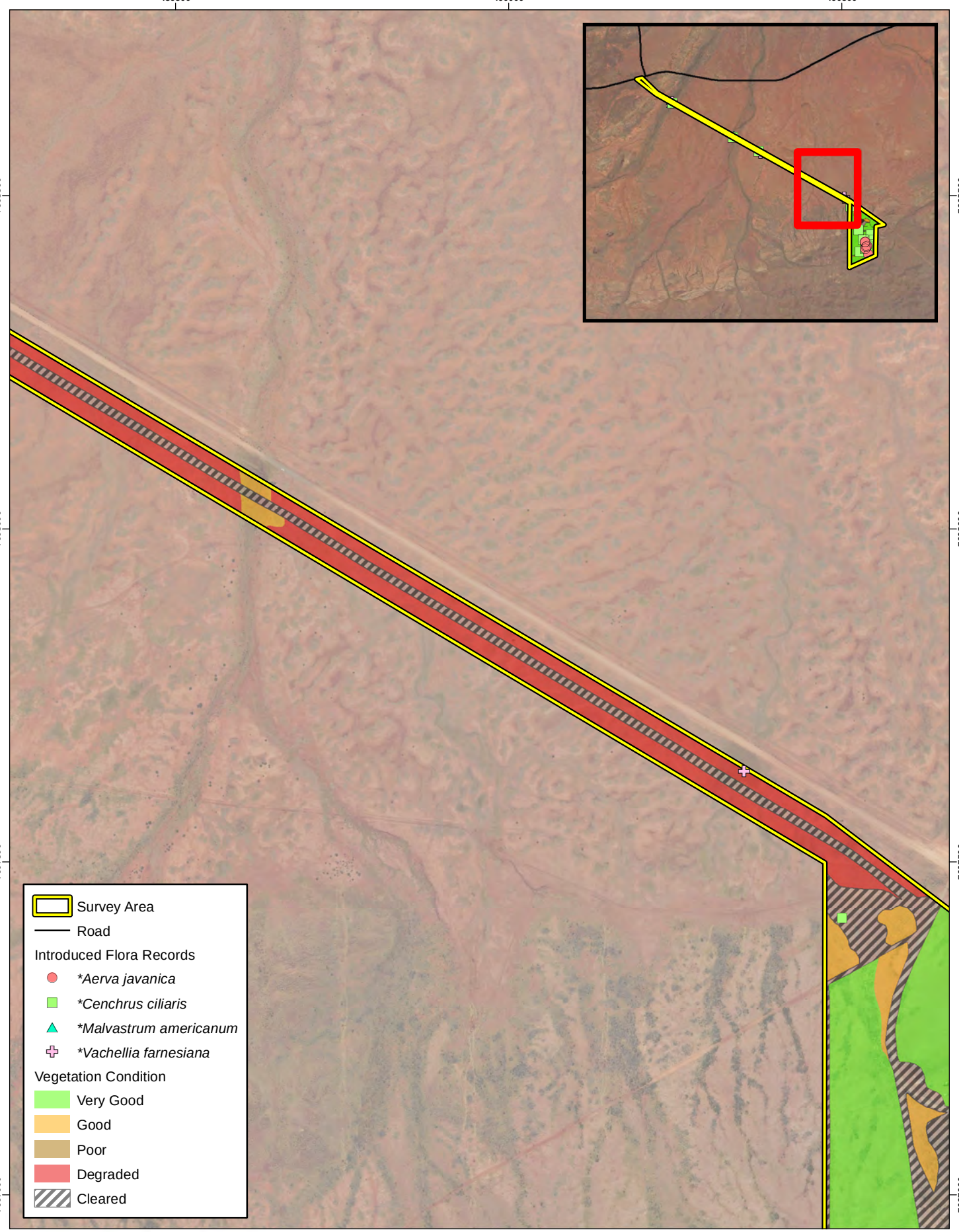
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Condition and Introduced Flora Records
MAP 11C



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

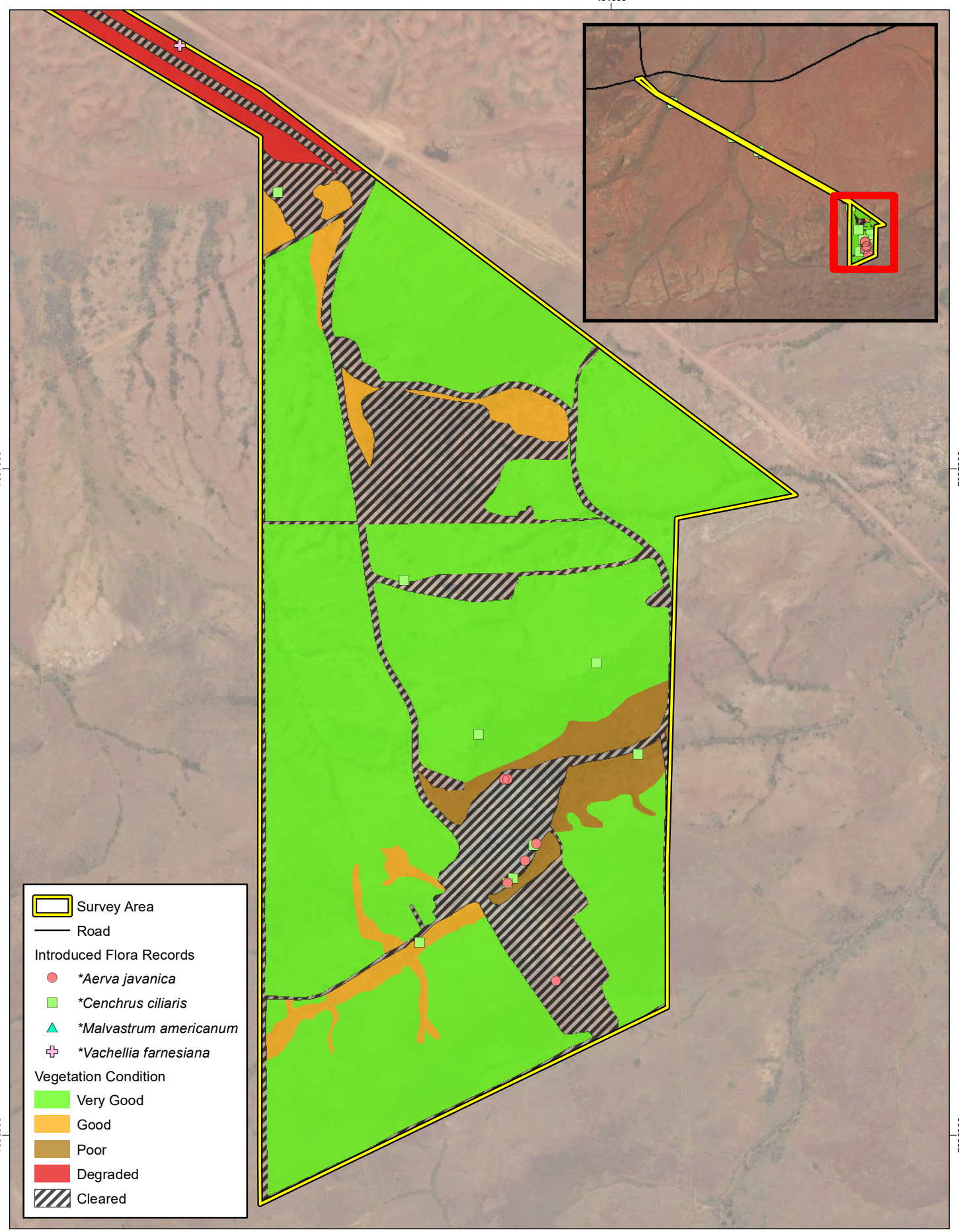
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 14/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Condition and Introduced Flora Records
MAP 11D



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 12/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

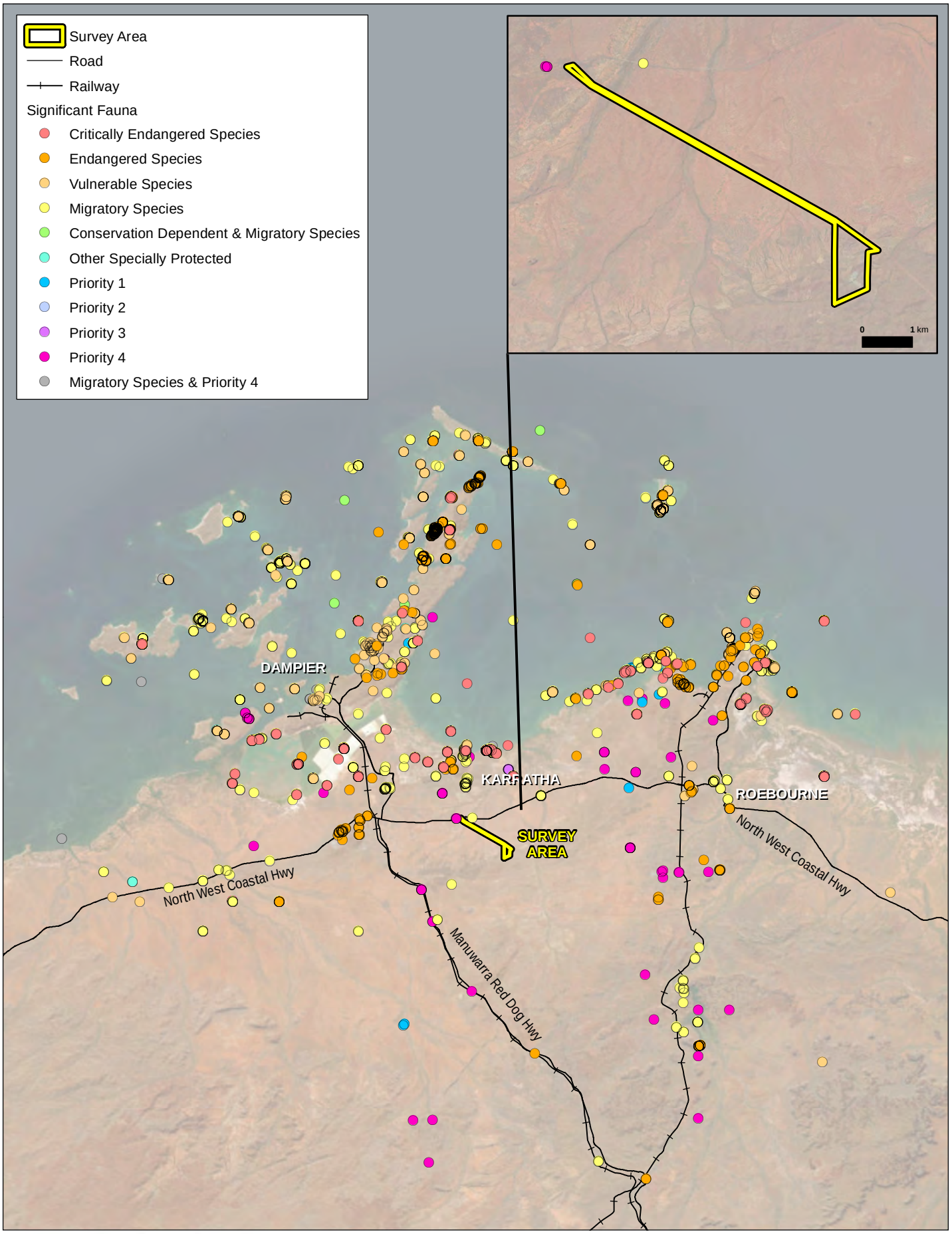
DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Vegetation Condition and Introduced Flora Records

MAP 11E

C:\GIS\Jobs\360\675.072378.00001 - Bardies Well Detailed Flora and Fauna Survey\Figures\675-072378-00001_M11e Vegetation Condition and Introduced Flora Records_240612.mxd



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

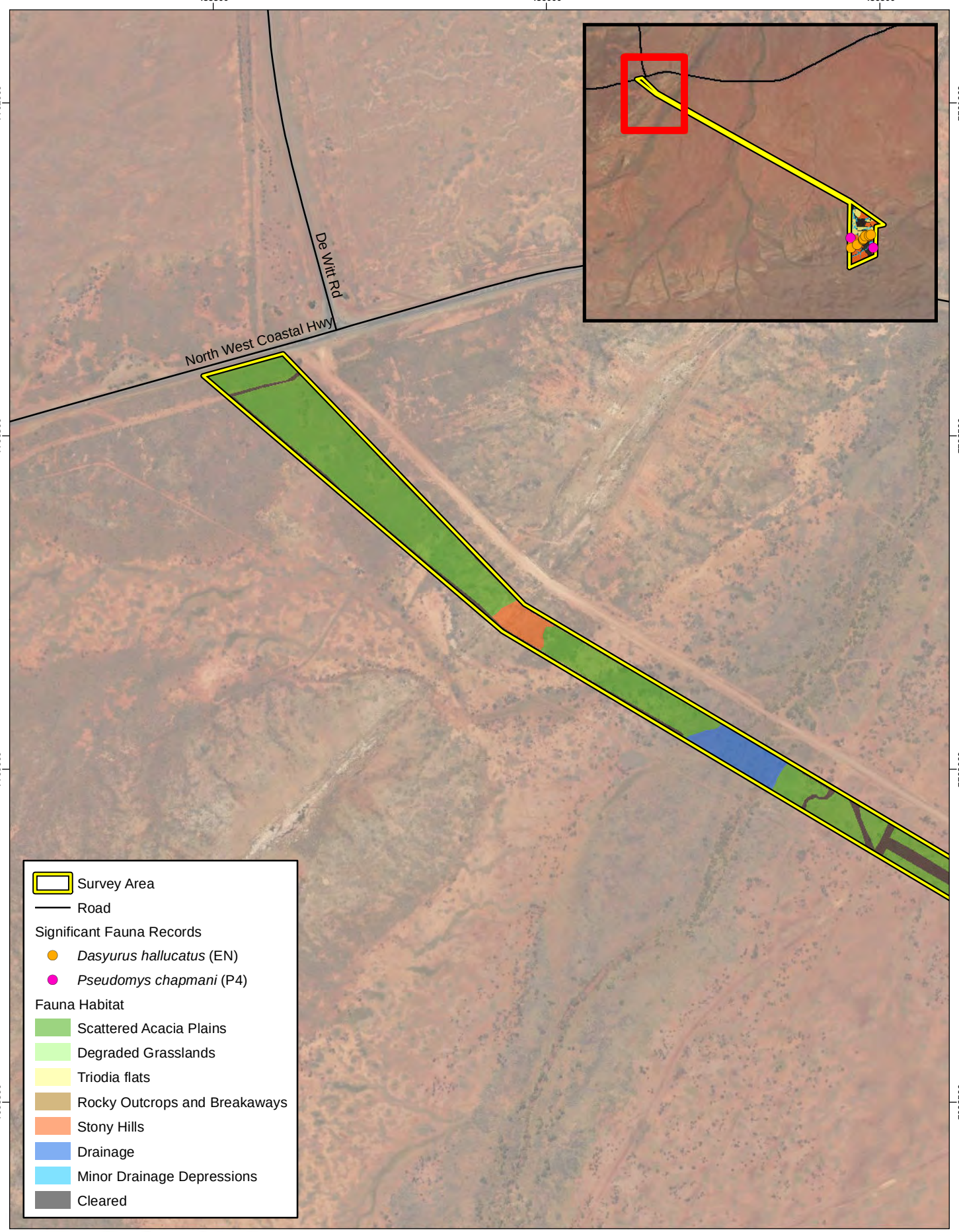
N 0 5 10 20 km

Service Layer Credits: Landgate / SLIP

Coordinate System: GCS GDA 1994 @ A4
Scale : 1:600,000 @ A4
Project Number : 675.072378.00001
Date Drawn : 14/06/2024
Drawn By : Environmaps
Reviewed By : JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Significant Fauna
Database Search Results
MAP 12



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

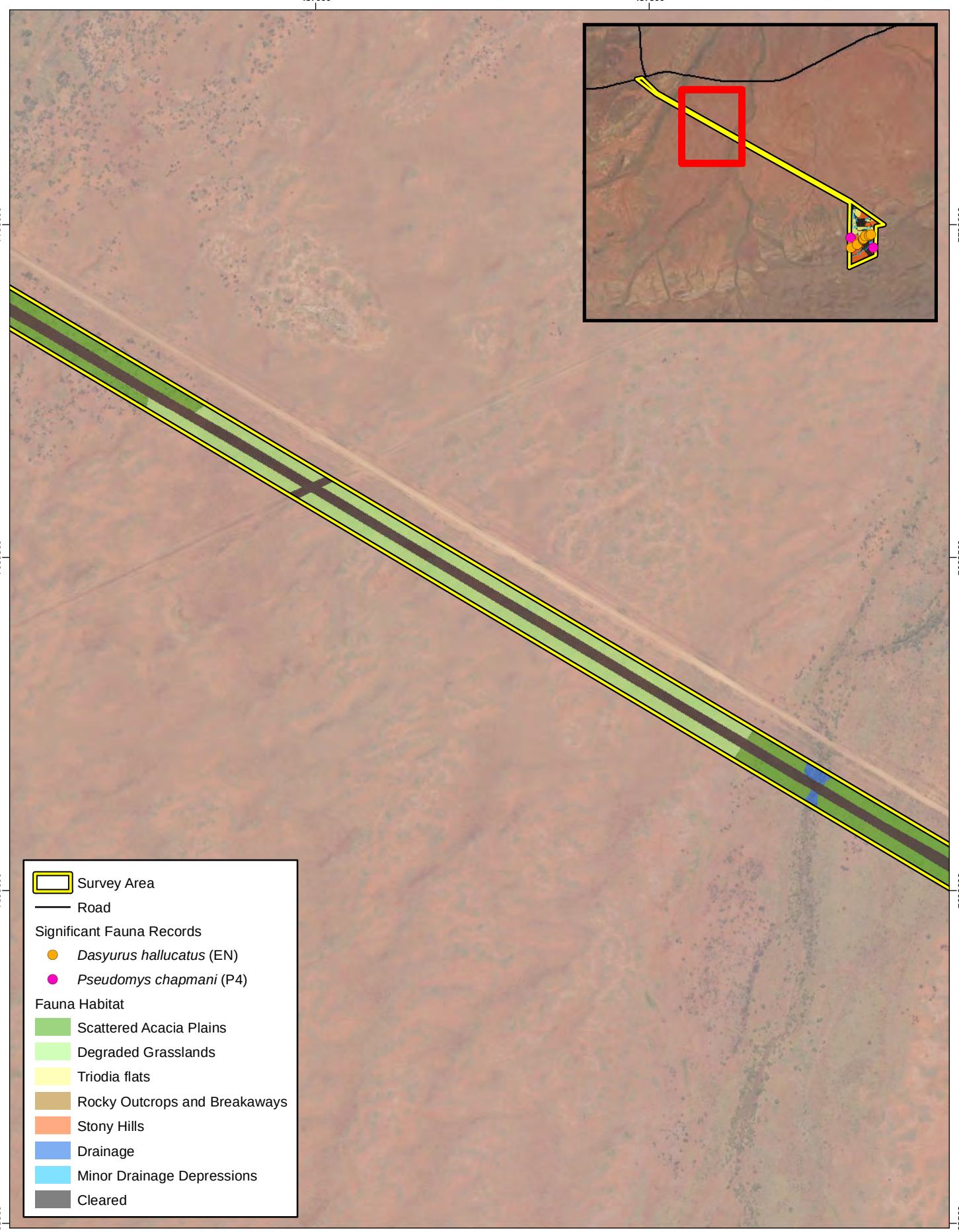
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 25/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Habitat and Significant Fauna Records
MAP 13A



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

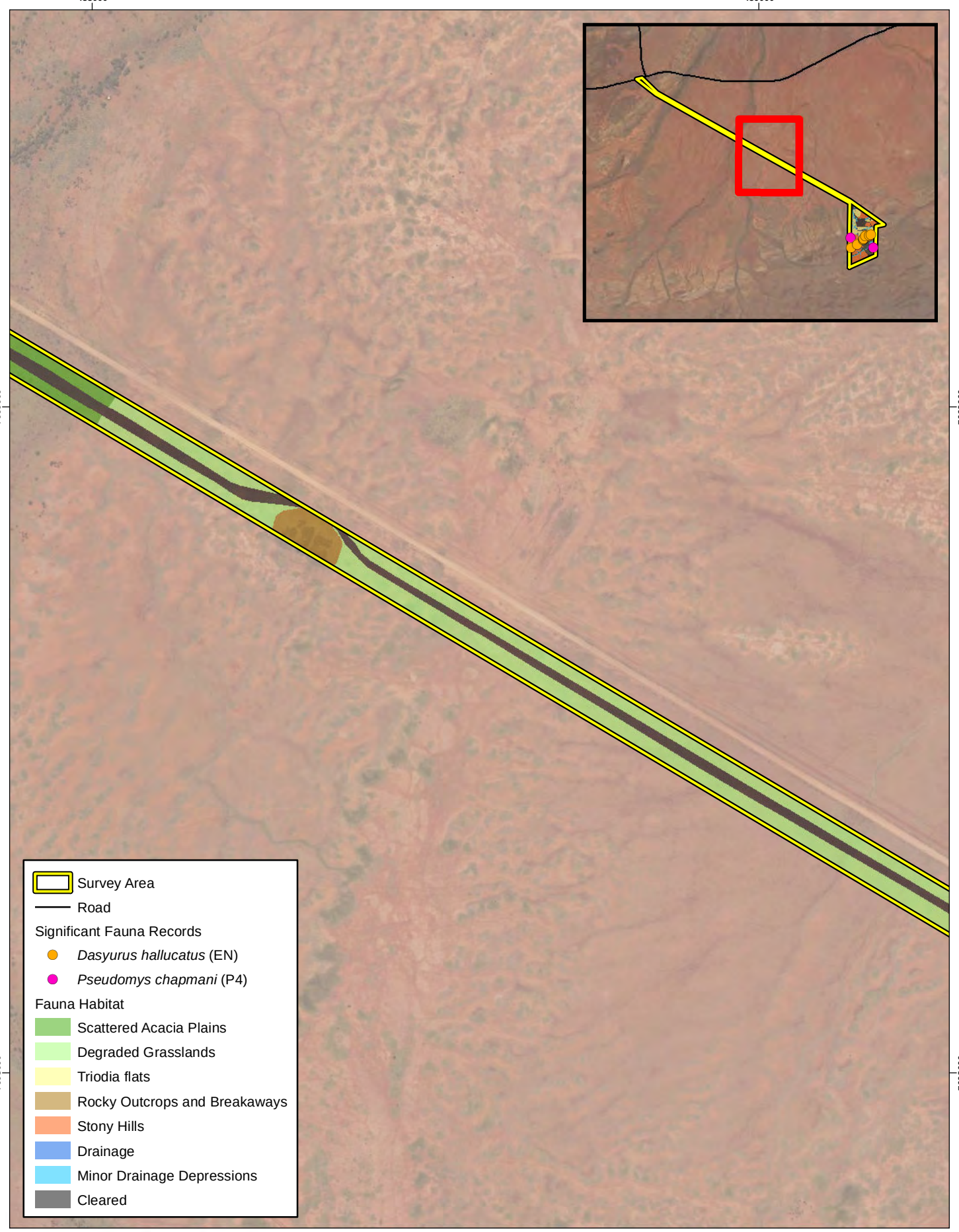
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 25/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Habitat and Significant Fauna Records
MAP 13B



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

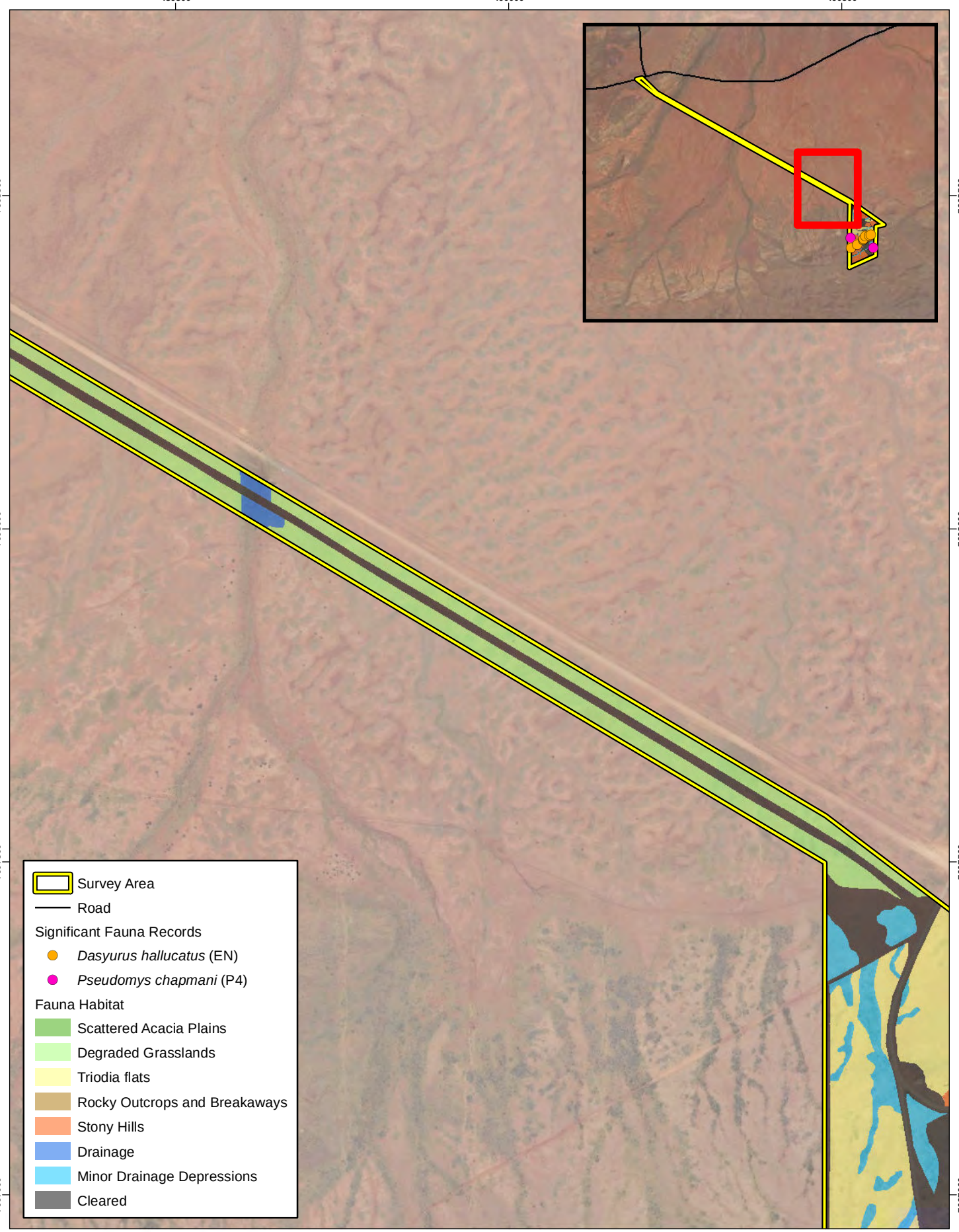
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 25/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Habitat and Significant Fauna Records
MAP 13C



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

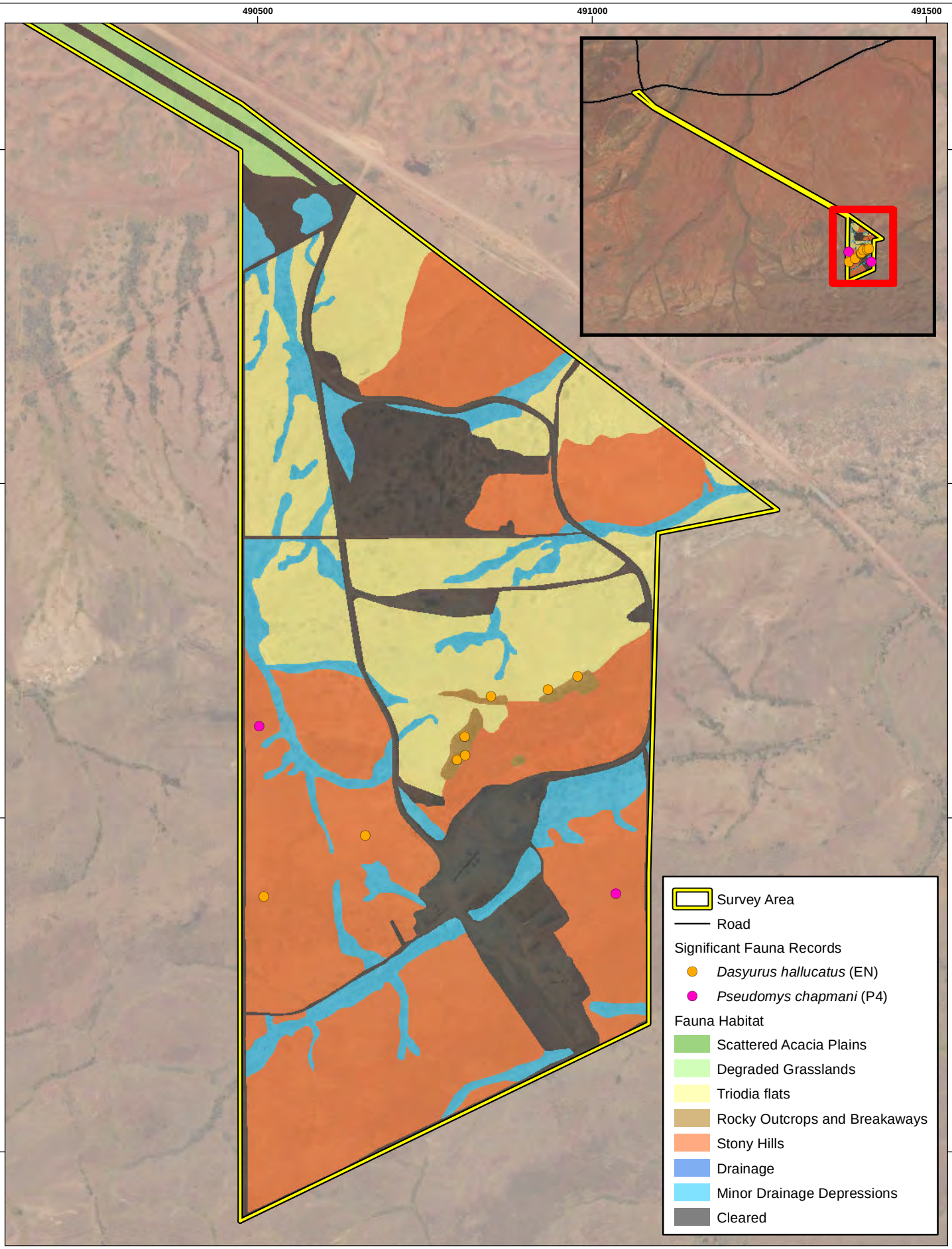
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 25/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Habitat and Significant Fauna Records
MAP 13D



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

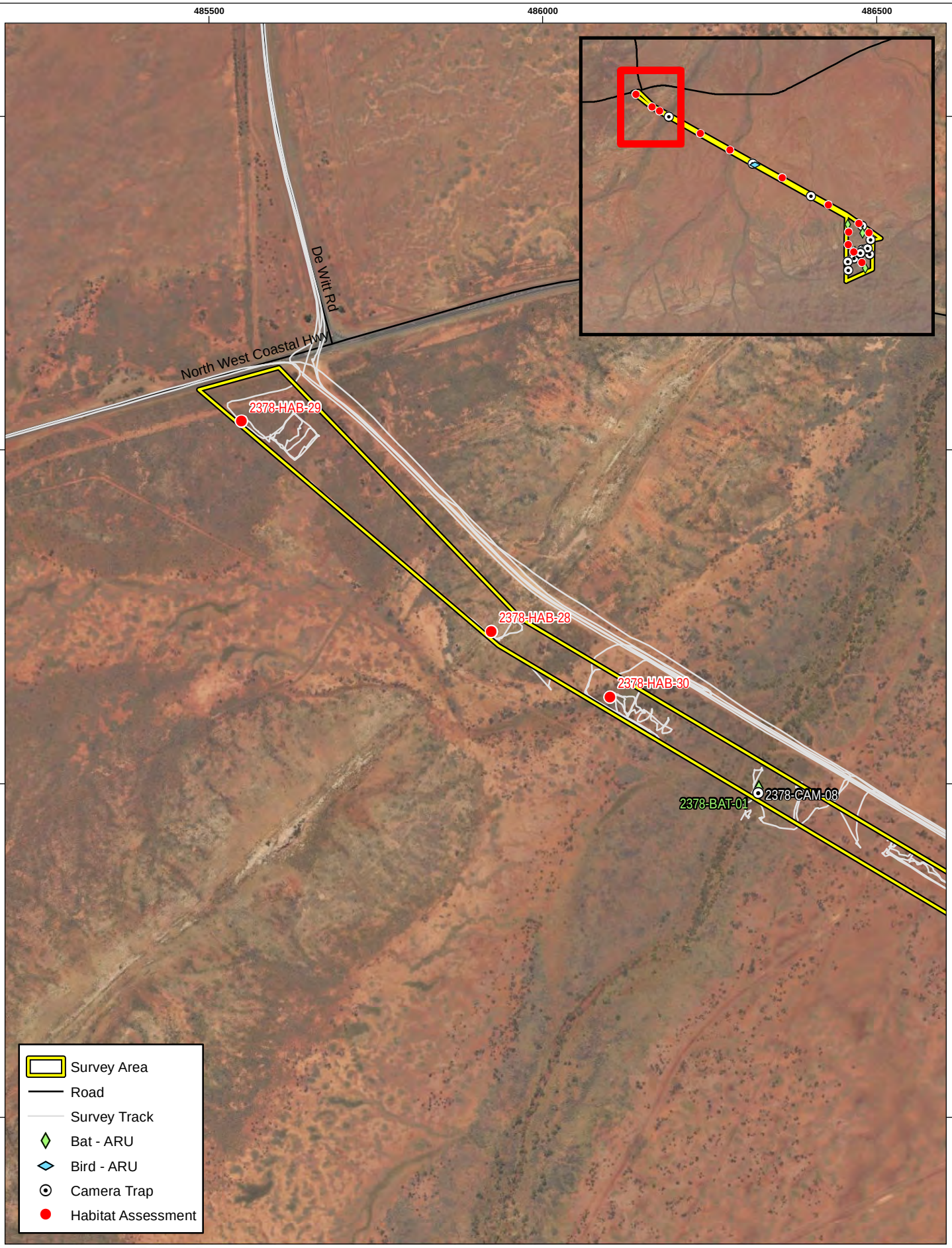
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 25/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Habitat and Significant Fauna Records
MAP 13E



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

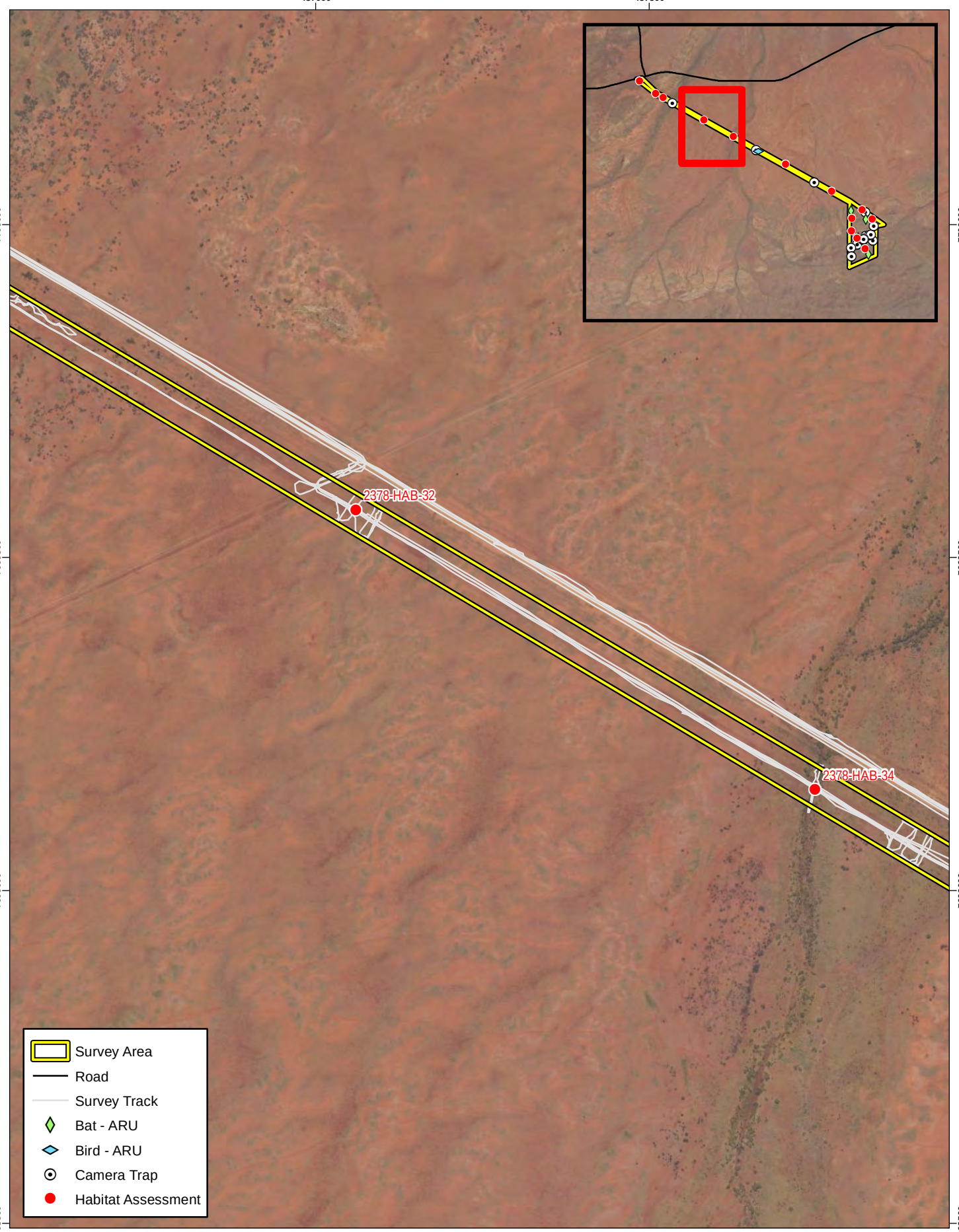
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 28/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Survey Effort
MAP 14A



N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

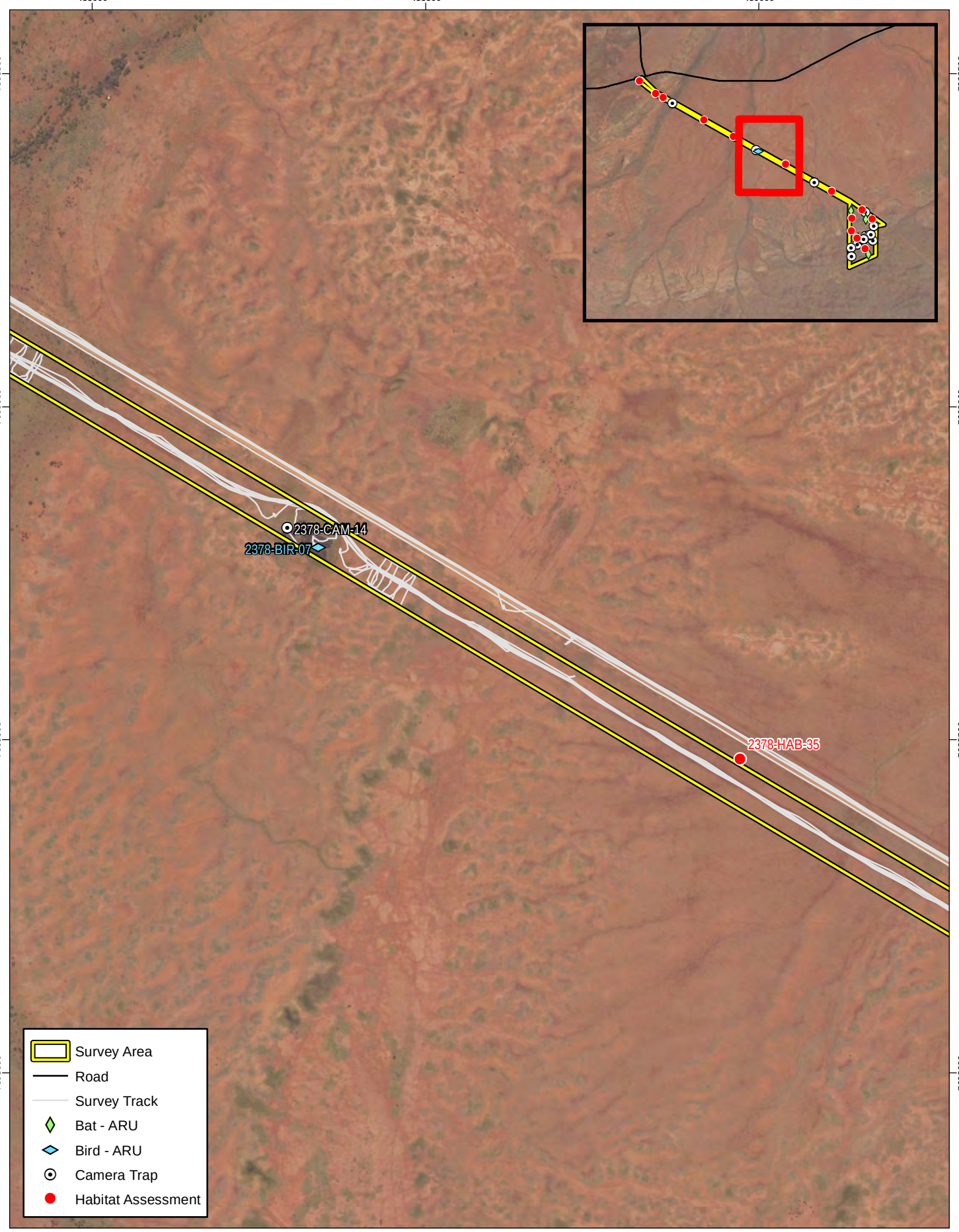
Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 28/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Survey Effort
MAP 14B



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

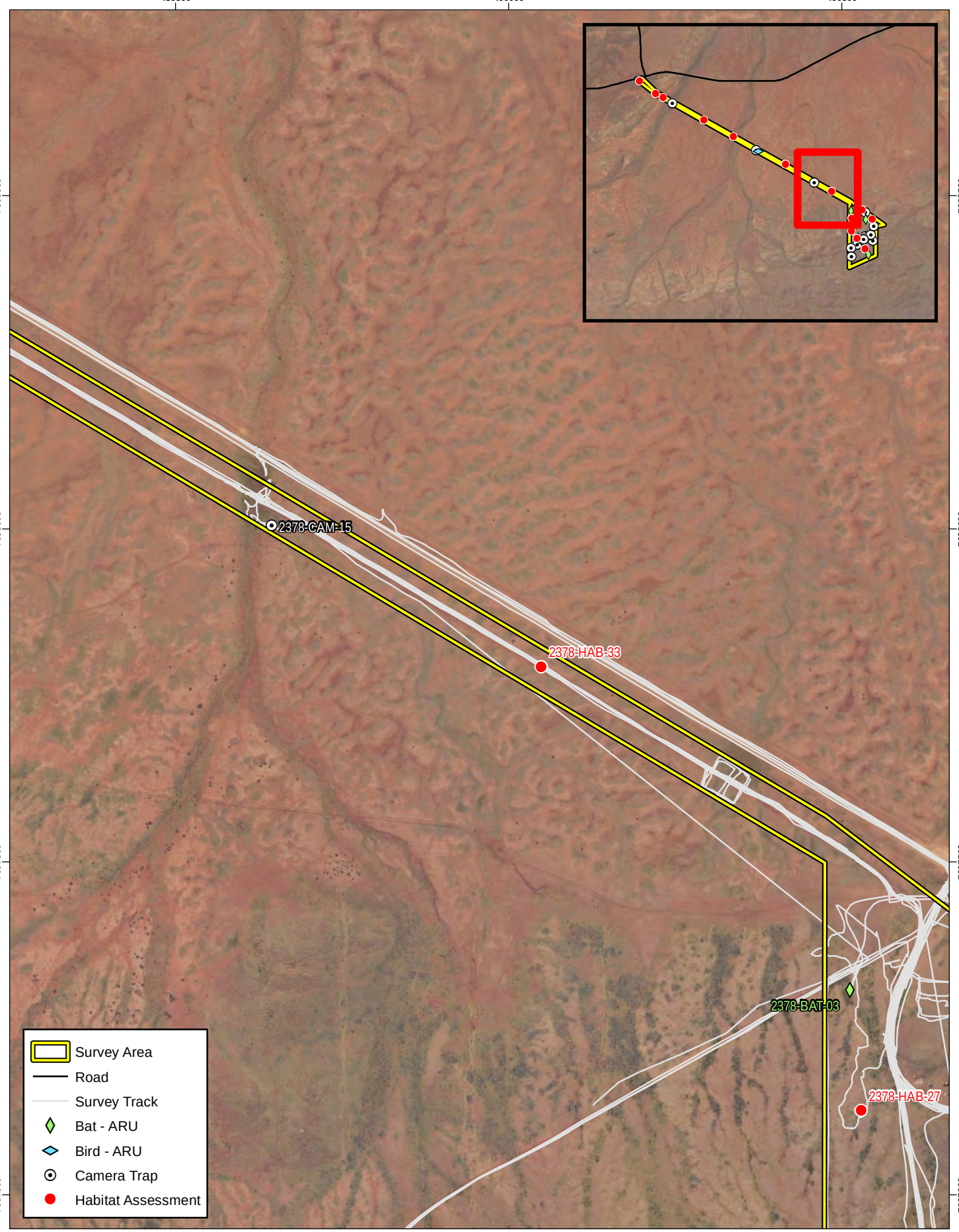
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 28/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Survey Effort
MAP 14C



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

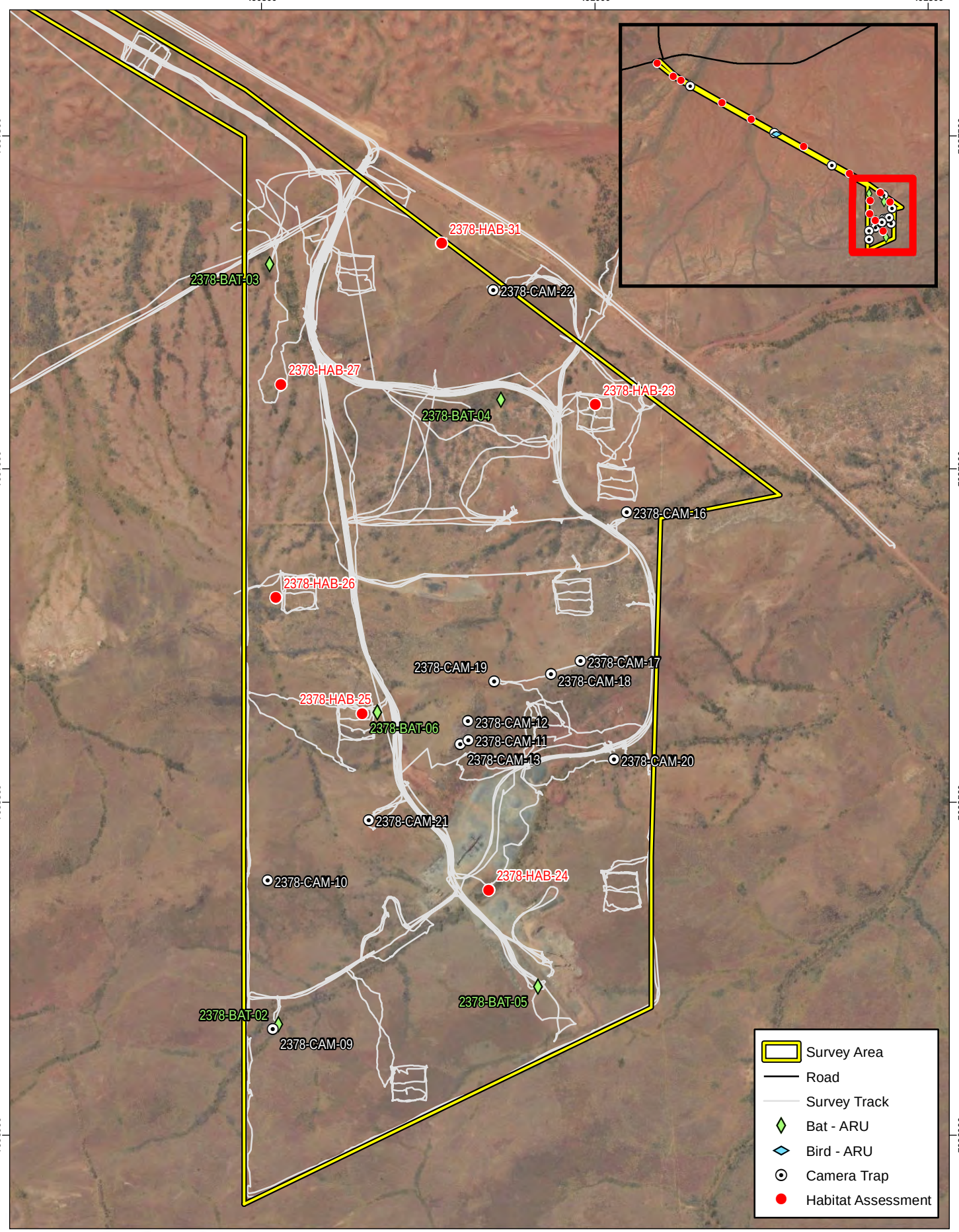
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 28/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Survey Effort
MAP 14D



SLR

DISCLAIMER: All information within this document may be based on external sources. SLR Consulting Pty Ltd makes no warranty regarding data's accuracy or reliability for any purpose.

N 0 75 150 300 m

Service Layer Credits: Landgate / SLIP

Coordinate System: GDA 1994 MGA Zone 50 @ A4

Scale	: 1:7,500 @ A4
Project Number	: 675.072378.00001
Date Drawn	: 28/06/2024
Drawn By	: Environmaps
Reviewed By	: JH

Brookdale Contractors
Bardies Well Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Fauna Survey Effort
MAP 14E

Appendix B Literature Review Summary

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Appendix B Fauna Literature Review

ID	Report	Survey Location	Survey Timing	Survey Type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
Lit A	Karratha and Boodarie Biological Surveys (360 Environmental, 2021)	~10 km north northwest of the Survey Area	June 2021	Basic vertebrate fauna survey	• No threatened or priority species or evidence were recorded in the Survey Area.	• Minor Drainage • Rocky hills • Stony plains
Lit B	Report for Karratha Land Release - Amendment 21 Flora and Fauna Assessment (GHD 2011)	~11 km north northwest of the Survey Area	August 2011	Basic vertebrate fauna survey	Karratha Hills Location • Western Pebble-mound Mouse (*Pseudomys chapmani*) – Listed as Priority 4 by the DBCA	• *Acacia* shrublands/hummock grassland flats • Hummock grasslands on rocky hills and slopes • Hummock grassland on sandy plains • Major creekline • Minor creeklines • Rock outcrops and breakaways • Tidal mudflats • *Triodia* grassland on low hills • Tussock grassland on cracking clay plains • Tussock grassland/chenopod plains • Wastewater treatment ponds
Lit C	Horizon Power 124-KRT-DMP 132kV Line Upgrade Project Flora and Fauna Survey (GHD, 2019)	~15 km northwest of the Survey Area	June 2019	Basic fauna survey – reconnaissance survey	• No threatened or priority species or evidence were recorded in the Survey Area.	• Gilgai grassland • Minor drainage lines • Rocky plains and low rises • Rock piles • Saline flats • Sandy loam plains

ID	Report	Survey Location	Survey Timing	Survey Type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
Lit D	Terrestrial Vertebrate Fauna Survey for Anketell Point Rail Alignment and Port Projects (Phoenix Environmental Sciences, 2010)	~25 km northeast of the Survey Area	June 2009 March 2010	Detailed vertebrate fauna survey	• Far Eastern Curlew (*Numenius madagascariensis*) Listed as Critically Endangered under the EPBC Act and Critical under the BC Act • Nevin's Slider (*Lerista nevinae*) Listed as Endangered under the EPBC Act and BC Act • Western Pebble-mound Mouse (*Pseudomys chapmani*) Listed as Priority 4 by the DBCA • Lined Soil-crevice Skink (*Notoscincus butleri*) Listed as Priority 4 by the DBCA	• Beaches • Coastal dunes • Coastal plains • Drainage lines • Hill slopes • Mangroves • Mudflats and samphire • Rocky outcrops
Lit E	Maitland to Karratha Terminal Flora and Fauna Survey (GHD, 2022)	~26 km north northwest of the Survey Area	March 2022	Basic fauna survey	• No threatened or priority species or evidence were recorded in the Survey Area.	• Broad drainage lines • Grassland claypans • Hummock grasslands on sandy clay loam plains • Low undulating rocky rises and slopes
Lit F	Rio Tinto Iron Ore Rail Duplication Fauna Survey: Cape Lambert Variation (Biota, 2008)	~26 km northeast of the Survey Area	August 2008	Basic fauna survey and Detailed significant vertebrate fauna and short-range endemic invertebrates	• Lined Soil-crevice Skink (*Notoscincus butleri*) Listed as Priority 4 by the DBCA	• Boulder pile • Dune with *Acacia* over *Triodia* • Plain adjacent to creekline with *Corymbia* over *Acacia* over *Triodia* • Plain with *Acacia* over *Triodia* • Rocky hill slope with *Triodia*
Lit G	Terrestrial fauna survey for the Balla Balla Magnetite Project barge loading facility (Phoenix Environmental Sciences, 2013)	~72 km east of the Survey Area	November 2012 December 2012	Basic fauna survey and Detailed significant vertebrate fauna and short-range endemic invertebrates	• Black-footed Rock-wallaby (*Petrogale lateralis lateralis*) Listed as Endangered under the EPBC Act and BC Act • Great Knot (*Calidris tenuirostris*) Listed as Vulnerable under the EPBC Act and Critical under the BC Act • Red Knot (*Calidris canutus*) Listed as Vulnerable under the	• Coastal sand dunes • Mangrove thickets and intertidal mudflats • Minor creeks and drainage lines • Open shrubland • Rocky outcrops and boulder piles • Salt flats • Samphire plains

ID	Report	Survey Location	Survey Timing	Survey Type	Significant fauna recorded during the survey	Fauna habitats recorded during the survey
					EPBC Act and Endangered under the BC Act • Greater Sand Plover (*Charadrius leschenaultii leschenaultii*) Listed as Vulnerable under the EBCA Act and BC Act • Terek Sandpiper (*Xenus cinereus*) Listed as Vulnerable under the EPBC Act	• Tussock and hummock grasslands
Lit H	Terrestrial fauna surveys for the Balla Balla Railway Project (Phoenix Environmental Sciences, 2014)	~82 km east of the Survey Area	August – September 2014	Basic fauna survey and Detailed significant vertebrate fauna and detailed short-range endemic invertebrates	• Northern Quoll (*Dasyurus hallucatus*) Listed as Endangered under the EPBC Act and BC Act • Lined Soil-crevice Skink (*Notoscincus butleri*) Listed as Priority 4 by the DBCA • Western Pebble-mound Mouse (*Pseudomys chapmani*) Listed as Priority 4 by the DBCA	• Gully • Hummock and tussock grassland • Isolated sand dune • Minor creek and drainage line • Open and closed shrubland • Rocky hill slope • Sandplain • Woodland

Appendix B Flora Literature Review

Report	Project Area	Survey Timing	Survey Effort	Conservation Significant Ecological Communities	Conservation Significant Flora	Introduced Flora
Anketell Port Proposal, Level 2 Flora and Vegetation Assessment (Aecom, 2011)	~26km's Northeast of the Survey Area	April 2011	Detailed flora and vegetation assessment	Horseflat land system of the Roebourne Plain (Priority 3).	• None recorded	• **Neltuma pallida (mesquite)*
Flora and Vegetation Assessment, Bardies Well (ENV, 2012)	Assessment intersects the current survey area	March 2012	Detailed flora and vegetation assessment	None recorded	• None recorded	•**Aerva javanica* •**Cenchrus ciliaris* •**Malvastrum americanum*
Horizon Power 124-KRT-DMP 132kV Line Upgrade Project Flora and Fauna Survey (GHD, 2019)	~15km's Northwest of the Survey Area	June 2019	Detailed flora and vegetation assessment	• Burrup Peninsula rock pile communities (Priority 1) • Horseflat land system of the Roebourne Plains (Priority 3).	• *Rhynchosia bungarensis* (P4)	• **Aerva javanica* • **Cenchrus ciliaris* • **Vechellia farnesiana*
Maitland to Karratha Terminal Flora and Fauna Survey (GHD, 2022)	~26 km north northwest of the Survey Area	March 2022	Detailed flora and vegetation assessment	• None recorded	• None recorded	• **Aerva javanica* • **Cenchrus ciliaris* • **Malvastrum americanum* • **Vechellia farnesiana* • **Passiflora foetida*
Report for Karratha Land Release - Amendment 21 Flora and Fauna Assessment (GHD 2011)	~11 km north northwest of the Survey Area	August 2011	Detailed flora and vegetation assessment	• Burrup Peninsula rock pile communities (Priority 1) • Horseflat land system of the Roebourne Plains (Priority 3). • Burrup Peninsula Rock Pool Communities	• None recorded	• **Aerva javanica* • **Cenchrus ciliaris*
Targeted Flora Survey of the Naturebank Envelope in Millstream Chichester National Park (DBCA, 2013)	~65km's Southeast of the survey area	July & September 2013	Targeted flora	• None recorded	• *Trianthema sp. Python Pool* (P2)	• **Cenchrus ciliaris* • **Cenchrus setiger*

Appendix C Licences and Permits

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

FAUNA TAKING (BIOLOGICAL ASSESSMENT) LICENCE

Regulation 27, Biodiversity Conservation Regulations 2018

Licence Number: BA27000998

Licence Holder: [redacted]
SLR Consulting
Unit 4/193 Oxford Street
Leederville WA 6007

Date of Issue: 29/02/2024

Date Valid From: 29/02/2024
Date of Expiry: 31/03/2025

LICENSED ACTIVITIES

Subject to the terms and conditions on this licence, the licence holder may –

Undertake fauna surveys on behalf of Brookdale Contractors, to determine species presence and inform future environmental management plans for anticipated work programs at Bardies Well area.

1. Take or disturb fauna during deployment (installation and retrieval) of remote camera traps set with replenishable, consumable lures and other detection devices in accordance with DBCA and other relevant Standard Operating Procedures for fauna survey and monitoring techniques.

LOCATIONS

1. Bardies Well Quarry, approximately 15km southeast of Karratha (DBCA Pilbara Region).

AUTHORISED PERSONS

[redacted]

CONDITIONS

1. Fauna must not be taken on CALM land, (as defined in the Conservation and Land Management Regulations 2002*),* unless authorised by a written notice of a lawful authority issued under regulations 4 and 8 of the Conservation and Land Management Regulations 2002.
2. If persons, other than the licence holder, are authorised to carry out/assist in carrying out the activities under the licence, the licence holder must ensure those persons have read and understand the licence terms and conditions.
3. The written authorisation of the person in possession or occupation of the land accessed and upon which fauna is taken, as required under regulation 101(2) and referred to in “Additional information” below, must:
   a) state location details (including lot or location number, street/road, suburb and local government authority);
   b) state land owner or occupier name, and contact phone number;
   c) specify the time period that the authorisation is valid for;

d) be signed and dated; and

e) be attached to this licence at all times.

4. This licence, and any written authorisation or lawful authority which authorises the take of fauna on specified locations must be carried at all times while conducting licensed activities and be produced on demand by a wildlife officer.

5. If a species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* is inadvertently captured, that species is to be released immediately at the point of capture. If the fauna is injured or deceased, the licence holder shall contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of any capture of threatened fauna must be included in the "Return of Fauna Taken."

6. The licence holder must not:

   a) release any fauna in any area where it does not naturally occur;

   b) transfer fauna to any other person or authority (other than the Western Australian Museum) unless approved in writing by the CEO; or

   c) dispose of the remains of fauna in any manner likely to interfere the natural or present day distribution of the species.

7. The licence holder must not take and remove more than ten specimens of any one protected species of fauna from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.

8. All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence must be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range must be offered to the Western Australian Museum.

9. All specimens and material retained under the authority of this licence must be offered to the Western Australian Museum for loan, for inclusion in its collection, or on request be made available to other persons involved in relevant scientific studies.

10. The licence holder must create, compile and maintain records and information as required in a DBCA approved "Return of Fauna Taken" of all fauna taking activities as they occur.

11. A DBCA approved "Return of Fauna Taken" must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the end of each annual period of the licence (from the valid from date) (refer to "Additional Information" section

WILDLIFE PROTECTION BRANCH

Delegate of CEO

ADDITIONAL INFORMATION

1. It is an offence to take any species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* unless the person is authorised under Section 40. The penalty ranges between [redacted] and [redacted]; Section 150 Biodiversity Conservation Act 2016.
2. Regulation 82 empowers the CEO to add, substitute or delete a term or condition of a licence or to correct errors. Such power may be exercised on application of a licence holder or by the CEO's own initiative. If an amendment to a licence term or condition is required, please contact the CEO or the Licensing Section on wildlifelicensing@dbca.wa.gov.au in the first instance. The licence holder, if adversely affected by a condition imposed in this licence, may apply to the State Administrative Tribunal for review of the decision of the CEO to impose that condition on a licence: regulation 89(2) Biodiversity Conservation Regulations 2018.
3. A person must not contravene a condition of a licence. The penalty for an offence involving the contravention of a condition of a licence is a fine of [redacted]: regulation 84 of the Biodiversity Conservation Regulations 2018.
4. It is an offence for persons authorised by this licence to enter land that is not in their possession or under their control without first having the *prior* written authorisation of the current owner or occupier of the land to:

   a) enter the land; and

   b) carry out the activity authorised by this licence.

   The penalty for this offence is a fine of [redacted]: regulation 101(2) of the Biodiversity Conservation Regulations 2018.
5. The licence holder must be able to produce for inspection upon request any information or records required by regulation 85(2) of the Biodiversity Conservation Regulations 2018 Penalty $[redacted]. It is an offence to knowingly include false or misleading information or make statements in records: regulation 85(3) of the Biodiversity Conservation Regulations 2018 Penalty $[redacted]. It is an offence to include any information or make any statement in a return that the licence holder knows to be false or misleading in a material particular: regulation 86 (2) of the Biodiversity Conservation Regulations 2018 Penalty $10 000.
6. The approved DBCA "Return of Fauna Taken" data file can be downloaded from the DBCA webpage (https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities).
7. The issuing of a licence under the Biodiversity Conservation Regulations 2018 does not constitute an animal ethics approval or a licence to use animals for scientific purposes as required under the *Animal Welfare Act 2002,* Animal Welfare (Scientific Purposes) Regulations 2003. It is the responsibility of a licence applicant / licence holder to ensure that they comply with the requirements of all applicable legislation. Enquiries relating to the Animal Welfare Act licences and animal ethics approvals are to be directed to the Department of Primary Industries and Regional Development (https://www.agric.wa.gov.au/animalwelfare).
8. Threatened fauna can only be taken under a *Biodiversity Conservation Act 2016* Section 40 authorisation, Occurrences of threatened species must be reported to the CEO. For more information please see https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals.
9. Any interaction involving Nationally Listed Threatened Fauna that may be invasive and/or harmful to the fauna may require approval from the Commonwealth Department of the Environment and Energy http://www.environment.gov.au/about-us/business-us/permits-assessments-licences. Interaction with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the *Biodiversity Conservation Act 2016* and Biodiversity Conservation Regulations 2018.

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

AUTHORISATION TO TAKE OR DISTURB THREATENED SPECIES

Section 40 of the Biodiversity Conservation Act 2016

AUTHORISATION DETAILS

Authorisation number: TFA 2324-0202

Authorisation duration: From date signed by Minister's delegate below until 31 March 2025

AUTHORISATION HOLDER

[redacted]

Senior Ecologist

SLR Consulting

Unit 4 / 193 Oxford Street

Leederville WA 6007

AREA TO WHICH THIS AUTHORISATION APPLIES

Bardies Well Quarry, approximately 15 km southeast of Karratha. (DBCA Pilbara Region).

AUTHORISED ACTIVITY

Purpose of taking/disturbance:

Undertake a targeted fauna survey on the behalf of Brookdale Contractors to determine species presence and inform future environmental management plans.

Threatened species authorised to be taken/disturbed (including conservation status):

Night parrot, *Pezoporus occidentalis* (Critically Endangered)

Northern Quoll, *Dasyurus hallucatus* (Endangered)

Ghost bat, *Macroderma gigas* (Vulnerable)

Pilbara leaf-nosed bat, *Rhinonicteris aurantia* (Pilbara form) (Vulnerable)

Quantity of threatened species authorised to be taken/disturbed:

Any number of individual animals of the above listed threatened fauna species may be disturbed by the survey activities.

Authorised taking/disturbance methodology:

Disturb threatened fauna through the deployment of remote cameras with a consumable lure that may be replenished.

Disturb ghost bats and Pilbara leaf-nosed bats when entering roost sites to deploy (install and retrieve) ultrasonic bat detectors.

Disturb night parrots through the deployment (installation and retrieval) of acoustic recording devices within areas of potential night parrot nesting and roosting habitat.

All proposed activities will be conducted in accordance with DBCA Standard Operating Procedures (SOPs) for fauna survey and monitoring techniques. Deployment of acoustic call recorders will be conducted in accordance with the DBCA interim guideline for preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia.

Dates within which taking/disturbance authorised:

From date signed by Minister's Delegate below until 31 March 2025.

AUTHORISED PERSONS

[redacted]

Additional personnel who are suitably qualified and experienced in the Authorised Activities working under the direction of the Authorisation Holder.

Field assistants working under the direct supervision of the Authorisation Holder or suitably qualified and experienced named Authorised Persons.

CONDITIONS

1. The written authorisation of the person in possession or occupation of the land accessed and upon which threatened fauna is taken or disturbed must:
    a. state location details (including lot or location number, street/road, suburb and local government authority);
    b. state land owner or occupier name, and contact phone number;
    c. specify the time period that the authorisation is valid for;
    d. be signed and dated; and
    e. be attached to this Authorisation to take or disturb threatened species at all times.
2. This Authorisation to take or disturb threatened species, and any other written authorisation or lawful authority which authorises the take or disturbance of fauna on specified locations for the Authorised Activities must be carried at all times while conducting Authorised Activities and be produced on demand by a wildlife officer.
3. Authorised Persons who are not suitably qualified and experienced in the Authorised Activities, and field assistants assisting with the Authorised Activities, must be working under direct supervision of experienced and competent named Authorised Persons.
4. Any inadvertently captured species of non-target threatened fauna or non-threatened fauna (threatened fauna as defined in *Biodiversity Conservation Act 2016* Section 19) is to be released immediately at the point of capture. Details of such fauna must be included in the fauna taking/disturbance return as required under this Authorisation.
5. The Authorisation Holder, unless specified in the Authorised Activities, must not:
    a. release any threatened fauna in any area where it does not naturally occur;
    b. transfer threatened fauna to any other person or authority (other than the Western Australian Museum) unless the fauna is injured or abandoned fauna (condition 6); or

c. dispose of the remains of threatened fauna in any manner likely to confuse the natural or present-day distribution of the species.

6. All threatened fauna injuries, unexpected deaths, unplanned euthanasia, and abandoned young or eggs, must be reported by the Authorisation Holder to the DBCA Wildlife Protection Branch, Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) to notify of the incident and for advice on treatment or disposal. All deceased threatened fauna must be offered to the Western Australian Museum.

7. The Authorisation Holder must create, compile and maintain records and information as required in a DBCA approved "Return of Fauna Taken/Disturbed" of all fauna taking/disturbance activities as they occur.

8. A DBCA approved "Return of Fauna Taken/Disturbed" must be completed in full (including nil taking/disturbance details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the end of the Authorisation duration and, if the Authorisation duration is greater than 12 months, prior to the end of each annual period of the Authorisation (from the date signed by the Minister's delegate) (refer to "Additional Information" section below). Where a licence to take or disturb fauna is issued in conjunction with this Authorisation to take or disturb threatened species, a combined "Return of Fauna Taken/Disturbed" may be completed and submitted.

9. A written report detailing the undertaken Authorised Activities, outcome, unintended incidents, injuries and mortalities of threatened fauna, implemented monitoring, mitigation and management, and explaining the records and information as required in a DBCA approved "Return of Fauna Taken/Disturbed" must be submitted, in addition to a "Return of Fauna Taken/Disturbed" to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au).

ADDITIONAL INFORMATION

1. Before undertaking the Authorised Activity, permission must be obtained from: (a) the owner or occupier of private land; or (b) the department or authority controlling Crown land, on which the threatened fauna occurs. This includes obtaining the written endorsement from Department of Biodiversity, Conservation and Attractions (DBCA) if the Authorised Activity is proposed for land managed by DBCA.

2. This Authorisation to take or disturb threatened species does not constitute lawful authority issued under regulations 4 and 8 of the *Conservation and Land Management Regulations 2002*. Contact the applicable Department District Officer for further information.

3. The approved DBCA "Return of Fauna Taken/Disturbed" template can be obtained from DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au).

4. Any interference or influence involving nationally listed threatened fauna that may be harmful to the fauna and/or invasive may require approval from the Commonwealth Department of Climate Change, Energy, the Environment and Water (https://www.dcceew.gov.au/environment/biodiversity/threatened/permits). Interference or influence with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and *Environment Protection and Biodiversity Conservation Regulations 2000*.

5. It is the responsibility of the Authorisation Holder to ensure that they comply with the requirements of all applicable legislation.

6. An Authorisation to take or disturb threatened species does not constitute an animal ethics approval or a licence to use animals for scientific purposes as required under the *Animal Welfare Act 2002* and *Animal Welfare (Scientific Purposes) Regulations 2003*. Enquiries relating to the Animal Welfare Act scientific purposes licence and animal ethics committee approvals are to be directed to the Western Australian Department of Primary Industries and Regional Development (https://www.agric.wa.gov.au/animalwelfare).

Appendix D Flora Desktop Assessment Results and Likelihood of Occurrence

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Summary of results of the database searches (numbers represent counts of records within 50 km of the Survey Area)

Taxon	Nature Map	TPFL[1]	WAHerb[2]
Priority 1			
Gomphrena axillaris	1		1
Goodenia pallida	1	1	1
Helichrysum oligochaetum	2		2
Tephrosia rosea var. Port Hedland (A.S. George 1114)	11		11
Priority 2			
Euphorbia inappendiculata var*. inappendiculata*	2		3
Neptunia longipila	3		11
Pentalepis trichodesmoides subsp. *hispida*			5
Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	5		9
Priority 3			
Abutilon sp. Pritzelianum (S. van Leeuwen 5095*)*	1		1
Atriplex lindleyi subsp*. conduplicata*	1		1
Corchorus congener			1
Dolichocarpa sp. Hamersley Station (A.A. Mitchell PRP 1479)	4		10
Eragrostis crateriformis	1	2	3
Eragrostis lanicaulis	2		2
Eragrostis surreyana	3		3
Eriochloa fatmensis	1		1
Euphorbia australis var*. glabra*			1
Euphorbia stevenii	3		3
Fimbristylis sieberiana		1	4
Glycine falcata	1		1
Gomphrena cucullata	2		2
Gomphrena leptophylla	1		1
Gymnanthera cunninghamii	1	1	5
Solanum albostellatum	1		11
Stackhousia clementii	4	2	2
Terminalia supranitifolia	47	7	44
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	2		6

[1] Department of Biodiversity Conservation and Attractions. (2024). Threatened and Priority Flora List (TPFL) database request (custom search).
[2] Department of Biodiversity Conservation and Attractions. (2024). Western Australia Herbarium Flora Database (custom search).

Taxon	Nature Map	TPFL[1]	WAHerb[2]
Vigna triodiophila	16		19
Priority 4			
Rhynchosia bungarensis	39		41

Community[3]	TEC PEC
Priority 3	
Burrup Peninsula rock pile communities	Priority 1
Burrup Peninsula rock pool communities	Priority 1
Chenopod vegetation associations of the Roebourne Plains	Priority 1
Coastal dune tussock grassland dominated by Whiteochloa airoides	Priority 3
Four plant assemblages of the Wona Land System (previously 'Cracking clays of the Chichester and Mungaroona Range')	Priority 1
Horseflat Land System of the Roebourne Plains	Priority 3
Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands)	Priority 1

[3] Department of Biodiversity Conservation and Attractions. (2024). Threatened and Priority Ecological Communities database request (custom search).

Appendix: Assessment of the Likelihood of Occurrence of Threatened and Priority Flora as per Desktop Assessment Database Searches surrounding the Survey Area

Distance to Nearest Record from the Survey Area is based on a distance analysis undertaken against 2024 DBCA database. High = Suitable habitat present and records less than 20 km from the Survey Area, Medium = Suitable habitat present and records between 20 km and 40 km from the Survey Area, and Low = No suitable habitat present and/or records greater than 40 km from the Survey Area, Unknown = Insufficient information available to classify . CR= Listed as Critically Endangered under the EPBC Act, EN = Listed as Endangered under the EBPC Act, VU = listed as Vulnerable under the EBPC Act. T = Threatened under the BC Act, P = Priority Listed, Ranked and Listed by the DBCA. Likelihoods are assessed both pre and post survey based on knowledge of the Survey Area, nearest known records, known flowering period of flora taxa and knowledge gained from the survey effort during ground truthing. 1: Department of the Environment (2024). SPRAT EPBC Threatened Flora in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. 2: Department of Biodiversity, Conservation and Attractions (2024). FloraBase - TheWestern Australian Flora. https://florabase.dpaw.wa.gov.au/

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Priority 1											
Gomphrena axillaris	P1	-	-	-	✓	21.38	-	Low red sand dunes. Red/ brown sand.[2]	Medium	No	Low
Goodenia pallida	P1	-	✓	-	✓	42.83	August	Red soils.[2]	Low	No	Low
Helichrysum oligochaetum	P1	-	✓	-	✓	33.85	Aug to Nov	Red clay. Alluvial plains.[2]	Medium	Yes	Low
Tephrosia rosea var. Port Hedland (A.S. George 1114)	P1	-	✓	-	✓	28.27	Jul - Sep	Pale red/yellow/brown sand. Sand plains.[2]	Medium	No	Low
Priority 2											
Euphorbia inappendiculata var. *inappendiculata*	P2	-	✓	-	✓	16.58	May, Aug	Red, brown clay or loam. Plains.[2]	High	Yes	High
Neptunia longipila	P2	-	-	-	✓	7.19	September	Clay, Cracking clays, sandy soils. Floodplains.[2]	High	Yes	High
Pentalepis trichodesmoides subsp. *hispida*	P2	-	✓	-	-	<50	July	Undulating hills and crests. Red brown clay loam.[2]	Medium	Yes	Low
Trianthema sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)	P2	-	✓	-	✓	12.34	March - May	Stony flats. Low undulating hills.[2]	High	No	Low
Priority 3											
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	P3	-	✓	-	✓	30.87	Jun, Aug - Sep	Sandy plains.[2]	Medium	No	Low
Atriplex lindleyi subsp. *conduplicata*	P3	-	✓	-	✓	37.47	-	Crabhole plains, dry, yellow bare sandy clay, by lakes.[2]	Medium	No	Low
Corchorus congener	P3	-	✓	-	-	<50	Apr - Jun or Aug - Nov	Sand, red sandy loam with limestone. Sand dunes, plains.[2]	Low	No	Low
Dolichocarpa sp. Hamersley Station (A.A. Mitchell PRP 1479)	P3	-	-	-	✓	12.98	May - Jul or Sep	Brown sandy clay, or medium clay. Claypans, drainage lines, cracking clays, crabhole plains.[2]	High	Yes	High
Eragrostis crateriformis	P3	-	-	-	✓	12.54	Jan - May or Jul	Clayey loam or clay. Creek banks, depressions.[2]	High	Yes	High

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Species	Conservation Status		Source			Distance to Nearest Record (km)	Flowering Period	Prefered Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
Eragrostis lanicaulis	P3	-	✓	-	✓	36.64	Mar to May or Aug to Oct	Red sandy clay. Flats.[2]	Medium	Yes	Low
Eragrostis surreyana	P3	-	✓	-	✓	30.77	May - Sep	Soak areas, broad drainage areas, wet areas.[2]	Medium	No	Low
Eriochloa fatmensis	P3	-	✓	-	✓	25.02	Jan - May	Woodland.[2]	Medium	No	Low
Euphorbia australis var. *glabra*	P3	-	✓	-	-	<50	May	Clay pans. Cracking clays. Red brown clay loam.[2]	Low	Yes	Low
Euphorbia stevenii	P3	-	✓	-	✓	42.46	-	Clay, Cracking clays, sandy soils.[2]	Low	Yes	Low
Fimbristylis sieberiana	P3	-	✓	-	-	<50	May to Jun	Mud, skeletal soil pockets. Pool edges, sandstone cliffs.[2]	Low	No	Low
Glycine falcata	P3	-	✓	-	✓	23.48	May or Jul	Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.[2]	Medium	No	Low
Gomphrena cucullata	P3	-	✓	-	✓	7.23	Feb - Apr	Red sandy loam, clayey sand. Open floodplains.[2]	High	No	Low
Gomphrena leptophylla	P3	-	✓	-	✓	34.35	Mar - Sep	Sand, sandy to clayey loam, granite, quartzite. Open flats, sandy creek beds, edges salt pans and marshes, stony hillsides.[2]	Medium	No	Low
Gymnanthera cunninghamii	P3	-	✓	-	✓	40.85	Jan - Dec	Sandy soils.[2]	Low	No	Low
Nicotiana umbratica	P3	-	✓	-	-	<50	Apr to Jun	Shallow soil. Rocky outcrops.[2]	Low	No	Low
Schoenus punctatus	P3	-	✓	-	-	<50	Aug	Watercourses.[2]	Low	No	Low
Solanum albostellatum	P3	-	✓	-	✓	23.48	Mar - May	Open clay flats, flat undulating plains, clay, cracking clay.[2]	Medium	Yes	Low
Stackhousia clementii	P3	-	✓	-	✓	20.06	Nov- Mar	Skeletal soils. Sandstone hills.[2]	Medium	No	Low
Terminalia supranitifolia	P3	-	✓	-	✓	9.32	May or Jul or Dec	Sand. Among basalt rocks. Hill tops.[2]	High	No	Low
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	P3	-	✓	-	✓	9.95	Aug	Red clay. Clay pan, grass plain.[2]	High	Yes	High
Vigna triodiophila	P3	-	✓	-	✓	16.50	Mar - May	Stony red-brown clay loam. Among boulders, steep slopes.[2]	High	No	Low
Priority 4											
Rhynchosia bungarensis	P4	-	✓	-	✓	16.02	May - Dec	Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.[2]	High	No	Low

[1] Department of Agriculture, Water and Environment (2020) [2]Western Australian Herbarium (2020)

Appendix E Inventory of Vascular Flora

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Vascular Flora Recorded from the Survey Area

Family	*Taxon*	Status
Amaranthaceae	*Aerva javanica*	*
	Alternanthera sp	g
	Gomphrena cunninghamii	
	Ptilotus astrolasius	
	Ptilotus calostachyus	
	Ptilotus exaltatus	
Asteraceae	*Pterocaulon sphaeranthoides*	
Boraginaceae	*Ehretia saligna*	
	Euploca sp	g
	Trichodesma zeylanicum var. *zeylanicum*	
Capparaceae	*Capparis spinosa* subsp. *nummularia*	
Chenopodiaceae	*Atriplex codonocarpa*	
	Rhagodia eremaea	
	Salsola australis	
	Sclerolaena densiflora	
	Sclerolaena hostilis	
	Sclerolaena sp	g
Cleomaceae	*Arivela viscosa*	
Convolvulaceae	*Bonamia pilbarensis*	
	Bonamia sp	g
	Evolvulus alsinoides var. *villosicalyx*	
	Evolvulus sp	g
	Ipomoea lonchophylla	
	Operculina aequisepala	
Cucurbitaceae	*Cucumis variabilis*	
	Trichosanthes cucumerina	
Elatinaceae	*Bergia trimera*	
Euphorbiaceae	*Euphorbia coghlanii*	
Fabaceae	*Acacia ancistrocarpa*	
	Acacia arida	
	Acacia bivenosa	
	Acacia colei var. *colei*	
	Acacia coriacea subsp. *pendens*	
	Acacia inaequilatera	
	Acacia maitlandii	
	Acacia pyrifolia var. *pyrifolia*	
	Acacia synchronicia	
	Acacia trachycarpa	
	Acacia trachycarpa x unknown *hybrid*	h
	Acacia tumida var. *pilbarensis*	
	Acacia xiphophylla	
	Afrohybanthus aurantiacus	
	Cullen leucanthum	

Family	*Taxon*	Status
	Indigofera ?linnaei	s
	Indigofera colutea	
	Indigofera monophylla	
	Neptunia sp	g
	Neptunia xanthonema	
	Rhynchosia minima	
	Senna artemisioides subsp. *oligophylla*	
	Senna glutinosa subsp. *glutinosa*	
	Senna glutinosa subsp. *pruinosa*	
	Senna notabilis	
	Senna sp	g
	Senna symonii	
	Tephrosia rosea var. *clementii*	
	Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)	
	Vachellia farnesiana	*
Goodeniaceae	*Dampiera candicans*	
	Goodenia stobbsiana	
	Scaevola spinescens	
Lauraceae	*Cassytha capillaris*	
Malvaceae	*Abutilon sp*	g
	Corchorus ?parviflorus	s
	Corchorus parviflorus	
	Corchorus sp	g
	Malvastrum americanum	*
	Melhania oblongifolia	
	Sida sp	g
	Sida sp. Pilbara (A.A. Mitchell PRP 1543)	
	Triumfetta appendiculata	
	Triumfetta clementii	
	Triumfetta maconochieana	
Menispermaceae	*Tinospora smilacina*	
Moraceae	*Ficus aculeata* var. *indecora*	
	Ficus brachypoda	
Myrtaceae	*Corymbia hamersleyana*	
	Eucalyptus victrix	
Nyctaginaceae	*Boerhavia coccinea*	
	Boerhavia sp	g
Oleaceae	*Jasminum didymum* subsp. *lineare*	
Phyllanthaceae	*Phyllanthus maderaspatensis*	
Plantaginaceae	*Stemodia grossa*	
	Stemodia kingii	
Poaceae	*Cenchrus ciliaris*	*
	Cymbopogon ambiguus	
	Eragrostis xerophila	

Family	*Taxon*	Status
	Eriachne benthamii	
	Eriachne mucronata	
	Eulalia aurea	
	Themeda triandra	
	Triodia ?secunda	s
	Triodia angusta	
	Triodia epactia	
	Triodia wiseana	
Portulacaceae	*Portulaca ?conspicua*	s
Proteaceae	*Grevillea pyramidalis* subsp. *leucadendron*	
	Grevillea wickhamii subsp. *hispidula*	
	Hakea lorea subsp. *lorea*	
Rubiaceae	*Psydrax sp*	g
Scrophulariaceae	*Eremophila longifolia*	
Solanaceae	*Solanum diversiflorum*	
	Solanum horridum	
	Solanum sp	g
Zygophyllaceae	*Tribulus hirsutus*	
	Tribulus suberosus	*

*** = Introduced taxa, g = Identified to genus, h = Hybrid, s = Identified to tentative species.**

Appendix F Flora Site Sheets

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

FLORA SITE SHEET

Site: **BWR01**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83067 **Lat** 116.91160 **Long**
Described by:	J. Hardie, L. Geidans
Date:	03-04-2024
Type:	RELEVE 25 x 100
Landform:	Ridge
Slope:	Steep
Rock Type:	Quartz,Granite
Soil Type:	Clay
Soil Colour:	Brown

Vegetation: *Ficus brachypoda low open woodland over Ehretia saligna tall sparse shrubland over *Cenchrus ciliaris low open tussock grassland over mixed herbs.*

Condition: Very Good **Disturbance Type:** Weeds,Litter
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Afrohybanthus aurantiacus	10	0.1	
Arivela viscosa	10	0.1	
**Cenchrus ciliaris*	30	15	
Cymbopogon ambiguus	50	0.1	
Ehretia saligna	200	8	
Eriachne mucronata	20	0.1	
Ficus brachypoda	400	5	
Tinospora smilacina	30	0.1	
Trichosanthes cucumerina	10	0.1	
Triodia epactia	30	1	

FLORA SITE SHEET

Site: **BWR02**

Project Name Bardies Well Flora and Fauna Survey
Location -20.82960 **Lat** 116.91332 **Long**
Described by: J. Hardie, L. Geidans
Date: 04-04-2024

Type: RELEVE 25 x 100
Landform: Ridge
Slope: Moderate
Rock Type: Quartz
Soil Type: Gravel
Soil Colour: Brown

Vegetation: *Ehretia saligna and Grevillea pyramidalis subsp. leucadendron tall sparse shrubland over Eriachne mucronata and *Cenchrus ciliaris low sparse tussock grassland.*

Condition: Very Good **Disturbance Type:** Weeds
Fire Age: >10 years

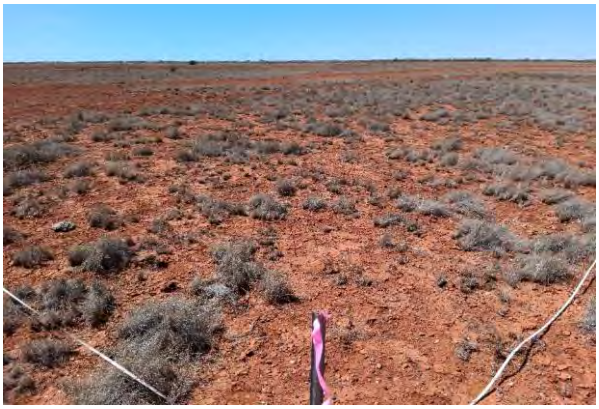
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia pyrifolia var. pyrifolia	120	0.1	
Afrohybanthus aurantiacus	50	0.1	
Arivela viscosa	5	0.1	
Boerhavia coccinea	5	0.1	
**Cenchrus ciliaris*	30	2	
Corymbia hamersleyana	200	0.1	
Cymbopogon ambiguus	60	0.1	
Ehretia saligna	200	4	
Eriachne mucronata	20	3	
Gomphrena cunninghamii	5	0.1	
Grevillea pyramidalis subsp. leucadendron	180	3	
Senna sp.	10	0.1	
Tephrosia rosea var. clementii	20	0.1	
Tinospora smilacina	50	0.1	
Tribulus suberosus	60	0.1	
Triodia epactia	50	0.1	
Triumfetta maconochieana	20	0.1	

FLORA SITE SHEET

Site: **BWQ03**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.80383 **Lat** 116.87539 **Long**
Described by:	J. Hardie, L. Geidans
Date:	04-04-2024
Type:	QUADRAT 50 x 50
Landform:	Cracking Clays
Slope:	Flat
Rock Type:	Quartz
Soil Type:	Clay
Soil Colour:	Brown,Orange



Vegetation: *Eragrostis xerophila and Eriachne benthamii low open tussock grassland.*

Condition:	Degraded	**Disturbance Type:**	Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing
Fire Age:	Unknown		

SPECIES LIST

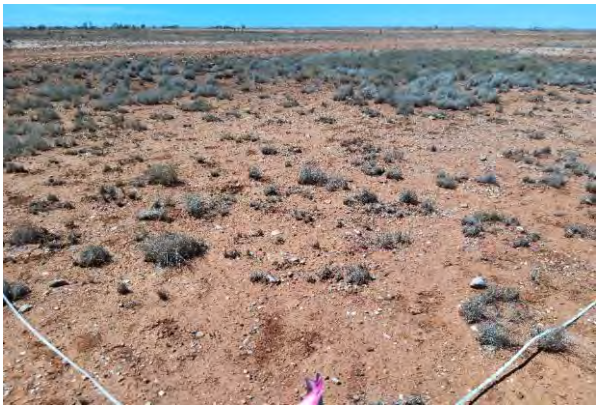
Taxon	Height (cm)	Cover (%)	Notes
Eragrostis xerophila	20	20	
Eriachne benthamii	20	5	
Neptunia sp.	5	0.1	
Operculina aequisepala	20	0.1	
Sclerolaena hostilis	30	0.5	
Sclerolaena sp.	5	0.1	
Stemodia kingii	10	0.1	

FLORA SITE SHEET

Site: **BWQ04**

Project Name Bardies Well Flora and Fauna Survey
Location -20.81156 **Lat** 116.88910 **Long**
Described by: J. Hardie, L. Geidans
Date: 04-04-2024

Type: QUADRAT 50 x 50
Landform: Cracking Clays
Slope: Flat
Rock Type: Quartz
Soil Type: Clay
Soil Colour: Brown,Orange



Vegetation: *Eragrostis xerophila and Eriachne benthamii low open tussock grassland.*

Condition: Degraded
Fire Age: Unknown
Disturbance Type: Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing

SPECIES LIST

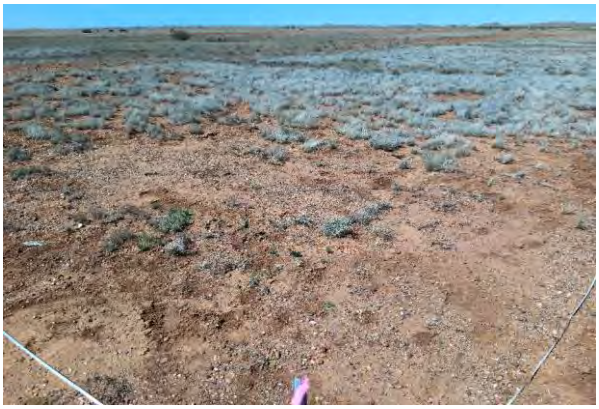
Taxon	Height (cm)	Cover (%)	Notes
Bonamia pilbarensis	5	0.1	
Corchorus sp.	2	0.1	
Eragrostis xerophila	15	15	
Eriachne benthamii	20	5	
Euploca sp	5	0.1	
Neptunia sp.	5	0.1	
Pterocaulon sphaeranthoides	5	0.1	
Ptilotus exaltatus	4	0.1	
Sclerolaena sp.	5	0.1	

FLORA SITE SHEET

Site: **BWQ05**

Project Name Bardies Well Flora and Fauna Survey
Location -20.82138 **Lat** 116.90667 **Long**
Described by: J. Hardie, L. Geidans
Date: 04-04-2024

Type: QUADRAT 50 x 50
Landform: Cracking Clays
Slope: Flat
Rock Type: Quartz
Soil Type: Clay
Soil Colour: Brown,Orange



Vegetation: *Eragrostis xerophila and Eriachne benthamii low open tussock grassland.*

Condition: Degraded
Fire Age: Unknown
Disturbance Type: Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Arivela viscosa	5	0.1	
Eragrostis xerophila	15	20	
Eriachne benthamii	20	8	
Euphorbia coghlanii	5	0.1	
Ipomoea lonchophylla	5	0.1	
Sclerolaena sp.	5	0.1	
Senna artemisioides subsp. oligophylla	20	0.1	
Tephrosia ?sp. NW Eremaean (S. van Leeuwen et al. PB	5	0.1	

FLORA SITE SHEET

Site: **BWR06**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.81075 **Lat** 116.88805 **Long**
Described by:	J. Hardie, L. Geidans
Date:	04-04-2024
Type:	RELEVE 25 x 100
Landform:	Dolerite outcrop
Slope:	Moderate
Rock Type:	Dolerite
Soil Type:	Gravel
Soil Colour:	Brown

Vegetation: *Ficus aculeata var. indecora low open woodland over Ehretia saligna tall sparse shrubland over Triodia epactia low open hummock grassland.*

Condition: Good **Disturbance Type:** Weeds,Grazing,Fauna tracks/scats

Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Capparis spinosa subsp. nummularia	50	0.1	
**Cenchrus ciliaris*	30	3	
Ehretia saligna	300	2	
Ficus aculeata var. indecora	250	3	
Rhynchosia minima	30	0.1	
Triodia epactia	30	11	

FLORA SITE SHEET

Site: **BWQ07**

Project Name Bardies Well Flora and Fauna Survey
Location -20.80833 **Lat** 116.88333 **Long**
Described by: J. Hardie, L. Geidans
Date: 04-04-2024

Type: QUADRAT 50 x 50
Landform: Plains
Slope: Flat
Rock Type: Quartzite
Soil Type: Clay
Soil Colour: Brown

Vegetation: *Acacia inaequilatera and Acacia pyrifolia var. pyrifolia tall open shrubland over Triodia wiseana (Triodia epactia) low open hummock grassland over ?Eragrostis xerophila low sparse tussock grassland.*

Condition: Good **Disturbance Type:** Grazing,Vehicle tracks,Litter,Fauna tracks/scats
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	100	0.1	
Acacia inaequilatera	250	11	
Acacia pyrifolia var. pyrifolia	170	3	
Boerhavia sp.	5	0.1	
Corchorus sp.	30	0.1	
Eragrostis xerophila	20	5	
Eremophila longifolia	20	0.1	
Pterocaulon sphaeranthoides	30	0.1	
Sclerolaena sp.	20	0.1	
Stemodia grossa	30	0.1	
Triodia ?secunda	30	0.1	
Triodia epactia	30	0.5	
Triodia wiseana	30	22	

FLORA SITE SHEET

Site: **BWR08**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.79999 **Lat** 116.86856 **Long**
Described by:	J. Hardie, L. Geidans
Date:	05-04-2024
Type:	RELEVE 25 x 100
Landform:	Minor drainage
Slope:	Gentle
Rock Type:	Dolerite
Soil Type:	Loam,Sand
Soil Colour:	Brown

Vegetation: *Eucalyptus victrix low open woodland over Acacia coriacea subsp. pendens tall sparse shrubland over Eulalia aurea (*Cenchrus ciliaris and Themeda triandra) mid tussock grassland over Triodia epactia low sparse hummock grassland.*

Condition: Poor **Disturbance Type:** Weeds,Grazing,Litter,Fauna tracks/scats,Infrastructure

Fire Age: >10 years

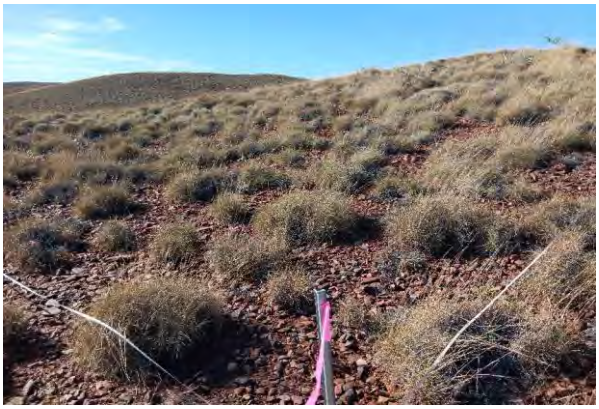
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia colei var. colei	160	0.1	
Acacia coriacea subsp. pendens	250	2	
Acacia pyrifolia var. pyrifolia	30	0.1	
Acacia trachycarpa	160	0.1	
Cassytha capillaris	10	0.1	
**Cenchrus ciliaris*	30	2	
Corchorus sp.	20	0.1	
Cucumis variabilis	50	0.1	
Cullen leucanthum	200	0.1	
Eucalyptus victrix	900	5	
Eulalia aurea	70	35	
Evolvulus sp.	10	0.1	
Indigofera monophylla	60	0.1	
**Malvastrum americanum*	20	0.1	
Themeda triandra	30	0.5	
Trichodesma zeylanicum var. zeylanicum	70	0.1	
Triodia epactia	30	2	
**Vachellia farnesiana*	200	0.1	

FLORA SITE SHEET

Site: **BWQ09**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83509 **Lat** 116.91058 **Long**
Described by:	J. Hardie, L. Geidans
Date:	05-04-2024
Type:	QUADRAT 50 x 50
Landform:	Undulating hills
Slope:	Gentle
Rock Type:	Dolerite,Quartzite
Soil Type:	Clay,Loam
Soil Colour:	Brown



Vegetation: *Acacia pyrifolia var. pyrifolia mid sparse shrubland over Triodia epactia (Triodia wiseana) low hummock grassland.*

Condition: Very Good **Disturbance Type:** Litter
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia pyrifolia var. pyrifolia	80	1	
Bonamia pilbarensis	10	0.1	
Bonamia sp.	10	0.1	
Corchorus parviflorus	20	0.1	
Dampiera candicans	20	0.1	
Indigofera monophylla	30	0.1	
Pterocaulon sphaeranthoides	20	0.1	
Ptilotus calostachyus	5	0.1	
Ptilotus exaltatus	30	0.1	
Senna symonii	110	0.1	
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS	5	0.1	
Trichodesma zeylanicum var. zeylanicum	150	0.1	
Triodia epactia	30	31	
Triodia wiseana	30	1	

FLORA SITE SHEET

Site: **BWR10**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83362 **Lat** 116.91056 **Long**
Described by:	J. Hardie, L. Geidans
Date:	05-04-2024
Type:	RELEVE 25 x 100
Landform:	Minor drainage
Slope:	Gentle
Rock Type:	Dolerite
Soil Type:	Clay,Sand
Soil Colour:	Brown

Vegetation: *Corymbia hamersleyana low open woodland over Acacia ancistrocarpa, Acacia bivenosa and Acacia pyrifolia var. pyrifolia tall sparse shrubland over Triodia epactia (Triodia wiseana) low hummock grassland over mixed herbs.*

Condition:	Good	**Disturbance Type:**	Weeds,Grazing,Litter,Fauna tracks/scats,Infrastructure
Fire Age:	>10 years		

SPECIES LIST

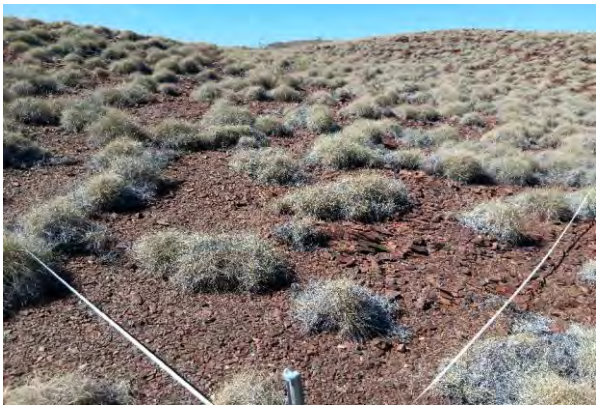
Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	250	4	
Acacia bivenosa	250	2	
Acacia pyrifolia var. pyrifolia	180	0.1	
Cassytha capillaris	20	0.1	
**Cenchrus ciliaris*	30	0.1	
Corymbia hamersleyana	450	1	
Cucumis variabilis	30	0.1	
Evolvulus alsinoides var. villosicalyx	20	0.1	
Indigofera monophylla	30	0.1	
Melhania oblongifolia	20	0.1	
Phyllanthus maderaspatensis	20	0.1	
Pterocaulon sphaeranthoides	30	0.1	
Rhynchosia minima	20	0.1	
Senna artemisioides subsp. oligophylla	50	0.1	
Senna glutinosa subsp. glutinosa	170	0.1	
Senna notabilis	20	0.1	
Sida sp.	30	0.1	
Themeda triandra	50	0.1	
Trichodesma zeylanicum var. zeylanicum	60	0.1	
Triodia epactia	40	29	
Triodia wiseana	30	3	

FLORA SITE SHEET

Site: **BWQ11**

Project Name Bardies Well Flora and Fauna Survey
Location -20.83243 **Lat** 116.91365 **Long**
Described by: J. Hardie, L. Geidans
Date: 05-04-2024

Type: QUADRAT 50 x 50
Landform: Undulating hills
Slope: Gentle
Rock Type: Dolerite,Quartzite
Soil Type: Clay,Loam
Soil Colour: Brown



Vegetation: *Acacia pyrifolia var. pyrifolia mid isolated shrubs over Triodia wiseana (Triodia epactia) low hummock grassland.*

Condition: Very Good **Disturbance Type:** Fauna tracks/scats
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	50	0.1	
Acacia pyrifolia var. pyrifolia	100	0.5	
Bonamia pilbarensis	10	0.1	
Corchorus parviflorus	30	0.1	
Indigofera monophylla	30	0.1	
Pterocaulon sphaeranthoides	30	0.1	
Ptilotus exaltatus	40	0.1	
Senna glutinosa subsp. pruinosa	170	0.1	
Trichodesma zeylanicum var. zeylanicum	50	0.1	
Triodia epactia	40	1	
Triodia wiseana	30	31	

FLORA SITE SHEET

Site: **BWR12**

Project Name Bardies Well Flora and Fauna Survey
Location -20.80766 **Lat** 116.88225 **Long**
Described by: J. Hardie, L. Geidans
Date: 05-04-2024

Type: RELEVE 25 x 100
Landform: Minor drainage
Slope: Flat
Rock Type: Dolerite
Soil Type: Clay,Sand
Soil Colour: Brown

Vegetation: *Corymbia hamersleyana low open woodland over Acacia coriacea subsp. pendens and Acacia trachycarpa tall sparse shrubland over Eriachne benthamii (*Cenchrus ciliaris and Eulalia aurea) low open tussock grassland.*

Condition: Degraded
Fire Age: >10 years
Disturbance Type: Weeds,Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Infrastructure

SPECIES LIST

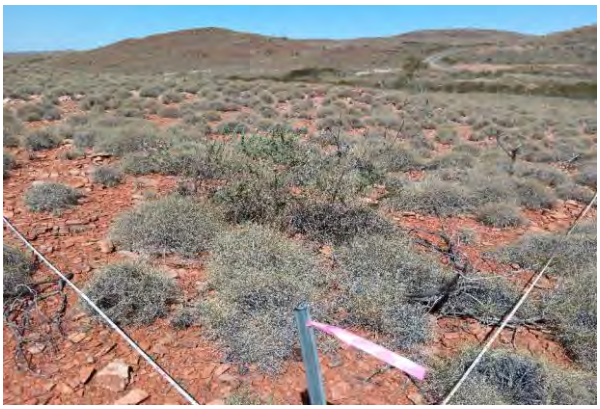
Taxon	Height (cm)	Cover (%)	Notes
Acacia coriacea subsp. pendens	250	0.5	
Acacia pyrifolia var. pyrifolia	100	0.1	
Acacia trachycarpa	250	1	
**Cenchrus ciliaris*	30	1	
Corchorus sp.	30	0.1	
Corymbia hamersleyana	600	8	
Eriachne benthamii	30	15	
Eulalia aurea	30	0.5	
**Malvastrum americanum*	20	0.1	
Themeda triandra	30	0.1	
Triodia epactia	30	1	

FLORA SITE SHEET

Site: **BWQ13**

Project Name Bardies Well Flora and Fauna Survey
Location -20.82695 **Lat** 116.91357 **Long**
Described by: J. Hardie, L. Geidans
Date: 05-04-2024

Type: QUADRAT 50 x 50
Landform: Undulating hills
Slope: Gentle
Rock Type: Quartz
Soil Type: Clay,Loam
Soil Colour: Beige



Vegetation: *Acacia bivenosa mid isolated shrubs over Triodia wiseana low hummock grassland.*

Condition: Very Good **Disturbance Type:** Infrastructure
Fire Age: >10 years

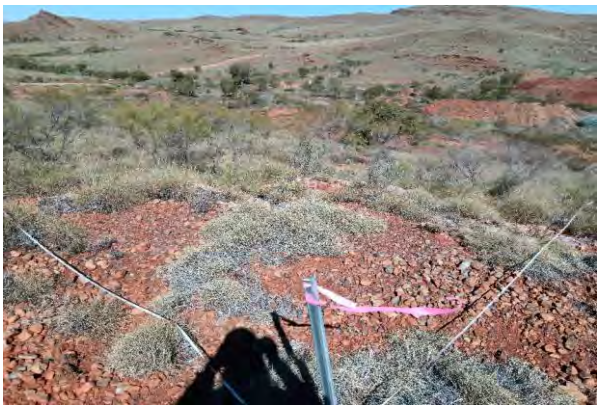
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	150	0.5	
Acacia pyrifolia var. pyrifolia	30	0.1	
Corchorus sp.	10	0.1	
Pterocaulon sphaeranthoides	20	0.1	
Senna glutinosa subsp. pruinosa	100	0.1	
Triodia wiseana	30	32	

FLORA SITE SHEET

Site: **BWQ14**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83013 **Lat** 116.91254 **Long**
Described by:	J. Hardie, L. Geidans
Date:	05-04-2024
Type:	QUADRAT 50 x 50
Landform:	Hillside
Slope:	Moderate
Rock Type:	Quartz
Soil Type:	Clay
Soil Colour:	Beige



Vegetation: *Corymbia hamersleyana low isolated trees over Acacia arida (Acacia ancistrocarpa) mid open shrubland over Triodia epactia (Triodia wiseana) low open hummock grassland.*

Condition: Very Good **Disturbance Type:** Litter,Infrastructure
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	250	0.5	
Acacia arida	180	15	
Acacia pyrifolia var. pyrifolia	50	0.1	
Cassytha capillaris	20	0.1	
Corymbia hamersleyana	700	0.1	
Goodenia stobbsiana	10	0.1	
Indigofera monophylla	30	0.1	
Jasminum didymum subsp. lineare	30	0.1	
Ptilotus calostachyus	50	0.1	
Senna glutinosa subsp. glutinosa	170	0.1	
Solanum sp.	10	0.1	
Tinospora smilacina	5	0.1	
Triodia epactia	30	25	
Triodia wiseana	30	3	

FLORA SITE SHEET

Site: **BWQ15**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.82838 **Lat** 116.90906 **Long**
Described by:	J. Hardie, L. Geidans
Date:	06-04-2024
Type:	QUADRAT 50 x 50
Landform:	Foothills
Slope:	Gentle
Rock Type:	Quartz,Shale
Soil Type:	Clay,Gravel,Loam
Soil Colour:	Beige

Vegetation: *Acacia bivenosa and Acacia inaequilatera tall isolated shrubs over Triodia angusta and Triodia wiseana low hummock grassland.*

Condition: Good **Disturbance Type:** Grazing,Fauna tracks/scats,Infrastructure
Fire Age: >10 years

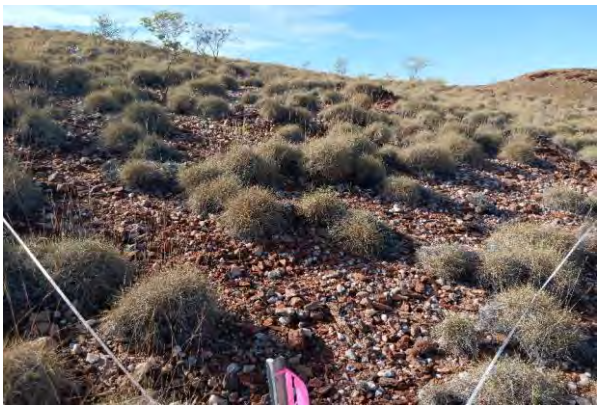
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	120	0.1	
Acacia inaequilatera	250	0.1	
Bonamia pilbarensis	10	0.1	
Cassytha capillaris	30	0.1	
Corchorus ?parviflorus	10	0.1	
Ptilotus exaltatus	30	0.1	
Sclerolaena densiflora	5	0.1	
Senna glutinosa subsp. glutinosa	100	0.1	
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS	5	0.1	
Triodia angusta	30	26	
Triodia wiseana	30	5	

FLORA SITE SHEET

Site: **BWQ16**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83015 **Lat** 116.90982 **Long**
Described by:	J. Hardie, L. Geidans
Date:	06-04-2024
Type:	QUADRAT 50 x 50
Landform:	Undulating hill
Slope:	Gentle
Rock Type:	Quartz
Soil Type:	Clay,Loam
Soil Colour:	Brown



Vegetation: *Acacia ancistrocarpa, Acacia bivenosa and Acacia synchronicia mid sparse shrubland over Triodia wiseana (Triodia epactia) low hummock grassland.*

Condition: Very Good **Disturbance Type:** Infrastructure
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	160	1	
Acacia bivenosa	170	2	
Acacia pyrifolia var. pyrifolia	100	0.1	
Acacia synchronicia	160	0.5	
Cassytha capillaris	30	0.1	
Corchorus parviflorus	20	0.1	
Eriachne mucronata	30	0.5	
Goodenia stobbsiana	50	0.1	
Indigofera monophylla	30	0.1	
Ptilotus calostachyus	100	0.1	
Senna artemisioides subsp. oligophylla	100	0.1	
Senna glutinosa subsp. glutinosa	100	0.1	
Senna glutinosa subsp. pruinosa	100	0.1	
Senna symonii	30	0.1	
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	20	0.1	
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS	5	0.1	
Triodia epactia	30	1	
Triodia wiseana	30	31	

FLORA SITE SHEET

Site: **BWR17**

Project Name Bardies Well Flora and Fauna Survey
Location -20.83096 **Lat** 116.90987 **Long**
Described by: J. Hardie, L. Geidans
Date: 06-04-2024

Type: RELEVE 25 x 100
Landform: Drainage thicket
Slope: Gentle
Rock Type: Quartz
Soil Type: Clay,Sand
Soil Colour: Brown

Vegetation: *Corymbia hamersleyana low isolated trees over Acacia ancistrocarpa, Acacia bivenosa and Acacia pyrifolia var. pyrifolia tall sparse shrubland over Triodia epactia low sparse humock grassland over mixed herbs.*

Condition: Very Good **Disturbance Type:** Grazing,Fauna tracks/scats
Fire Age: >10 years

SPECIES LIST

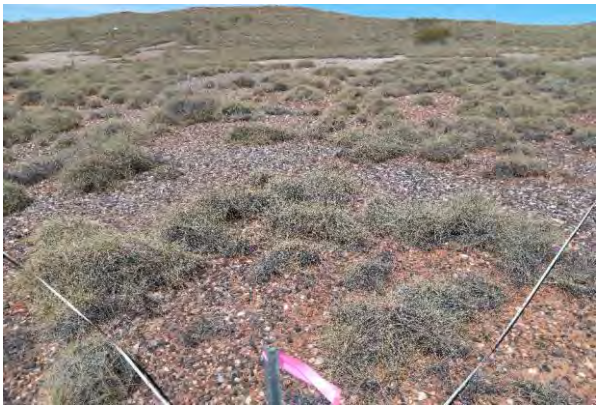
Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	170	5	
Acacia bivenosa	200	1	
Acacia pyrifolia var. pyrifolia	200	1	
Afrohybanthus aurantiacus	40	0.1	
Boerhavia coccinea	20	0.1	
Bonamia pilbarensis	10	0.1	
Cassytha capillaris	30	0.1	
Corchorus parviflorus	30	0.1	
Corymbia hamersleyana	500	1	
Cucumis variabilis	30	0.1	
Cymbopogon ambiguus	50	0.1	
Evolvulus alsinoides var. villosicalyx	10	0.1	
Goodenia stobbsiana	30	0.1	
Indigofera monophylla	50	0.1	
Pterocaulon sphaeranthoides	30	0.5	
Senna artemisioides subsp. oligophylla	100	0.1	
Solanum horridum	20	0.1	
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS	10	0.1	
Themeda triandra	50	0.5	
Trichodesma zeylanicum var. zeylanicum	50	0.1	
Triodia epactia	30	8	
Triodia wiseana	30	0.1	
Triumfetta clementii	5	0.1	

FLORA SITE SHEET

Site: **BWQ18**

Project Name Bardies Well Flora and Fauna Survey
Location -20.82598 **Lat** 116.91328 **Long**
Described by: J. Hardie, L. Geidans
Date: 06-04-2024

Type: QUADRAT 50 x 50
Landform: Low foothills
Slope: Flat
Rock Type: Quartz
Soil Type: Clay,Loam,Sand
Soil Colour: Beige



Vegetation: *Acacia ancistrocarpa, Acacia bivenosa and Acacia pyrifolia var. pyrifolia mid sparse shrubland over Triodia angusta and Triodia wiseana low open hummock grassland.*

Condition: Very Good **Disturbance Type:** Fauna tracks/scats
Fire Age: >10 years

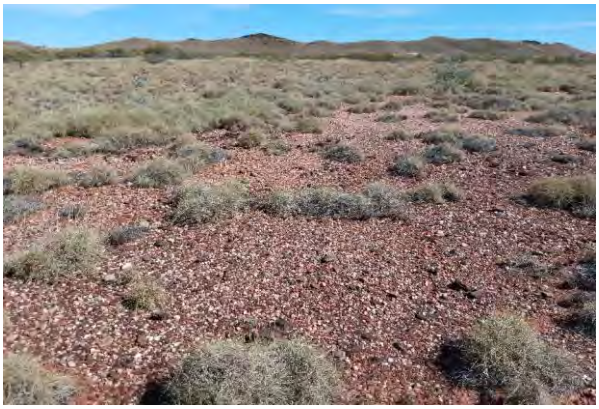
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	170	0.5	
Acacia bivenosa	120	0.5	
Acacia pyrifolia var. pyrifolia	100	0.1	
Acacia synchronicia	50	0.1	
Ptilotus exaltatus	30	0.1	
Senna glutinosa subsp. pruinosa	100	0.1	
Triodia angusta	30	20	
Triodia wiseana	30	5	

FLORA SITE SHEET

Site: **BWR19**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.82530 **Lat** 116.90901 **Long**
Described by:	J. Hardie, L. Geidans
Date:	06-04-2024
Type:	RELEVE 25 x 100
Landform:	Plains
Slope:	Flat
Rock Type:	Quartz
Soil Type:	Clay,Sand
Soil Colour:	Brown



Vegetation: *Acacia ancistrocarpa and Acacia bivenosa mid isolated shrubs over Triodia wiseana low hummock grassland.*

Condition: Very Good **Disturbance Type:** Fauna tracks/scats,Infrastructure

Fire Age: >10 years

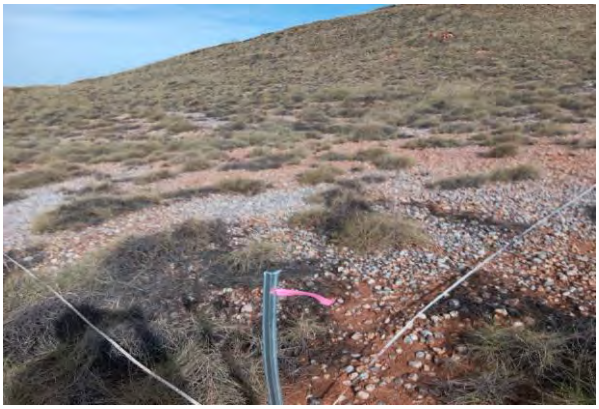
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	200	0.5	
Acacia bivenosa	100	1	
Acacia synchronicia	50	0.1	
Afrohybanthus aurantiacus	30	0.1	
Hakea lorea subsp. lorea	100	0.1	
Ptilotus exaltatus	30	0.1	
Senna artemisioides subsp. oligophylla	50	0.1	
Senna symonii	100	0.1	
Triodia wiseana	30	31	

FLORA SITE SHEET

Site: **BWQ20**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.82851 **Lat** 116.91291 **Long**
Described by:	J. Hardie, L. Geidans
Date:	06-04-2024
Type:	QUADRAT 50 x 50
Landform:	Hillside
Slope:	Gentle
Rock Type:	Quartz
Soil Type:	Clay,Loam
Soil Colour:	Beige



Vegetation: *Acacia ancistrocarpa mid isolated shrubs over Triodia angusta and Triodia wiseana low hummock grassland.*

Condition: Very Good **Disturbance Type:** Infrastructure
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	100	0.1	
Bonamia pilbarensis	5	0.1	
Cassytha capillaris	30	0.1	
Goodenia stobbsiana	30	0.1	
Ptilotus calostachyus	30	0.1	
Triodia angusta	30	15	
Triodia wiseana	30	17	

FLORA SITE SHEET

Site: **BWR21**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.79785 **Lat** 116.86494 **Long**
Described by:	J. Hardie, L. Geidans
Date:	07-04-2024
Type:	QUADRAT 50 x 50
Landform:	Quartz rise
Slope:	Gentle
Rock Type:	Quartz
Soil Type:	Clay
Soil Colour:	Brown

Vegetation: *Acacia inaequilatera tall sparse shrubland over Triodia epactia and Triodia wiseana low hummock grassland.*

Condition: Good **Disturbance Type:** Vehicle tracks,Litter,Infrastructure

Fire Age: >10 years

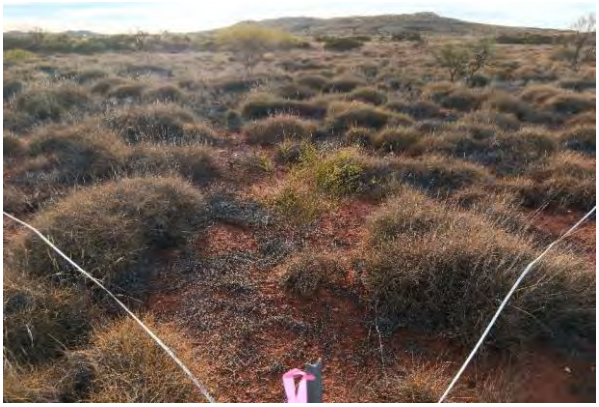
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	100	0.1	
Acacia inaequilatera	300	2	
Acacia maitlandii	60	0.1	
Bonamia pilbarensis	10	0.1	
Indigofera monophylla	20	0.1	
Psydrax sp.	100	0.1	
Ptilotus exaltatus	30	0.1	
Sclerolaena densiflora	10	0.1	
Triodia epactia	30	16	
Triodia wiseana	30	15	

FLORA SITE SHEET

Site: **BWQ22**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.79518 **Lat** 116.86158 **Long**
Described by:	J. Hardie, L. Geidans
Date:	07-04-2024
Type:	QUADRAT 50 x 50
Landform:	Plains
Slope:	Flat
Rock Type:	Granite
Soil Type:	Clay,Loam
Soil Colour:	Brown,Orange



Vegetation: *Acacia ancistrocarpa and Acacia xiphophylla mid sparse shrubland over Rhagodia eremaea and Sclerolaena densiflora mid sparse shrubland over Triodia epactia low hummock grassland over Eragrostis xerophila low sparse tussock grassland.*

Condition:	Poor	**Disturbance Type:**	Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing,Infrastructure
Fire Age:	>10 years		

SPECIES LIST

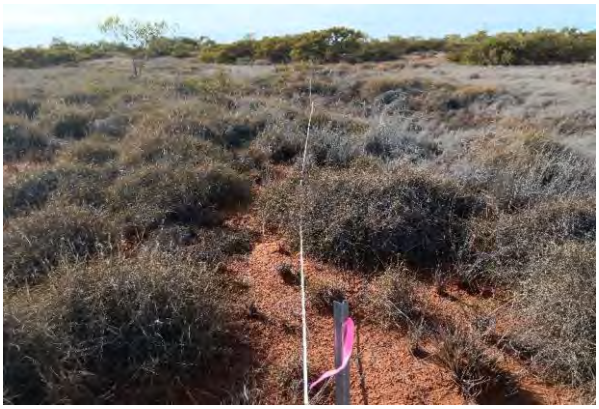
Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	180	1	
Acacia bivenosa	40	0.1	
Acacia pyrifolia var. pyrifolia	60	0.1	
Acacia xiphophylla	180	1	
Corchorus sp.	20	0.1	
Eragrostis xerophila	30	3	
Hakea lorea subsp. lorea	160	0.1	
Pterocaulon sphaeranthoides	20	0.1	
Ptilotus exaltatus	30	0.1	
Rhagodia eremaea	100	0.5	
Scaevola spinescens	60	0.1	
Sclerolaena densiflora	50	0.5	
Senna artemisioides subsp. oligophylla	40	0.1	
Senna glutinosa subsp. glutinosa	50	0.1	
Sida sp.	20	0.1	
Solanum sp.	30	0.1	
Trichodesma zeylanicum var. zeylanicum	70	0.1	
Triodia epactia	30	31	

FLORA SITE SHEET

Site: **BWQ23**

Project Name Bardies Well Flora and Fauna Survey
Location -20.79890 **Lat** 116.86660 **Long**
Described by: J. Hardie, L. Geidans
Date: 07-04-2024

Type: QUADRAT 25 x 100
Landform: Plains
Slope: Flat
Rock Type: Quartz
Soil Type: Clay,Loam
Soil Colour: Brown,Orange



Vegetation: *Acacia xiphophylla mid open shrubland over Rhagodia eremaea and Sclerolaena densiflora mid sparse shrubland over Triodia epactia low sprase hummock grassland over Eragrostis xerophila low sparse tussock grassland.*

Condition: Poor
Fire Age: >10 years
Disturbance Type: Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing,Infrastructure

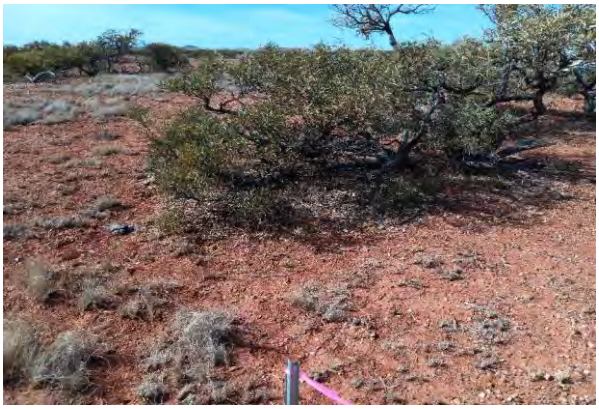
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	40	0.1	
Acacia pyrifolia var. pyrifolia	60	0.1	
Acacia xiphophylla	180	15	
Atriplex codonocarpa	10	0.1	
Capparis spinosa subsp. nummularia	50	0.1	
Corchorus sp.	20	0.1	
Eragrostis xerophila	30	8	
Pterocaulon sphaeranthoides	20	0.1	
Ptilotus exaltatus	30	0.1	
Rhagodia eremaea	100	0.5	
Sclerolaena densiflora	50	0.5	
Triodia angusta	20	0.1	
Triodia epactia	30	3	
Triodia wiseana	30	0.1	

FLORA SITE SHEET

Site: **BWQ24**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.80060 **Lat** 116.87052 **Long**
Described by:	J. Hardie, L. Geidans
Date:	07-04-2024
Type:	QUADRAT 25 x 100
Landform:	Plains
Slope:	Flat
Rock Type:	Quartz
Soil Type:	Clay
Soil Colour:	Brown,Orange



Vegetation: *Acacia xiphophylla mid open shrubland over Triodia epactia and Triodia wiseana low sparse hummock grassland over Eragrostis xerophila low sparse tussock grassland.*

Condition:	Poor	**Disturbance Type:**	Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing,Infrastructure
Fire Age:	>10 years		

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia bivenosa	60	0.1	
Acacia pyrifolia var. pyrifolia	50	0.1	
Acacia xiphophylla	200	11	
Corchorus sp.	20	0.1	
Ehretia saligna	170	0.1	
Eragrostis xerophila	20	2	
Hakea lorea subsp. lorea	150	0.1	
Psydrax sp.	80	0.1	
Ptilotus exaltatus	30	0.1	
Rhagodia eremaea	100	0.1	
Sclerolaena densiflora	30	0.1	
Sclerolaena hostilis	20	0.1	
Senna artemisioides subsp. oligophylla	20	0.1	
Triodia epactia	30	1	
Triodia wiseana	30	2	

FLORA SITE SHEET

Site: **BWR25**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.81746 **Lat** 116.90019 **Long**
Described by:	J. Hardie, L. Geidans
Date:	07-04-2024
Type:	RELEVE 25 x 100
Landform:	Minor drainage
Slope:	Flat
Rock Type:	N/A
Soil Type:	Clay
Soil Colour:	Brown,Orange

Vegetation: *Acacia ancistrocarpa, Acacia pyrifolia var. pyrifolia and Acacia trachycarpa tall sparse shrubland over Eriachne benthamii low tussock grassland.*

Condition:	Degraded	**Disturbance Type:**	Grazing,Vehicle tracks,Litter,Fauna tracks/scats,Historical Clearing,Infrastructure
Fire Age:	>10 years		

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	160	1	
Acacia inaequilatera	220	1	
Acacia pyrifolia var. pyrifolia	250	2	
Acacia trachycarpa	170	2	
Acacia trachycarpa x unknown hybrid	300	0.1	
Alternanthera sp.	5	0.1	
Bergia trimera	10	0.1	
Eriachne benthamii	25	50	
Indigofera ?linnaei	5	0.1	
Stemodia kingii	5	0.1	
Triodia epactia	30	0.1	

FLORA SITE SHEET

Site: **BWR26**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.83082 **Lat** 116.91395 **Long**
Described by:	J. Hardie, L. Geidans
Date:	08-04-2024
Type:	RELEVE 25 x 100
Landform:	Minor drainage
Slope:	Gentle
Rock Type:	N/A
Soil Type:	Clay,Sand
Soil Colour:	Brown,Orange

Vegetation: *Corymbia hamersleyana low open woodland over Acacia ancistrocarpa and Acacia bivenosa tall sparse shrubland over Triodia epactia low hummock grassland over *Cenchrus ciliaris (Themeda triandra) low sparse tussock grassland over mixed herbs.*

Condition: Poor **Disturbance Type:** Weeds,Grazing,Litter,Fauna tracks/scats,Historical Clearing,Infrastructure

Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	300	2	
Acacia bivenosa	150	2	
Acacia pyrifolia var. pyrifolia	140	0.1	
Acacia trachycarpa	60	0.1	
Cassytha capillaris	30	0.1	
**Cenchrus ciliaris*	30	11	
Corchorus parviflorus	30	0.1	
Corymbia hamersleyana	800	8	
Evolvulus alsinoides var. villosicalyx	5	0.1	
Goodenia stobbsiana	50	0.1	
Indigofera monophylla	30	0.1	
Pterocaulon sphaeranthoides	30	0.1	
Ptilotus exaltatus	20	0.1	
Senna artemisioides subsp. oligophylla	60	0.1	
Senna glutinosa subsp. glutinosa	120	0.1	
Solanum sp.	5	0.1	
Tephrosia rosea var. clementii	70	0.1	
Themeda triandra	30	0.5	
Triodia epactia	40	31	
Triodia wiseana	30	0.1	
Triumfetta appendiculata	60	0.1	

FLORA SITE SHEET

Site: **BWR27**

Project Name Bardies Well Flora and Fauna Survey
Location -20.83094 **Lat** 116.91165 **Long**
Described by: J. Hardie, L. Geidans
Date: 08-04-2024

Type: RELEVE 50 x 50
Landform: Hillside
Slope: Moderate
Rock Type: Quartz
Soil Type: Clay,Loam
Soil Colour: Brown,Orange

Vegetation: *Acacia arida mid sparse shrubland over Triodia epactia low open hummock grassland.*

Condition: Good **Disturbance Type:** Litter,Fauna tracks/scats,Historical Clearing,Infrastructu
Fire Age: >10 years

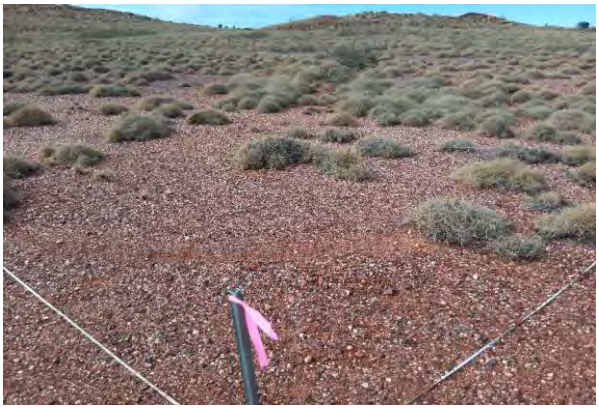
SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	170	0.1	
Acacia arida	140	7	
Acacia pyrifolia var. pyrifolia	140	0.1	
Bonamia pilbarensis	30	0.1	
Cassytha capillaris	30	0.1	
Cymbopogon ambiguus	30	0.1	
Grevillea pyramidalis subsp. leucadendron	180	0.1	
Ptilotus calostachyus	50	0.1	
Ptilotus exaltatus	30	0.1	
Senna glutinosa subsp. pruinosa	180	0.1	
Trichodesma zeylanicum var. zeylanicum	100	0.1	
Triodia epactia	30	28	

FLORA SITE SHEET

Site: **BWQ28**

Project Name	Bardies Well Flora and Fauna Survey
Location	-20.82407 **Lat** 116.90987 **Long**
Described by:	J. Hardie, L. Geidans
Date:	08-04-2024
Type:	QUADRAT 50 x 50
Landform:	Foothills
Slope:	Gentle
Rock Type:	Quartz
Soil Type:	Clay,Sand
Soil Colour:	Brown,Orange



Vegetation: *Acacia ancistrocarpa and Acacia bivenosa mid isloated shrubs over Triodia angusta and Triodia wiseana low hummock grassland.*

Condition: Very Good **Disturbance Type:** Weeds,Infrastructure
Fire Age: >10 years

SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
Acacia ancistrocarpa	160	0.1	
Acacia bivenosa	100	0.5	
Dampiera candicans	10	0.1	
Pterocaulon sphaeranthoides	10	0.1	
Ptilotus exaltatus	30	0.1	
Trichodesma zeylanicum var. zeylanicum	30	0.1	
Triodia angusta	30	5	
Triodia wiseana	30	26	

Appendix G Flora Statistical Analysis

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

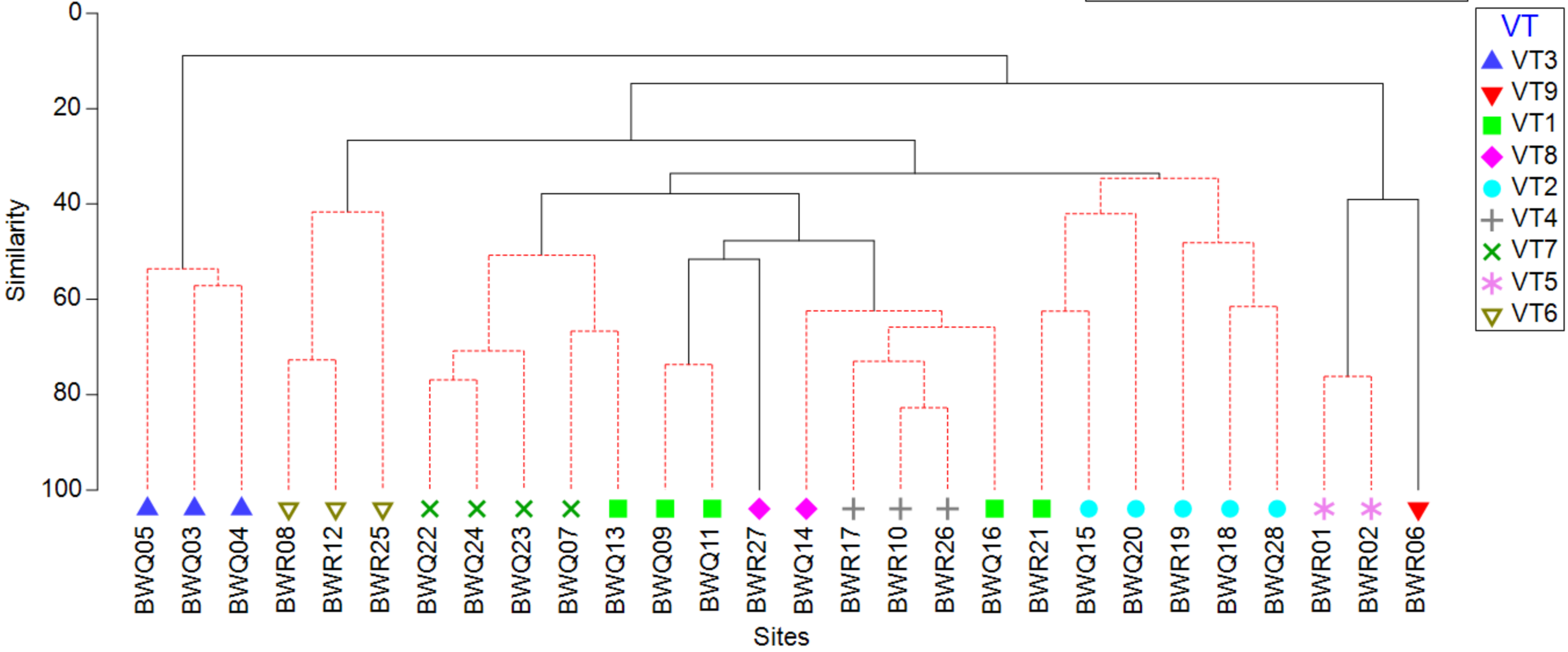
SLR Project No.: 675.072378.00001

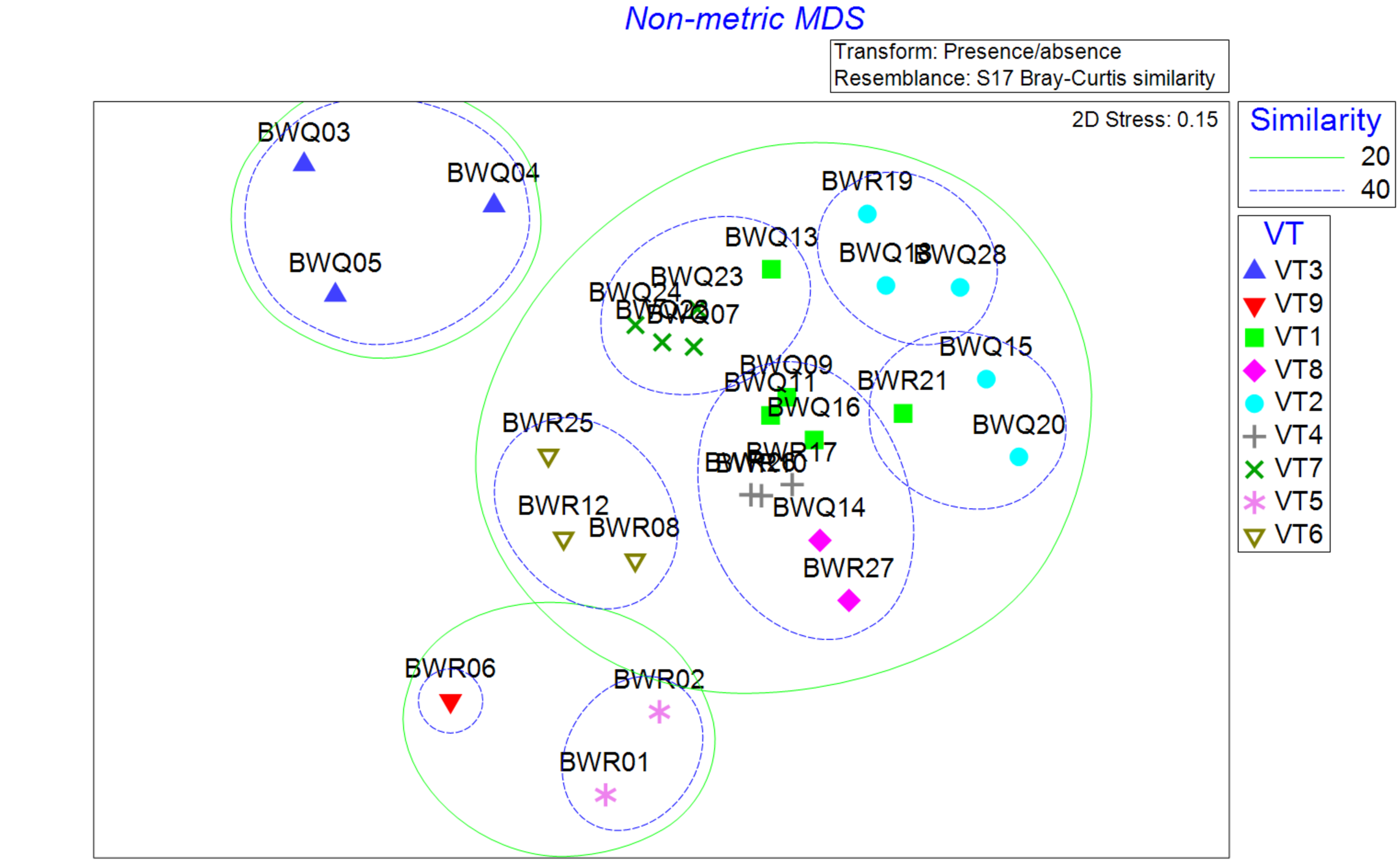
28 June 2024

Bardies Well CLUSTER Output

Group average

Transform: Presence/absence
Resemblance: S17 Bray-Curtis similarity




Non-metric MDS
Transform: Presence/absence
Resemblance: S17 Bray-Curtis similarity
2D Stress: 0.15
Similarity
20
40
VT
VT3
VT9
VT1
VT8
VT2
VT4
VT7
VT5
VT6
BWQ03
BWQ04
BWQ05
BWR19
BWQ13
BWQ18
BWQ28
BWQ23
BWQ24
BWQ07
BWQ15
BWQ09
BWQ11
BWR21
BWQ16
BWQ20
BWR25
BWR17
BWR12
BWQ14
BWR08
BWR27
BWR06
BWR02
BWR01

Appendix H Fauna Desktop Assessment Results

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Conservation Status: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation, Commonwealth - Listed under Environmental Protection and Biodiversity Conservation Act 1999. CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.

Database: NM - NatureMap, PMST - EPBC Protected Matters Search Tool, DBCA - DBCA Threatened and Priority Fauna database search, Field - Recorded during the current field survey.

Literature: A - Karratha and Boodarie Biological Surveys (360 Environmental, 2021)

Literature: B - Report for Karratha Land Release - Amendment 21 Flora and Fauna Assessment (GHD 2011)

Literature: C - Horizon Power 124-KRT-DMP 132kV Line Upgrade Project Flora and Fauna Survey (GHD, 2019)

Literature: D - Terrestrial Vertebrate Fauna Survey for Anketell Point Rail Alignment and Port Projects (Phoenix Environmental Sciences, 2010)

Literature: E - Maitland to Karratha Terminal Flora and Fauna Survey (GHD, 2022)

Literature: F - Rio Tinto Iron Ore Rail Duplication Fauna Survey: Cape Lambert Variation (Biota, 2008)

Literature: G - Terrestrial fauna survey for the Balla Balla Magnetite Project barge loading facility (Phoenix Environmental Sciences, 2013)

Literature: H - Terrestrial fauna surveys for the Balla Balla Railway Project (Phoenix Environmental Sciences, 2014)

Family	Scientific Name	Common Name	Conservation Status		Database			Field	Literature							
			State	Common wealth	NM	PMST	DBCA		A	B	C	D	E	F	G	H
Amphibians																
Bufonidae	*Rhinella marina*	Cane Toad	-	-	x											
Limnodynastidae	*Neobatrachus aquilonius*	Northern Burrowing Frog	-	-	x											
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot	-	-	x								x			
Limnodynastidae	*Platyplectrum spenceri*	Centralian Burrowing Frog	-	-	x											
Myobatrachidae	*Pseudophryne guentheri*	Crawling Toadlet	-	-	x											
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet	-	-	x											
Myobatrachidae	*Uperoleia saxatilis*	Pilbara Toadlet	-	-	x											
Pelodryadidae	*Cyclorana australis*	Giant Frog	-	-	x											
Pelodryadidae	*Cyclorana cultripes*	Knife-footed Frog	-	-	x											
Pelodryadidae	*Cyclorana maini*	Sheep Frog	-	-	x								x			
Pelodryadidae	*Cyclorana occidentalis*	Western Water-holding Frog	-	-	x								x			
Pelodryadidae	*Litoria rubella*	Little Red Tree Frog	-	-	x						x			x		
Birds																
Acanthizidae	*Gerygone fusca*	Western Gerygone	-	-	x							x				
Acanthizidae	*Gerygone tenebrosa*	Dusky Gerygone	-	-	x							x			x	
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat	-	-	x											

Acanthizidae	*Smicrornis brevirostris*	Weebill	-	-	x									x	x	
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk	-	-	x							x				
Accipitridae	*Accipiter fasciatus*	Brown Goshawk	-	MA (overfly marine area)	x							x				x
Accipitridae	*Aquila audax*	Wedge-tailed Eagle	-	-	x					x		x	x	x	x	x
Accipitridae	*Circus approximans*	Swamp Harrier	-	MA (overfly marine area)	x										x	x
Accipitridae	*Circus assimilis*	Spotted Harrier	-	-	x							x		x	x	x
Accipitridae	*Elanus axillaris*	Black-shouldered Kite	-	-	x							x			1	
Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	VU	EN		x										
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-eagle	-	MA	x					x		x			x	
Accipitridae	*Haliastur indus*	Brahminy Kite	-	MA	x					x		x		x	x	
Accipitridae	*Haliastur sphenurus*	Whistling Kite	-	MA (overfly marine area)	x					x		x	x		x	
Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard	-	-	x											
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	-	-	x					x						x
Accipitridae	*Lophoictinia isura*	Square-tailed Kite	-	-	x											
Accipitridae	*Milvus migrans*	Black Kite	-	-	x			x		x		x				x
Acrocephalidae	*Acrocephalus australis*	Australian Reed Warbler	-	MA (overfly marine area)	x											
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar	-	-	x					x		x				x
Alaudidae	*Mirafra javanica*	Horsfield's Bush Lark	-	-	x					x		x			x	x
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra	-	-	x					x		x			x	x
Alcedinidae	*Todiramphus chloris (Wallacea transition point from T. sordidus)*	Collared Kingfisher	-	-	x					x		x			x	
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher	-	-	x					x		x		x	x	

Alcedinidae	*Todiramphus sanctus*	Sacred Kingfisher	-	MA (overfly marine area)	x							x	x		x	
Alcedinidae	*Todiramphus sordidus pilbara*	Pilbara Collared Kingfisher	-	-	x											
Anatidae	*Anas gracilis*	Grey Teal	-	-	x					x		x				
Anatidae	*Anas superciliosa*	Pacific Black Duck	-	-	x					x						x
Anatidae	*Aythya australis*	Hardhead	-	-	x											
Anatidae	*Chenonetta jubata*	Australian Wood Duck, Wood Duck, Maned Duck	-	-	x											
Anatidae	*Cygnus atratus*	Black Swan	-	-	x					x					x	x
Anatidae	*Dendrocygna arcuata*	Wandering Whistling Duck, Chestnut Whistling Duck	-	MA (overfly marine area)	x					x						
Anatidae	*Dendrocygna eytoni*	Plumed Whistling Duck	-	-	x											
Anatidae	*Malacorhynchus membranaceus*	Pink-eared Duck	-	-	x											
Anatidae	*Nettapus pulchellus*	Green Pygmy Goose	-	MA (overfly marine area)	x											
Anatidae	*Stictonetta naevosa*	Freckled Duck	-	-	x											
Anatidae	*Tadorna tadornoides*	Australian Shelduck, Mountain Duck	-	-	x							x				
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter	-	-	x											
Anhingidae	Anhinga melanogaster	*Oriental Darter*	-	-	x											
Apodidae	*Apus pacificus*	Pacific Swift, Fork-tailed Swift	MI	MI, MA (overfly marine area)	x	x	x									
Ardeidae	*Ardea alba*	Great Egret, Eastern Great Egret	-	MA (overfly marine area)	x											
Ardeidae	*Ardea alba modesta*	Eastern Grey Egret	-	(A. modesta MA (overfly marine area))	x										x	
Ardeidae	*Ardea intermedia*	Intermediate Egret	-	MA (overfly marine area)	x											

Ardeidae	*Ardea pacifica*	White-necked Heron	-	-	x											x
Ardeidae	*Bubulcus coromandus*	Eastern Cattle Egret	-	-	x											
Ardeidae	*Butorides striata*	Striated Heron Mangrove Heron	-	-	x							x				
Ardeidae	*Egretta garzetta*	Little Egret	-	MA	x					x		x			x	x
Ardeidae	*Egretta novaehollandiae*	White-faced Heron	-	-	x							x		x	x	x
Ardeidae	*Egretta sacra*	Eastern Reef Heron, Pacific Reef Heron	-	MA	x					x		x				
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	(I. flavicollis australis SW subpop. P2)	-	x											
Ardeidae	*Nycticorax caledonicus*	Nankeen Night Heron, Rufous Night Heron	-	MA (overfly marine area)	x											
Artamidae	*Artamus cinereus*	Black-faced Woodswallow	-	-	x			x	x	x		x	x	x	x	
Artamidae	*Artamus leucorynchus*	White-breasted Woodswallow	-	-	x					x		x			x	
Artamidae	*Artamus minor*	Little Woodswallow	-	-	x											x
Artamidae	*Artamus personatus*	Masked Woodswallow	-	-	x											x
Artamidae	*Artamus superciliosus*	White-browed Woodswallow	-	-	x											
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird	-	-	x					x		x	x	x	x	x
Artamidae	*Cracticus torquatus*	Grey Butcherbird	-	-	x											
Artamidae	*Gymnorhina tibicen*	Australian Magpie	-	-	x					x		x			x	x
Burhinidae	*Burhinus grallarius*	Bush Stone-curlew, Bush Thick-knee	-	-	x											
Burhinidae	*Esacus magnirostris*	Beach Stone-curlew, Beach Thick-knee	-	MA	x										x	
Cacatuidae	*Cacatua sanguinea*	Little Corella	-	-	x			x				x			x	x
Cacatuidae	*Cacatua sanguinea westralensis*	Western Little Corella	-	-	x					x						
Cacatuidae	*Eolophus roseicapilla*	Galah	-	-	x			x		x		x	x	x	x	x
Cacatuidae	*Nymphicus hollandicus*	Cockatiel	-	-	x					x		x				
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckooshrike	-	MA (overfly marine area)	x			x		x		x	x	x	x	x

Campephagidae	*Lalage leucomela*	Varied Triller	-	-	x											
Campephagidae	*Lalage tricolor*	White-winged Triller	-	-	x					x		x			x	x
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar	-	MA (overfly marine area)	x							x			x	x
Casuariidae	*Dromaius novaehollandiae*	Emu	-	-	x									x	x	x
Charadriidae	*Charadrius leschenaultii*	Greater Sand Plover	VU	VU, MI, MA	x	x	x					x			x	
Charadriidae	*Charadrius mongolus*	Lesser Sand Plover	EN	EN, MI, MA	x	x	x					x			x	
Charadriidae	*Charadrius ruficapillus*	Red-capped Plover	-	MA (overfly marine area)	x					x		x			x	
Charadriidae	*Charadrius veredus*	Oriental Plover	MI	MI, MA (overfly marine area)	x	x	x									
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel	-	-	x					x					x	x
Charadriidae	*Erythrogonys cinctus*	Red-kneed Dotterel	-	-	x					x						
Charadriidae	*Pluvialis fulva*	Pacific Golden Plover	MI	MI, MA	x		x									
Charadriidae	*Pluvialis squatarola*	Grey Plover	MI	VU, MI, MA (overfly marine area)	x	x	x									
Charadriidae	*Vanellus miles*	Masked Lapwing	-	-	x											
Charadriidae	*Vanellus tricolor*	Banded Lapwing	-	-	x										x	
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	-	-	x											
Columbidae	*Columba livia*	Domestic Pigeon, Rock Dove	-	-	x											
Columbidae	*Geopelia cuneata*	Diamond Dove	-	-	x					x		x	x	x	x	x
Columbidae	*Geopelia humeralis*	Bar-shouldered Dove	-	-	x					x		x	x			
Columbidae	*Geopelia striata*	Zebra Dove	-	-	x					x				x	x	
Columbidae	*Geopelia striata placida*	Peaceful Dove	-	-	x			x								
Columbidae	*Geophaps plumifera*	Spinifex Pigeon	-	-	x					x		x	x	x	x	x
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	-	-	x			x		x		x	x	x	x	
Columbidae	*Phaps chalcoptera*	Common Bronzewing	-	-	x					x			x			
Columbidae	*Phaps histrionica*	Flock Bronzewing, Flock Pigeon	-	-	x										x	
Columbidae	*Spilopelia chinensis*	Spotted Turtle Dove	-	-	x											

Corvidae	*Corvus bennetti*	Little Crow	-	-	x			x								
Corvidae	*Corvus orru*	Torresian Crow	-	-	x					x		x	x	x	x	x
Corvidae	*Corvus splendens*	House Crow	-	-	x											
Cuculidae	*Centropus phasianinus*	Pheasant Coucal	-	-	x							x				
Cuculidae	*Chalcites basalis*	Horsfield's Bronze Cuckoo	-	MA (overfly marine area)	x					x		x			x	
Cuculidae	*Chalcites osculans*	Black-eared Cuckoo	-	MA (overfly marine area)	x											
Cuculidae	*Cuculus saturatus optatus*	Horsfield's Cuckoo	MI (as C. optatus)	MI (C. saturatus MA (overfly marine area))	x		x									
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo	-	MA (overfly marine area)	x					x		x				
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird	-	-	x											
Estrildidae	*Emblema pictum*	Painted Finch	-	-	x					x		x	x	x	x	x
Estrildidae	*Heteromunia pectoralis*	Pictorella Mannikin	-	-	x											
Estrildidae	*Neochmia ruficauda*	Star Finch	-	-	x											
Estrildidae	*Taeniopygia castanotis*	Australian Zebra Finch	-	-	x					x		x	x	x	x	
Falconidae	*Falco berigora*	Brown Falcon	-	-	x			x		x		x	x		x	x
Falconidae	*Falco cenchroides*	Nankeen Kestral	-	MA (overfly marine area)	x			x		x		x	x	x	x	x
Falconidae	*Falco hypoleucos*	Grey Falcon	VU	VU	x	x	x									
Falconidae	*Falco longipennis*	Australian Hobby	-	-	x							x				x
Falconidae	*Falco peregrinus*	Peregrine Falcon	OS	-	x		x									
Falconidae	*Falco subniger*	Black Falcon	-	-	x											
Fregatidae	*Fregata ariel*	Lesser Frigatebird	MI	MI, MA	x	x	x									
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	MI	MI, MA (overfly marine area)	x	x	x									
Glareolidae	*Stiltia isabella*	Australian Pratincole	-	MA (overfly marine area)	x											
Gruidae	*Antigone rubicunda*	Brolga	-	-	x											

Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	-	-	x					x		x			x	
Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	-	-	x					x		x			x	
Haematopodidae	*Haematopus ostralegus*	Eurasian Oystercatcher	-	-	x											
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow	-	-	x							x				
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	-	MA	x							x				
Hirundinidae	*Hirundo rustica*	Barn Swallow	MI	MI, MA (overfly marine area)	x		x									
Hirundinidae	*Petrochelidon ariel*	Fairy Martin	-	-	x					x		x				
Hirundinidae	*Petrochelidon nigricans*	Tree Martin	-	MA (overfly marine area)	x							x			x	
Laridae	*Anous stolidus*	Common Noddy, Brown Noddy	MI	MI, MA	x		x									
Laridae	*Chlidonias hybrida*	Whiskered Tern	-	MA	x							x			x	
Laridae	*Chlidonias leucopterus*	White-winged Black Tern	MI	MI, MA	x		x									
Laridae	*Chroicocephalus novaehollandiae*	Silver Gull	-	-	x					x		x			x	
Laridae	*Gelochelidon nilotica*	Gull-billed Tern	MI	MI, MA	x		x					x			x	
Laridae	*Hydroprogne caspia*	Caspian Tern	MI	MI, MA	x	x	x			x		x			x	
Laridae	*Larus pacificus*	Pacific Gull	-	MA	x											
Laridae	*Onychoprion anaethetus*	Bridled Tern	MI	MI, MA	x	x	x			x						
Laridae	*Sterna dougallii*	Roseate Tern	MI	MI, MA	x	x	x								x	
Laridae	*Sterna hirundo*	Common Tern	MI	MI, MA	x		x								x	
Laridae	*Sternula albifrons*	Little Tern	MI	MI, MA	x	x	x					1			x	
Laridae	*Sternula albifrons sinensis*	White-shafted Little Tern	(S. albifrons MI)	(S. albifrons sinensis)	x											
Laridae	*Sternula nereis*	Fairy Tern	(S. nereis nereis VU)	MA (S. nereis nereis VU)	x	x	x									
Laridae	*Thalasseus bengalensis*	Lesser Crested Tern	-	MA	x							x				
Laridae	*Thalasseus bergii*	Greater Crested Tern, Crested Tern	MI	MI, MA	x	x	x			x		x			x	
Locustellidae	*Cincloramphus cruralis*	Brown Songlark	-	-	x					x					x	
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark	-	-	x					x			x		x	
Locustellidae	*Poodytes carteri*	Spinifexbird	-	-	x					x		x				
Locustellidae	*Poodytes gramineus*	Little Grassbird	-	-	x											

Maluridae	*Amytornis whitei (check sp. & subsp.)*	Rufous Grasswren	(A. whitei whitei: P4 as A. striatus striatus)	(A. striatus howei EN)	x											
Maluridae	*Malurus lamberti*	Variegated Fairywren	-	-	x					x		x	x	x	x	x
Maluridae	*Malurus leucopterus*	White-winged Fairywren	(M. leucopterus edouardi, M.s leucopterus leucopterus VU	(M. leucopterus edouardi, M. leucopterus leucopterus VU)	x					x		x			x	
Maluridae	*Stipiturus ruficeps*	Rufous-crowned Emu-wren	-	-	x											
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	-	-											x	
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater	-	-	x							x			x	
Meliphagidae	*Epthianura aurifrons*	Orange Chat	-	-	x							x				
Meliphagidae	*Epthianura tricolor*	Crimson Chat	-	-	x					x	x	x	x		x	
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater	-	-	x			x		x	x	x	x	x	x	x
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	-	-	x					x	x	x		x	x	x
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner	-	-	x					x	x	x	x	x	x	x
Meliphagidae	*Melithreptus gularis*	Black-chinned Honeyeater	-	-	x											
Meliphagidae	*Ptilotula keartlandi*	Grey-headed Honeyeater	-	-	x					x		x	x			
Meliphagidae	*Ptilotula penicillata*	White-plumed Honeyeater	-	-	x			x		x		x			x	
Meliphagidae	*Ptilotula plumula*	Grey-fronted Honeyeater	-	-	x											
Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater	-	-	x											
Meliphagidae	*Sugomel nigrum*	Black Honeyeater	-	-	x							x			x	
Meropidae	*Merops ornatus*	Rainbow Bee-eater	-	MA (overfly marine area)	x			x		x	x	x			x	x
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	-	MA	x					x	x	x	x	x	x	x
Monarchidae	*Myiagra alecto*	Shining Flycatcher	-	-	x											

Motacillidae	*Anthus australis*	Australian Pipit	-	MA (overfly marine area)	x			x		x	x	x	x		x	
Motacillidae	*Motacilla alba*	White Wagtail	-	MA (overfly marine area)									x			
Motacillidae	*Motacilla cinerea*	Grey Wagtail	MI	MI, MA (overfly marine area)		x										
Motacillidae	*Motacilla tschutschensis*	Eastern Yellow Wagtail	MI	MI, MA (overfly		x										
Muscicapidae	*Cyanoptila cyanomelana*	Blue And White Flycatcher	-	-	x											
Oceanitidae	*Oceanites oceanicus*	Wilson's Storm Petrel	MI	MI, MA	x		x									
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird	-	-	x					x		x		x	x	
Otididae	*Ardeotis australis*	Australian Bustard	-	-	x				x			x	x		x	x
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush	-	-	x						x				x	x
Pachycephalidae	*Pachycephala lanioides*	White-breasted Whistler	-	-	x							x			x	
Pachycephalidae	*Pachycephala melanura*	Mangrove Golden Whistler	-	-	x							x				
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler	-	-	x										x	
Pandionidae	*Pandion haliaetus*	Osprey	MI	MI, MA	x	x	x									
Pandionidae	*Pandion haliaetus cristatus*	Eastern Osprey	(P. haliaetus MI)	(P. haliaetus MI, MA)	x							x			x	
Pardalotidae	*Pardalotus rubricatus*	Red-browed Pardalote	-	-	x							x				
Pardalotidae	*Pardalotus striatus*	Striated Pardalote	-	-	x											
Passeridae	*Passer domesticus*	House Sparrow	-	-	x											
Passeridae	*Passer montanus*	Eurasian Tree Sparrow	-	-	x											
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican	-	MA (overfly marine area)	x							x				
Petroicidae	*Melanodryas cucullata*	Hooded Robin	-	-												x
Petroicidae	*Peneothello pulverulenta*	Mangrove Robin	-	-	x							x			x	
Petroicidae	*Petroica goodenovii*	Red-capped Robin	-	-	x							x				
Phaethontidae	*Phaethon lepturus*	White-tailed Tropicbird	MI	MI, MA		x										
Phaethontidae	*Phaethon rubricauda*	Red-tailed Tropicbird	MI, P4	MI, MA (P. r. westralis MI		x										
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant	-	-	x							x				x
Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	-	-	x											
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant	-	-	x							x				

Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant, Australian Pied Cormorant	-	-	x					x		x				
Phasianidae	*Synoicus ypsilophorus*	Brown Quail	-	-	x							x	x			
Pittidae	*Pitta moluccensis*	Blue-winged Pitta	-	-	x											
Podargidae	*Podargus strigoides*	Tawny Frogmouth	-	-	x											
Podicipedidae	*Podiceps cristatus*	Great Crested Grebe	-	-	x											
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe	-	-	x											
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe, Black-throated Grebe	-	-	x					x						
Pomatostomidae	*Pomatostomus superciliosus*	White-browed Babbler	-	-	x											
Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler	-	-	x										x	
Procellariidae	*Ardenna pacifica*	Wedge-tailed Shearwater	MI	MI, MA	x	x	x									
Procellariidae	*Calonectris leucomelas*	Streaked Shearwater	MI	MI, MA		x										
Procellariidae	*Macronectes giganteus*	Southern Giant Petrel	MI	EN, MI, MA		x										
Psittaculidae	*Barnardius zonarius*	Australian Ringneck	-	-	x						x	x			x	x
Psittaculidae	*Melopsittacus undulatus*	Budgerigar	-	-	x				x	x	x	x	x		x	x
Psittaculidae	*Neopsephotus bourkii*	Bourke's Parrot	-	-	x											
Psittaculidae	*Pezoporus occidentalis*	Night Parrot	CR	EN		x										
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird	-	-	x						x	x				x
Rallidae	*Fulica atra*	Eurasian Coot	-	-	x											
Rallidae	*Gallinula tenebrosa*	Dusky Moorhen	-	-	x											
Rallidae	*Hypotaenidia philippensis*	Buff-banded Rail	-	MA	x					x						
Rallidae	*Porphyrio melanotus*	Australasian Swamphen	-	MA	x											
Rallidae	*Porzana fluminea*	Australian Spotted Crake, Australian Crake	-	-	x											
Rallidae	*Tribonyx ventralis*	Black-tailed Native-hen	-	-	x											
Rallidae	*Zapornia pusilla*	Baillon's Crake	-	MA (overfly marine area)	x											
Rallidae	*Zapornia tabuensis*	Spotless Crake	-	MA (overfly marine area)	x											
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt	-	-	x										x	
Recurvirostridae	*Himantopus himantopus*	Black-winged Stilt	-	MA (overfly marine area)	x					x		x			x	

Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet	-	MA (overfly marine area)	x											
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	-	-	x										x	
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	-	-	x			x		x	x	x		x	x	
Rhipiduridae	*Rhipidura phasiana*	Mangrove Grey Fantail; Mangrove Fantail	-	-	x					x		x			x	
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN	EN, MA (overfly marine area)	x	x	x									
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	MI	MI, MA	x	x	x					x			x	
Scolopacidae	*Arenaria interpres*	Ruddy Turnstone	MI	VU, MI, MA	x	x	x					x			x	
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	MI	VU, MI, MA	x	x	x									
Scolopacidae	*Calidris alba*	Sanderling	MI	MI, MA	x		x								x	
Scolopacidae	*Calidris canutus*	Red Knot	EN	VU, MI, MA (overfly marine area)	x	x	x								x	
Scolopacidae	*Calidris falcinellus*	Broad-billed Sandpiper	MI	MI, MA (overfly	x	x	x									
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR	CE, MI, MA	x	x	x									
Scolopacidae	*Calidris melanotos*	Pectoral Sandpiper	MI	MI, MA (overfly		x										
Scolopacidae	*Calidris pugnax*	Ruff	MI	MI, MA (as P. pugnax)						x						
Scolopacidae	*Calidris ruficollis*	Red-necked Stint	MI	MI, MA (overfly marine area)	x	x	x					x			x	
Scolopacidae	*Calidris subminuta*	Long-toed Stint	MI	MI, MA (overfly marine area)	x	x	x								x	
Scolopacidae	*Calidris tenuirostris*	Great Knot	CR	VU, MI, MA (overfly marine area)	x	x	x								x	
Scolopacidae	*Gallinago stenura*	Pin-tailed Snipe	MI	MI, MA (overfly marine area)	x		x									
Scolopacidae	*Limnodromus semipalmatus*	Asian Dowitcher	MI	VU, MI, MA (overfly		x										
Scolopacidae	*Limosa lapponica*	Bar-tailed Godwit	MI (L. l.	MI, MA (L.	x	x	x			x		x				
Scolopacidae	*Limosa lapponica menzbieri*	Bar-tailed Godwit	CR	EN		x									x	

Scolopacidae	*Limosa limosa*	Black-tailed Godwit	MI	EN, MI, MA (overfly	x	x	x					x				
Scolopacidae	*Numenius madagascariensis*	Far Eastern Curlew, Eastern Curlew	CR	CE, MI, MA	x	x	x					x			x	
Scolopacidae	*Numenius minutus*	Little Curlew	MI	MI, MA (overfly marine area)	x		x									
Scolopacidae	*Numenius phaeopus*	Whimbrel	MI	MI, MA	x	x	x					x			x	
Scolopacidae	*Phalaropus lobatus*	Red-necked Phalarope	MI	MI, MA		x										
Scolopacidae	*Tringa brevipes*	Grey-tailed Tattler	MI, P4	MI, MA	x	x	x					x			x	
Scolopacidae	*Tringa glareola*	Wood Sandpiper	MI	MI, MA (overfly marine area)	x		x					x				
Scolopacidae	*Tringa nebularia*	Common Greenshank	MI	EN, MI, MA (overfly	x	x	x					x				
Scolopacidae	*Tringa stagnatilis*	Marsh Sandpiper	MI	MI, MA	x	x	x					x				
Scolopacidae	*Xenus cinereus*	Terek Sandpiper	MI	VU, MI, MA (overfly	x	x	x					x			x	
Strigidae	*Ninox boobook*	Boobook Owl	-	(N. boobook boobook MA	x											
Strigidae	*Ninox boobook boobook*	Southern Boobook	-	MA (overfly marine area)	x											
Strigidae	*Ninox connivens*	Barking Owl	(N. connivens connivens SW subpop. P3)	-	x											
Sulidae	*Sula leucogaster*	Brown Booby	MI	MI, MA	x		x									
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill	-	-	x											
Threskiornithidae	*Platalea regia*	Royal Spoonbill	-	-	x											
Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	MI	MI, MA (overfly marine area)	x		x			x						
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	-	MA (overfly marine area)	x							x				

Threskiornithidae	*Threskiornis spinicollis*	Straw-necked Ibis	-	MA (overfly marine area)	x					x						
Turnicidae	*Turnix velox*	Little Buttonquail	-	-	x					x	x	x	x		x	
Tytonidae	*Tyto javanica*	Eastern Barn Owl	-	-	x											
Zosteropidae	*Zosterops luteus*	Yellow White-eye; Canary White-eye	-	-	x					x		x			x	
Mammals																
Bovidae	*Bos primigenius taurus*	European Cattle	-	-				x					x		x	x
Bovidae	*Capra aegagrus hircus*	Goat	-	-	x											
Bovidae	*Ovis aries*	Sheep	-	-	x											
Camelidae	*Camelus dromedarius*	Dromedary Camel	-	-												x
Canidae	*Canis familiaris*	Dingo / Dog	-	-	x					x	x	x	x		x	
Canidae	*Vulpes vulpes*	Red Fox	-	-	x					x		x			x	
Dasyuridae	*Dasykaluta rosamondae*	Kaluta	-	-	x							x				
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN	EN	x	x	x	x								x
Dasyuridae	*Ningaui timealeyi*	Pilbara Ningaui	-	-	x							x			x	
Dasyuridae	*Planigale maculata*	Common Planigale	-	-	x											
Dasyuridae	*Planigale tealei*	Cracking-clay Pilbara Planigale	-	-	x											
Dasyuridae	*Pseudantechinus macdonnellensis*	Fat-tailed Pseudantechinus	-	-	x											
Dasyuridae	*Pseudantechinus roryi*	Rory's False Antechinus	-	-	x											
Dasyuridae	*Pseudantechinus woolleyae*	Woolley's Pseudantechinus	-	-	x						x					
Dasyuridae	*Sminthopsis macroura*	Stripe-faced Dunnart	-	-	x					x		x			x	
Dasyuridae	*Sminthopsis youngsoni*	Lesser Hairy-footed Dunnart	-	-	x										x	
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat	-	-	x							x			x	
Emballonuridae	*Taphozous georgianus*	Common Sheath-tailed Bat	-	-	x			x			x	x			x	
Equidae	*Equus ferus caballus*	Horse	-	-	x										x	
Felidae	*Felis catus*	Cat	-	-	x					x	x	x	x		x	x
Leporidae	*Oryctolagus cuniculus*	Rabbit	-	-	x											
Macropodidae	*Lagostrophus fasciatus fasciatus*	Banded Hare-wallaby	VU	VU	x		x									
Macropodidae	*Osphranter robustus*	Common Wallaroo	(O. robustus isabellinus VU)	(O. robustus isabellinus VU)	x			x		x	x	x	x		x	

Macropodidae	*Osphranter robustus erubescens*	Euro, Biggada	-	-	x											
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu	-	-	x				x			x			x	
Macropodidae	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	EN	EN											x	
Macropodidae	*Petrogale rothschildi*	Rothschild's Rock-wallaby	-	-	x											
Megadermatidae	*Macroderma gigas*	Ghost Bat	VU	VU	x	x	x									
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat	-	-	x						x	x				
Molossidae	*Chaerephon jobensis colonicus*	Greater Northern Free-tailed Bat	-	-	x			x			x	x				x
Molossidae	*Ozimops beccarii*	Beccari's Free-tailed Bat	-	-	x											
Molossidae	*Ozimops cobourgianus*	Northern Coastal Free-tailed Bat	P1	-	x		x					x			x	
Molossidae	*Ozimops loriae*	Little northern free-tailed bat	-	-	x										x	
Muridae	*Hydromys chrysogaster*	Water Rat	P4	-	x		x									
Muridae	*Leggadina lakedownensis*	Short-tailed Mouse	P4	-	x		x									
Muridae	*Mus musculus*	House Mouse	-	-	x							x			x	
Muridae	*Notomys alexis alexis*	Spinifex Hopping-mouse	-	-	x							x			x	
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	P4	-	x		x	x		x		x				
Muridae	*Pseudomys delicatulus*	Delicate Mouse	-	-	x										1	
Muridae	*Pseudomys desertor*	Desert Mouse	-	-	x							x			1	
Muridae	*Pseudomys hermannsburgensis*	Sandy Inland Mouse	-	-	x							x			1	
Muridae	*Pseudomys johnsoni*	Kimberley Mouse	-	-	x											
Muridae	*Rattus rattus*	Black Rat	-	-	x						x	x			x	
Muridae	*Rattus tunneyi tunneyi*	Pale Field-rat	-	-	x											
Muridae	*Zyzomys argurus*	Common Rock-rat	-	-	x											
Peramelidae	*Isoodon fusciventer*	Quenda	P4	-	x											
Phalangeridae	*Trichosurus vulpecula arnhemensis*	Northern Brushtail Possum	VU (Kimberley)	VU	x											
Pteropodidae	*Pteropus alecto gouldii*	Black Flying-fox	-	-	x											
Pteropodidae	*Pteropus scapulatus*	Little Red Flying-fox	-	-	x											

Rhinonycteridae	*Rhinonicteris aurantia*	Orange Leaf-nosed Bat	P4 (Pilbara form VU)	(VU Pilbara from)	x	x	x									
Tachyglossidae	*Tachyglossus aculeatus acanthion*	Short-beaked Echidna	-	-	x					x	x	x				
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	VU		x										
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	-	-	x			x				x			x	x
Vespertilionidae	*Chalinolobus morio*	Chocolate Wattled Bat	-	-											x	
Vespertilionidae	*Nyctophilus arnhemensis*	Arnhem Long-eared Bat	-	-	x							x			x	
Vespertilionidae	*Nyctophilus daedalus*	Pallid Long-eared Bat	-	-	x											
Vespertilionidae	*Nyctophilus geoffroyi geoffroyi*	Lesser Long-eared Bat	-	-	x			x				x			x	
Vespertilionidae	*Scotorepens balstoni*	Inland Broad-nosed Bat	-	-	x											
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	-	-	x			x				x			x	
Vespertilionidae	*Vespadelus finlaysoni*	Finlayson's Cave Bat	-	-	x			x			x	x			x	
Vespertilionidae	*Vespadelus regulus*	Southern Forest Bat	-	-	x											
Reptiles																
Agamidae	*Ctenophorus caudicinctus*	Western Ring-tailed Dragon	-	-	x			x	x	x	x	x	x		x	x
Agamidae	*Ctenophorus isolepis*	Central Military Dragon	-	-	x				x	x		x	x		x	
Agamidae	*Ctenophorus isolepis citrinus*	Yellowy Military Dragon	-	-	x											
Agamidae	*Ctenophorus isolepis isolepis*	Central Military Dragon	-	-	x								x			x
Agamidae	*Ctenophorus nguyarna*	Lake Disappointment Dragon	P1	-			x									
Agamidae	*Ctenophorus nuchalis*	Central Netted Dragon	-	-	x					x		x	x		x	x
Agamidae	*Ctenophorus reticulatus*	Western Netted Dragon	-	-	x											
Agamidae	*Diporiphora pindan*	Pindan Dragon	-	-	x											
Agamidae	*Diporiphora valens*	Southern Pilbara Tree Dragon	-	-	x											

Agamidae	*Diporiphora vescus*	Northern Pilbara Tree Dragon	-	-	x								x			
Agamidae	*Diporiphora winneckei*	Canegrass Dragon	-	(not WAM)	x							x				
Agamidae	*Gowidon longirostris*	Long-nosed Dragon	-	-	x					x		x	x		x	x
Agamidae	*Lophognathus gilberti*	Top End Ta-ta Dragon	-	-	x							x	x			
Agamidae	*Pogona minor*	Dwarf Bearded Dragon	(P. minor minima VU)	-	x								x		x	
Agamidae	*Pogona minor minor*	Western Bearded Dragon	-	-	x								x			
Agamidae	*Pogona minor mitchelli*	Northwest Bearded Dragon	-	-	x					x		x	x			
Agamidae	*Tympanocryptis cephalus*	Coastal Pebble-mimic Dragons	-	-	x								x			
Carphodactylidae	*Nephrurus levis pilbarensis*	Smooth knob-tailed gecko	-	-	x											
Carphodactylidae	*Nephrurus wheeleri*	Southern Banded Knob-tailed Gecko	-	-	x											
Carphodactylidae	*Underwoodisaurus seorsus*	Pilbara Barking Gecko	P2	-			x									
Diplodactylidae	*Crenadactylus ocellatus*	South-western Clawless Gecko	-	-	x											
Diplodactylidae	*Diplodactylus conspicillatus*	Variable Fat-tailed Gecko	-	-	x							x				
Diplodactylidae	*Diplodactylus fulleri*	Lake Disappointment Ground Gecko	P1	-			x									
Diplodactylidae	*Diplodactylus galaxias*	Northern Pilbara Beak-faced Gecko	-	-	x											
Diplodactylidae	*Diplodactylus mitchelli*	Western Fat-tailed Gecko	-	-	x											
Diplodactylidae	*Diplodactylus savagei*	Southern Pilbara Beak-faced Gecko	-	-	x							x			x	x
Diplodactylidae	*Lucasium stenodactylus (check L. woodwardi for pilbara/gascoyne)*	Sand-plain Gecko	-	-	x											
Diplodactylidae	*Lucasium wombeyi*	Pilbara Ground Gecko	-	-	x											
Diplodactylidae	*Lucasium woodwardi*	Pilbara Ground Gecko	-	-	x											

Diplodactylidae	*Oedura marmorata*	Marbled Velvet Gecko	-	(not WAM)	x											
Diplodactylidae	*Rhynchoedura ornata*	Western Beaked Gecko	-	-	x							x	x		x	x
Diplodactylidae	*Strophurus ciliaris*	Northern Spiny-tailed Gecko	-	(not WAM)	x							x				
Diplodactylidae	*Strophurus elderi*	Jewelled Gecko	-	-	x											
Diplodactylidae	*Strophurus jeanae*	Southern Phasmid Gecko	-	-	x							x				
Diplodactylidae	*Strophurus strophurus*	Western Spiny-tailed Gecko	-	-	x								x			
Diplodactylidae	*Strophurus wellingtonae*	Western-shield Spiny-tailed Gecko	-	-	x							x			x	
Elapidae	*Acanthophis wellsi*	Pilbara Death Adder	-	-	x							x				
Elapidae	*Brachyurophis approximans*	North-western Shovel-nosed Snake	-	-	x							x				
Elapidae	*Brachyurophis fasciolatus fasciatus*	Narrow-banded Shovel-nosed Snake	-	-	x											
Elapidae	*Demansia reticulata*	Reticulated Whipsnake	-	(not WAM)	x											
Elapidae	*Demansia rufescens*	Rufous Whipsnake	-	-	x							x				
Elapidae	*Furina ornata*	Moon Snake	-	-	x											
Elapidae	*Pseudechis australis*	Mulga Snake	-	-	x											
Elapidae	*Pseudonaja mengdeni*	Western Brown Snake	-	-	x											
Elapidae	*Pseudonaja modesta*	Ringed Brown Snake	-	-	x											
Elapidae	*Pseudonaja nuchalis*	Gwardar; Northern Brown Snake	-	-	x											
Elapidae	*Suta fasciata*	Rosen's Snake	-	-	x							x				
Elapidae	*Suta monachus*	Inland Hooded Snake	-	-	x							x			x	
Elapidae	*Suta punctata*	Spotted Snake	-	-	x											
Elapidae	*Vermicella snelli*	Pilbara Bandy Bandy	-	-	x										x	
Gekkonidae	*Gehyra australis*	Northern House Gecko	-	(not WAM)	x											
Gekkonidae	*Gehyra fenestrula*	Hamersley Range Spotted Gehyra	-	-	x											
Gekkonidae	*Gehyra peninsularis*	Burrup Peninsula Rock Gehyra	-	-												
Gekkonidae	*Gehyra pilbara*	Pilbara Dtella	-	-	x					x		x	x			
Gekkonidae	*Gehyra punctata*	Spotted Pilbara Rock Dtella	-	-	x					x						

Gekkonidae	*Gehyra variegata*	Variegated Gehyra	-	-	x												
Gekkonidae	*Hemidactylus frenatus*	Asian House Gecko	-	-	x							x					
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko	-	-	x												
Gekkonidae	*Heteronotia spelea*	Pilbara Cave Gecko	-	-	x							x					
Homalopsidae	*Fordonia leucobalia*	White-bellied Mangrove Snake	-	-	x							x					
Pygopodidae	*Delma borea*	Rusty-topped Delma	-	-	x												
Pygopodidae	*Delma butleri*	Spinifex Delma	-	-	x												
Pygopodidae	*Delma elegans*	Pilbara Delma	-	-	x												
Pygopodidae	*Delma nasuta*	Sharp-snouted Delma	-	-	x						x						
Pygopodidae	*Delma pax*	Peaceful Delma	-	-	x							x					x
Pygopodidae	*Delma tincta*	Excitable Delma	-	-	x					x	x	x	x				x
Pygopodidae	*Lialis burtonis*	Burton's Snake-lizard	-	-	x					x	x	x	x				x
Pygopodidae	*Pygopus nigriceps*	Western Hooded Scaly-foot	-	-	x												
Pythonidae	*Antaresia childreni*	Children's Python	-	-	x					x	x	x	x		x	x	
Pythonidae	*Antaresia perthensis*	Pygmy Python	-	-	x												
Pythonidae	*Aspidites melanocephalus*	Black-headed Python	-	-	x												
Pythonidae	*Aspidites ramsayi*	Woma	P1 (southwest subpop.)	-	x												
Pythonidae	*Liasis olivaceus barroni*	Pilbara Olive Python	VU	VU	x	x	x					x					
Pythonidae	*Liasis olivaceus olivaceus*	Common Olive Python	-	-	x												
Scincidae	*Carlia munda*	Shaded-litter Rainbow-skink	-	-	x												
Scincidae	*Carlia triacantha*	Desert Rainbow Skink	-	-	x							x			x	x	
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink	-	-	x							x					
Scincidae	*Cryptoblepharus plagiocephalus*	Péron's Snake-eyed Skink	-	-	x							x			x	x	
Scincidae	*Cryptoblepharus ustulatus*	Russet Snake-eyed Skink	-	-	x					x							
Scincidae	*Ctenotus angusticeps*	Northwestern Coastal Ctenotus	P3	-	x		x										x
Scincidae	*Ctenotus australis*	Western Limestone Ctenotus	-	-	x							x	x				

Scincidae	*Ctenotus duricola*	Eastern Pilbara Lined Ctenotus	-	-	x											
Scincidae	*Ctenotus fallens*	West-coast Laterite Ctenotus	-	-	x											
Scincidae	*Ctenotus grandis*	Grand Ctenotus	-	-	x											
Scincidae	*Ctenotus hanloni*	Nimble Ctenotus	-	-	x											
Scincidae	*Ctenotus helenae*	Clay-soil Ctenotus	-	-	x							x	x		x	x
Scincidae	*Ctenotus leonhardii*	Common Desert Ctenotus	-	-	x								x			x
Scincidae	Ctenotus pallasotus	Western Pilbara Lined Ctenotus	-	-	x								x			
Scincidae	Ctenotus pantherinus	Leopard Ctenotus	-	-	x											x
Scincidae	Ctenotus robustus	Robust Striped Ctenotus	-	-	x						x	x				
Scincidae	Ctenotus rubicundus	Ruddy Ctenotus	-	-	x											
Scincidae	Ctenotus saxatilis	Rock Ctenotus	-	-	x											
Scincidae	Ctenotus schomburgkii	Barred Wedge-snouted Ctenotus	-	-	x							x			x	
Scincidae	Ctenotus serventyi	North-western Sandy-loam Ctenotus	-	-	x											
Scincidae	Ctenotus uber uber	Western Spotted Ctenotus	-	-	x							x	x			x
Scincidae	Cyclodomorphus melanops	Spinifex Slender Blue-tongue	-	(not WAM)	x										x	
Scincidae	Egernia cygnitos	Western Pilbara Spiny-tailed Skink	-	-	x							x	x			x
Scincidae	Egernia depressa	Southern Pygmy Spiny-tailed Skink	-	-	x											
Scincidae	Egernia pilbarensis	Pilbara Skink	-	-	x											
Scincidae	Eremiascincus fasciolatus	Narrow-banded Sand Swimmer	-	(not WAM)	x					x	x	x	x		x	x
Scincidae	Eremiascincus isolepis	Northern Bar-lipped Skink	-	-	x											
Scincidae	Eremiascincus musivus	Mosaic Desert Skink	-	-	x							x				
Scincidae	Eremiascincus pallidus	Western Narrow-banded Skink	-	-	x					x	x	x	x		x	x
Scincidae	Lerista bipes	North-western Sandslider	-	-	x							x	x			
Scincidae	Lerista clara	Sharp-blazed Three-toed Slider	-	-	x							x			x	

Scincidae	Lerista flammicauda	Pilbara flame-tailed slider	-	-	x											
Scincidae	Lerista jacksoni	Jackson's Three-toed Slider	-	-	x					x		x			x	x
Scincidae	Lerista kingi	King's Slider	-	-	x								x			
Scincidae	Lerista muelleri	Wood Mulch-slider	-	-	x							x				
Scincidae	Lerista nevinae	Nevin's Slider	EN	EN	x	x	x					x				
Scincidae	Lerista onsloviana		-	-								x				
Scincidae	Lerista quadrivincula	Four-chained Slider	P1	-	x		x					x	x			
Scincidae	Lerista timida	Timid Slider	-	-	x											
Scincidae	Lerista verhmens	Powerful Three-toed Slider	-	-	x											
Scincidae	Liopholis striata	Night Skink	-	-	x							x	x		x	x
Scincidae	Menetia greyii	Common Dwarf Skink	-	-	x					x	x	x	x			
Scincidae	Menetia surda	Western Dwarf Skink	-	(not WAM)	x											
Scincidae	Morethia ruficauda	Lined Fire-tailed Skink	-	(not WAM)	x											
Scincidae	Morethia ruficauda exquisita	Lined Fire-tailed Skink	-	-	x											
Scincidae	Morethia ruficauda ruficauda	Lined Fire-tailed Skink	-	-	x							x				x
Scincidae	Notoscincus butleri	Lined Soil-crevice Skink	P4	-	x		x					x			x	
Scincidae	Notoscincus ornatus	Ornate Soil-crevice Skink	-	(not WAM)	x						x					
Scincidae	Proablepharus reginae	Western Soil-crevice Skink	-	-	x											
Scincidae	Tiliqua multifasciata	Central Blue-tongue	-	-	x			x								
Typhlopidae	Anilios ammodytes	Pilbara Blind Snake	-	-	x											
Typhlopidae	Anilios australis	Southern Blind Snake	-	-	x											
Typhlopidae	Anilios diversus	Northern Blind Snake	-	-	x							x	x		x	x
Typhlopidae	Anilios grypus	Long-beaked Blind Snake	-	-	x						x					
Typhlopidae	Indotyphlops braminus	Brahminy Blind Snake	-	-	x					x		x				
Varanidae	Varanus acanthurus	Spiny-tailed Goanna	-	-	x						x		x			x
Varanidae	Varanus brevicauda	Short-tailed Pygmy Goanna	-	-	x											

Varanidae	Varanus bushi	Pilbara Mulga Goanna	-	-	x							x			x		
Varanidae	Varanus eremius	Pygmy Desert Goanna	-	-	x								x				
Varanidae	Varanus giganteus	Perentie	-	-	x												
Varanidae	Varanus gouldii	Bungarra Or Sand Goanna	-	-	x							x	x				
Varanidae	Varanus panoptes rubidus	Yellow-Spotted Monitor	-	-	x							x	x		x		
Varanidae	Varanus pilbarensis	Northern Pilbara Rock Goanna	-	-	x												
Varanidae	Varanus tristis	Racehorse Goanna	-	-	2												

Appendix I Fauna Habitat Assessment

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

2378-BAT-01

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	486323	**Northing**	7699993

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Unknown
Aspect	Negligible	**Surface stone cover**	25 - 50%
Soil type	Sandy loam	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks, Leaf litter, Peeling bark, Woody debris
Disturbance	Infrastructure, Litter, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus victrix*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia coriacea pendens, Corymbia hamersleyana*
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Cenchrus ciliaris, Triodia epactia*

Fulcrum photo ID	17068700-9ad1-4439-a5b9-99efc001d4b8

2378-BAT-02

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	490525	**Northing**	7696166

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Dolerite, Quartz
Aspect	Negligible	**Surface stone cover**	50 - 75%
Soil type	Sandy loam	**Surface stone size classes present**	Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Leaf litter, Woody debris
Disturbance	Vehicle tracks		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia ancistrocarpa, Corymbia hamersleyana*
Ground stratum	Low (>0.5 m)	Sparse woody shrubland/chenopods (0.25-20%)	*Triodia sp.*

Fulcrum photo ID	ae77c052-686b-492d-8298-1137e049ca54

2378-BAT-03

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	490511	**Northing**	7697307

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Unknown
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks, Leaf litter, Rock crevices
Disturbance	Overgrazing, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia ancistrocarpa and Acacia pyrifolia*
Ground stratum	Low (>0.5 m)	*Sparse hummock grassland (0.25-20%)*	*Triodia epactia*

Fulcrum photo ID	a3f40e48-dbb9-4113-adc8-4681d39a2d94,8a13516e-f49b-4317-a63c-

2378-BAT-04

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	490858	**Northing**	7697104

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	None
Aspect	Negligible	**Surface stone cover**	
Soil type	Sandy loam	**Surface stone size classes present**	
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks
Disturbance	Infrastructure, Overgrazing, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia ancistrocarpa, Acacia bivenosa, Hakea sp.*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*

Fulcrum photo ID	621d7414-e8d7-4a24-bef2-56e5514f9be1,3ce0a079-491c-47a8-90e0-

2378-BAT-05

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	490914	**Northing**	7696223
Landform and Soil			**Rock**		
Landform	Outcrop/breakaway		**Rock type/s**	Dolerite, Granite	
Aspect	Negligible		**Surface stone cover**	50 - 75%	
Soil type	Rock		**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
Soil colour	Red				
Condition			**Habitat Features**		
Quality	Highly degraded		**Water Source**	Absent	
Fire History	Little or no fire evidence (>5 years)		**Microhabitats**	Hummocks, Rock crevices	
Disturbance	Infrastructure, Vehicle tracks				
Introduced fauna	None observed		**Ground Cover**	<10%	
Vegetation					
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		*Triodia sp.*	

Fulcrum photo ID	9979307e-5389-4ea0-99db-65ef178f31ad,d171b737-619a-4278-9735-

2378-BAT-06

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	490674	**Northing**	7696634
Landform and Soil			**Rock**		
Landform	Outcrop/breakaway		**Rock type/s**	Granite, Laterite, Quartz	
Aspect	Southeast		**Surface stone cover**	50 - 75%	
Soil type	Rock		**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
Soil colour	Red				
Condition			**Habitat Features**		
Quality	Disturbed		**Water Source**	Absent	
Fire History	Little or no fire evidence (>5 years)		**Microhabitats**	Hummocks, Leaf litter, Rock crevices	
Disturbance	None observed				
Introduced fauna	None observed		**Ground Cover**	26-50%	
Vegetation					
Upper stratum	Absent				
Mid stratum	Mid (1-2 m)	Isolated mallee shrubs (<0.25%)		*Acacia sp*	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)		*Triodia sp.*	

Fulcrum photo ID	64398792-54e3-4ba5-8827-7ddc01aa4f6a,05d2ce80-331c-4a45-acbb-

2378-BIR-07

Project:	675.072378				
Date	3-04-2024		**Sample Type**	ARU	
Zone	50	**Easting**	488338	**Northing**	7698789

Landform and Soil		Rock	
Landform	Outcrop/breakaway	**Rock type/s**	Granite
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Boulders (>2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	rock		

Condition		Habitat Features	
Quality	Very good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Leaf litter, Rock crevices
Disturbance	Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation

Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Cenchrus ciliaris, Triodia epactia*

Fulcrum photo ID	cbe489f1-ca2d-4759-aa54-44d33fa6d764,f1e581bc-47b0-49cf-9ca3-

2378-CAM-08

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	486322	**Northing**	7699985

Landform and Soil		Rock	
Landform	Drainage line	**Rock type/s**	Unknown
Aspect	Negligible	**Surface stone cover**	25 - 50%
Soil type	Sandy loam	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		

Condition		Habitat Features	
Quality	Disturbed	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks, Leaf litter, Peeling bark, Woody debris
Disturbance	Infrastructure, Litter, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation

Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Eucalyptus victrix*
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia coriacea pendens, Corymbia hamersleyana*
Ground stratum	Mid (0.5-1 m)	Hummock grassland (50-80%)	*Cenchrus ciliaris, Triodia epactia*

Fulcrum photo ID	1f0edcb1-ceb9-4969-a9e5-6ccf9481b624,2bf874a0-f171-4db7-a4c2-

2378-CAM-09

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490516	**Northing**	7696159

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Dolerite, Quartz
Aspect	Negligible	**Surface stone cover**	50 - 75%
Soil type	Sandy loam	**Surface stone size classes present**	Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Leaf litter, Woody debris
Disturbance	Vehicle tracks		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Tall (>2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia ancistrocarpa, Corymbia hamersleyana*
Ground stratum	Low (>0.5 m)	Sparse woody shrubland/chenopods (0.25-20%)	*Triodia sp.*

Fulcrum photo ID	d375f9be-5134-464e-acb8-f362c7965c45,a8550535-939c-4ff2-912c-

2378-CAM-10

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490509	**Northing**	7696381

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Dolerite, Ironstone
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*

Fulcrum photo ID	ba1bd559-66bc-4b15-af39-8f776094cb6c,3eb9560c-f7a8-4c86-873d-

2378-CAM-11

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490810	**Northing**	7696593

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Granite, Quartz
Aspect	South	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Boulders (>2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Leaf litter, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*Ficus brachypoda*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia epactia*

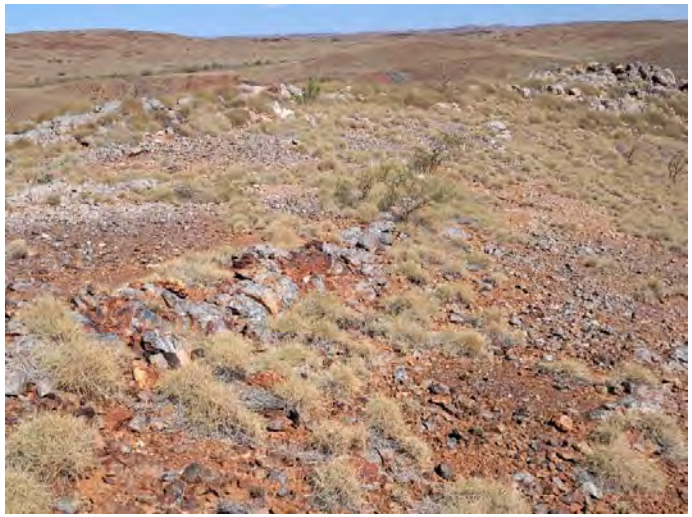
Fulcrum photo ID	053b6013-6120-4dc6-ad6c-47278d8d5d1d,2d1f00fa-2e12-4cf6-9ae1-

2378-CAM-12

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490809	**Northing**	7696621

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Granite, Quartz
Aspect	South	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Boulders (>2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Leaf litter, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*Ficus pepper*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia sp.*



Fulcrum photo ID	b4debac6-0d48-4173-a613-5842780eb5c5,49007dde-9962-4e0a-b8e3-

2378-CAM-13

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490798	**Northing**	7696586

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Granite, Quartz
Aspect	South	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Boulders (>2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Leaf litter, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Isolated shrubs and/or heath shrubs (<0.25%)	*Ficus brachypoda*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia epactia*

Fulcrum photo ID	1dee37f4-2d42-42a1-ac31-15a4fa4dfb71,3b9d7a9b-9644-4eac-9cfc-

2378-CAM-14

Project:	675.072378				
Date	3-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	488292	**Northing**	7698818

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Granite
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Boulders (>2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	rock		
Condition		**Habitat Features**	
Quality	Very good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Leaf litter, Rock crevices
Disturbance	Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Cenchrus ciliaris, Triodia epactia*

Fulcrum photo ID	f7adf29a-56c9-4b4e-bd0a-fd333cf5620a,653f02ce-dc95-4ed7-960d-

2378-CAM-19

Project:	675.072378				
Date	4-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490849	**Northing**	7696681

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Dolerite, Granite
Aspect	North	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Unknown	**Microhabitats**	Hummocks, Rock crevices
Disturbance	Weeds		
Introduced fauna	None observed	**Ground Cover**	11-25%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Ficus pepper*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia sp.*

Fulcrum photo ID	ca6b6e28-3e8b-4c4f-9ca6-5e12244a57bd,7cfef790-8375-4f20-a8e4-

2378-CAM-20

Project:	675.072378				
Date	4-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	491028	**Northing**	7696564

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Unknown
Aspect	North	**Surface stone cover**	50 - 75%
Soil type	Sand	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Leaf litter, Rock crevices
Disturbance	Infrastructure, Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Corymbia hamersleyana*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia bivenosa*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*

Fulcrum photo ID	8a6671a3-59b5-4f2d-b29f-d21d6bd83cd2,b1f22112-d03c-47e0-a030-

2378-CAM-21

Project:	675.072378				
Date	4-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490660	**Northing**	7696473

Landform and Soil		**Rock**	
Landform	Outcrop/breakaway	**Rock type/s**	Calcrete, Granite
Aspect	East	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Absent		
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia ancistrocarpa*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*

Fulcrum photo ID	28bed85d-aeda-4cc8-b339-522f6824303c,542c63be-4c9d-4b64-b493-

2378-CAM-22

Project:	675.072378				
Date	4-04-2024		**Sample Type**	Camera Trap	
Zone	50	**Easting**	490847	**Northing**	7697268

Landform and Soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Granite
Aspect	South	**Surface stone cover**	50 - 75%
Soil type	Rock	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia ancistrocarpa*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia sp.*

Fulcrum photo ID	fb836b0d-233c-471f-977e-b29443dfd1cc,6ebbd064-4a76-4e31-b52a-

2378-HAB-23

Project:	675.072378				
Date	6-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	491002	**Northing**	7697098

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete, Dolerite, Quartz
Aspect	North	**Surface stone cover**	50 - 75%
Soil type	Sand	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Orange,Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Overgrazing		
Introduced fauna	Cattle	**Ground Cover**	

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia Angusta, Triodia wiseana*

Fulcrum photo ID	6c995cad-02d9-4ffe-96e7-fc74d110596c,71a69973-721d-4ebf-945b-

2378-HAB-24

Project:	675.072378				
Date	6-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490842	**Northing**	7696369

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Unknown
Aspect	Negligible	**Surface stone cover**	50 - 75%
Soil type	Sandy loam	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Infrastructure, Litter, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	*Corymbia hamersleyana*
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia bivenosa, Acacia ancistrocarpa*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia sp.*

Fulcrum photo ID	c3f94cd3-e697-4a7b-988b-e09d55fbfdd5

2378-HAB-25

Project:	675.072378				
Date	6-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490652	**Northing**	7696634

Landform and Soil		**Rock**	
Landform	Upper slope	**Rock type/s**	Quartz
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Big Rocks (60 cm - 2 m), Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Rock crevices
Disturbance	None observed		
Introduced fauna	None observed	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Open woody shrubland/chenopods (20-50%)	*Acacia pyrifolia pyrifolia, Triodia epactia, Triodia wiseana*

Fulcrum photo ID	d4450ee7-fe27-414b-8827-11f3bbcdcd39,d75302f8-854a-4a2e-a4f9-

2378-HAB-26

Project:	675.072378				
Date	6-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490522	**Northing**	7696808

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Calcrete, Dolerite, Quartz
Aspect	Negligible	**Surface stone cover**	75 - 100%
Soil type	Rock	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Leaf litter, Rock crevices
Disturbance	Vehicle tracks		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Open mallee shrubland (20-50%)	*Acacia bivenosa , Acacia pyrifolia*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia wiseana*

Fulcrum photo ID	b05d2ede-bc33-4066-9d9a-59c0db158df5,5f67a709-21ee-4674-bab7-

2378-HAB-27

Project:	675.072378				
Date	6-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490530	**Northing**	7697128

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Basalt, Granite, Quartz
Aspect	Negligible	**Surface stone cover**	50 - 75%
Soil type	Sand	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Good	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Overgrazing		
Introduced fauna	Cattle	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia bivenosa , Acacia pyrifolia*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia wiseana*

Fulcrum photo ID	d80941e5-32ba-45b5-9198-f85c0f6e79b1,9c517f06-4a4a-42f2-91cc-

2378-HAB-28

Project:	675.072378				
Date	7-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	485924	**Northing**	7700229

Landform and Soil		**Rock**	
Landform	Undulating plain	**Rock type/s**	Quartz
Aspect	North	**Surface stone cover**	75 - 100%
Soil type	Sand	**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Litter, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Low (0.5-1 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia inaequalatera*
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)	*Triodia wiseana*

Fulcrum photo ID	5c8f7e5d-d547-4232-a973-4214a67bdf34,46a0bde5-a975-47ee-9da2-

2378-HAB-29

Project:	675.072378				
Date	7-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	485550	**Northing**	7700544

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Quartz
Aspect	Negligible	**Surface stone cover**	5 - 25%
Soil type	Sandy clay	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Leaf litter
Disturbance	Infrastructure, Litter, Vehicle tracks, Weeds		
Introduced fauna	None observed	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Sparse shrubland and/or heathland (0.25-20%)	*Acacia ancistrocarpa and Snakewood*
Ground stratum	Low (>0.5 m)	Sparse hummock grassland (0.25-20%)	*Triodia epactia*

Fulcrum photo ID	ca8492dd-43b8-4916-8fb3-a3612d5ce7d2,8705da04-28a1-4631-

2378-HAB-30

Project:	675.072378				
Date	7-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	486102	**Northing**	7700131

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	None
Aspect	Negligible	**Surface stone cover**	
Soil type	Clay	**Surface stone size classes present**	
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Disturbed	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Burrows, Hummocks, Leaf litter
Disturbance	Infrastructure, Vehicle tracks, Weeds		
Introduced fauna	Cattle	**Ground Cover**	51-75%

Vegetation			
Upper stratum	Absent		
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia xiphophylla*
Ground stratum	Low (>0.5 m)	Hummock grassland (50-80%)	*Triodia angusta*

Fulcrum photo ID	f901cde8-c06b-4c1f-8529-5ae1763976ab,74c6afe0-9102-47e7-bc2a-

2378-HAB-31

Project:	675.072378				
Date	8-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490771	**Northing**	7697340
Landform and Soil			**Rock**		
Landform	Lower slope		**Rock type/s**	Calcrete, Quartz	
Aspect	North		**Surface stone cover**	75 - 100%	
Soil type	Rock		**Surface stone size classes present**	Pebbles (<0.6 cm), Rocks (20 - 60 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
Soil colour	Red				
Condition			**Habitat Features**		
Quality	Disturbed		**Water Source**	Absent	
Fire History	Little or no fire evidence (>5 years)		**Microhabitats**	Hummocks	
Disturbance	Overgrazing, Vehicle tracks, Weeds				
Introduced fauna	Cattle		**Ground Cover**	26-50%	
Vegetation					
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Low (>0.5 m)	Open hummock grassland (20-50%)		*Triodia wiseana*	

Fulcrum photo ID	5d5172d5-1cb8-4ef4-b102-db842a43ac71,b7ff4641-14bb-48ab-8724-

2378-HAB-32

Project:	675.072378				
Date	7-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	487061	**Northing**	7699573
Landform and Soil			**Rock**		
Landform	Plain		**Rock type/s**	Quartz	
Aspect	Negligible		**Surface stone cover**	5 - 25%	
Soil type	Clay		**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)	
Soil colour	Red				
Condition			**Habitat Features**		
Quality	Highly degraded		**Water Source**	Absent	
Fire History	Little or no fire evidence (>5 years)		**Microhabitats**	Burrows, Hummocks	
Disturbance	Infrastructure, Litter, Vehicle tracks, Weeds				
Introduced fauna	Cattle		**Ground Cover**	26-50%	
Vegetation					
Upper stratum	Absent				
Mid stratum	Absent				
Ground stratum	Low (>0.5 m)	Open tussock grassland (20-50%)		*Eragrostis xerophila, Eriachne benthamii*	

Fulcrum photo ID	302159c4-171e-42c0-9451-7e15769b5ab3,06578611-355e-4fcd-9cab-

2378-HAB-33

Project:	675.072378				
Date	8-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	490050	**Northing**	7697794

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Quartz
Aspect	Negligible	**Surface stone cover**	50 - 75%
Soil type	Clay	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Highly degraded	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Infrastructure, Overgrazing, Vehicle tracks, Weeds		
Introduced fauna	Cattle	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Open tussock grassland (20-50%)	*Eragrostis xerophila, Eriachne benthamii*

Fulcrum photo ID	c830d499-211d-47a2-b56b-b1136e66374a,9163fe77-f42b-4176-9f4f-

2378-HAB-34

Project:	675.072378				
Date	8-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	487750	**Northing**	7699153

Landform and Soil		**Rock**	
Landform	Drainage line	**Rock type/s**	Quartz
Aspect	Negligible	**Surface stone cover**	25 - 50%
Soil type	Clay	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Rocks (6 - 20 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Highly degraded	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks, Peeling bark, Woody debris
Disturbance	Infrastructure, Overgrazing, Vehicle tracks, Weeds		
Introduced fauna	Cattle	**Ground Cover**	26-50%

Vegetation			
Upper stratum	Low (<10 m)	Open woodland (0.25-20%)	Corymbia hamersleyana
Mid stratum	Mid (1-2 m)	Open shrubland and/or heathland (20-50%)	*Acacia inaequalatera, Acacia bivenosa*
Ground stratum	Low (>0.5 m)	Open woody shrubland/chenopods (20-50%)	*Grass and mixed sp.*

Fulcrum photo ID	4ca22998-7af8-4346-a462-aedaef274392,56199aaf-1016-47d3-b91c-

2378-HAB-35

Project:	675.072378				
Date	8-04-2024		**Sample Type**	Habitat Assessment	
Zone	50	**Easting**	488973	**Northing**	7698472

Landform and Soil		**Rock**	
Landform	Plain	**Rock type/s**	Quartz
Aspect	Negligible	**Surface stone cover**	0 - 5%
Soil type	Sandy clay	**Surface stone size classes present**	Pebbles (<0.6 cm), Small Stones (0.6 - 2 cm), Stones (2 - 6 cm)
Soil colour	Red		
Condition		**Habitat Features**	
Quality	Highly degraded	**Water Source**	Absent
Fire History	Little or no fire evidence (>5 years)	**Microhabitats**	Hummocks
Disturbance	Infrastructure, Litter, Overgrazing, Vehicle tracks, Weeds		
Introduced fauna	Cattle	**Ground Cover**	11-25%

Vegetation			
Upper stratum	Absent		
Mid stratum	Absent		
Ground stratum	Low (>0.5 m)	Sparse tussock grassland (0.25-20%)	*Grass sp.*

Fulcrum photo ID	2a96138f-5112-40be-9214-184974b970de,3ae63bba-fb75-4588-98c2-

Appendix J Fauna Recorded During the Survey

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Family	Scientific Name	Common Name	Conservation Status		Call	Camera trap	*ARU	Diggings, burrows, mounds	Scat	Sighting	Sighting - overhead	Total
			State	Common wealth								
Birds												
Accipitridae	*Milvus migrans*	Black Kite	-	-						1		**1**
Artamidae	*Artamus cinereus*	Black-faced Woodswallow	-	-						6		**6**
Cacatuidae	*Cacatua sanguinea*	Little Corella	-	-						2		**2**
Cacatuidae	*Eolophus roseicapilla*	Galah	-	-						1		**1**
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckooshrike	-	-						2		**2**
Columbidae	*Geopelia striata placida*	Peaceful Dove	-	-	1					2		**3**
Columbidae	*Ocyphaps lophotes*	Crested Pigeon	-	-		1				6		**7**
Corvidae	*Corvus bennetti*	Little Crow	-	-	1	3				2		**6**
Falconidae	*Falco berigora*	Brown Falcon	-	-						1		**1**
Falconidae	*Falco cenchroides*	Nankeen Kestrel	-	-						1		**1**
Meliphagidae	*Gavicalis virescens*	Singing Honeyeater	-	-						1		**1**
Meliphagidae	*Ptilotula penicillata*	White-plumed Honeyeater	-	-						1		**1**
Meropidae	*Merops ornatus*	Rainbow Bee-eater	-	-						2	1	**3**
Motacillidae	*Anthus australis*	Australian Pipit	-	-						2		**2**
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail	-	-	2					6		**8**
Mammals												
Bovidae	***Bos primigenius taurus*	European Cattle	-	-		2			2	3		**7**
Muridae	*Muridae sp.*	Muridae sp.	-	-		6						**6**
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN	EN		8						**8**
Dasyuridae	*Sminthopsis macroura*	Stripe-faced Dunnart	-	-		2						**2**
Emballonuridae	*Taphozous georgianus*	Common Sheath-tailed Bat	-	-			25					**25**
Macropodidae	*Macropus robustus*	Common Wallaroo	-	-						1		**1**
Macropodidae	*Petrogale rothschildi*	Rothschild's Rock Wallaby	-	-		1						**1**
Molossidae	*Chaerephon jobensis*	Northern Freetail Bat	-	-			5					**5**
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	P4	-				2				**2**

Family	Scientific Name	Common Name	Conservation Status		Call	Camera trap	*ARU	Diggings, burrows, mounds	Scat	Sighting	Sighting - overhead	Total
			State	Common wealth								
Muridae	**Rattus rattus*	Black Rat	-	-		5						**5**
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	-	-			25					**25**
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	-	-			10					**10**
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	-	-			15					**15**
Vespertilionidae	*Vespadelus finlaysoni*	Finlayson's Cave Bat	-	-			25					**25**
Reptiles												
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon	-	-						3		**3**
Scincidae	*Egernia formosa*	Goldfields Crevice-skink	-	-		1						**1**
Scincidae	*Tiliqua multifasciata*	Centralian Blue-tongued Skink	-	-		1						**1**
Varanidae	*Varanidae* sp.	Varanidae sp.				1						**1**

*= ARU data is the number of calls recorded during the survey and confirms the presence of a species. The data is not definitive on abundance due to the likelihood that calls may derive from one individual utilising the area.

**= introduced species

Appendix K Significant Fauna Likelihood of Occurrence

Detailed Flora and Vegetation, Basic and Targeted Fauna Survey

Bardies Well

Brookdale Contractors

SLR Project No.: 675.072378.00001

28 June 2024

Conservation Status: State - Listed under Biodiversity Conservation Act 2016 or Department of Biodiversity, Conservation and Attractions Conservation, Commonwealth - Listed under Environmental Protection and Biodiversity Conservation Act 1999. CR - Critically Endangered, EN - Endangered, VU - Vulnerable, MI - Migratory, CD - Conservation Dependent fauna, OS - Other Specially Protected fauna, MA - Marine, P - Listed as Priority by DBCA.
Source: NM - NatureMap, PMST - EPBC Protected Matters Search Tool, DBCA - DBCA Threatened and Priority Fauna database search, Field - Recorded during the current field survey.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Accipitridae	*Erythrotriorchis radiatus* Red Goshawk	VU	EN	Tropical and subtropical open-forests and woodlands dominated by eucalypts and paperbarks along streams and near wetlands (Menkhorst et al., 2017).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Apodidae	*Apus pacificus* Pacific Swift, Fork-tailed Swift	MI	MI, MA (overfly marine area)	Low to very high airspace over varied habitat (Morcombe, 2003).	The DBCA database identified ten records within 50 km of the Survey Area, including 12 km north-northwest in 2011 and 31 km northeast in 2017 (DBCA).	**Medium** Records <12 km from the Survey Area, may infrequently occupy aerial space over the Survey Area when commuting.
Charadriidae	*Charadrius leschenaultii* Greater Sand Plover	VU	VU, MI, MA	Tidal flats, beaches (Menkhorst et al., 2017).	The DBCA database identified ninety-three records within 50 km of the Survey Area, including 18.2 km northwest in 2016 and 19 km northwest in 2017 (DBCA).	**Low** Records nearby associated with coastal habitats. No suitable habitat within the Survey Area.
Charadriidae	*Charadrius mongolus* Lesser Sand Plover	EN	EN, MI, MA	Tidal flats (Menkhorst et al., 2017).	The DBCA database identified thirty-six records within 50 km of the Survey Area, including 11.5 km north in 2017 and 28 km northeast in 2019 (DBCA).	**Low** Records nearby associated with coastal habitats. No suitable habitat within the Survey Area.
Charadriidae	*Charadrius veredus* Oriental Plover	MI	MI, MA (overfly marine area)	Grasslands, thinly vegetated plains (Menkhorst et al., 2017).	The DBCA database identified six records within 50 km of the Survey Area, including 19 km northwest in 2016 and 21.5 km northwest in 2012 (DBCA).	**Medium** Nearby records associated with coastal habitats in the region. Limited suitable habitat within the Survey Area.
Charadriidae	*Pluvialis fulva* Pacific Golden Plover	MI	MI, MA	Coastal, tidal flats, beaches, reefs (Menkhorst et al., 2017).	The DBCA database identified thirteen records within 50 km of the Survey Area, including 12 km north in 2013 and 2015 km (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Charadriidae	*Pluvialis squatarola* Grey Plover	MI	VU, MI, MA (overfly marine area)	Coastal, tidal flats (Menkhorst et al., 2017).	The DBCA database identified thirty-seven records within 50 km of the Survey Area, including 11.6 km north in 2007 and 19 km north in 2017 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Cuculidae	*Cuculus saturatus optatus* Horsfield's Cuckoo	MI (as C. optatus)	MI (C. saturatus MA (overfly marine area))	Riverside forests, rainforest patches, mangroves (Johnstone and Storr, 1998).	No nearby records identified from the database searches or literature. Species only returned by NatureMap.	**Low** No suitable habitat within the Survey Area.
Falconidae	*Falco hypoleucos* Grey Falcon	VU	VU	Open plains with treed watercourses in arid inland (Menkhorst et al., 2017).	The DBCA database identified three records within 50 km of the Survey Area, including 42.5 km southeast in 2012, 42.6 km east in 2011 and 44 km west in 2020. (DBCA).	**Medium** Records <44 km from the Survey Area with suitable hunting habitat present within the Survey Area
Falconidae	*Falco peregrinus* Peregrine Falcon	OS	-	Most environments with suitable nest sites: cliff faces preferred, including man-made ones, commonly uses stick nests built by other species (Menkhorst et al., 2017).	The DBCA database identified thirteen records within 50 km of the Survey Area, including 25 km northwest in 2012 and 29 km northeast in 2019 (DBCA).	**Medium** Suitable hunting habitat within the Survey Area.
Fregatidae	*Fregata ariel* Lesser Frigatebird	MI	MI, MA	Oceanic (Johnstone and Storr, 1998).	The DBCA database identifiedForty-one records within 50 km of the Survey Area, including 36.4 km north in 2000 and 42 km north in 2002 (DBCA).	**Low** Records are historical predating 2002. No suitable habitat within the Survey Area.
Glareolidae	*Glareola maldivarum* Oriental Pratincole	MI	MI, MA (overfly marine area)	Open plains, open areas around tidal flats, beaches, wetlands (Morcombe, 2003).	The DBCA database identified sixteen records within 50 km of the Survey Area, including 8.5 km north in 2013 and 21.8 km northwest in 2016 (DBCA).	**Low** No suitable habitat within the Survey Area, though taxon may infrequently occupy aerial space over the Survey Area when commuting.
Hirundinidae	*Hirundo rustica* Barn Swallow	MI	MI, MA (overfly marine area)	Coastal and wetlands. Forages over open country, often congregates in areas with high densities of flying insects. (Menkhorst et al., 2017)	The DBCA database identified four records within 50 km of the Survey Area, including 24 km northwest in 2016 (DBCA).	**Low** No suitable habitat within the Survey Area, though taxon may infrequently occupy aerial space over the Survey Area when commuting.
Laridae	*Chlidonias leucopterus* White-winged Black Tern	MI	MI, MA	Fresh to saline wetlands. coastal, estuaries, freshwater lakes, swamps, salt lakes (Menkhorst et al., 2017.(Johnstone and Storr, 1998).	The DBCA database identified nine records within 50 km of the Survey Area, including 42 km north northwest in 2000 and 21.6 km northwest in 2013 (DBCA).	**Low** No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Laridae	*Gelochelidon nilotica* Gull-billed Tern	MI	MI, MA	Coastal, estuaries, tidal creeks, salt lakes, freshwater swamps, lagoons, claypans (Johnstone and Storr, 1998).	The DBCA database identified thirty-one records within 50 km of the Survey Area, including 8.7 km north in 1979, 11.5 km north in 2017 and 25.6 km north in 2020 (DBCA).	**Low** No suitable habitat within the Survey Area.
Laridae	*Hydroprogne caspia* Caspian Tern	MI	MI, MA	Sheltered coastal waters, fresh to saline lakes, large rivers, temporary wetlands, estuaries, tidal creeks, near-coastal salt lakes, brackish pools (Johnstone and Storr, 1998; Menkhorst et al., 2017).	The DBCA database identified 279 records within 50 km of the Survey Area, including 11.5 km north in 2017 and 20 km north in 2020 (DBCA).	**Low** Records associated with coastal habitats and saline lakes. No suitable habitat within the Survey Area.
Laridae	*Onychoprion anaethetus* Bridled Tern	MI	MI, MA	Tropical and subtropical seas (Merlin, 2023).	The DBCA database identified forty-five records within 50 km of the Survey Area, including 19 km north in 2011 and 27 km north-northeast in 2011 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Laridae	*Sterna dougallii* Roseate Tern	MI	MI, MA	Tropical and subtropical seas, and along the Western Australian coastline as far south as Eagle Bay (Merlin, 2023).	The DBCA database identified thirty-one records within 50 km of the Survey Area, including 19 km north in ND and 31.7 km north in 1981 (DBCA).	**Low** Records historical, preadating 1994 and are associated with coastal habitats. No suitable habitat within the Survey Area.
Laridae	*Sterna hirundo* Common Tern	MI	MI, MA	Coastal, near-coastal saltworks, sewage ponds (Johnstone and Storr, 1998).	The DBCA database identified twenty-one records within 50 km of the Survey Area, including 19 km north in ND and 29 km west in 2011 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Laridae	*Sternula albifrons* Little Tern	MI	MI, MA	Sheltered coastal waters, beaches, sandbars, estuaries, mangroves, near-coastal saltworks (Johnstone and Storr, 1998; Menkhorst et al., 2017)	The DBCA database identified forteen records within 50 km of the Survey Area, including 19 km north northwest in 2017 and 21.4 km northwest in 2012 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Laridae	*Sternula albifrons* White-shafted Little Tern	(S. albifrons MI)	(S. albifrons sinensis)	Sheltered coastal waters, beaches, sandbars, estuaries, mangroves, near-coastal saltworks (Johnstone and Storr, 1998; Menkhorst et al., 2017)	No nearby records identified by literature or DBCA, only returned by Naturemap.	**Low** No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Laridae	*Sternula nereis* Fairy Tern	(S. nereis nereis VU)	MA (S. nereis nereis VU)	Marine, sheltered coasts, bays, inlets, estuaries, coastal lagoons, ocean beaches, but rarely out to sea or even out of sight of land. Also near-coastal wetlands, including salt ponds, lakes (Morcombe, 2003).	The DBCA database identified twenty-seven records within 50 km of the Survey Area, including 19 km north in ND and 33 km north in 1990 (DBCA).	**Low** Records historical and associated with coastal habitats. No suitable habitat within the Survey Area.
Laridae	*Thalasseus bergii* Greater Crested Tern, Crested Tern	MI	MI, MA	Coastal, beaches, bays, lagoons, salt ponds and lakes, estuaries, tidal creeks (Johnstone and Storr, 1998; Morcombe, 2003).	The DBCA database identified 121 records within 50 km of the Survey Area, including 8.5 km north in 2016 and 19.2 km northwest in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Maluridae	*Amytornis whitei (check sp. & subsp.)* Rufous Grasswren	(A. whitei whitei: P4 as A. striatus striatus)	(A. striatus howei EN)	Restricted to spinifex associations, preferring areas with tall dense spinifex hummocks (Menkhorst et al., 2017).	No nearby records identified by literature or DBCA, only returned by Naturemap.	**Low** No nearby recent records. Limited suitable habitat within the Survey Area.
Motacillidae	*Motacilla cinerea* Grey Wagtail	MI	MI, MA (overfly marine area)	Fresh sandy or rocky streams, mown grass, ploughed land, sewage ponds (Morcombe, 2003).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Motacillidae	*Motacilla tschutschensis* Eastern Yellow Wagtail	MI	MI, MA (overfly marine area)	Damp short grass flats, swamp edges, sewage ponds, mowed grass (Johnstone and Storr, 1998).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Oceanitidae	*Oceanites oceanicus* Wilson's Storm Petrel	MI	MI, MA	Oceanic (Menkhorst et al., 2017).	The DBCA database identified ten records within 50 km of the Survey Area, including 11 km north in ND and 31.5 km north in 2008 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Pandionidae	*Pandion haliaetus* Osprey	MI	MI, MA	Coastal, estuaries, large rivers, major rivers, wetlands, river pools (Johnstone and Storr, 1998; Morcombe, 2003).	The DBCA database identified 445 records within 50 km of the Survey Area, including 5 km north-northwest in 2013 and 32.8 km east in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Phaethontidae	*Phaethon lepturus* White-tailed Tropicbird	MI	MI, MA	Oceanic (Menkhorst et al., 2017).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Phaethontidae	*Phaethon rubricauda* Red-tailed Tropicbird	MI, P4	MI, MA (P. r. westraliS MI, MA)	Oceanic (Menkhorst et al., 2017)	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Procellariidae	*Ardenna pacifica* Wedge-tailed Shearwater	MI	MI, MA	Oceanic (Johnstone and Storr, 1998).	The DBCA database identified eighty-seven records within 50 km of the Survey Area, including 31.7 km north in 1980 and 36 km north in 2000 (DBCA).	**Low** No suitable habitat within the Survey Area.
Procellariidae	*Calonectris leucomelas* Streaked Shearwater	MI	MI, MA	Oceanic (Johnstone and Storr, 1998).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Procellariidae	*Macronectes giganteus* Southern Giant Petrel	MI	EN, MI, MA	Southern oceans, bays, harbours (Menkhorst et al., 2017).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Psittaculidae	*Pezoporus occidentalis* Night Parrot	CR	EN	Long unburnt spinifex and samphire shrublands bordering salt lakes (Morcombe, 2017).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Rostratulidae	*Rostratula australis* Australian Painted Snipe	EN	EN, MA (overfly marine area)	Well vegetated surrounds and shallows of wetlands (Morcombe, 2003).	The DBCA database identified two records within 50 km of the Survey Area, both are 41 km south in 2011 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Actitis hypoleucos* Common Sandpiper	MI	MI, MA	Coastal and interior wetlands, narrow muddy edges of billabongs, river pools, mangroves, rocky beaches, estuaries, near-coastal salt lakes, lagoons, claypans, sewage ponds (Johnstone and Storr, 1998; Morcombe, 2003).	The DBCA database identified 101 records within 50 km of the Survey Area, including 19.2 km north-northwest in 2017 and 20 km north in 2020 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Arenaria interpres* Ruddy Turnstone	MI	VU, MI, MA	Coastal, tidal flats, beaches, rocky shorelines (Menkhorst et al., 2017).	The DBCA database identified 146 records within 50 km of the Survey Area, including 8.6 km north in 2016 and 19 km north northwest in 2017 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Scolopacidae	*Calidris acuminata* Sharp-tailed Sandpiper	MI	VU, MI, MA	Fresh and salt wetlands, muddy edges of lagoons, swamps, lakes, dams, soaks, sewage farms, temporary floodwaters (Morcombe, 2003).	The DBCA database identified forty-three records within 50 km of the Survey Area, including 7.2 km northeast in 2015 and 8.6 km north in 2013 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris alba* Sanderling	MI	MI, MA	Beaches, sandy tidal flats (Menkhorst et al., 2017).	The DBCA database identified twenty records within 50 km of the Survey Area, including 21.4 km northeast in 2011 and 19 km northwest in 2017 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Calidris canutus* Red Knot	EN	VU, MI, MA (overfly marine area)	Coastal, extensive firm tidal flats (Menkhorst et al., 2017).	The DBCA database identified twelve records within 50 km of the Survey Area, including 11.9 km north in 2011 and 25.2 km northwest in 2016 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Calidris falcinellus* Broad-billed Sandpiper	MI	MI, MA (overfly marine area)	Estuaries, near-coastal salt lakes, drying freshwater lakes (Johnstone and Storr, 1998).	The DBCA database identified five records within 50 km of the Survey Area, including 21.6 km northwest in 2012 and 25.2 km northwest in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris ferruginea* Curlew Sandpiper	CR	CE, MI, MA (overfly marine area)	Inter-tidal mudflats of estuaries, lagoons, mangrove channels, dams, floodwaters, flooded saltbush surrounds of inland lakes (Morcombe, 2003).	The DBCA database identified thirty-two records within 50 km of the Survey Area, including 11.9 km north in 2011 and 19.5 km north in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris melanotos* Pectoral Sandpiper	MI	MI, MA (overfly marine area)	Coastal fresh to saline wetlands, inland permanent and temporary wetlands, mudflats, swamps with dense vegetation (Morcombe, 2003).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris pugnax* Ruff	MI	MI, MA (as P. pugnax)	Shallow wetlands, freshwater lakes, swamps, flood lands, salt ponds, dry grassland, tidal mudflats, beaches, estuaries (Johnstone & Storr, 1998).	Recorded in the literature 11 km northwest of the Survey Area in 2021 (GHD, 2011)	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris ruficollis* Red-necked Stint	MI	MI, MA (overfly marine area)	Tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands, salt fields, sewage ponds (Pizzey and Knight, 1997).	The DBCA database identified forty records within 50 km of the Survey Area, including 19 km north in 2016 and 19.2 km north in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.

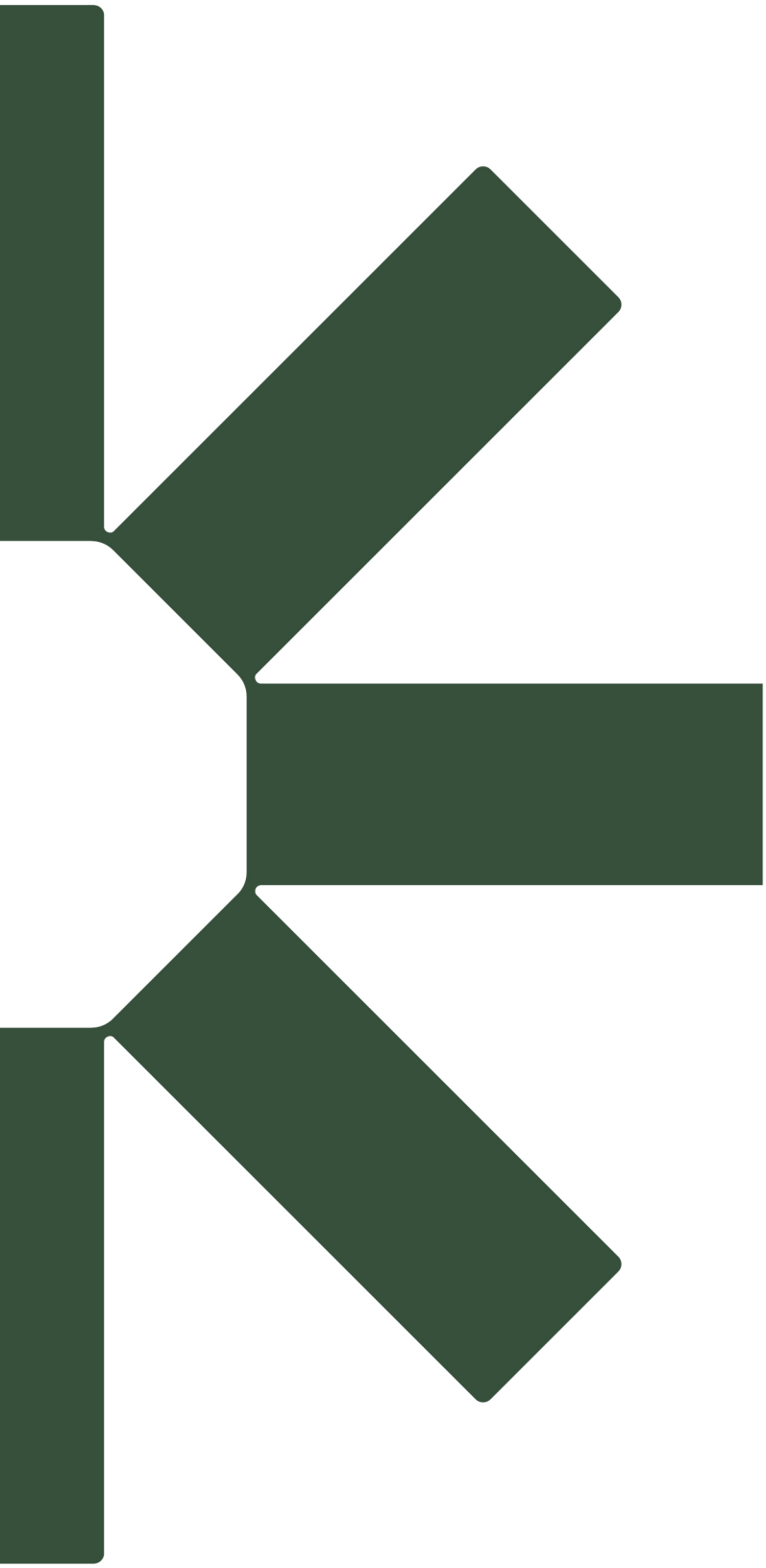
Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Scolopacidae	*Calidris subminuta* Long-toed Stint	MI	MI, MA (overfly marine area)	Muddy fringes of fresh wetlands (Menkhorst et al., 2017).	The DBCA database identified eleven records within 50 km of the Survey Area, including 13 km northwest in 2014 and 15 km northwest in 2010 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Calidris tenuirostris* Great Knot	CR	VU, MI, MA (overfly marine area)	Coastal, tidal flats, beaches (Menkhorst et al., 2017).	The DBCA database identified thirty-seven records within 50 km of the Survey Area, including 19.1 km north in 2017 and 12 km north in 2014 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Gallinago stenura* Pin-tailed Snipe	MI	MI, MA (overfly marine area)	Shallow freshwaters, river pools, sewage ponds, floodwaters (Johnstone and Storr, 1998).	The DBCA database identified one record within 50 km of the Survey Area; 30.7 km east in 1979 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Limnodromus semipalmatus* Asian Dowitcher	MI	VU, MI, MA (overfly marine area)	Coastal tidal flats (Menkhorst et al., 2017)	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Limosa lapponica menzbieri* Bar-tailed Godwit	CR	EN	Coastal tidal flats (Menkhorst et al., 2017)	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Limosa limosa* Black-tailed Godwit	MI	EN, MI, MA (overfly marine area)	Shallow inland wetlands (Menkhorst et al., 2017).	The DBCA database identified five records within 50 km of the Survey Area, including 12 km north in 2014 and 21.4 km north-northeast in 2011 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Numenius madagascariensis* Far Eastern Curlew, Eastern Curlew	CR	CE, MI, MA	Coastal tidal flats (Menkhorst et al., 2017).	The DBCA database identified 102 records within 50 km of the Survey Area, including 32.8 km wast in 2017 and 11.5 km north in 2017 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Numenius minutus* Little Curlew	MI	MI, MA (overfly marine area)	Dry grassland, plains and woodland of grassy understorey of clay and black soil plain (Menkhorst et al., 2017).	The DBCA database identified twenty-one records within 50 km of the Survey Area, including 12.9 km north in 2015 and 7.4 km north in 2010 (DBCA).	**Low** No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Scolopacidae	*Numenius phaeopus* Whimbrel	MI	MI, MA	Coastal tidal flats and mangroves (Menkhorst et al., 2017).	The DBCA database identified 163 records within 50 km of the Survey Area, including 19.2 km north in 2017 and 11.5 km north in 2017 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Phalaropus lobatus* Red-necked Phalarope	MI	MI, MA	Near-coastal salt lakes (Johnstone and Storr, 1998).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Tringa brevipes* Grey-tailed Tattler	MI, P4	MI, MA	Coastal, tidal flats, rocky shorelines (Menkhorst et al., 2017).	The DBCA database identified 190 records within 50 km of the Survey Area, including 20 km north in 2017 and 24 km northwest in 2016 (DBCA).	**Low** Records associated with coastal habitats. No suitable habitat within the Survey Area.
Scolopacidae	*Tringa glareola* Wood Sandpiper	MI	MI, MA (overfly marine area)	Freshwater wetlands with emergent sedges and taller fringing vegetation (Menkhorst et al., 2017).	The DBCA database identified thirty-three records within 50 km of the Survey Area, including 4.8 km north in 2016 and 19 km northwest in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Tringa nebularia* Common Greenshank	MI	EN, MI, MA (overfly marine area)	Permanent and temporary wetlands, billabongs, swamps, lakes, floodplains, sewage farms and salt works ponds, flooded irrigated crops, mudflats, mangrove swamps, muddy shallows of lagoons (Morcombe, 2003).	The DBCA database identified 133 records within 50 km of the Survey Area, including 19 km north in 2017 and 20 km north in 2020 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Tringa stagnatilis* Marsh Sandpiper	MI	MI, MA (overfly marine area)	Shallow, fresh to brackish inland wetlands (Menkhorst et al., 2017).	The DBCA database identified forty-three records within 50 km of the Survey Area, including 24 km northwest in 2016 and 19.2 km north in 2017 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scolopacidae	*Xenus cinereus* Terek Sandpiper	MI	VU, MI, MA (overfly marine area)	tidal flat, saltwork ponds.(Menkhorst et al., 2017)	The DBCA database identified twenty-three records within 50 km of the Survey Area, including 19.2 km north in 2017 and 19 km northwest in 2016 (DBCA).	**Low** No suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Sulidae	*Sula leucogaster* Brown Booby	MI	MI, MA	Oceanic (Johnstone and Storr, 1998).	The DBCA database identified seventeen records within 50 km of the Survey Area, including 31.7 km north in 1980 and 45 km north in 1984 (DBCA).	**Low** Records historical and associated with coastal habitats. No suitable habitat within the Survey Area.
Threskiornithidae	*Plegadis falcinellus* Glossy Ibis	MI	MI, MA (overfly marine area)	Shallow, fresh water, and estuarine waters, dry grasslands (Menkhorst et al., 2017).	The DBCA database identified eight records within 50 km of the Survey Area, including 19.2 km north in 2017 and 21.6 km northwest in 2013 (DBCA).	**Low** No suitable habitat within the Survey Area.
Dasyuridae	*Dasyurus hallucatus* Northern Quoll	EN	EN	Rocky escarpments, eucalypt forest and woodland (Van Dyck and Strahan, 2008).	The DBCA database identified 538 records within 50 km of the Survey Area, including 19.7 km north in 2022 and 6.1 km north in 2023 (DBCA).	**Recorded** Records <12km from the Survey Area and suitable habitat is present within the Survey Area.
Megadermatidae	*Macroderma gigas* Ghost Bat	VU	VU	Deep caves and mines, and occasionally rock fissures and boulder piles occurring within a widespread but patchy distribution across northern Australia from the arid Pilbara to the lush rainforests of north Queensland (Baker, A. M., & Gynther, I. C., 2023).	The DBCA database identified eight records within 50 km of the Survey Area, including 20.5 km northeast in 2018 and 21.6 km northeast in 2018 (DBCA).	**Low** No suitable roosting habitat within the Survey Area.
Molossidae	*Ozimops cobourgianus* Northern Coastal Free-tailed Bat	P1	-	Avicennia marina tree hollows (Menkhorst and Knight, 2001).	The DBCA database identified nineteen records within 50 km of the Survey Area, including 15.1 km northeast in 2009 and 24.8 km northeast in 2009 (DBCA).	**Low** No suitable roosting habitat within the Survey Area.
Muridae	*Hydromys chrysogaster* Water Rat	P4	-	permanent fresh to brackish water bodies.(Van Dyck and Strahan, 2008)	The DBCA database identified four records within 50 km of the Survey Area, including 28.1 km north in 1996 and 47.1 km north in 1984 (DBCA).	**Low** Records historical and limited habitat within the Survey Area.

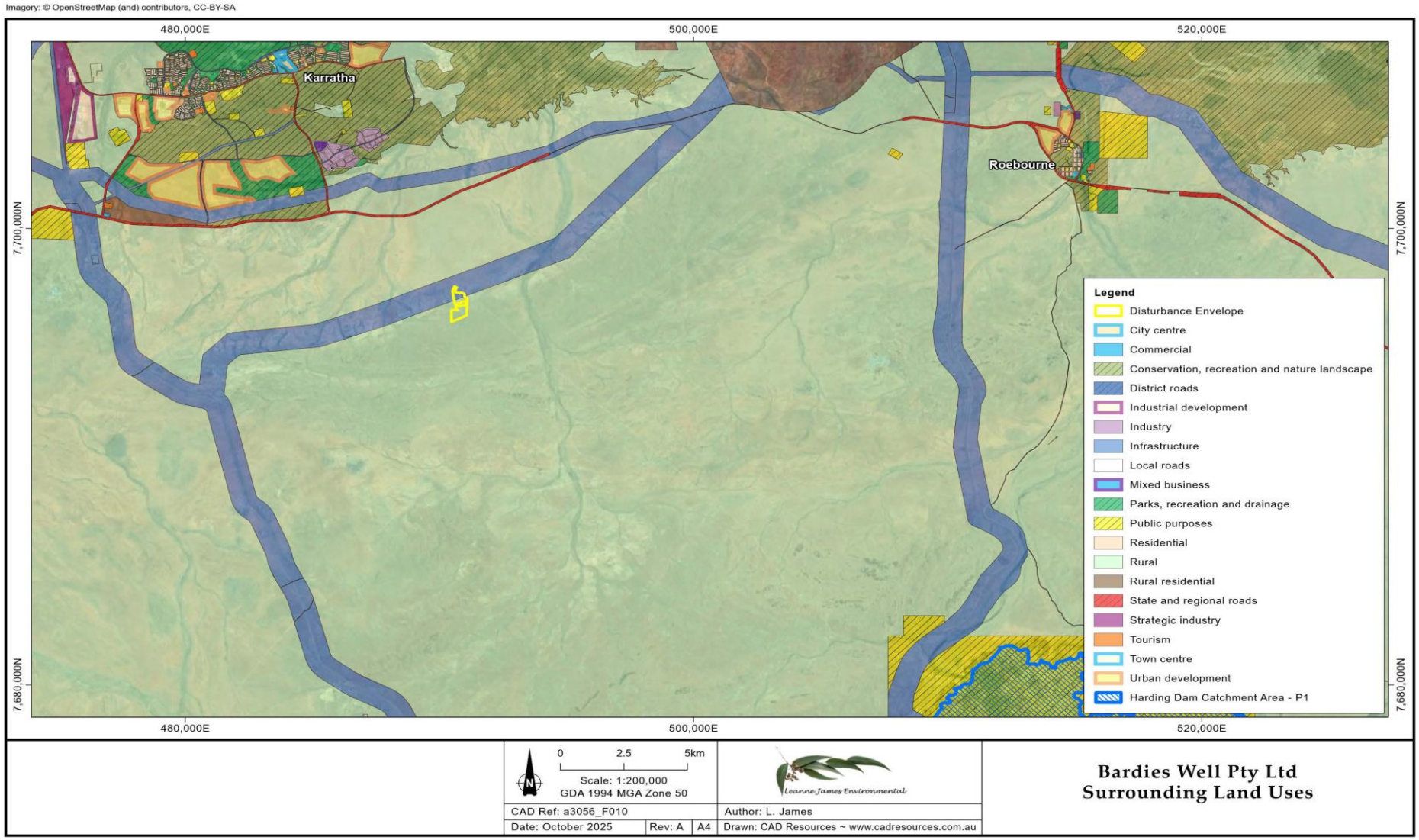
Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Muridae	*Leggadina lakedownensis* Short-tailed Mouse	P4	-	Monsoon tropical coast to semiarid areas in spinifex and tussock grasslands, samphire, sedgelands, Acacia shrublands, tropical eucalypt and Melaleuca woodlands and stony ranges (Van Dyck, Gynther and Baker, 2013).	The DBCA database identified fifteen records within 50 km of the Survey Area, including 10 km south-southwest in 2011 and 13.4 km east in 2011 (DBCA).	**High** Records nearby and suitable habitat present within the Survey Area.
Muridae	*Pseudomys chapmani* Western Pebble-mound Mouse	P4	-	Gentler slopes of rocky ranges covered by stony mulch and hard spinifex, often with a sparse overstorey of eucalypts and scattered shrubs (Van Dyck, Gynther and Baker, 2013).	The DBCA database identified twenty-three records within 50 km of the Survey Area, including 20.5 km north in 2020 and 22.3 km southeast in 2022 (DBCA).	**Recorded** Records nearby and suitable habitat present within the Survey Area.
Peramelidae	*Isoodon fusciventer* Quenda	P4	-	Sandy soils with dense heathy vegetation (Van Dyck and Strahan, 2008).	No nearby records identified by literature or DBCA, only returned by Naturemap.	**Low** No suitable habitat within the Survey Area.
Phalangeridae	*Trichosurus vulpecula arnhemensis* Northern Brushtail Possum	VU (Kimberley)	VU	Woodlands to forests with sufficient tree hollows and ground refuges (Van Dyck, Gynther and Baker, 2013).	No nearby records identified by literature or DBCA, only returned by Naturemap.	**Low** No suitable habitat within the Survey Area.
Rhinonycteridae	*Rhinonicteris aurantia* Orange Leaf-nosed Bat	P4 (Pilbara form VU)	(VU Pilbara from)	Monsoon rainforest, tall open forest, open savannah woodland and grasslands (Van Dyck, Gynther and Baker, 2013).	The DBCA database identified one record within 50 km of the Survey Area; including 25.6 km east in 1985 (DBCA).	**Low** No suitable habitat within the Survey Area.
Thylacomyidae	*Macrotis lagotis* Bilby, Dalgyte	VU	VU	Mitchell grass and stony downs country of cracking clays, desert sandplains and dune fields sometimes containing laterite, hummock grassland and massive red earths with Acacia shrubland (Van Dyck and Strahan, 2008).	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records (PMST).	**Low** No nearby records
Carphodactylidae	*Underwoodisaurus seorsus* Pilbara Barking Gecko	P2	-	Shelters under rocks and other cover on arid rocky slopes and in gorges with sparse tree cover and spinifex as the dominant ground cover (Cogger, 2018).	The DBCA database identified one record within 50 km of the Survey Area; 29.1 km north-northeast in 2019 (DBCA).	**Low** No nearby records and slightly out of taxon distribution range and limited suitable habitat within the Survey Area.

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Common wealth			
Pythonidae	*Liasis olivaceus barroni* Pilbara Olive Python	VU	VU	Arid to subhumid areas of the Pilbara and the northern Gascoyne. Associated with open water, watercourses, and rock pools especially those close to rocky areas. Often found in rocky hills, escarpments, and plains dominated by dense grassy vegetation such as Triodia (Wilson and Swan, 2017).	The DBCA database identified forty-one records within 50 km of the Survey Area, including 22 km north in 2023 and 22 km north in 2022 (DBCA).	**Medium** Records associated with coastal habitat in the desktop search and limited suitable habitat within the Survey Area.
Scincidae	*Ctenotus angusticeps* Northwestern Coastal Ctenotus	P3	-	Coastal mudflats vegetated with samphire (Wilson and Swan, 2017).	The DBCA database identified five records within 50 km of the Survey Area, all of which are 9.4 km north in 2012 (DBCA).	**Low** No suitable habitat within the Survey Area.
Scincidae	*Lerista nevinae* Nevin's Slider	EN	EN	Coastal dune vegetated with Acacia coriacea and low shrubs, currently only from a small area near Cape Lambert, WA (Smith and Adams, 2007).	The DBCA database identified eighty-eight records within 50 km of the Survey Area, including 27.1 km north-northeast in 2018, 2014 and 2011 (DBCA).	**Low** Records associated with coastal habitats of Cape Lambert. No suitable habitat within the Survey Area.
Scincidae	*Lerista quadrivincula* Four-lined Slider	P1	-	Loose soil or sand beneath stones, logs, termite mounds etc., only known population around Karratha Station, WA (Cogger, 2018).	The DBCA database identified two records within 50 km of the Survey Area, both 22.6 km south-southwest in 1980 (DBCA).	**Low** Records are historical and are only known to be associated around Karratha Station.
Scincidae	*Notoscincus butleri* Lined Soil-crevice Skink	P4	-	Arid, rocky, near coastal Pilbara. Associated with spinifex-dominated areas near creek and river margins (Wilson and Swan, 2017).	The DBCA database identified forty-two records within 50 km of the Survey Area, including 13 km east in 2011, 27.4 km east in 2015 and 365 m northwest in 2004 (DBCA).	**Medium** Records nearby and limited suitable habitat within the Survey Area.



Making Sustainability Happen

Attachment 7: Map of Sensitive Landuses


Imagery: © OpenStreetMap (and) contributors, CC-BY-SA
480,000E
500,000E
520,000E
7,700,000N
7,680,000N
Karratha
Roebourne
Legend
Disturbance Envelope
City centre
Commercial
Conservation, recreation and nature landscape
District roads
Industrial development
Industry
Infrastructure
Local roads
Mixed business
Parks, recreation and drainage
Public purposes
Residential
Rural
Rural residential
State and regional roads
Strategic industry
Tourism
Town centre
Urban development
Harding Dam Catchment Area - P1
0
2.5
5km
Scale: 1:200,000
GDA 1994 MGA Zone 50
Leanne James Environmental
CAD Ref: a3056_F010
Author: L. James
Date: October 2025
Rev: A
A4
Drawn: CAD Resources ~ www.cadresources.com.au
Bardies Well Pty Ltd
Surrounding Land Uses