GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9547/2
Permit Holder:	Commonwealth Scientific, Industry and Research Organisation's (CSIRO)
Duration of Permit:	From 9 January 2023 to 9 January 2033

The permit holder is authorised to clear native vegetation subject to the following conditions of this permit.

PART I –CLEARING AUTHORISED

1. Purpose for which clearing may be done

Clearing for the purpose of constructing an accommodation camp, contractor compound, fibre cable, emergency airstrip, material extraction and access road for the Square Kilometre Array Project.

2. Land on which clearing is to be done

Lot 18 on Plan 220344, South Murchison
Boolardy-Kalli Road Reserve (PIN 11708251), South Murchison
Beringarra-Pindar Road Reserve (PIN 11665424), South Murchison

3. Area of clearing

The permit holder must not clear more than 105.68 hectares of *native vegetation* within the areas shaded yellow in Figures 1 and 2 of Schedule 1.

4. Application

This permit allows the permit holder to authorise persons, including employees, contractors and agents of the permit holder, to clear *native vegetation* for the purposes of this permit subject to compliance with the conditions of this permit and approval from the permit holder.

5. Staged clearing

The permit holder shall not clear *native vegetation* unless the purpose for which the clearing is authorised is enacted within three months of the clearing being undertaken.

6. Period during which clearing is authorized

The permit holder must not clear any *native vegetation* after 09 January 2028.

PART II –MANAGEMENT CONDITIONS

7. Avoid, minimise and reduce the impacts and extent of clearing

The permit holder must apply the following principles in relation to clearing authorised under this permit, set out in order of preference:

(a) avoid the clearing of *native vegetation*;
(b) minimise the amount of *native vegetation* to be cleared; and
(c) reduce the impact of clearing on any environmental value where it is reasonably practicable to do so.

8. Weed control

When undertaking any clearing authorised under this permit, the permit holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
(b) ensure that no known *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

9. Priority flora management - *Gunniopsis divisa*

The permit holder shall not cause or allow the clearing of more than 50 percent of the population of *Gunniopsis divisa* (Priority 3) recorded within the approved clearing area, as identified in AECOMs pre-clearance flora survey of the approved clearing area undertaken on 14 September 2022.

10. Priority flora management - *Calandrinia* sp. Boolardy Station (P. Jayasekara 719-JHR-01)

The permit holder shall not clear within the area shaded red in Figure 3 of Schedule 1, to maintain a 20-metre buffer to the recorded location of *Calandrinia* sp. Boolardy Station (P. Jayasekara 719-JHR-01) (Priority 1).

11. Directional clearing

The permit holder must:

(a) conduct clearing authorised under this permit from one direction to the other towards adjacent *native vegetation*; and
(b) allow a reasonable time for fauna present within the areas being cleared to move into adjacent *native vegetation* ahead of the clearing activity.

12. Revegetation and rehabilitation (temporary works)

The permit holder must:

(a) retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared.

(b) at an *optimal time* within six months following completion of gravel extraction, *revegetate* and *rehabilitate* areas not required for future scheduled and approved development, by:
    (i) ripping the ground on the contour to remove soil compaction;
    (ii) re-shaping the surface of the land so that it is consistent with the surrounding five metres of un-cleared land;
    (iii) laying the vegetative material and topsoil retained under condition 12(a) on the cleared area(s); and
(c) undertake *weed* control activities as required, to reduce *weed* cover within the cleared areas to no greater than the *weed* cover within the surrounding five metres of uncleared land.
(d) within 12 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 12(b) of this permit:
    (i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and
    (ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 12(d)(i) of this permit will not result in similar species composition, structure and density to that of pre-clearing vegetation types in that area, *revegetate* the area by deliberately planting and/or *direct seeding* native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area and ensuring only *local provenance* seeds and propagating material are used.

PART III - RECORD KEEPING AND REPORTING

13. Records that must be kept

The Permit Holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020, expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 7; (f) actions taken to minimise the risk of the introduction and spread of weeds in accordance with condition 8; (g) the population of *Gunniopsis divisa* (Priority 3) cleared in accordance with condition 9; (h) actions taken in accordance with condition 10; (i) actions undertaken in accordance with condition 11.

No.	Relevant matter	Specifications
2.	In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 12.	(a) the size of the area *revegetated* and *rehabilitated*; (b) the date(s) on which the area of *revegetation* and *rehabilitation* was undertaken; and the boundaries of the area *revegetated* and *rehabilitated* (recorded digitally as a shapefile); (c) actions taken to *revegetate* and *rehabilitate*; (d) any *weed* management actions; (e) results of *environmental specialist* inspection; and (f) any remedial actions undertaken.

14. Reporting

(a) The permit holder must provide to the *CEO*, on or before 30 June of each calendar year, a written report containing:

(i) the records required to be kept under condition 13; and

(ii) records of activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year.

(b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 30 June of each calendar year.

(c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of the permit, a written report of records required under condition 13, where these records have not already been provided under condition 14(a).

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.

Term	Definition
EP Act	*Environmental Protection Act 1986* (WA)
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means those species that are known to occur within the same Interim Biogeographic Regionalisation for Australia (IBRA) Region
mulch	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	means April to June
priority flora	means those plant taxa described as priority flora classes 1, 2, 3, or 4 in the *Department of Biodiversity, Conservation and Attractions Threatened and Priority Flora List for Western Australia* (as amended).
rehabilitate/ed/ion	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate/ed/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area
temporary works	means access tracks, spoil areas, side tracks, site offices, storage areas, laydown areas, extraction sites, camps, project surveys, pre-construction activities, and similar works associated with a project activity that are temporary in nature.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or not indigenous to the area concerned.

END OF CONDITIONS

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

8 May 2023

Schedule 1 - Draft

The boundary of the areas authorised to clear are shown in Figures 1 and 2. The boundary of the area that is not authorised to clear, subject to Condition 10, is shown in Figure 3.

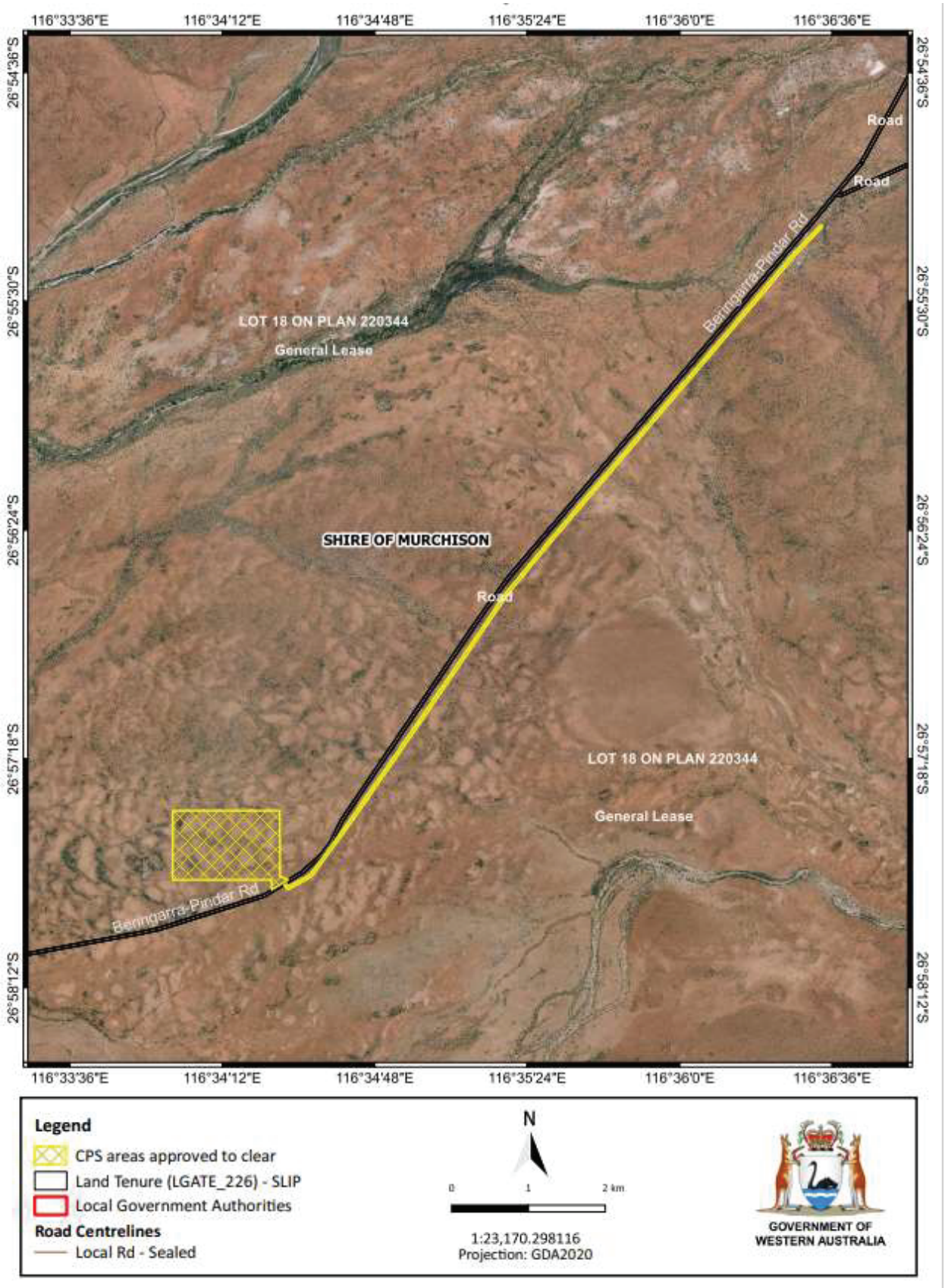

Figure 1: Map of the boundary of the area within which clearing may occur.

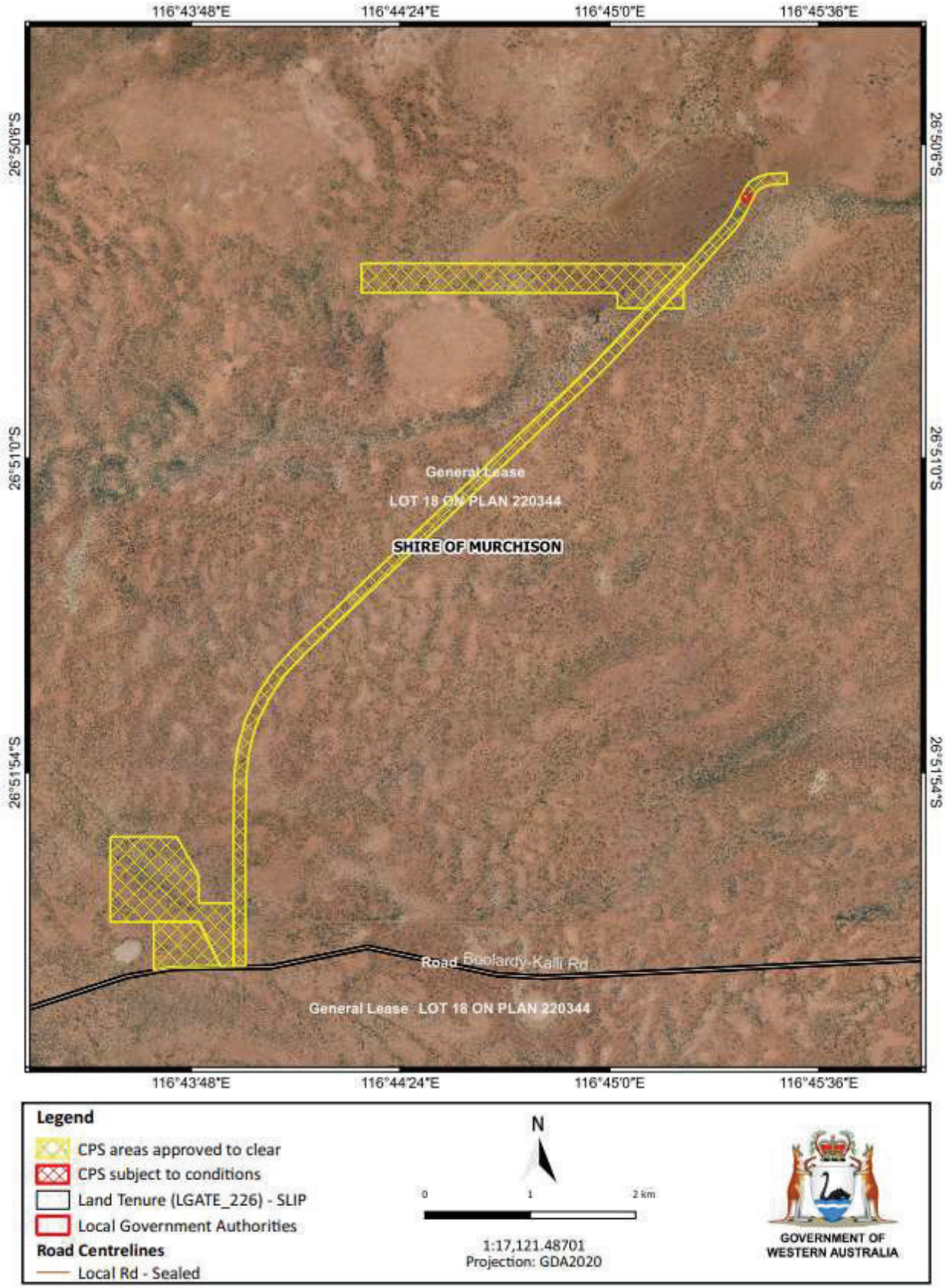

Figure 2: Map of the boundary of the area within which clearing may occur shaded yellow. The area subject to conditions that is not authorised to clear is shaded red.

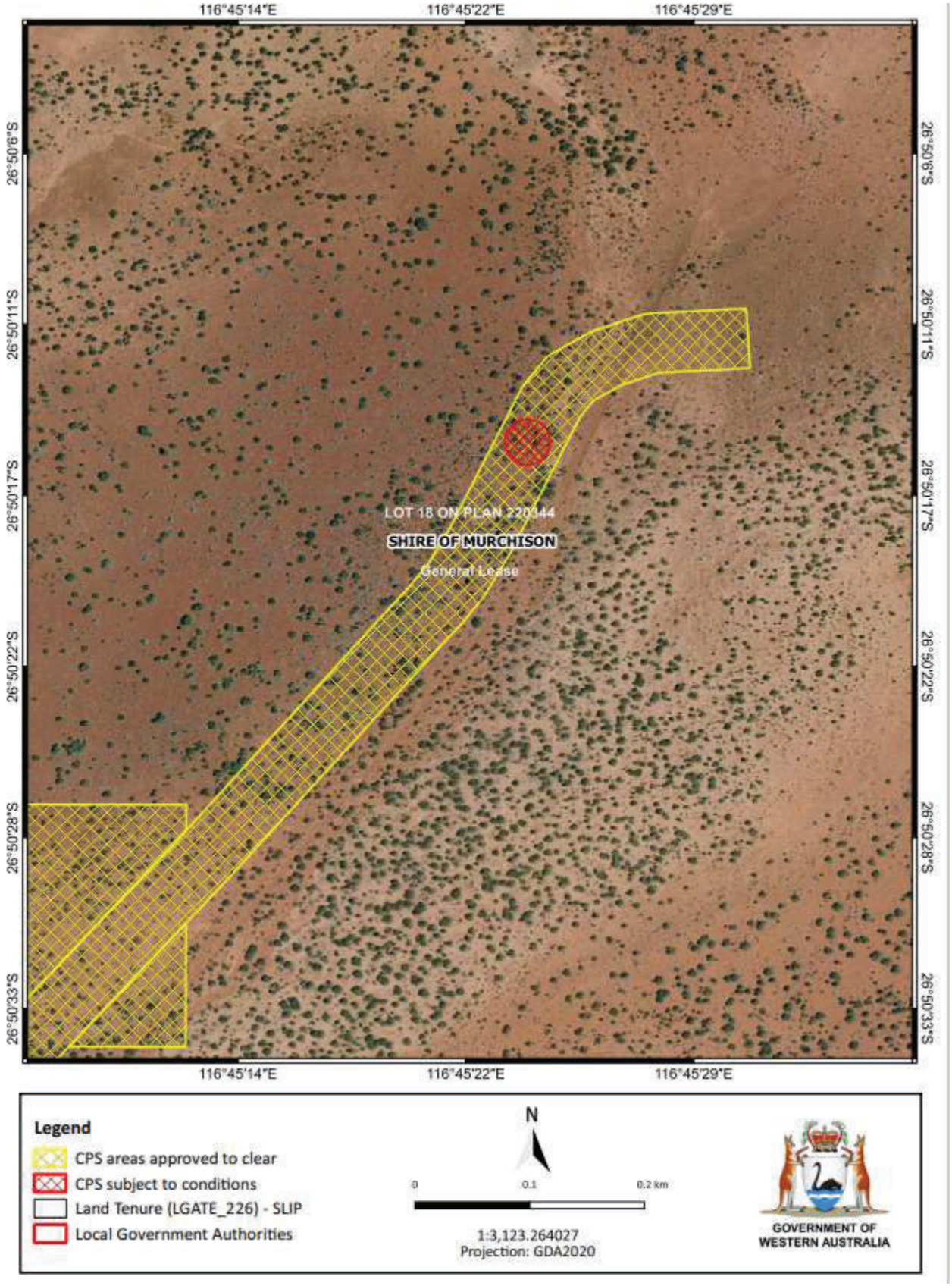

Figure 3: Map of the boundary of the area that is not authorised to clear as shaded red, subject to Condition 9 of this clearing permit.

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9547/2
Permit type:	Purpose permit
Applicant name:	Commonwealth Scientific, Industry and Research Organisation's (CSIRO)
Application received:	3 March 2023
Application area:	105.68 hectares of native vegetation within a 129.75 hectare application footprint
Purpose of clearing:	Constructing an accommodation camp, contractor compound, fibre cable, emergency airstrip and access road for the Square Kilometre Array Project and gravel extraction.
Method of clearing:	Mechanical
Property:	Lot 18 on Plan 220344 Beringarra-Pindar Road Reserve (PIN 11665424) Boolardy-Kalli Road Reserve (PIN 11708251)
Location (LGA area/s):	Shire of Murchison
Localities (suburb/s):	South Murchison

1.2. Description of clearing activities

The proposed amendment to CPS 9547/1 is to increase the overall clearing footprint to include an additional clearing area of 6.68 hectares within Lot 18 on Plan 220344 for the purpose of extracting materials for road construction/repairs and laydown areas. No additional land parcels are required for the amendment.

The clearing permit (purpose permit) CPS 9547/1 was granted on 16 December 2022 to Commonwealth Scientific, Industry and Research Organisation's (CSIRO) to clear up to 99 hectares of native vegetation, to construct an accommodation camp, contractor compound, fibre cable, emergency airstrip and access road associated with the Square Kilometre Array Project (SKA1-Low array).

The CPS 9547/2 amendment would allow the clearing of up to 105.68 hectares of native vegetation within an amended 129.75 hectare clearing footprint (Section 1.5, Figure 1 and 2).

1.3. Decision on application

Decision:	Granted
Decision date:	8 May 2023
Decision area:	105.68 hectares of native vegetation as depicted in Section 1.5, below.

1.4. Reasons for decision

The application to amend purpose permit CPS 9547/1 under section 51K of the *Environmental Protection Act 1986* (EP Act) was received on the 3 March 2023. The Department of Water and Environmental Regulation (the department) advertised the application for 21 days and no public submissions were received.

In making this decision, the Delegated Officer had regard for the CPS 9547/1 Decision Report, relevant datasets (Appendix E.1), the findings of a flora and fauna assessment (AECOM 2022a; 2022b), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), and any other matters considered relevant to the assessment (see Section 3).

An assessment of current environmental information indicated that the additional area is unlikely to contain environmental values in addition to those present within the existing permit area. The Delegated Officer has determined that:

- the impact to two priority flora species, *Gunniopsis divisa* (Priority 3) and *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (Priority 1) is unchanged from the CPS 9547/1 assessment;
- the risk of wind erosion from the proposed clearing is unchanged from the CPS 9547/1 assessment.
- the risk of weeds impacting native vegetation directly adjacent to the application area is unchanged from the CPS 9547/1 assessment.

Although the assessment determination has not changed since the assessment for CPS 9547/1, the assessment has considered environmental values of the additional area applied for under the amendment.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer found that the additional proposed clearing area is not likely to lead to an unacceptable risk to the environment. The Delegated Officer decided to grant an amended clearing permit. Permit CPS 9547/2 has been amended to increase the clearing area to 105.68 hectares within a 129.75 hectare footprint.

The additional clearing area will only be cleared temporarily for gravel extraction. Therefore, a revegetation management condition will be required on the amended permit. All clearing permit conditions stipulated in CPS 9547/1 have been maintained, including to:

- avoid and minimise measures to reduce the impacts and extent of clearing
- construction activities must occur within three months of clearing to reduce the exposure time of bare sandy soils and minimise the risk of wind erosion
- take hygiene steps to reduce the risk of introducing and spreading weeds into adjacent conservation areas
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- avoid and provide a 20 metre buffer to the recorded occurrence of *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (Priority 1)
- clear no more than 50 per cent of the recorded population of *Gunniopsis divisa* (Priority 3)
- revegetation and rehabilitation of the areas cleared for temporary works by returning vegetative material and topsoil removed by clearing.

1.5. Site maps

The applicant is authorised to clear up to 105.68 hectares with the areas shaded yellow as shown in Figures 1 and 2 below. The applicant is not authorised to clear within the area shaded red in Figure 3, noting that this area represents the recorded location of *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (Priority 1) and a surrounding 20 metre buffer.

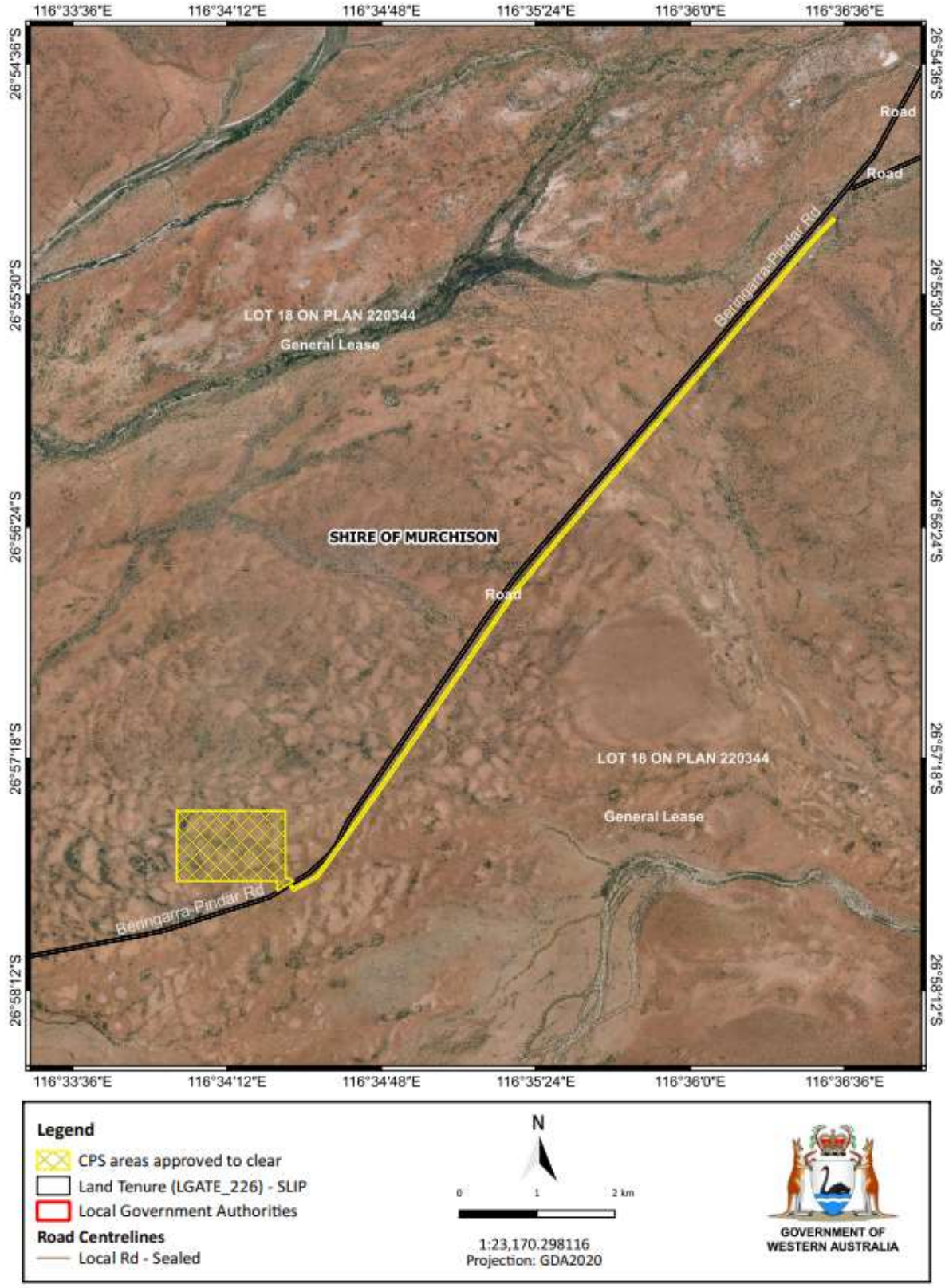

Figure 1. Map of the southernmost approved clearing area shaded yellow.

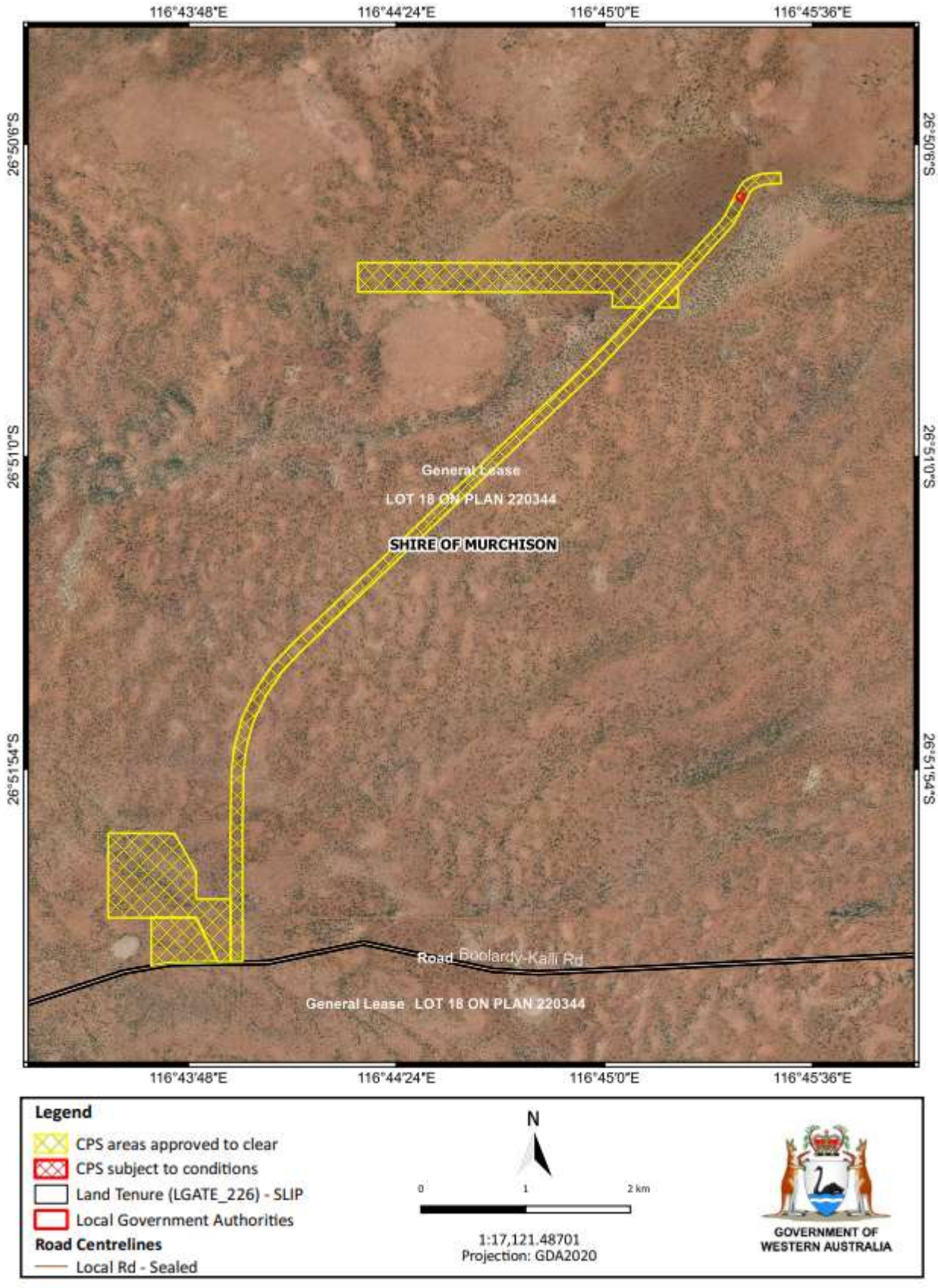

Figure 2. Map of the northernmost approved clearing area shaded yellow.

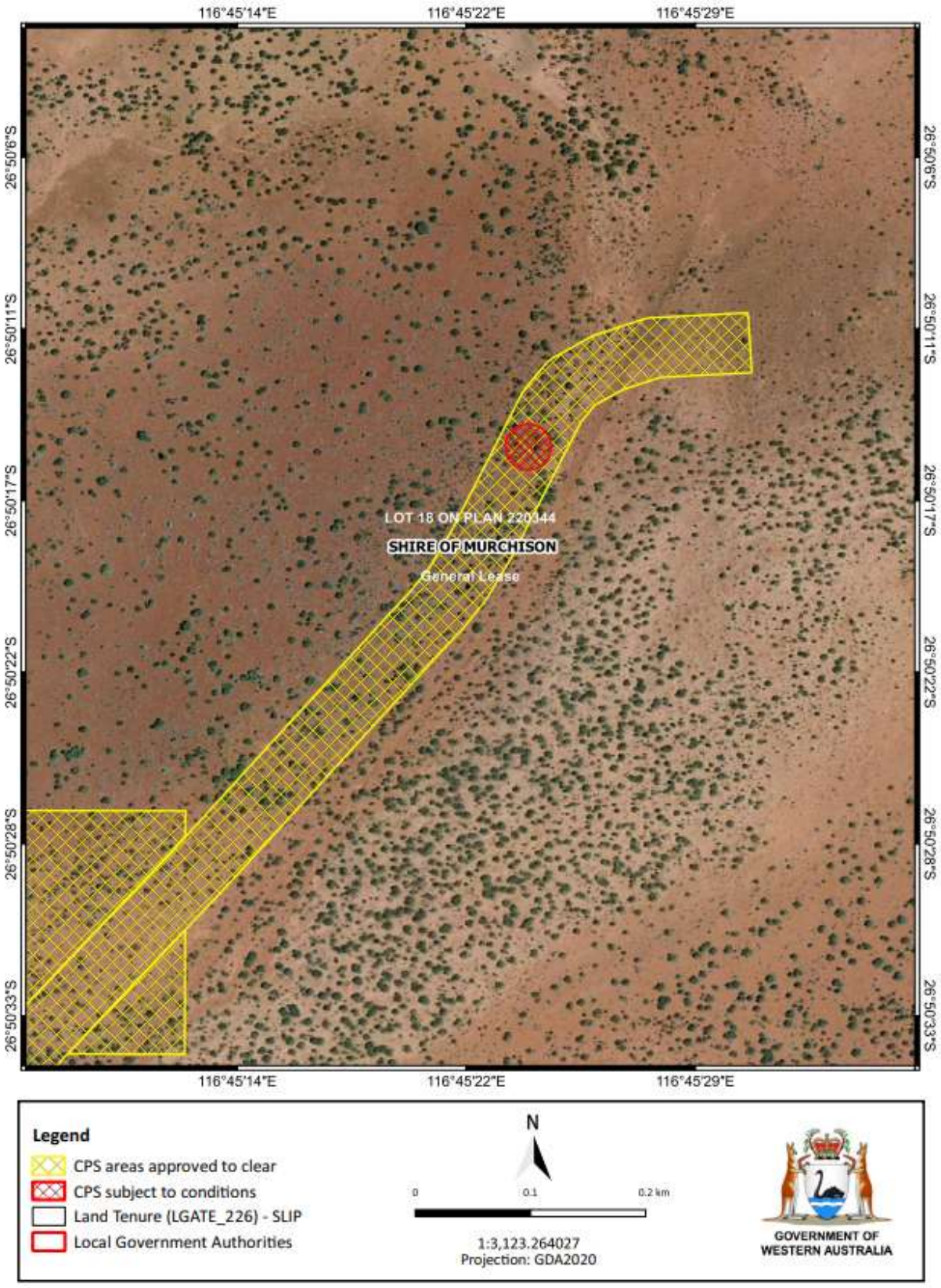

Figure 3. Map showing the area not authorised to clear shaded red, representing the *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (Priority 1) location and a 20 metre buffer.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the polluter pays principle
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Supporting documentation was submitted by CSIRO, identifying that the proposed amendment to CPS 9547/1 is necessary given existing materials pits are considered insufficient for the requirement of the project. CSIRO also noted that the additional area reduces the need to travel on public roads causing hazards.

The applicant's commitments to undertaking the following management measures remain unchanged from the existing permit (AECOM, 2021):

- demarcate the approved clearing area using GPS coordinates and flagged star pickets
- demarcate any native vegetation within the site boundary that will be retained
- demarcate topsoil and weed management boundaries
- restrict access by personnel, vehicles and plant into vegetated areas adjacent to the project boundary
- ensure no new informal tracks arise and all vehicle and personnel movements are limited to the approved project boundary
- report all incidents relating to vegetation clearing management actions to CSIRO within 24 hours of the incident
- stockpile all cleared vegetation separately and mulch for use either on-site (for stabilisation) or for other rehabilitation projects
- weed hygiene management
    - control weeds should monitoring indicate weed spread
    - ensure all vehicles, equipment and plant undergo a complete quarantine inspection prior to site access
    - ensure fill (if used) is certified weed free
    - control, with an aim to eradicate, any infestations of high priority weeds
    - locate topsoil and cleared vegetation stockpiles away from areas where runoff from rainfall may occur

The Delegated Officer is satisfied that the applicant has made a reasonable effort to avoid, minimise and mitigate potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, land and water resource values. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

A review of current environmental information (Appendix D and Appendix E) indicates that the environmental values

present within the existing permit area and local area (50 kilometres from the application area) remain unchanged from the previous assessment of the permit and can be found in the Decision Report prepared for CPS 9547/1. The key considerations of the previous assessment include:

- the proposed clearing is not likely to impact on significant habitat for conservation significant fauna,
- the proposed clearing may impact on any fauna species utilising the application area at the time of clearing,
- the proposed clearing will impact on the following priority flora species:
    - *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (P1)
    - *Gunniopsis divisa* (P3)

The additional area of proposed clearing contains similar values to those previously assessed under CPS 9547/1. The assessment of the environmental values in the additional area that required further consideration are detailed below.

Assessment relating to additional area:

The proposed amendment to CPS 9547/1 includes an additional clearing area of 6.68 hectares adjacent to the existing permit area (Figure 4).

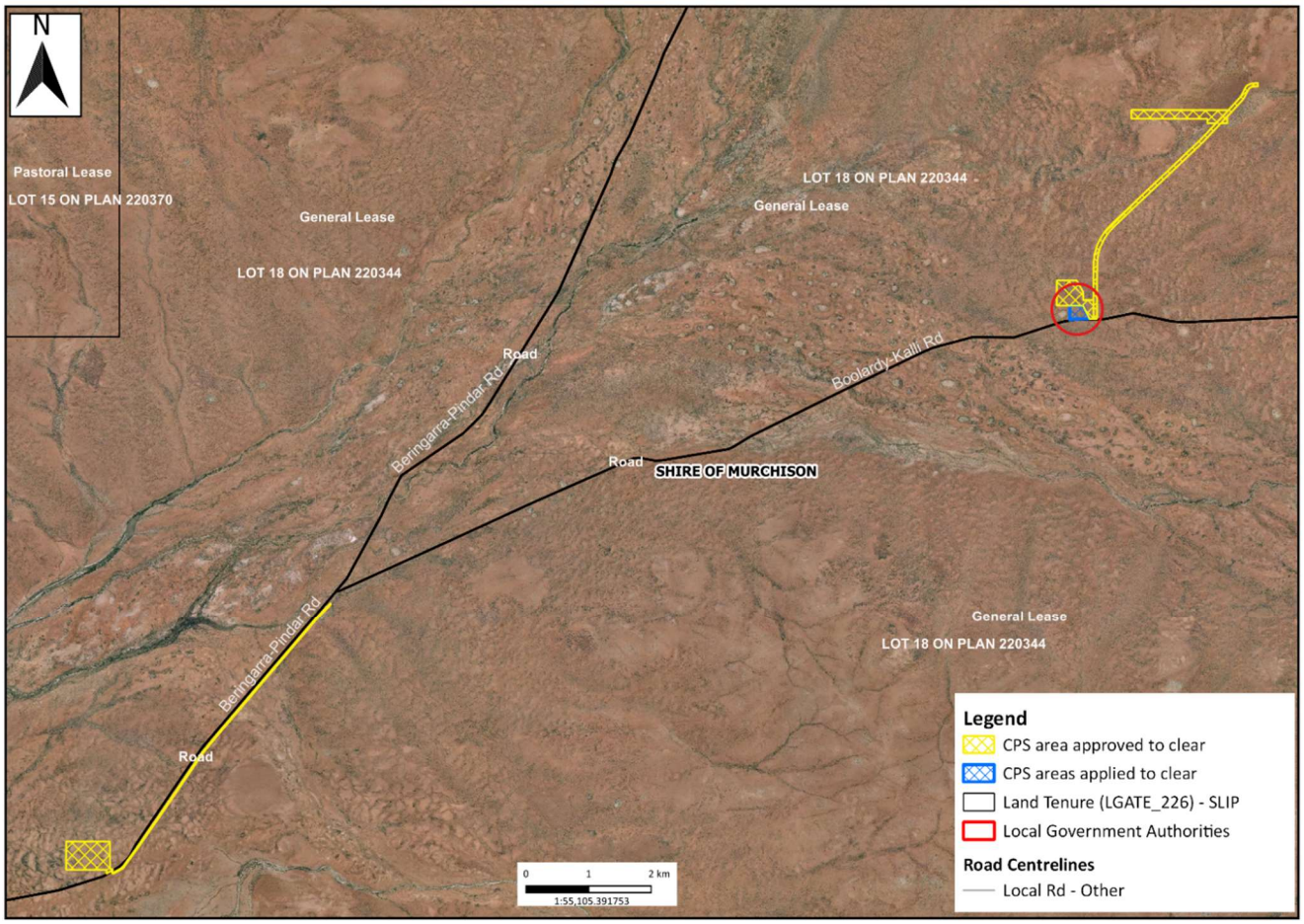

Figure 4. The areas crosshatched yellow indicate the areas authorised to be cleared under clearing permit CPS 9547/1. The area crosshatched blue (and circled in red for clarity) indicate the additional area applied to be cleared under clearing permit amendment application CPS 9547/2.

Conservation significant fauna

A desktop assessment of current databases identified no records of threatened or priority fauna species occuring within the additional area proposed to be cleared. Further, no new records of threatened or priority fauna species occur within the local area since the previous assessment of the permit.

An Ecological Assessment was undertaken by AECOM to support the assessment of the existing permit (AECOM, 2022a). The assessment included a basic fauna survey, which was undertaken during May 2022 in accordance with the methods outlined in the Technical Guidance – *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA, 2016). The Ecological Assessment identified three fauna habitat types across the existing permit area (AECOM, 2022a):

- Hardpan plain with intermittent sandplain

  This habitat type contains sparse *Acacia* over mixed native shrubs on hardpan plain with intermittent sandplains. The understorey density varies throughout, ranging from bare ground to moderately dense shrubs. Surface leaf litter and small rocks occurred occasionally, with large logs rare throughout the application area. Microhabitats were minimal, with the fauna observed primarily consisting of small birds moving in flocks through the application area. Habitat quality ranged from low to high primarily due to the lack of variety in microhabitats.

- Channels and creek line

  This habitat type comprised major and minor drainage lines subject to occasional and seasonal flooding. This habitat exhibits little variation in habitat characteristics to hardpan plains (when dry), apart from slightly higher vegetation cover and sandier soils. The major drainage channels contained larger trees. The habitat quality for these areas ranged from moderate to high. The drainage lines and floodplains contain a variety of microhabitats and provide a wildlife corridor for migratory species. Large logs were infrequently observed, and no rocks were present. Standing water was observed at numerous locations, with a large amount of new grass and annual herbs. This would provide suitable foraging for larger herbivores and encourage insect populations which supports small mammals, reptiles and bird species.

- Sandplain

  This habitat type contains alluvial plains of orange to brown sands (often with thin crust). This habitat supports *Acacia, Eremophila* and *Ptilotus* species. The sandplain habitat contained a wider variety of microhabitats than the hardpan plains. Small logs were common, with medium sized logs (10- 30 centimetres) occurring occasionally. Grass was abundant, with larger amounts of course leaf litter present than other sections of the application area. Small stones also occurred occasionally on the surface. This habitat is moderate to high quality due to the variety in microhabitats present and the broad number of fauna observed.

Based on aerial imagery and the fauna habitat mapping (AECOM, 2022a), the additional area is considered likely to be representative of the adjacent fauna habitat, 'hardpan plain with intermittent sandplain' (Figure 6). This habitat covers 85 per cent of the current permit area.

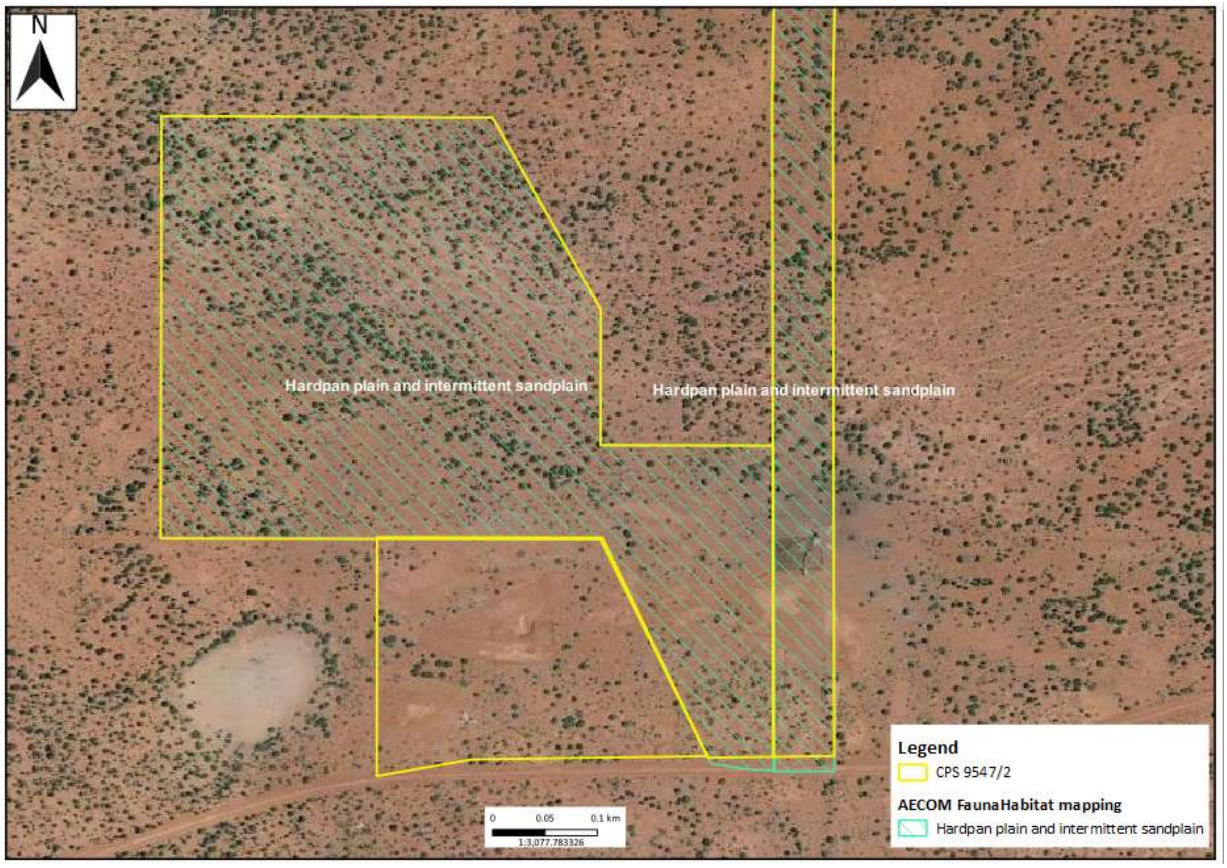

Figure 6. Fauna habitat mapping for CPS 9547/1 (AECOM, 2022a).

Based on the Ecological Assessment findings (AECOM, 2022a), the fauna habitat, 'hardpan plain with intermittent sandplain', was considered to provide suitable habitat for the Northern Shield-backed Trapdoor Spider (*Idiosoma clypeatum*, P3) and Mulgara (*Dasycercus blythi*, P4). Given this, it is considered that the additional area may provide habitat for these two priority species.

A likelihood assessment conducted for the existing permit considered that up to 11 conservation significant fauna species may utilise the existing permit area (see Decision Report prepared for CPS 9547/1). Of these, none were positively identified during the basic fauna survey of the existing permit area (AECOM, 2022a). A follow up targeted fauna survey was undertaken by AECOM in September 2022 to support the assessment of the existing permit (AECOM, 2022b). This survey area included the additional area applied for under this amendment (see Figure 7 Appendix D). No conservation significant fauna species were observed during the targeted fauna survey (AECOM, 2022b).

The proposed additional clearing is not likely to impact on significant habitat for conservation significant fauna. However, individuals may utilise the application area to disperse through the landscape. Mechanical clearing activities may pose a risk of fauna fatalities should individuals occur within the application area. Slow, directional clearing to allow for dispersal of species into other areas of remnant vegetation will mitigate this risk.

Based on the above assessment, the impacts to conservation significant fauna species is considered unchanged. No conservation significant fauna species were identified within the additional area, there have been no changes in known distribution, documented ecology, or conservation status of the species considered during the previous assessment of the permit. Given this, the Delegated Officer determined that the assessment of impacts to fauna species remains unchanged from the previous assessment of the permit and that the existing fauna management conditions on the permit are still adequate to mitigate any potential impacts to conservation significant fauna.

Vegetation communities

According to current databases, the additional area to be cleared is situated within the mapped Upper Murchison vegetation association, described as: low woodland of *Acacia aneura* and associated species. This is consistent with the broad scale vegetation association mapped for the existing permit. The extent of this vegetation association remains unchanged from the CPS 9547/1 assessment and retains 99.8 per cent of its pre-European vegetation extent.

The Ecological Assessment undertaken by AECOM for the existing permit mapped two Acacia woodland vegetation communities across the existing permit area, noting that the vegetation was largely homogenous, characterised by Acacia open woodlands on clays, clay loams and clay sands on flat terrain, sometimes with quartz on the surface (AECOM, 2022a):

- AfEfPo: *Acacia fuscaneura*, *Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus*, *Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland, and
- ApAgEf: *Acacia pteraneura* low woodland to open woodland over *Acacia grasbyi* and *Acacia tetragonophylla* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *helmsii* and *Eremophila fraseri* subsp. *parva* mid shrubland.

Based on the pre-European mapping, aerial imagery and AECOM's vegetation mapping (AECOM, 2022a), the vegetation within the additional area is considered likely to be representative of the adjacent vegetation type ApAgEf (Figure 5).

AECOM described the vegetation condition for the existing permit as a good reflection of pre-European vegetation and identified the vegetation within the entire survey area to be in Very Good condition, noting evidence of sheep and cattle grazing (AECOM, 2022a). Given the homogenous nature of the vegetation within the existing permit area (AECOM, 2022a), the vegetation condition is considered likely to be in Very Good condition (Trudgen, 1991) consistent with that of the existing permit.

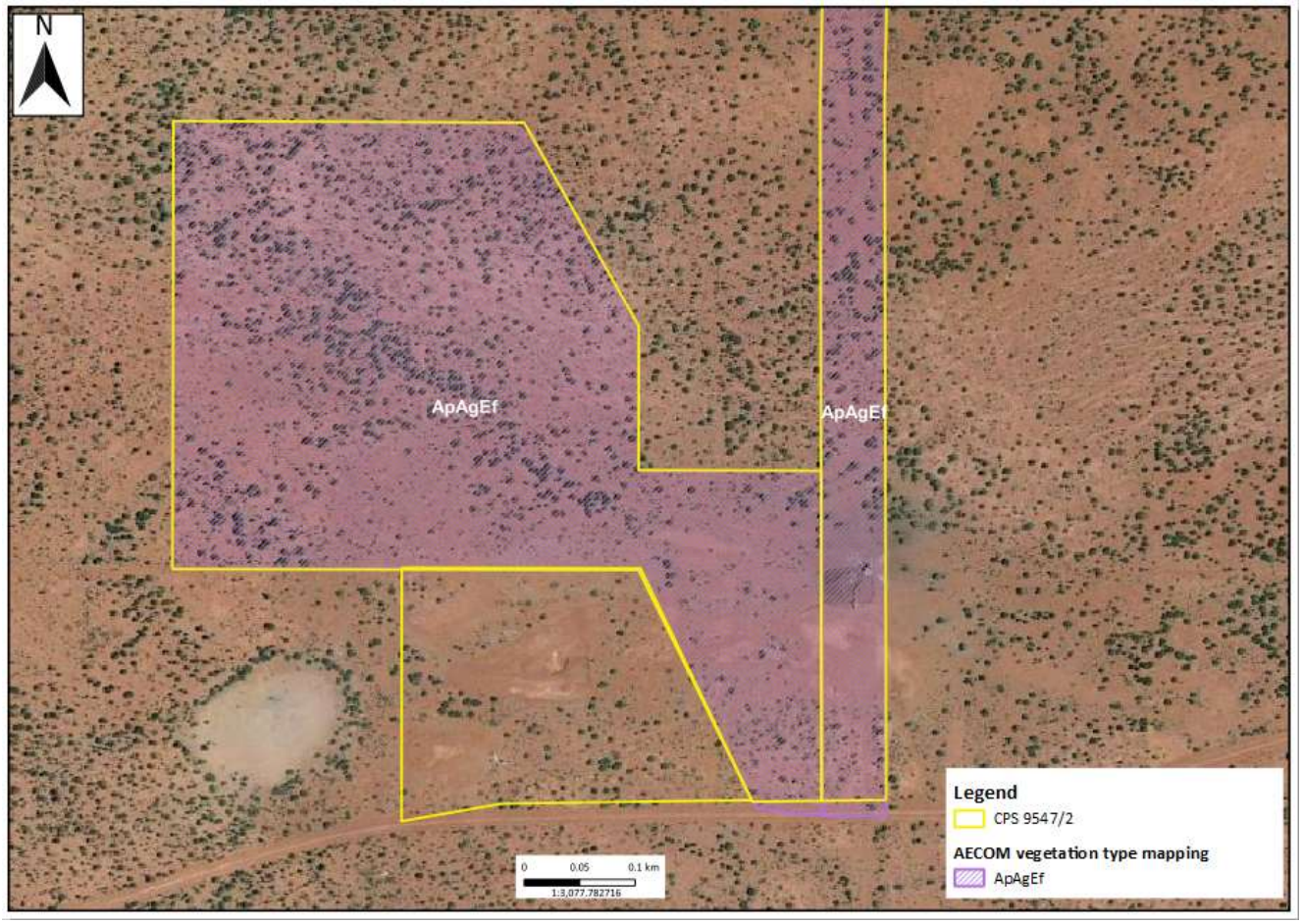

Figure 5. Vegetation type mapping for CPS 9547/1 (AECOM, 2022a).

A desktop assessment of current databases identified no records of threatened or priority ecological communities (TEC's and PEC's) within the local area or the additional area proposed to be cleared. The vegetation types recorded by AECOM across the existing permit area are not considered to represent a TEC or PEC. Given the above and that the vegetation within the additional area is considered to be consistent with that mapped by AECOM, the additional area is not considered to be representative of any known TEC's or PEC's.

Based on the above, the inclusion of the additional area is not expected to significantly alter the vegetation composition within the clearing area or to result in the inclusion of any unique floristic values that were not considered during the previous assessment of the permit.

Conservation significant flora

A desktop assessment of current databases identified no records of threatened or priority flora species occur within the additional area. Further, no new records of threatened or priority flora species occur within the local area since the previous assessment of the permit.

According to available databases and the findings of an Ecological assessment (AECOM, 2022a), the vegetation and soil type within the additional area is consistent with that of the existing permit area. Given this, it is considered that the habitat values of the additional area align with those present in the existing permit area, and the likelihood assessment of conservation significant flora species remains unchanged from the previous assessment of the permit (see section A.1). The previous assessment for the permit considered the application area to potentially contain habitat for 13 priority flora species (see section A.2).

A targeted flora survey was undertaken by AECOM in September 2022 to support the assessment of the existing permit (AECOM, 2022b). The targeted flora survey was undertaken during the optimal time to detect annual flora species in the region and focused on significant flora that were considered as having the potential to occur within the application area. The survey area included the additional area applied for under this amendment (see Figure 7 Appendix D). During the targeted flora survey, two priority flora species were recorded within the existing permit area; *Calandrinia* sp. Boolardy Station (P. Jayasekara 719-JHR- 01) (P1) and *Gunniopsis divisa* (P3), however no threatened or priority flora species were recorded within the additional area.

Based on the above assessment, the impacts to conservation significant flora species are considered unchanged from the previous assessment of the permit. The Delegated Officer determined that the existing flora management conditions on the permit are still adequate to mitigate any potential impacts to conservation significant flora.

Land degradation
The mapped soil types within the additional clearing area and local area are prone to water and wind erosion. Given the low rainfall in the region, and lack of major watercourses or wetlands within the application area, the risk of land degradation from water erosion is considered low. The additional area will be cleared for temporary works (gravel extraction) and therefore bare soils will be exposed and susceptible to wind erosion post extraction. A condition to revegetate and rehabilitate this area will ensure that there will not be any areas that are left bare for an extended period of time that may lead to an increased risk of impacts to the surrounding vegetation.

Conclusion

The proposed temporary clearing of native vegetation for gravel extraction is not likely to contain significant flora, fauna or ecological communities. Based on the above, it is not considered likely that the clearing of an additional 6.68 hectares will significantly alter the impacts of the clearing approved under CPS 9547/1. A review of current environmental databases indicate that the environmental values assessed for the existing permit remain unchanged since the previous assessment of the permit in December 2022 and that the environmental values of the additional area are consistent with those of the existing permit area.

Given the above, the Delegated Officer determined that the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values remains unchanged from the previous assessment of the permit and can be found in the Decision Report prepared for CPS 9547/1.

Outcome

The Delegated Officer determined that the management conditions remain unchanged from the CPS 9547/1 assessment. Therefore, the following management measures will be required as conditions on the clearing permit:

- avoid and minimise measures to reduce the impacts and extent of clearing
- slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity
- avoid and provide a 20 metre buffer to the identified location of *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (P1) to avoid impacts to the seed bank of this species
- clear no more than 50 per cent of the recorded population of *Gunniopsis divisa* to reduce the extent of local impact to this species
- revegetation and rehabilitation of the areas cleared for temporary works by returning vegetative material and topsoil removed by clearing.

3.3. Relevant planning instruments and other matters

According to a review of available datasets, there are no Aboriginal Sites of Significance mapped within the additional area or existing permit area). It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

The proposed amendment area is located within Lot 18 on Plan 220344, therefore no additional land parcels are required for the amendment. CSIRO have received a special lease over the land parcels specific to the SKA1-Low array, for a term of sixty 60 years commencing 4 November 2022. Noting that the proposed clearing will be consistent with the special lease, CSIRO have advised that Development Approval from the Shire of Murchison is not required for the development.

The existing permit area intersects Boolardy-Kali Road Beringarra-Pindar Road Reserves, South Murchison. The Shire of Murchison advised that it has no objection for CSIRO to enter into and clear these portions of the road reserves.

End

Appendix A. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to the department at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix B.

A.1. Site characteristics

Characteristic	Details
Local context	The application area is part of an expansive tract of native vegetation in the Murchison Bioregion, in the locality of South Murchison. Spatial data indicates the local area (50km radius from the centre of the application area) retains around 99 per cent of its original native vegetation cover. Unchanged from CPS 9547/1 assessment.
Ecological linkage	According to available datasets, the application area is not within any formal ecological linkages and is unlikely to provide any specific linkage values noting the extent of surrounding native vegetation. Unchanged from CPS 9547/1 assessment.
Conservation areas	The closest conservation area to the proposed clearing is Lakeside National Park, located around 100kms southeast of the application area. Unchanged from CPS 9547/1 assessment.
Vegetation description	The Ecological Assessment identified the following vegetation types within the existing permit area (AECOM, 2022a): • **AfEfPo -** Acacia Woodland *Acacia fuscaneura, Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii, Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus, Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland. This vegetation type comprises 18.31 hectares of the application area footprint. • **ApAgEf -** Acacia Woodland *Acacia pteraneura* low woodland to open woodland over *Acacia grasbyi* and *Acacia tetragonophylla* tall sparse shrubland over *Eremophila forrestii* subsp*. forrestii, Senna artemisioides* subsp*. helmsii* and *Eremophila fraseri* subsp*. parva* mid shrubland. This vegetation type comprises 105.46 hectares of the application area footprint. Based on the extrapolation of the vegetation types identified from the reconnaissance flora survey conducted for the existing permit (AECOM, 2022a), the additional area applied to clear is considered likely representative of the adjacent vegetation type ApAgEf, The entire application area comprises Beard Vegetation Association 29, described as sparse low woodland; Mulga, discontinuous in scattered groups (Shepherd et al., 2001). This vegetation association retains 99.8 per cent of its pre-European vegetation extent.

Characteristic	Details
Vegetation condition	The Ecological Assessment identified that Boolardy station, within which the application area forms a part of, has been used for sheep and cattle grazing since 1876 (AECOM, 2022a). This has resulted in a loss of biomass, erosion of the surface, and soil compaction. The Ecological Assessment considered that the existing application area is in a 'Very Good' (Trudgen, 1991) condition (AECOM, 2022a). Based on the extrapolation of the vegetation condition identified from the reconnaissance flora survey conducted for the existing permit (AECOM, 2022a), the additional area applied to clear is likely in Very Good (Trudgen, 1991) condition. The full Trudgen (1991) condition rating scale is provided in Appendix C.
Climate and landform	The Shire of Murchison has an arid climate with a mean annual rainfall of 190-240mm. Rainfall varies significantly depending on the occurrence of sporadic significant rainfall events that are driven by cyclonic weather from the north and cold fronts from the southwest (AECOM, 2021). The Western Murchison subregion supports low Mulga woodlands with bunch grasses and ephemerals (annuals). Landscape features include outcrop and extensive fine textured hardpan wash plains. Quaternary sandplains support hummock grasslands, calcareous soils support Saltbush and saline alluvia support *Halosarcia* low shrublands (AECOM, 2021). Unchanged from CPS 9547/1 assessment.
Soil description	Soil landscape mapping indicates that the following soil subsystems occur within the application area: • Challenge, comprising gently undulating gritty-surfaced plains, occasional granite hills, tors and low breakaways, with *Acacia* shrublands – mapped over 0.4 hectares of the application area • Beringarra, comprising riverine plains with floodplains and channels, supporting halophytic shrublands, mixed acacia shrublands and low woodlands with minor perennial grasses – mapped over 1.7 hectares of the application area • Ero, comprising tributary floodplains with shallow, erodible duplex soils on red-brown hardpan, saline, and supporting *Acacia* shrublands with halophytic and non-halophytic undershrubs; grazed preferentially and widely degraded and eroded – mapped over 24.5 hectares of the application area • Millrose, comprising level or very gently undulating stony plains on hardpan and granite with irregularly distributed sandy Wanderrie banks, supporting mostly scattered Mulga shrublands with minor Wanderrie grasses – mapped over 30.4 hectares of the application area • Yanganoo, comprising almost flat hardpan wash plains, with or without small Wanderrie banks and weak grooving; supporting Mulga shrublands and Wanderrie grasses on banks – mapped over 66.8 hectares of the application area. Unchanged from CPS 9547/1 assessment.
Land degradation risk	The soils in the local area are prone to water and wind erosion. Given the low rainfall in the region, and lack of major watercourses or wetlands within the application area, the water erosion risk is minimal. The wind erosion risk is more prominent, particularly on bare soils. Unchanged from CPS 9547/1 assessment.
Waterbodies	The desktop assessment and aerial imagery indicate that no watercourses or wetlands are mapped within the application area. However, the Ecological Assessment identified minor areas of marginal channels and creek lines within the application area (AECOM, 2022a). The southern most application area is also located in an area that is mapped as being 'subject to inundation'.

Characteristic	Details
	Unchanged from CPS 9547/1 assessment.
Conservation significant flora	The Ecological Assessment (undertaken out of season) did not identify any priority flora (AECOM, 2022a); however the appropriately timed targeted flora survey identified the following two priority flora species in the application area (AECOM, 2022b): • *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (P1) • *Gunniopsis divisa* (P3) According to a current review of available current datasets, no new threatened flora and 27 priority flora species are recorded within the additional area, existing permit area or the local area.
Ecological communities	No threatened or priority ecological communities are mapped within or near the application area. The Priority 1 listed 'Meka calcrete groundwater assemblage type on Murchison palaeodrainage on Meka Station' is the closest conservation significant ecological community to the application area, located 18km southeast. According to a current review of available current datasets, no threatened or priority ecological communities are recorded within the additional area, existing permit area or the local area.
Fauna	According to a review of current databases, 21 conservation significant fauna species have been recorded in the local area (see Section A.3. below). The closest record is the western spiny-tailed skink located around 3.2 km from the application area. Suitable habitat does not occur for this species. The Ecological Assessment for the existing permit area identified that 11 species of conservation significant fauna may occur within the application area (see below fauna analysis table) based on similarities between the preferred habitat for these species and that recorded within the application area (AECOM, 2022a). Of these, none were recorded in the application area (AECOM, 2022a; AECOM, 2022b). According to a current review of available current datasets, no new threatened or priority fauna species are recorded within the additional area, existing permit area or the local area.

A.2. Flora analysis table

A review of current available databases identified that the flora analysis remains unchanged from the CPS 9547/1 assessment.

The below flora species have been recorded within the local area and were considered as having the potential to occur pre-survey, based on mapped soil and vegetation types. The likelihood of occurrence of each species post survey is included, based on the above site characteristics (informed by the Ecological Assessment and desktop analysis) relative to the known habitat for each of these species (AECOM, 2022a). An appropriately timed targeted flora survey was undertaken by AECOM on 24 September 2022 and identified two priority species within the application area, *Calandrinia* sp. Boolardy Station (P. Jayasekara 719JHR-01) and *Gunniopsis divisa* (AECOM, 2022b).

Species	WA Cons. Code	Likelihood post survey	Justification
Angianthus microcephalus	P2	Unlikely	No suitable habitat present. Soils in the survey area are clays, clay loams and clay sands on flat terrain, no salt swamps and pans were observed. This species has an annual life cycle and detectability is restricted to September-December. There is one record from 1953 (WA Herbarium) described as being near Boolardy Station. It has not been recorded since.
Baeckea sp. Mount Barloweerie (J.Z. Weber 5079)	P1	May	Suitable habitat is present. This species is a perennial and would have been detected if present. No Myrtaceae species were recorded or collected in the survey area.

Species	WA Cons. Code	Likelihood post survey	Justification
Calandrinia butcherensis	P1	Likely	Records in the vicinity are associated with Mulga woodlands on red fine sand on undulating plains. Suitable habitat is present. This species has an annual life cycle and detectability is restricted to August-October.
Calandrinia sp. Boolardy Station (P. Jayasekara 719JHR-01)	P1	Present	Suitable habitat is present. This species has an annual life cycle. Detectability is likely to be limited to the flowering period. There is very little information publicly available for this species. There is one DBCA record in the vicinity of the survey area (WA Herbarium record from October 2006). Identified in the AECOM (2022b) targeted flora survey.
Eremophila muelleriana	P3	Likely	Suitable habitat is present. This species is perennial and may have been detectable during the survey. Despite this, sterile *Eremophila* spp. can be difficult to identify.
Eremophila simulans subsp. *megacalyx*	P3	Likely	Suitable habitat is present. This species has been recorded during previous surveys on Boolardy and requires suitable flowering material to be confidently identified to this subspecies. Four collections of *Eremophila* were made during the survey however, none represented *E. simulans.*
Frankenia confusa	P4	Unlikely	No suitable habitat is present.
Goodenia neogoodenia	P4	May	Suitable habitat is present in the form of minor drainage channels where soils were clay and clay loam. The likelihood of this species occurring is listed as 'may' due to the age of its last record (1999). This species has an annual life cycle and detectability is restricted to August-September.
Gunniopsis divisa	P3	Present	Suitable habitat is present. This species has an annual life cycle and detectability is restricted to August. Identified in the AECOM (2022b) targeted flora survey.
Hemigenia tysonii	P3	May	Suitable habitat is present. The flowering time for this species coincided with the survey dates as such it would have been detectable, yet it was not recorded.
Micromyrtus placoides	P3	Likely	Suitable habitat is present. As a perennial species it is anticipated that it would have been identified if present.
Prostanthera tysoniana	P3	May	Marginal habitat was identified for this species as soils in the survey area are clay dominated. As a perennial species it is anticipated that it would have been identified if present.
Ptilotus beardii	P3	May	This species has been recorded during previous surveys on Boolardy station where it was associated with clayey soil, saline flats and breakaways.
Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	May	This species has been recorded on Boolardy station during previous surveys where it was associated with mixed mulga and *Eremophila* shrubland over sand. This habitat was absent in the survey area. As a perennial species it is anticipated that it would have been present.
Verticordia jamiesonii	P3	May	Suitable habitat representing sandy clay soils are present. As a perennial species it is anticipated that it would have been identified if present.

A.3. Fauna analysis table

A review of current available databases identified that the fauna analysis remains unchanged from the CPS 9547/1 assessment.

The below table indicates the application area likelihood of occurrence of conservation significant fauna that have known distributions that overlap the application area (AECOM, 2022a; AECOM, 2022b).

Scientific Name	Common Name	Conservation Status		Likelihood of occurrence post-survey	Did surveys identify? (AECOM, 2022a; AECOM 2022b)	Reasoning for likelihood or exclusion
		State	Federal			
Actitis hypoleucos	Common Sandpiper	Migratory (MI), Protected Under International Agreement	Migratory (MI)	May	No	Coastal wetlands preferred habitat for this species although may seasonally utilise the marginal channel and creek line habitats.
Calidris acuminata	Sharp-tailed Sandpiper	MI	MI	Unlikely	No	Likely to be too far inland for this species to utilise the application area.
Calidris ferruginea	Curlew Sandpiper	Critically endangered (CR)	Critically endangered (CE)	May	No	Coastal wetlands preferred habitat for this species although may seasonally utilise the marginal channel and creek line habitats
Calidris subminuta	Long-toed Stint	MI	MI	May	No	Coastal wetlands preferred habitat for this species although may seasonally utilise the marginal channel and creek line habitats
Egernia stokesii	Western Spiny-tailed Skink	Vulnerable (VU)	E	Unlikely	No	Granite outcrops were searched for during the survey, however no suitable habitat was identified.
Falco peregrinus	Peregrine Falcon	Other specially protected fauna (OS)	-	Likely	No	May utilise the major channel creek lines with large eucalypts.
Gelochelidon nilotica	Gull-billed Tern	MI	MI	May	No	May seasonally utilise the marginal channel and creek line habitats.
Hypseleotris aurea	Golden Gudgeon	P2	-	Unlikely	No	Suitable habitat not present.
Idiosoma clypeatum	Northern Shield-backed Trapdoor Spider	P3	-	May	No	Many records nearby, within species distribution, potential habitat present.
Leipoa ocellata	Malleefowl	VU	VU	Unlikely	No	Unlikely due to lack of nearby records.
Motacilla cinerea	Grey Wagtail	MI	MI	May	No	May seasonally utilise the marginal channel and creek line habitats.
Motacilla flava	Yellow Wagtail	MI	MI	Unlikely	No	On edge of the species distribution, habitat not present within survey area, no records with search area.
Ninox connivens subsp. connivens	Barking Owl	P3	-	Unlikely	No	Suitable habitat not present.
Ogyris subterrestris petrina	Arid Bronze Azure Butterfly	CR	CE	Unlikely	No	Suitable habitat not present.
Oxyura australis	Blue-billed Duck	P4	-	Unlikely	No	Suitable habitat not present.

Scientific Name	Common Name	Conservation Status		Likelihood of occurrence post-survey	Did surveys identify? (AECOM, 2022a; AECOM 2022b)	Reasoning for likelihood or exclusion
		State	Federal			
Pezoporus occidentalis	Night Parrot	CR	E	Unlikely	No	Suitable habitat not present.
Plegadis falcinellus	Glossy Ibis	MI	MI	Unlikely	No	Suitable habitat not present.
Rostratula australis	Australian Painted Snipe	EN	E	May	No	May seasonally utilise the marginal channel and creek line habitats.
Sminthopsis longicaudata	Long-Tailed Dunnart	P4	-	May	No	May utilise the sandplain habitat which contains a higher density of grasses.
Tringa glareola	Wood Sandpiper	MI	MI	May	No	May seasonally utilise the marginal channel and creek line habitats.
Tringa nebularia	Common Greenshank	MI	MI	May	No	May seasonally utilise the marginal channel and creek line habitats.

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The Ecological Assessment recorded a total of 34 native flora species from 15 genera and 12 families. Two weed species were recorded during the survey, **Cenchrus ciliaris* and **Erodium aureum* (AECOM, 2022a). The application area does not contain vegetation in better condition than that in the surrounding region, noting that it has been subject to historical grazing pressures. The Ecological Assessment did not identify any threatened or priority ecological communities within the application area (AECOM, 2022a). An appropriately timed targeted flora survey identified two priority flora species within the application area (AECOM, 2022b): • *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) (P1) • *Gunniopsis divisa* (P3) Given the above, and noting that *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) is known from only one other record, the application area is considered to comprise a high level of biodiversity. The clearing permit requires the following measures to limit impacts to biodiversity: • avoidance and provision of a 20m buffer to the recorded location of *Calandrinia* sp. Boolardy Station (P.Jayasekara 719-JHR-01) • the clearing of no more than 50 per cent of the recorded population of *Gunniopsis divisa* to limit the extent of local impact to this species.	At variance as per CPS 9547/1	Yes *Refer to Section 3.2.1 above*

Assessment against the clearing principles	Variance level	Is further consideration required?
Noting the above conditions, the proposed clearing is not likely to result in a significant residual impact.		
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The application area contains suitable habitat for 11 species of conservation significant fauna, as identified in the above Table under Appendix A.3. (AECOM, 2022a). Of these, the Ecological Assessment and a follow up targeted fauna survey of the application area did not identify any of these species (AECOM, 2022a; AECOM, 2022b). The application area is therefore not expected to provide significant habitat for these species, also noting the extent of similar habitat within the local area, which retains 99 per cent native vegetation cover. To minimise the risk of the proposed clearing impacting on fauna utilising the application area at the time of clearing, the applicant will be required to undertake clearing in a slow one directional manner to allow fauna to move ahead of the clearing activity into adjacent vegetation.	Not likely to be at variance as per CPS 9547/1	Yes *Refer to Section 3.2.1 above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: According to available datasets, no threatened flora species have been recorded within the local area, and none were recorded during the Ecological Assessment or targeted flora survey (AECOM, 2022a; AECOM, 2022b). The proposed clearing is not likely to impact on any threatened flora species.	Not likely to be at variance as per CPS 9547/1	No
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: According to available datasets, and the Ecological Assessment (AECOM, 2022a), the vegetation within the application area is not representative of any known threatened ecological communities.	Not likely to be at variance as per CPS 9547/1	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of native vegetation in the local area is around 99 per cent. The mapped vegetation association in the application area retains 99.98 per cent of its pre-European extent (Government of Western Australia, 2019), and is considerably higher than the national objectives and targets for biodiversity conservation in Australia to prevent clearing ecological communities below 30 per cent of that present pre-1750 (Commonwealth of Australia, 2001) Therefore, the proposed clearing is not within an extensively cleared area.	Not likely to be at variance as per CPS 9547/1	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: The closest conservation area to the proposed clearing is Lakeside National Park, located approximately 100kms southeast of the application area. The proposed clearing is not likely to impact on this conservation area.	Not likely to be at variance as per CPS 9547/1	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: There are no wetlands or watercourses mapped within the application area. However, the Ecological Assessment identified areas comprising creeklines and flood channels within the application area (AECOM, 2022a). The proposed clearing is not likely to significantly impact on these creeks or channels, or on the riparian vegetation within the local area. This is noting the relatively small portions of the application area that intersect creeklines and that there are numerous watercourses mapped throughout the local area that will not be impacted by the proposed clearing.	At variance as per CPS 9547/1	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: While the recorded soils within the application area are susceptible to wind and water erosion, the proposed clearing of 105.68 hectares, of which includes long linear areas within an extensively vegetated landscape, is not likely to result in appreciable land degradation. As a condition of the clearing permit, the applicant will be required to undertake construction activities within three months of clearing to limit the exposure of bare sandy soils. The additional area proposed to be cleared under this amendment will be cleared for temporary works (gravel extraction) and therefore bare soils will be exposed and susceptible to wind erosion post extraction. A condition to revegetate and rehabilitate this area will be included to reduce the risk of land degradation from wind erosion.	Not likely to be at variance	Yes *Refer to Section 3.2.1 above.*
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: The proposed clearing of 105.68 hectares over a linear area is not likely to result in a perceptible rise in groundwater levels, particularly noting the extent of surrounding native vegetation. The application area does not intersect any known watercourses or wetlands. However, the Ecological Assessment identified small areas comprising channels and creek line habitat within the application area (AECOM, 2022a),	Not likely to be at variance as per CPS 9547/1	No

Assessment against the clearing principles	Variance level	Is further consideration required?
and the proposed clearing may lead to increased sedimentation of these areas, particularly after heavy rainfall. However, this impact is likely to be short term and localised, noting the minimal intersection with creeks/channels. As a condition of the clearing permit, the applicant is required to undertake construction activities within three months of clearing which will help to reduce the exposure time of bare sandy soils and the risk of sedimentation. The applicant also advised that it intends to minimise erosion when preparing access tracks through maintaining existing ground levels and minimising windrows so channelling and erosion due to stormwater flows did not occur (AECOM, 2021).		
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The climate of the region is described as arid with an average annual rainfall of 190 to 240 mm. It is expected that given the high average daily evaporation rate for the area, any surface water resulting from rainfall events is likely to be relatively short lived, even in bare areas post clearing. Noting the above, and that the application area is largely linear and surrounded by extensive tracts of remnant vegetation, run-off and surface flows will be limited, and the risk of flooding is considered low.	Not likely to be at variance as per CPS 9547/1	No

Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.).

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

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

Appendix D. Biological survey information excerpts (AECOM, 2022a; 2022b)

A targeted flora and fauna survey was undertaken by AECOM, the survey area included the additional area applied for in this amendment (AECOM, 2022a).

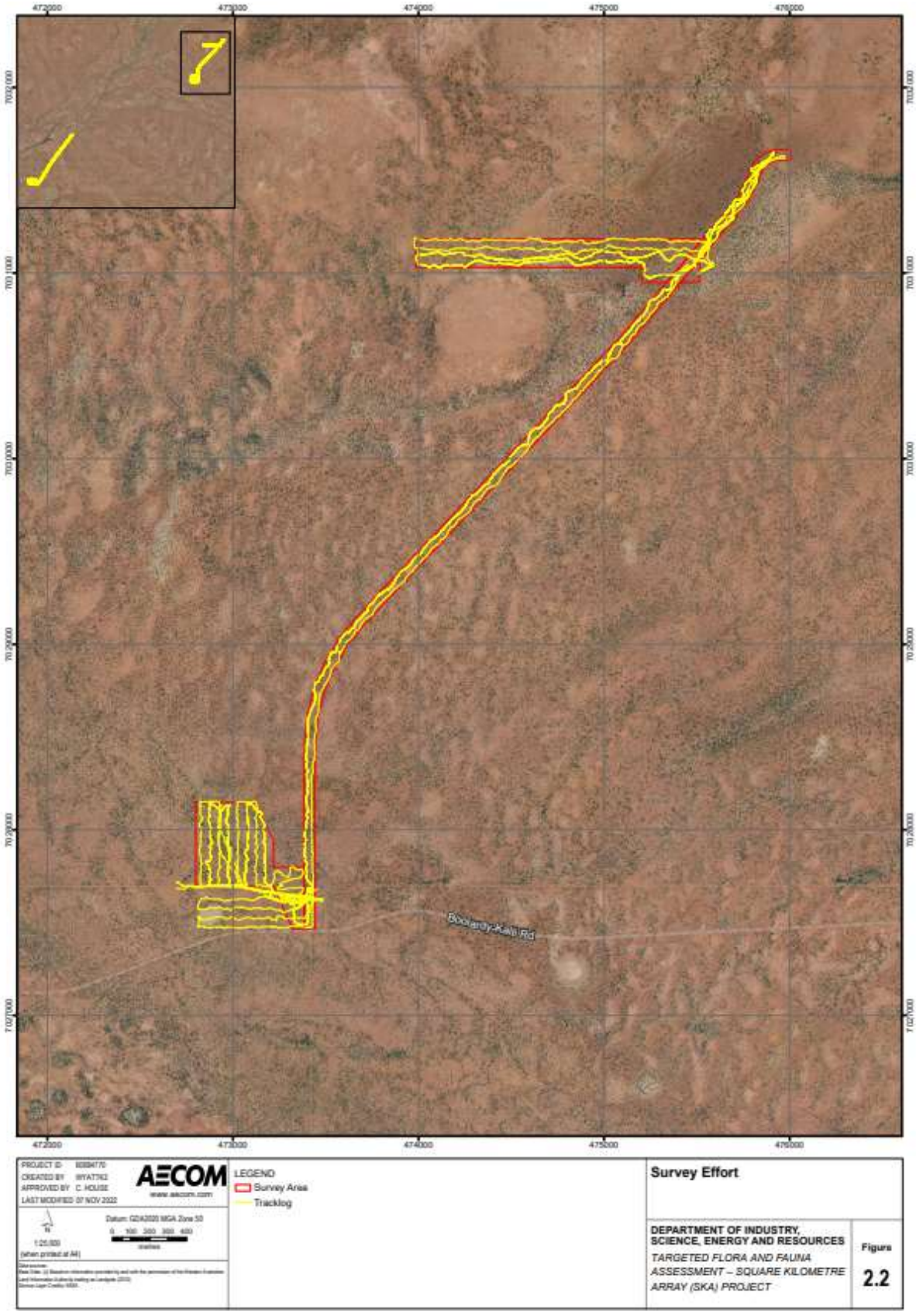

Figure 7. AECOM pre-clearance survey effort (AECOM, 2022a)

AECOM was commissioned to undertake a reconnaissance survey of the application area from 17 – 20 May 2022. The vegetation and fauna habitat types identified within the application area are shown in the figure below (AECOM, 2022a).

Vegetation Types Recorded in the Application Area

Description	Site details	Photo
Plains		
AfEfPo Acacia Woodland *Acacia fuscaneura, Acacia incurvaneura* and *Acacia victoriae* subsp. *victoriae* low open woodland over *Eremophila forrestii* subsp. *forrestii, Acacia tetragonophylla* and *Eremophila phyllopoda* low to tall open shrubland over *Ptilotus obovatus, Solanum lasiophyllum* and *Maireana planifolia* low sparse shrubland.	Common community found across variety of landscapes including hardpan clays, clay loams and clay sandy soils on flat terrain. May have quartz or granite rocks (small to large) on surface. Extent within survey area (ha): 18.31 Species richness: • 7 native species	
ApAgEf Acacia Woodland *Acacia pteraneura* low woodland to open woodland over *Acacia grasbyi* and *Acacia tetragonophylla* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii, Senna artemisioides* subsp. *helmsii* and *Eremophila fraseri* subsp. *parva* mid shrubland.	Undulating flat terrain with red-brown sandy loam soils. Extent within survey area (ha): 105.46 Species richness: • 30 native species • 2 weed species	

Fauna Habitat Types Recorded in the Application Area

Fauna Habitat	Habitat for conservation significant fauna	Survey Area		Representative Photo
		Ha	%	
Channels and creek line Major and minor drainage lines subject to occasional and seasonal flooding. Minor drainage areas tend to exhibit little variation in habitat characteristics to hardpan plains (when dry), apart from slightly higher vegetation cover and sandier soils. Major drainage channels tend to contain larger trees. The habitat quality for these areas ranges from moderate to high. The drainage lines and floodplains contain a variety of microhabitats and also provide an important wildlife corridor for many migratory species. Large logs were infrequently observed and no rocks were present. Standing water was observed at numerous locations, with a large amount of new grass and annual herbs. This would provide suitable foraging for larger herbivores and encourage insect populations which supports small mammals, reptiles and many bird species.	This habitat may seasonally provide habitat for waterbird species including: • Curlew Sandpiper *Calidris ferruginea* • Long-toed Stint *Calidris subminuta* • Gull-billed Tern *Gelochelidon nilotica* • Australian Painted Snipe *Rostratula australis* • Wood Sandpiper *Tringa glareola* • Common Greenshank *Tringa nebularia*. May provide habitat for Peregrine Falcon *Falco peregrinus*. Possible habitat for the Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum*.*	11.62	9.4	 

Hardpan plain with intermittent sandplain This habitat contains sparse *Acacia* over mixed native shrubs on hardpan plain with intermittent sandplains. Density of understorey varied throughout this habitat type, ranging from bare ground to moderately dense shrubs. Surface leaf litter and small rocks occurred occasionally, with large logs rare throughout the survey area. Microhabitats were minimal, with the fauna observed primarily consisting of small birds moving in flocks through the survey area. Tracks, scats and bones of larger mammals were also observed throughout this habitat type. Habitat quality ranged from low to high primarily due to the lack of variety in microhabitats.	Possible habitat for the Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum*.* Potential habitat for the Mulgara *Dasycercus blythi*. Although not identified in the initial desktop assessment, the suitability of habitat for this species has been assessed due to its inclusion in the assessment outlined in Section 6.3.1.	104.64	84.5	
Sandplain Alluvial plains of orange to brown sands (often with thin crust). Supports *Acacia, Eremophila* and *Ptilotus* species. The sandplain habitat contained a wider variety in microhabitats than the hardpan plains. Small logs were common, with medium sized logs (10-30 cm) occurring occasionally. Grass was abundant, with larger amounts of course leaf litter present than other sections of the survey area. Small stones also occurred occasionally on the surface. Tracks in a range of sizes were observed for both mammals and reptiles, along with numerous flocks of small birds. This habitat is moderate to high quality due to the variety in microhabitats present and the broad number of fauna observed.	Possible habitat for the Northern Shield-backed Trapdoor Spider *Idiosoma clypeatum*.* Potentially suitable habitat for the Long-tailed Dunnart *Sminthopsis longicaudata*. Potential habitat for the Mulgara *Dasycercus blythi*. Although not identified in the initial desktop assessment, the suitability of habitat for this species has been assessed due to its inclusion in the assessment outlined in Section 6.3.1.	7.50	6.1	
TOTAL Area (including Cleared – 0.04 ha)		**123.80**	**100**	

Appendix E. Sources of information

E.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)

- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

E.2. References

AECOM (2023) *Native Vegetation Clearing Permit Application CPS 9547/2,* received 3 March 2023 (DWER Ref: DWERDT753049)

AECOM (2022a) *Ecological Assessment – May 2022. Square Kilometre Array.*

AECOM (2022b) *Pre-clearance assessment of proposed sites for a construction camp and fibre cable corridor, a contractor compound and access road, and an emergency airstrip for the Square Kilometre Array project*.

AECOM (2021) *Native Vegetation Clearing Permit, Supporting Document. Square Kilometre Array. 22 December 2021.*

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