GOVERNMENT OF WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 10602/1
Permit Holder:	Shire of Esperance
Duration of Permit:	From 27 September 2025 to 27 September 2048

ADVICE NOTE

Allocation of offset sites

In relation to condition 16 of this permit, 34.88 hectares of Reserve 26912, Lot 1536 on Deposited Plan 209681, Lort River, will be attributed to the offset for this permit. The nominated 34.88-hectare area contains malleefowl (*Leipoa ocellata*) habitat, in addition to other environmental values.

In relation to condition 17 of this permit, it is noted that 54.28 hectares of Reserve 27355, Lot 80 on Deposited Plan 207664, Condinup, will be attributed to the offset for this permit. The nominated 54.28-hectare area contains vegetation that provides foraging habitat for Carnaby's black cockatoo (*Zanda latirostris)*, native vegetation representative of the Kwongkan Shrublands TEC and is representative of the highly cleared Beard Vegetation Association (BVA) Esperance 47, in addition to other environmental values.

Revegetation offset

The *revegetation* offset referred to in condition 18 of this permit is intended to facilitate the *revegetation* of a total of 0.10 hectares of *native vegetation* within the Reserve 24007, Lot 1499 on Deposited Plan 91061, Salmon Gums. The remaining balance of the revegetation area may be used as a banked offset for other projects. The revegetated 0.10-hectare area is within a significant remnant of native vegetation, in addition to other environmental values.

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of road upgrades and gravel extraction.

2. Land on which clearing is to be done

Circle Valley Road / Sassella Road reserve (PIN 1311232), Salmon Gums.

Circle Valley Road reserve (PIN 1311233, 11646237), Salmon Gums.

Sassella Road reserve (PIN 11648340), Salmon Gums.

River Road reserve (PIN 11642270), Cascade.

Farmers Road reserve (PIN 11642724), East Munglinup.

Shao Lu Road / Orleans Road reserve (PIN 11645171), Howick / Boyatup.

Orleans Road reserve (PIN 11645272), Howick.

3. Clearing authorised

The permit holder must not clear more than:

(a) 0.67 hectares of *native vegetation* within the areas cross-hatched yellow in Figure 1 of Schedule 1.

(b) 5.58 hectares of *native vegetation* within the combined areas cross-hatched yellow in Figure 2 and Figure 3 of Schedule 1.

(c) 0.06 hectares of *native vegetation* within the area cross-hatched yellow in Figure 4 of Schedule 1.

(d) 3.33 hectares of *native vegetation* within the areas cross-hatched yellow in Figure 5 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not:

(a) clear any *native vegetation* within the combined areas cross-hatched yellow in Figure 1, Figure 2, Figure 4 and Figure 5 of Schedule 1 after 27 September 2030;

(b) clear any *native vegetation* within the area cross-hatched yellow in Figure 3 of Schedule 1, prior to 27 September 2036 and without *CEO* approval obtained under condition 14(g); and

(c) clear any *native vegetation* within the area cross-hatched yellow in Figure 3, Schedule 1 after 27 September 2041.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending 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.

6. Weed and dieback management

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

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared;

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared;

(d) where *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is to be removed from the area to be cleared, ensure it is transferred to areas of comparable *soil disease status*; and

(e) only move soils in *dry conditions*, within the combined areas cross-hatched yellow in Figure 1, Figure 2, Figure 3 and Figure 5 of Schedule 1, in dry months (October to April) to limit the potential spread of *dieback*.

7. Wind erosion management

The permit holder must commence activities related to the purpose of the clearing, no later than three (3) months after undertaking the authorised clearing activities to reduce the potential for wind erosion.

8. Directional clearing

The permit holder must:

(a) conduct clearing activities authorised under this permit in one direction towards adjacent *native vegetation*; and

(b) allow a reasonable time for fauna present within the area being cleared to move into adjacent *native vegetation* ahead of the clearing activity.

9. Threatened Ecological Community management

The permit holder must not clear more than 2.54 hectares of *native vegetation* within the area cross-hatched yellow in Figure 5 of Schedule 1, that is representative of the 'Proteaceae Dominated Kwongkan Shrubland of the southeast coastal floristic province of Western Australia', Commonwealth listed Threatened Ecological Community.

10. Fauna management – black cockatoo habitat

The permit holder must not clear more than 7.29 hectares of *native vegetation* within the combined areas cross-hatched yellow in Figure 1, Figure 2, Figure 3 and Figure 5 of Schedule 1 that provide suitable foraging habitat for *Zanda latirostris* (Carnaby's cockatoo).

11. Fauna management – Malleefowl

The permit holder must not clear more than 8.91 hectares of *native vegetation* within the combined areas cross-hatched yellow in Figure 2, Figure 3 and Figure 5 of Schedule 1 that provide suitable foraging habitat for *Leipoa ocellata* (Malleefowl).

12. Priority flora management

(a) Prior to clearing authorised under this permit, the permit holder must ensure that:

(i) the boundaries of the area to be cleared are identified and demarcated, on ground, using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA20), expressing the geographical coordinates in Eastings and Northings or decimal degrees; and

(ii) *recorded priority flora* are identified within the clearing boundary, using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA20), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(b) When undertaking any clearing authorised under this permit, the permit holder must not cause or allow the clearing of more than the number of *recorded priority flora*, within the clearing boundary.

13. Vegetation management

The permit holder must not clear more than 3.33 hectares of *native vegetation* within the area cross-hatched yellow in Figure 5 of Schedule 1 that is representative of Beard Vegetation Association Esperance_47.

14. Mitigation – Rehabilitation and revegetation of temporary clearing area – River Road gravel pits

(a) For the combined areas cross-hatched yellow in Figure 2 and Figure 3 of Schedule 1, the permit holder must 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) For clearing of stage 1 authorised within the area cross-hatched yellow in Figure 2 of Schedule 1, within 12 months of the completion of gravel extraction and no later than 27 September 2031, at an *optimal time*, the permit holder must *revegetate* and *rehabilitate* the area by implementing the *Revegetation Management Plan – site B* prepared by the Shire of Esperance, dated May 2025, by including but not limited to the following actions:

(i) re-shaping the surface of the land so that it is consistent with the surrounding 5 metres of uncleared land;
(ii) ripping the ground on the contour to remove soil compaction;
(iii) lay the vegetative material and topsoil retained under condition 14(a) on the cleared area;

(c) The permit holder must undertake weed control activities of the areas *revegetated* and *rehabilitated* on an 'as needs' basis.

(d) The permit holder must, within 24 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 14(b) of this permit:

(i) engage an *environmental specialist* to determine the species composition, structure and density of the *vegetation* of area *revegetated*; and
(ii) engage an *environmental specialist* to make a determination as to whether the composition, structure and density determined under condition 14(d)(i) of this permit have, without further *revegetation* and *rehabilitation*, achieve the completion criteria specified in Table 1 of Schedule 2.

(e) If the determination made by the *environmental specialist* under condition 14(d)(ii) is that the species composition, structure, and density determined under condition 14(d)(i) is not likely to achieve the completion criteria specified in Table 1 of Schedule 2, the permit holder must undertake *remedial actions* for areas *revegetated* and *rehabilitated*, including:

(i) *revegetate*/*rehabilitate* the area by deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum completion criteria detailed in Table 1 of Schedule 2 and ensuring only *local provenance* seeds and propagating material are used; and
(ii) undertake *weed* control activities prior to *planting* and/or *direct seeding native vegetation.*

(f) Where additional *planting* or *direct seeding* of *native vegetation* is undertaken in accordance with condition 14(e), the permit holder must repeat the activities required by condition 14(d) and 14(e) within three (3) years of undertaking the additional *planting* or *direct seeding* of *native vegetation.*

(g) Where a determination is made by an *environmental specialist* under condition 14(d)(ii) that the composition, structure and density within areas *revegetated* and *rehabilitated* have achieved the completion criteria specified in Table 1 of

Schedule 2, that determination must be submitted to the *CEO* within three months of the determination being made by the *environmental specialist* for approval by the *CEO*.

(h) Clearing of stage 2 area, within the area cross-hatched yellow in Figure 3 of Schedule 1, must not commence unless *CEO* approval has been obtained under 14(g).

(i) For clearing stage 2 area, within the area cross hatched yellow in Figure 3 of Schedule 1, within 12 months of the completion of gravel extraction, and no later than 27 September 2042, at an *optimal time*, the permit holder must *revegetate* and *rehabilitate* the area by implementing the *Revegetation Management Plan – site B* prepared by the Shire of Esperance – May 2025, and repeat the activities required by conditions 14(b), 14 (c), 14(d), 14 (e) and 14(f).

15. Mitigation – Rehabilitation and revegetation of temporary clearing areas - Farmers Road gravel pits

(a) For the areas cross-hatched yellow in Figure 5 of Schedule 1, the permit holder must 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) Within 12 months of the completion of gravel extraction and no later than 27 September 2031, at an *optimal time*, the permit holder must *revegetate* and *rehabilitate* at least 3.33 hectares within the area cross-hatched yellow in Figure 5 of Schedule 1 in accordance with the *Revegetation Management Plan – site D* prepared by the Shire of Esperance – December 2024 including but not limited to the following actions, by way of:

(i) re-shaping the surface of the land so that it is consistent with the surrounding 5 metres of uncleared land;
(ii) ripping the ground on the contour to remove soil compaction; and
(iii) lay the vegetative material and topsoil retained under condition 15(a) on the cleared area.

(c) The permit holder must undertake weed control activities of the areas *revegetated* and *rehabilitated* on an ‘as needs’ basis.

(d) The permit holder must, within 24 months of laying the vegetative material and topsoil on the cleared area in accordance with condition 15(b) of this permit:

(i) engage an *environmental specialist* to determine the species composition, structure and density of the *vegetation* of area *revegetated*; and
(ii) engage an *environmental specialist* to make a determination as to whether the composition, structure and density determined under condition 15(d)(i) of this permit have, without further *revegetation* and *rehabilitation*, achieve the completion criteria specified in Table 2 of Schedule 2.

(e) If the determination made by the *environmental specialist* under condition 15(d)(ii) is that the species composition, structure, and density determined under condition 15(d)(i) have not achieved the completion criteria specified in Table 2 of Schedule 2, the permit holder must undertake *remedial actions* for areas *revegetated* and *rehabilitated*, including:

(i) *revegetate*/*rehabilitate* the area by deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum completion criteria detailed in Table 2 of Schedule 2 and ensuring only *local provenance* seeds and propagating material are used; and

(ii) undertake *weed* control activities prior to *planting* and/or *direct seeding native vegetation.*

(f) Where additional *planting* or *direct seeding* of *native vegetation* is undertaken in accordance with condition 15(e), the permit holder must repeat the activities required by condition 15(d) and 15(e) within 3 years of undertaking the additional *planting* or *direct seeding* of *native vegetation.*

(g) Where a determination is made by an *environmental specialist* under condition 15(d)(ii) that the composition, structure and density within areas *revegetated* and *rehabilitated* have achieved the completion criteria specified in Table 2 of Schedule 2, that determination shall be submitted to the *CEO* within three months of the determination being made by the *environmental specialist*.

16. Offsets - Lot 1536 on Deposited Plan 209681

Within 24 months of the commencement of clearing authorised under this permit and no later than 1 June 2027, the permit holder must provide to the *CEO* a copy of the executed change in purpose of Lot 1536 on Deposited Plan 209681 (Reserve 26912) from 'recreation and parklands' to 'conservation' within the area cross-hatched red in Figure 1 of Schedule 3.

17. Offsets - Lot 80 on Deposited Plan 207664

Within 24 months of the commencement of clearing authorized under this permit and no later than 27 September 2027, the permit holder must provide to the *CEO* a copy of the executed change in purpose of Lot 80 on Deposited Plan 207664 (Reserve 27355) from 'parkland' to 'conservation' within the area cross-hatched red in Figure 2 of Schedule 3.

18. Offset – Revegetation and rehabilitation

The permit holder must:

(a) Within 12 months of the commencement of clearing and no later than 27 September 2031, at an *optimal time*, the permit holder must commence *revegetating* and *rehabilitating* 0.10 hectares within the area cross-hatched red in Figure 3 of Schedule 3 in accordance with the *Offset Revegetation Plan* prepared by the Shire of Esperance – September 2024 including but not limited to the following actions:

(i) deliberately *planting* tube stock and salvaged *native vegetation* that will result in similar species composition, structure and density of *native vegetation* to the adjacent *reference sites* in Excellent (Keighery, 1994) condition within the Reserve 24007 (Lot 1499 on Deposited Plan 91061); and

(ii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area.

(b) Implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the *revegetation* site;

(c) Undertake *weed* control activities prior to *planting*, and on an 'as needs' basis to maintain a minimum criterion specified in Table 3 of Schedule 2;

(d) Undertake watering of the *planted* vegetation between November and March post-*planting* as required;

(e) Establish no less than two 10 x 10 metre quadrat monitoring sites within the *revegetated* and *rehabilitated* areas.

(f) Engage an *environmental specialist* to undertake yearly monitoring of the *revegetated* and *rehabilitated* areas.

(g) Achieve the completion criteria detailed in Table 3 of Schedule 2 after the five-year monitoring period for *revegetated* and *rehabilitated* areas.

(h) Undertake *remedial action* where monitoring by an *environmental specialist*, undertaken in accordance with condition 18(f) indicates that *revegetation* has not met the completion criteria detailed in Table 3 of Schedule 2, including:

(i) repeating the *revegetation* actions required under conditions 18(a)-(d);

(ii) annual monitoring of the additional *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria detailed in Table 3 of Schedule 2 are met; and

(h) Where an *environmental specialist* has determined that the completion criteria detailed in Table 3 of Schedule 2 have been met, that determination must be submitted to the *CEO* within three months of the determination being made by the *environmental specialist*.

19. Offsets - Lot 1499 on Deposited Plan 91061

Within 24 months of the commencement of clearing authorized under this permit and no later than 27 September 2027, the permit holder must provide to the *CEO* a copy of the executed change in purpose of Lot 1499 on Deposited Plan 91061 (Reserve 24007) from 'parkland' to 'environmental conservation' within the area cross-hatched red in Figure 3 of Schedule 3.

PART III - RECORD KEEPING AND REPORTING

20. 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 GDA2020, 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 5; (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 6; (g) actions taken in accordance with

No.	Relevant matter	Specifications
		condition 7; (h) actions taken in accordance with condition 8; (i) area of Proteaceae Dominated Kwongkan Shrubland of the southeast coastal floristic province of Western Australia' Commonwealth listed Threatened Ecological Community cleared in accordance with condition 9; (j) area of black cockatoo habitat cleared in accordance with condition 10; (k) area of malleefowl habitat cleared in accordance with condition 11; (l) area of Beard vegetation association Esperance_47 cleared in accordance with condition 13; (m) actions taken in accordance with condition 16; (n) actions taken in accordance with condition 17; and (o) actions taken in accordance with condition 19.
2.	In relation to flora management pursuant to condition 12.	(a) the name and location of each *priority flora* species, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings; (b) actions taken to demarcate each *priority flora* species recorded and their relevant buffers; and (c) actions taken to avoid the clearing of *priority flora* species.
3.	In relation to mitigation *rehabilitation* pursuant to conditions 14 and 15.	(a) a description of the *revegetation* and *rehabilitation* activities undertaken; (b) the size of the areas *revegetated* and *rehabilitated* (in hectares); (c) the date that *revegetation* and *rehabilitation* works began; *(d)* any remediation works *undertaken;* (e) *a copy of environmental* specialist reports; and (f) the date that completion criteria are considered to be met.
4.	In relation to offset *revegetation* pursuant to condition 18.	(a) size of the area *revegetated* and *rehabilitated*; (b) the date(s) on which the *revegetation* and

No.	Relevant matter	Specifications
		rehabilitation began; (c) the boundaries of the areas *revegetated* and *rehabilitated* (recorded digitally as a shapefile set to GDA2020); (d) a list of species, including quantities, used for *revegetation* and *rehabilitation;* (e) a description of the *revegetation* and *rehabilitation* activities undertaken, including actions taken to implement watering, hygiene protocols and *weed* control; (f) a copy of the *environmental specialist*'s monitoring report(s) and determination; (g) any *remedial actions* required to be undertaken; (h) the location and size of the *reference quadrat*s in accordance with condition 18 recorded using GPS a unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; (i) at least two photographs of each *reference quadrat* and the date that the *reference quadrat* baseline data is collected; (j) the baseline data recorded for the *reference quadrats*, including species richness, species density, bare ground cover, weed cover and vegetation condition; (k) at least two photographs of the areas *revegetated/rehabilitated* recorded biennially; (l) the species composition, structure, density of the areas *revegetated/ rehabilitated* biennially; (m) a description of the extent of bare ground cover, weed cover and vegetation condition of the areas *revegetated/rehabilitated,* recorded biennially; (n) the date completion criteria are considered to have been met by the *environmental specialist*; and (o) any other actions taken in accordance with condition 18.

21. 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 20; 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 20, where these records have not already been provided under condition 21(a).

DEFINITIONS

In this permit, the terms in Table 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.
dieback	means the effect of *Phytophthora* species on native vegetation.
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.
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.
dry conditions	means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches
EP Act	*Environmental Protection Act 1986* (WA)
environmental specialist	means a person who holds a tertiary qualification specialising 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.
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
Offset Revegetation Plan	means the plan developed by the permit holder for the *revegetation* and *rehabilitation* of the offset site in accordance with condition 18 of this

Term	Definition
	permit 'Offset Revegetation Plan Circle Valley Locality - *Shire of Esperance 2023/24 Strategic Purpose Permit – Site C - Circle Valley Road, SLK 1.32-7.68. September 2024'* prepared by the Shire of Esperance.
optimal time	means the optimal time for undertaking direct seeding and planting for that region.
planting	means the re-establishment of vegetation by creating soil conditions and planting seedlings of the desired species.
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 from time to time).
recorded	means individuals of those *priority flora* species found within the area cross-hatched yellow in Figures 1-5 of Schedule 1 during the following surveys: (a) Shire of Esperance (2024b) *Vegetation, Flora, Fauna and Environmental Considerations Report - Shire of Esperance 2024-25 Strategic Purpose Permit – Site A - Shao Lu and Orleans Road Intersection*. Received 30 April 2024. IBSA number: IBSA-2024-0196. (b) Shire of Esperance (2024c) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2024-25 Strategic Purpose Permit – Site B - River Road Gravel Pits*. Received 30 April 2024. IBSA number: IBSA-2024-0174. (c) Shire of Esperance (2024d) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2024-25 Strategic Purpose Permit – Site C – Circle Valley Road, SLK 1.32-7.68*. Received 30 April 2024. IBSA number: IBSA-2024-0198. (d) Shire of Esperance (2024e) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2023-24 Strategic Purpose Permit – Site D - Farmers Road Gravel Pit*. Received 30 April 2024. IBSA number: IBSA-2024-0197.
reference quadrat/site	means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density, foliage cover, vegetation condition (Keighery, 1994), weed species and extent, and extent of bare ground. Measurements from fixed reference quadrats or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects.
rehabilitate/ed/ing/ion	means actively managing an area containing native vegetation in order to improve the ecological function of that 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
remedial action/s	means, for the purpose of this permit, any activity that is required to ensure successful re-establishment of understorey to its pre-clearing composition, structure and density, and may include a combination of soil treatments and revegetation.
revegetate/ed/ing/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct

Term	Definition
	seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
Revegetation Management Plan – site B	means the revegetation plan developed by the permit holder in accordance with condition 14 of this permit '*Revised Revegetation Management Plan – Shire of Esperance 2024-25 Strategic Purpose Permit – Site B - River Road Gravel Pits. Updated May 2025*' prepared by the Shire of Esperance
Revegetation Management Plan – site D	means the revegetation plan developed by the permit holder in accordance with condition 15 of this permit '*Revised Revegetation Management Plan – Shire of Esperance 2023-24 Strategic Purpose Permit – Site D - Farmers Road Gravel Pit. November 2024*' prepared by the Shire of Esperance
soil disease status	means soil types either infested, not infested, uninterpretable or not interpreted with a pathogen.
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 (c) not indigenous to the area concerned.

END OF CONDITIONS

J Burton

Jessica Burton
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

3 September 2025

Schedule 1

The boundary of the combined areas authorised to be cleared is shown in the maps below (Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5).

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

Figure 2. Map of the boundary of the areas within which clearing may occur

Figure 3. Map of the boundary of the areas within which clearing may occur

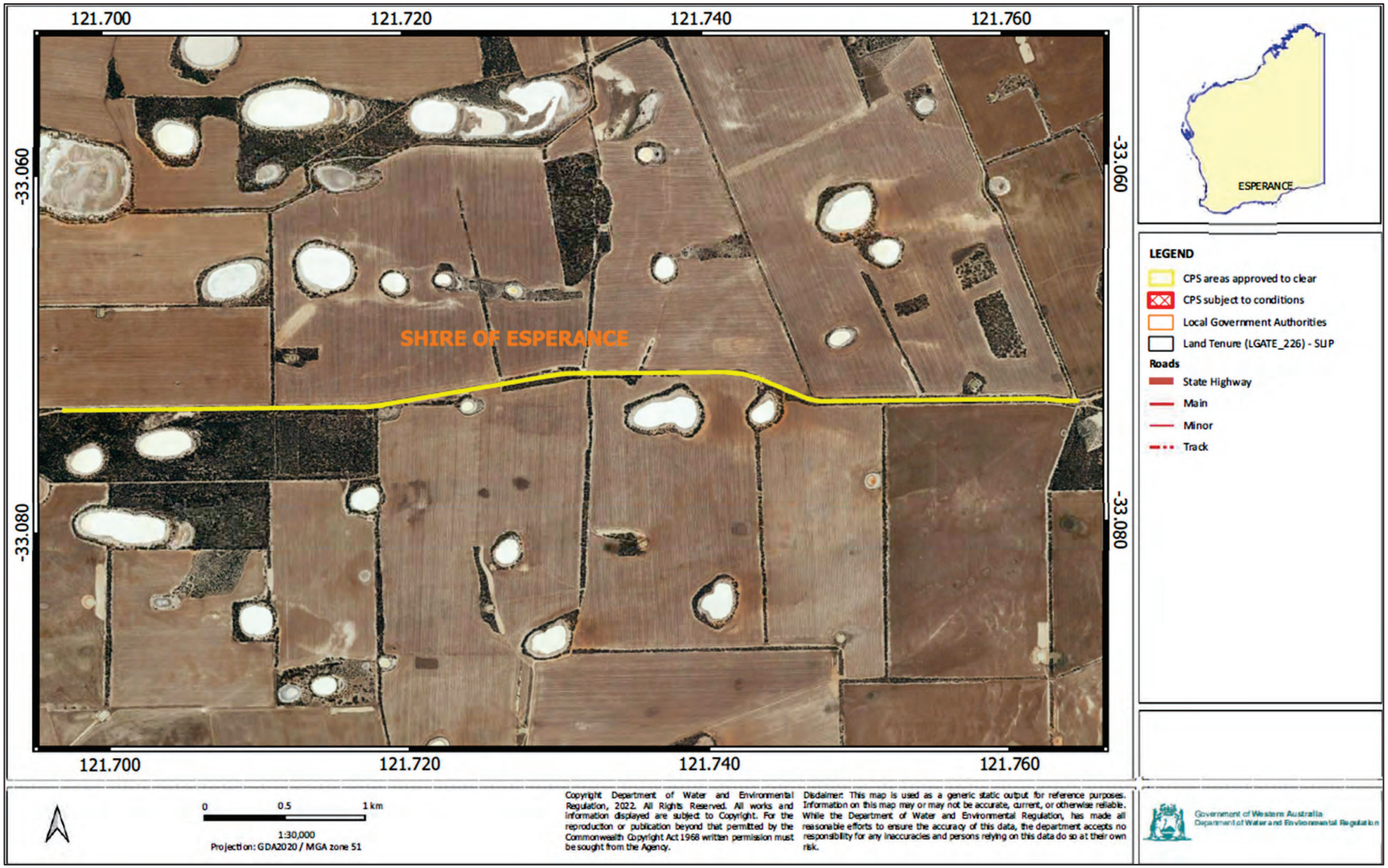


Figure 4. Map of the boundary of the area within which clearing may occur

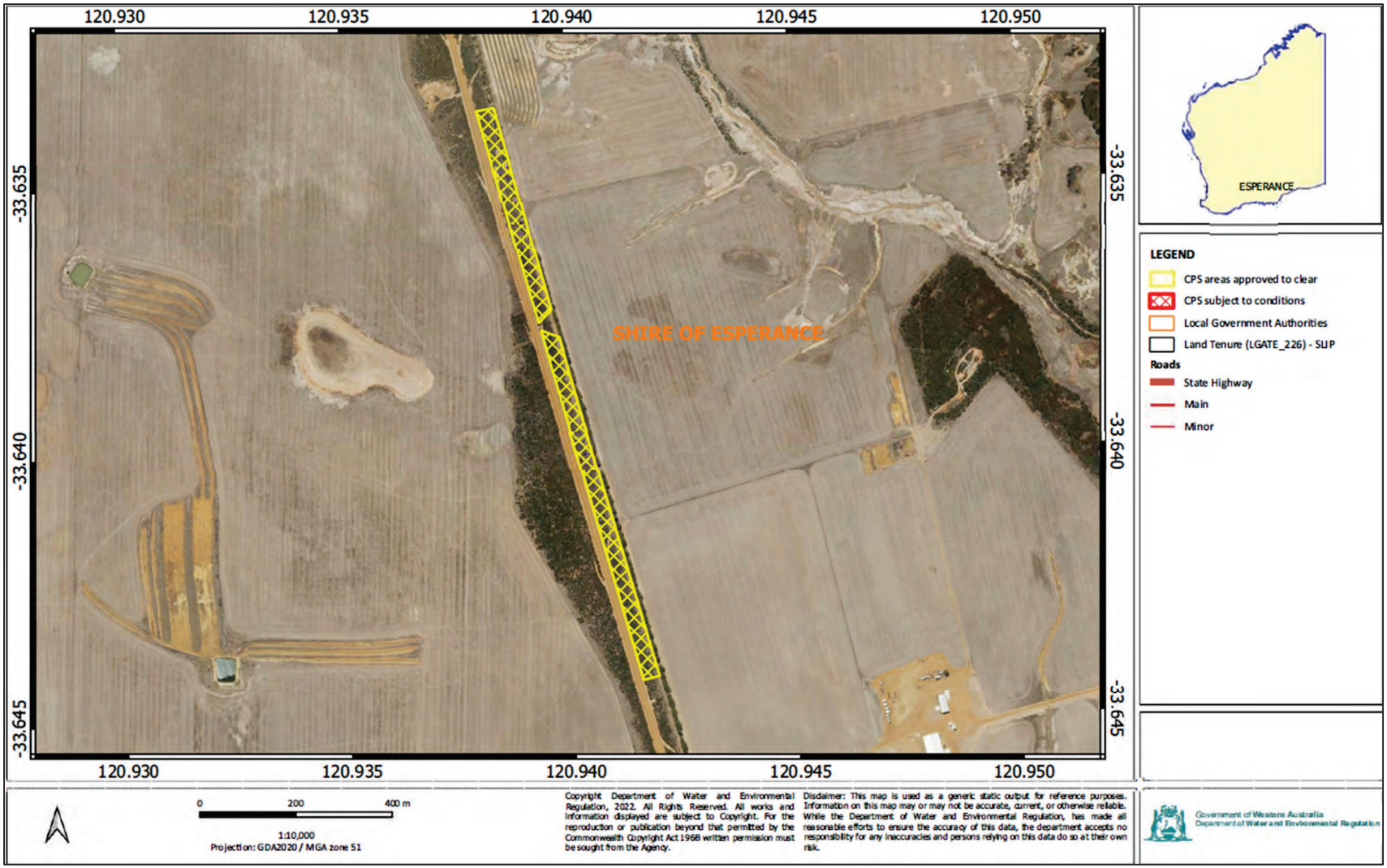


Figure 5. Map of the boundary of the areas within which clearing may occur

Schedule 2

The completion criteria in accordance with *revegetation* and *rehabilitation* conditions are shown in the tables below (Table 1, Table 2 and Table 3).

Table 1. The *rehabilitation* completion criteria in accordance with condition 14 are shown in the table below.

Criterion	Basic floristic data	Completion Target	Completion Criteria
1 – Species richness	131 native vascular plant taxa present prior to clearing	Restoration of a majority (70%) of floristic species richness after five years.	92 native vascular plant taxa present by the end of 5-year monitoring periods.
2 – Carnaby's foraging habitat	A total of 5.12 hectares of vegetation (3.54 hectares in stage 1 and 1.58 hectares in stage 2) was classified as Carnaby's cockatoo foraging habitat prior to clearing, with 43 foraging species present.	Returns of 80% foraging species after five years.	35 Proteaceous, Myrtaceous and/or Casuarinaceous species present, providing foraging habitat within at least: ▪ 3.54 hectares in stage 1, ▪ 1.58 hectares in stage 2 by the end of 5-year monitoring periods.
3 – Vegetation cover	Vegetation cover as presented in pre-clearing drone aerials.	Return of > 60% of vegetation cover by five years.	Drone aerial presenting adequate and increasing vegetative cover > 60% by the end of 5-year monitoring periods.
4 – Weed cover	Weed cover < 5 %	Minimal weed cover across rehabilitated site after five years.	Weed cover < 5% within the rehabilitation areas by the end of 5-year monitoring periods.
5 – Vegetation condition	Vegetation predominantly in Excellent (Keighery, 1994) condition	Restoration of vegetation condition to near pre-clearing state after five years.	Assessment of vegetation condition to be Very Good (Keighery, 1994) or better condition by the end of 5-year monitoring periods.

Table 2. The *rehabilitation* completion criteria in accordance with condition 15 are shown in the table below.

Criterion	Basic floristic data	Completion Target	Completion Criteria
1 – Species richness	Diversity was high with 113 taxa present prior to clearing.	A majority of species richness has returned.	70% of the native species diversity (79 taxa) are present five (5) years after the commencement of rehabilitation.
2 – Kwongkan TEC	A total of 2.5 ha within the project was classified as Kwongkan TEC prior to clearing with 21 proteaceous taxa present	Returns of 70% proteaceous taxa.	15 proteaceous taxa present five (5) years after the commencement of rehabilitation.
		Kwongkan TEC criteria as specified in the relevant approved Conservation Advice[1] has been met.	2 or more Kwongkan TEC diagnostic species making up a significant vegetative component within at least 2.5 ha of the revegetation area five (5) years after the commencement of rehabilitation.
3 – Carnaby's foraging habitat	A total of 1.5 hectares of vegetation within the project area was deemed as high quality Carnaby's black cockatoo foraging habitat. Carnaby's black cockatoo foraging debris from *Banksia baueri*, *Banksia violaceae* and *Banksia obovata* were present to the south of the project area.	Return to high quality Carnaby's black cockatoo foraging habitat as determined by scoring tool[2]. Return of key foraging species (*Banksia baueri*, *Banksia violaceae* and *Banksia obovata*) to the revegetation area.	At least 1.5 hectares of high quality Carnaby's black cockatoo foraging habitat are present five (5) years after the commencement of rehabilitation. *Banksia baueri*, *Banksia violaceae* and *Banksia obovata* are present within the project area.
4 – Vegetation cover	Vegetation cover in unburnt areas in pre-clearing drone aerials.	A majority of vegetation cover has returned within the entire site	Drone aerial showing at least 60% of pre-clearing (unburnt areas) vegetative coverage throughout the site five (5) years after the commencement of rehabilitation.
5 – Vegetation condition	93% of vegetation was in Very Good or Excellent (Keighery, 1994) condition.	Vegetation condition of revegetation area is comparable to pre-clearing condition.	93% of the revegetation area is in a Very Good (Keighery, 1994) or better condition.

[1] Department of the Environment (DOE) (2014). *Approved Conservation Advice for Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia.*

[2] Derived from Commonwealth of Australia (2022) *Referral guidelines for three WA threatened black cockatoo species. Carnaby's Cockatoo (Zanda latirostris), Baudin's Cockatoo (Zanda baudinii) and the Forest Red-tailed Black-cockatoo (Calyptorhynchus banksii naso)*

Criterion	Basic floristic data	Completion Target	Completion Criteria
6 – Number of weed species	16 weed species were recorded	The number of weed species is not higher than those in pre-clearing vegetation	No more than 16 weed species identified.
7 – Weed cover		Weed cover to be < 5%	Weed cover < 5%.
8 – Declared weeds	No declared weeds or Weeds of National Significance identified	No declared weeds or Weeds of National Significance to be present within the revegetation area	No declared weeds or Weeds of National Significance to be present within the revegetation area by the end of the 5-year monitoring period.

Table 3. The rehabilitation completion criteria in accordance with condition 18 are shown in the table below.

Criterion	Basic floristic data	Completion Target	Completion Criteria
1 – Tree density	Number of stems per 10m x 10m quadrat[3] to be identified in remnant vegetation.	Tree density in the revegetation area is comparable to that in the remnant vegetation.	The number of stems in revegetation quadrats is 70% or higher than the average number in the remnant vegetation quadrats by the end of 5-year monitoring period.
2 – Species richness	Species diversity per 10m x 10m quadrat to be identified in remnant vegetation.	Tree density in the revegetation area is comparable to that in the remnant vegetation.	The number of native species in revegetation quadrats is 70% or higher than the average number in the remnant vegetation quadrats by the end of 5-year monitoring period.
3 – Weed cover	Minimal weeds present, mainly small patches of Poaceae weeds.	Minimal weed cover across rehabilitated site.	Weed cover < 2% within the rehabilitation area by the end of 5-year monitoring periods.
4 – Vegetation condition	Surrounding vegetation was in Excellent (Keighery, 1994) condition	Vegetation condition of revegetation area is comparable to surrounding area	Revegetation area is in a Very Good (Keighery, 1994) or better condition by the end of 5-year monitoring periods.

[3] Two 10m x 10m quadrats will be established in the neighbouring remnant vegetation within the Reserve 24007 to identify the basic floristic data.

Schedule 3

The boundary of the combined areas where conditions apply is shown in the maps below (Figure 1, Figure 2 and Figure 3).

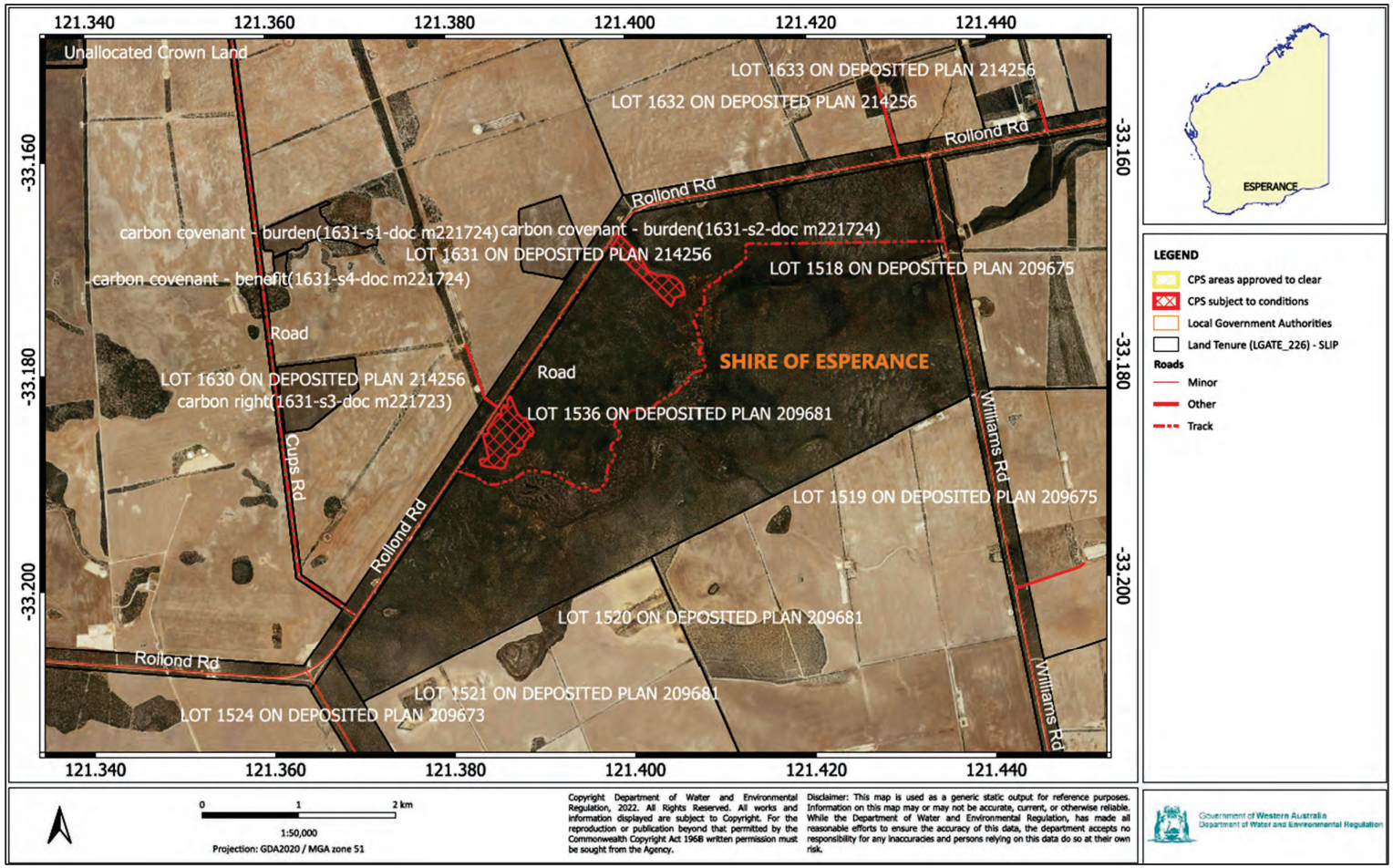


Figure 1. Map of the offset boundary area to be managed as an offset in accordance with condition 16

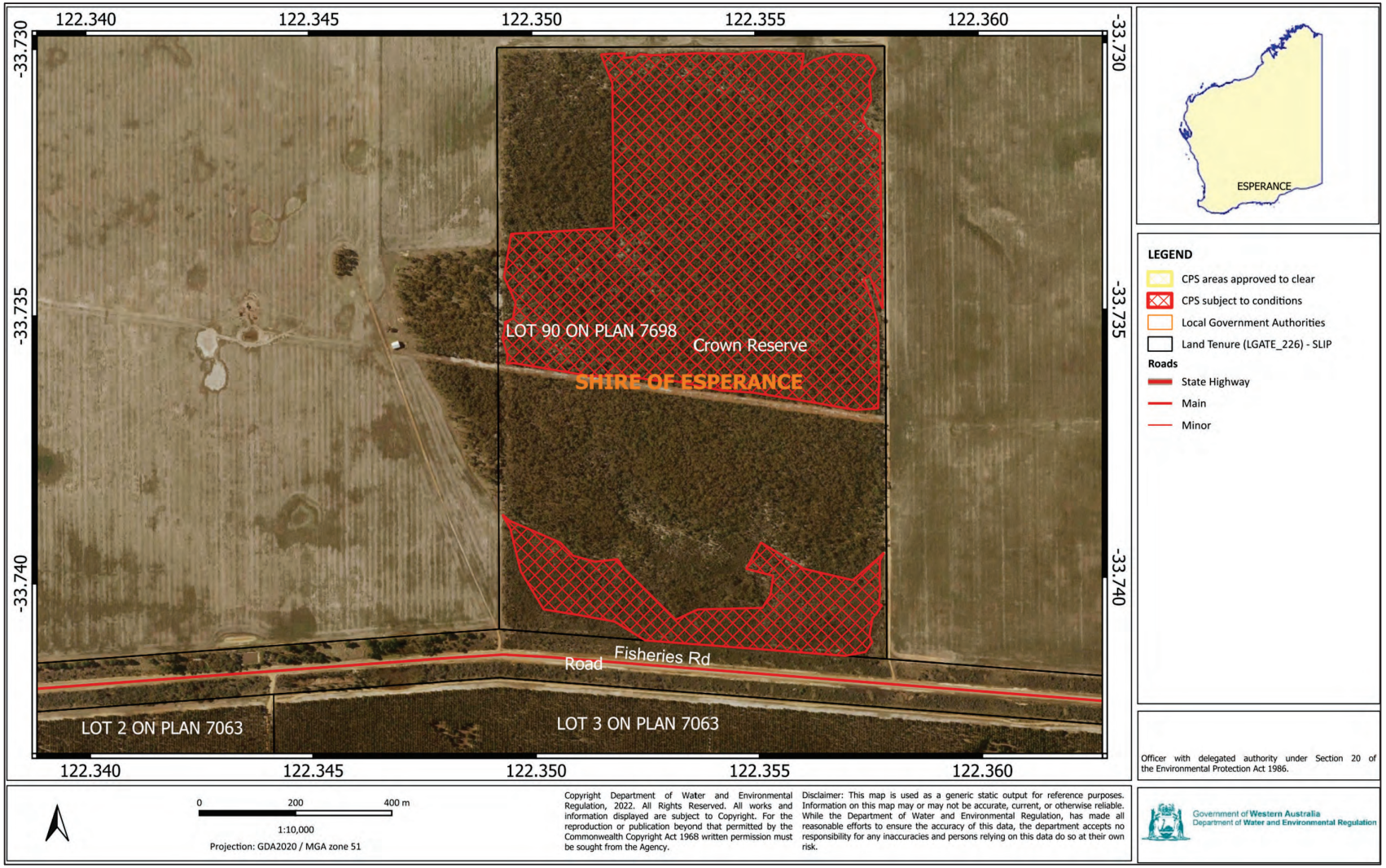


Figure 2. Map of the offset boundary area to be managed as an offset in accordance with condition 17

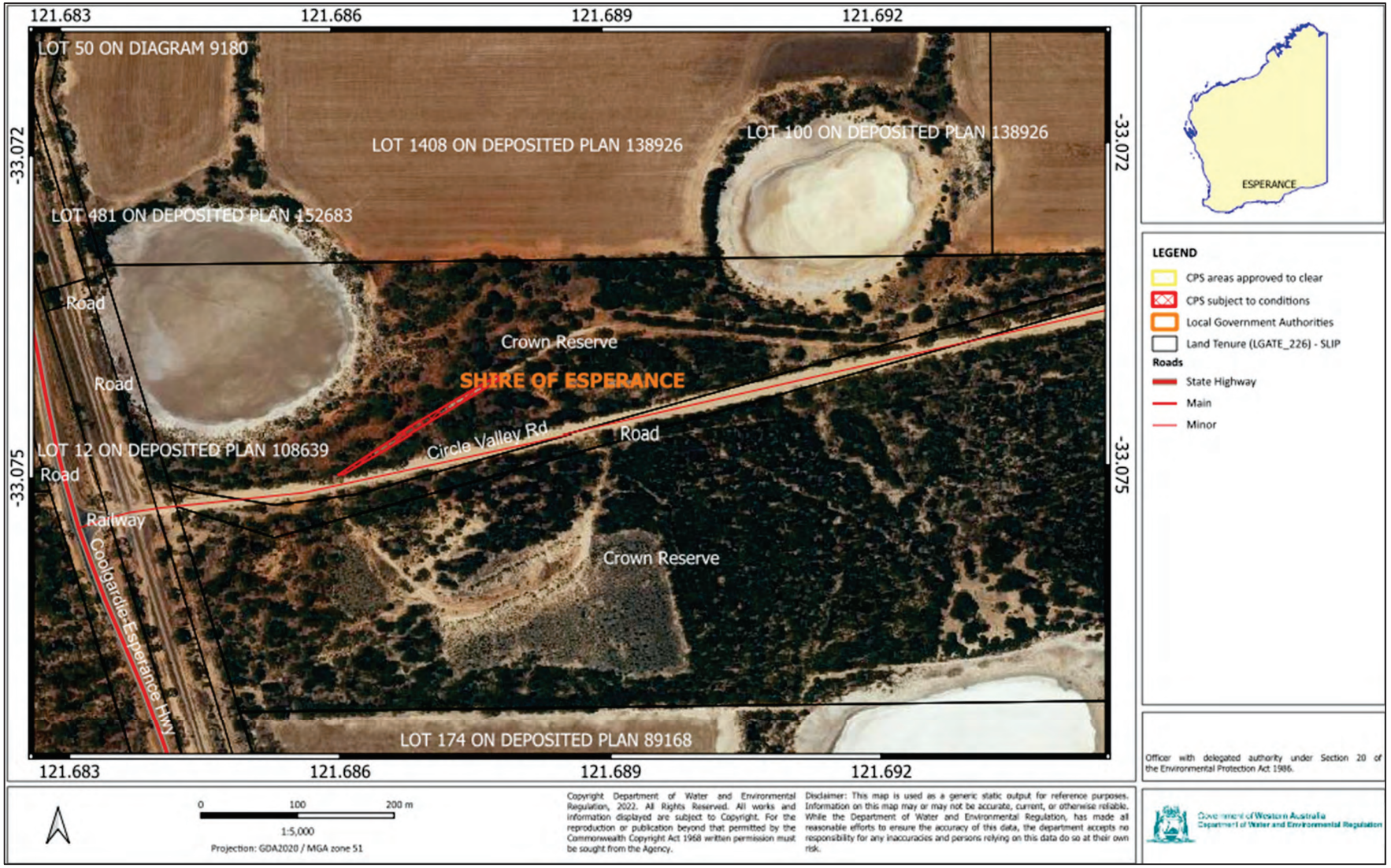


Figure 3. Map of the offset boundary area to be managed as an offset in accordance with condition 18 and 19

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 10602/1
Permit type:	Purpose permit
Applicant name:	Shire of Esperance
Application received:	30 April 2024
Application area:	9.64 hectares (as revised) of native vegetation within a 19.45-hectare footprint
Purpose of clearing:	Road upgrades and gravel extraction
Method of clearing:	Mechanical
Property:	Circle Valley Road / Sassella Road reserve (PIN 1311232), Salmon Gums Circle Valley Road reserve (PIN 1311233, 11646237), Salmon Gums Sassella Road reserve (PIN 11648340), Salmon Gums River Road reserve (PIN 11642270), Cascade Farmers Road reserve (PIN 11642724), East Munglinup Shao Lu Road / Orleans Road reserve (PIN 11645171), Howick / Boyatup Orleans Road reserve (PIN 11645272), Howick
Location (LGA area/s):	Shire of Esperance
Localities (suburb/s):	Boyatup, Cascade, East Munglinup, Howick, and Salmon Gums

1.2. Description of clearing activities

The vegetation proposed to be cleared is distributed across four separate sites along several road reserves within the Shire of Esperance (see Table 1 and Figures 1 - 5, Section 1.5).

The purposes of the proposed clearing are to improve the road safety (Site A and C); and to extract gravel for road construction (site B and D) due to unsuccessful efforts of the Shire of Esperance (the Shire) to source gravel from private properties (Shire of Esperance, 2024a).

Table 1. Proposed clearing area and location of each site across the revised application area

Site	Footprint area (ha)	Clearing area (ha)	Location	Clearing purpose
Site A	0.67	0.67	Orleans Road – Shao-Lu Road Reserve	Road safety – intersection realignment
Site B	7.47	5.58	River Road Reserve	Gravel extraction
Site C	7.30	0.06	Circle Valley Road Reserve	Road safety upgrade
Site D (adjusted)	4.01	3.33	Famers Road reserve	Gravel extraction
Total revised area	**19.45**	**9.64**		

Site A – Orleans Road – Shao-Lu Road Intersection is particularly narrow and sharply bends causing safely issues. The proposed clearing is to facilitate the realigning this intersection to a standard T-Junction configuration to provide a clear indication of right of way to road users (Shire of Esperance 2024b).

Site B - The proposed clearing area at this site is located on the River Road reserve, including both sides of the road and comprising of three separate areas. This site was identified as a last resort for gravel extraction, required for road project, as farmers in the area refused to allow the Shire to extract gravel on their paddocks (Shire of Esperance, 2024c).

Site C - Circle Vally Road is a local distributor road on the Shire of Esperance's road network providing vital link to properties and other access roads in northeast region of Esperance. The road is particularly narrow resulting in safety issues during grain harvest season; therefore, it is required to widen the road to maintain the safety of road users during harvest. The proposed clearing area at this site is 0.061 hectares of vegetation mainly around bends (Shire of Esperance, 2024d).

Site D – The proposed clearing at this site is for the gravel extraction to serve for the Farmers Road bituminisation project, after the effort of the Shire's road construction team to negotiate with private landholders to local gravel sources from historically cleared farmland has been fail (Shire of Esperance, 2024e). The proposed gravel pits are located on the Famers Road reserve, including two separate areas.

1.3. Decision on application

Decision:	Granted
Decision date:	3 September 2025
Decision area:	9.64 hectares of native vegetation within a 19.51-hectare footprint, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (the department) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix G.1), the findings of a flora, fauna and vegetation survey (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing which is to improve road safety across multiple roads and to extract gravel serving for road construction within the Shire.

The assessment identified that the proposed clearing will result in:

- the loss of 7.29 hectares of native vegetation that provides suitable foraging habitat for Carnaby's black cockatoo;
- the loss of 8.91 hectares of suitable habitat for malleefowl (*Leipoa ocellata*),
- the loss of 2.54 hectares of native vegetation that is representative of the Commonwealth listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia' (Kwongkan Shrublands),
- the loss of 3.39 hectares of significant remnant vegetation, including:
    - the loss of 0.06 hectares of native vegetation in an extensively cleared landscape, and
    - the loss of 3.33 hectares of vegetation mapped as and representative of highly cleared Beard Vegetation Association (BVA) Esperance 47.
- the loss of one individual of Priority 2 flora species *Persoonia spathulate* and ten individuals of Priority 3 flora species *Pityrodia chrysocalyx,*
- the potential indirect impacts to the surrounding flora and vegetation, including but not limited to conservation significant flora and Kwongkan Shrublands TEC, from risk of the introduction and spread of weeds and dieback into adjacent native vegetation,
- the potential risk of land degradation from wind erosion,
- the potential impacts to the ecological linkage function of vegetation at site B, and
- the potential direct impacts to fauna utilising the application area during the time of clearing.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the land degradation risk, the impacts to fauna individuals and ecological linkages, and the potential to facilitate the introduction of weeds and dieback can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values through permit conditioning. The loss of one plant of *Persoonia spathulate* (P2) and ten plants of *Pityrodia chrysocalyx* (P3) is unlikely to be significant, given majority of local populations has been avoided. However, impacts on foraging habitat for Carnaby's black cockatoos and malleefowl, Kwongkan shubland TEC and significant remnant vegetation remained significant even after the application of minimisation and mitigation measures and constituted significant residual impacts.

In accordance with the Government of Western Australia's *Environmental Offsets Policy* (2011) and *Environmental Offsets Guidelines* (2014), the Delegated Officer determined that the following offsets are required to address the above significant residual impacts:

- **Offset area 1 (banked offset)**: Crown Reserve 26912 – which vesting has been being changed from 'Recreation and Parklands' to 'Conservation', ensuring the conservation of 34.88 hectares of native vegetation in Excellent (or better) (Keighery, 1994) condition, that provides suitable habitat for malleefowl.

- **Offset area 2**: the change in vesting of Crown Reserve 27355 from 'Parkland' to 'Conservation', to conserve in perpetuity, comprising:
  - 36.98 hectares of native vegetation in Very Good (or better) (Keighery, 1994) condition, that provides high-quality foraging habitat for Carnaby's cockatoo;
  - 17.3 hectares of native vegetation in Very Good (or better) (Keighery, 1994) condition, that is representative of the Kwongkan Shrublands TEC;
  - 9.43 hectares of Vegetation Type B (comprising 9.02 hectares in Excellent (Keighery, 1994) condition and 0.41 hectares in Very Good (Keighery, 1994) condition), that is a representative of 'BVA Esperance 47'.

- **Offset area 3:** the revegetation of 0.10 hectares within Crown Reserve 24007 to a Very Good (Keighery, 1994) condition and conservation in perpetuity by changing the land vesting from 'Parkland' to 'Environmental Conservation'.

The Delegated Officer determined that the above offsets are sufficient to counterbalance the significant residual impacts associated with this project. Further information on the suitability of the offsets provided are summarised in Section 4.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid and minimise measures to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback,
- construction activities to occur within three months of clearing to minimise wind erosion risks,
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity,
- staged clearing at site B to maintain vegetation on one side of the road reserve at any time for fauna dispersal,
- rehabilitating 5.58 hectares at site B and 3.33 hectares at site D post gravel extraction, and
- provision of offsets, as outlined above.

1.5. Site maps

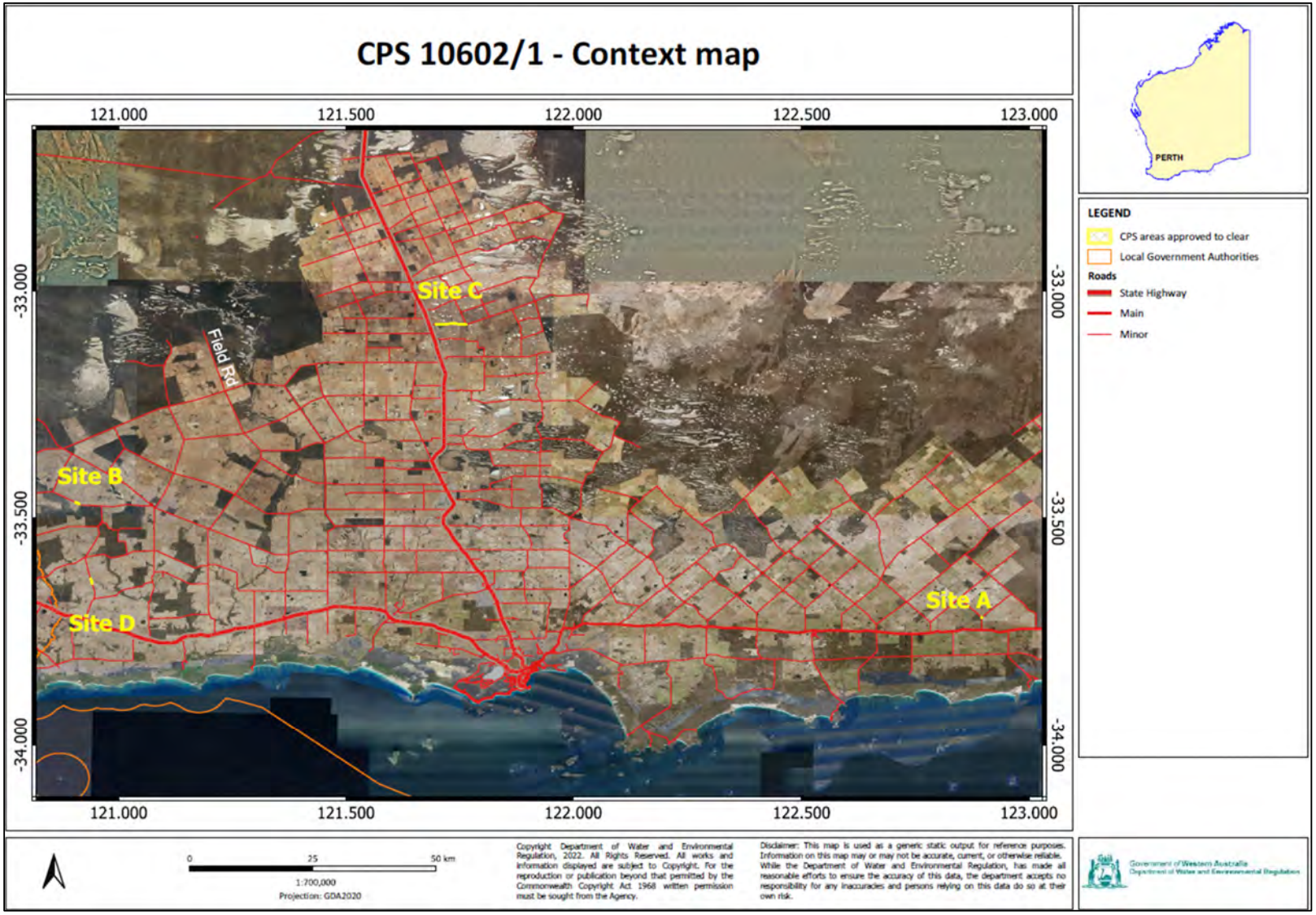


Figure 1 Context map of the application area

Figure 2 Map of the application area – Site A

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

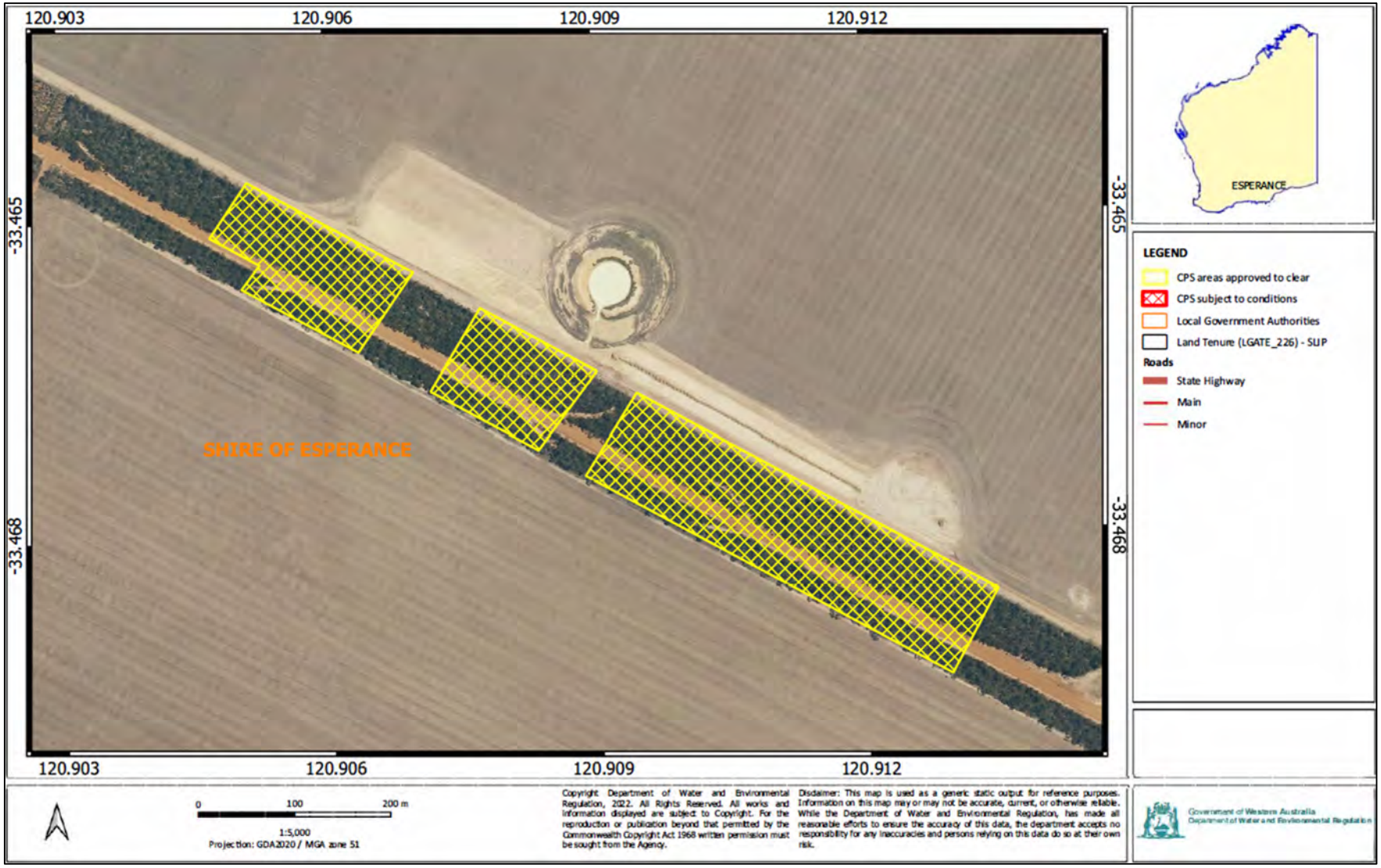


Figure 3 Map of the application area – Site B

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

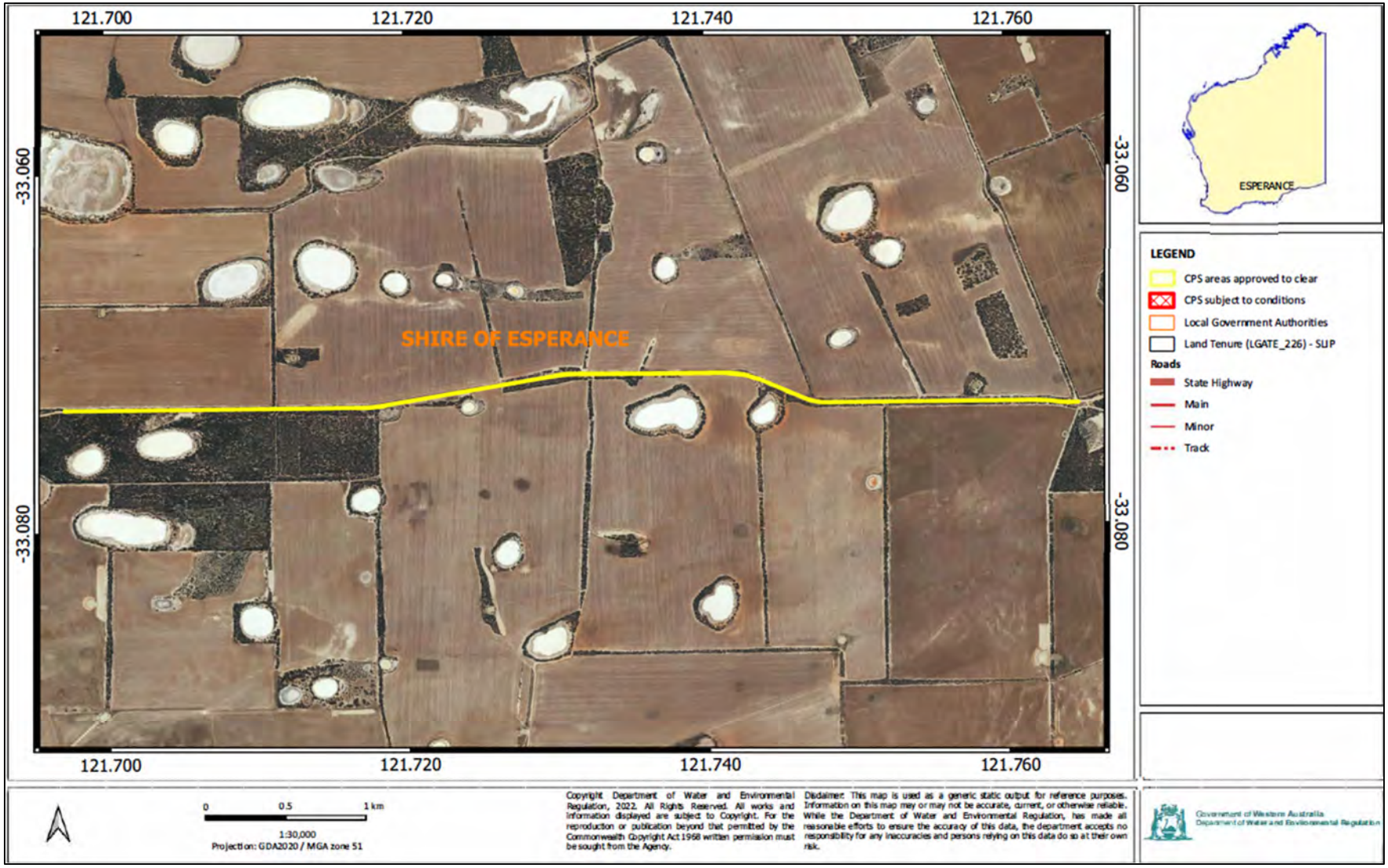


Figure 4 Map of the application area – Site C

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

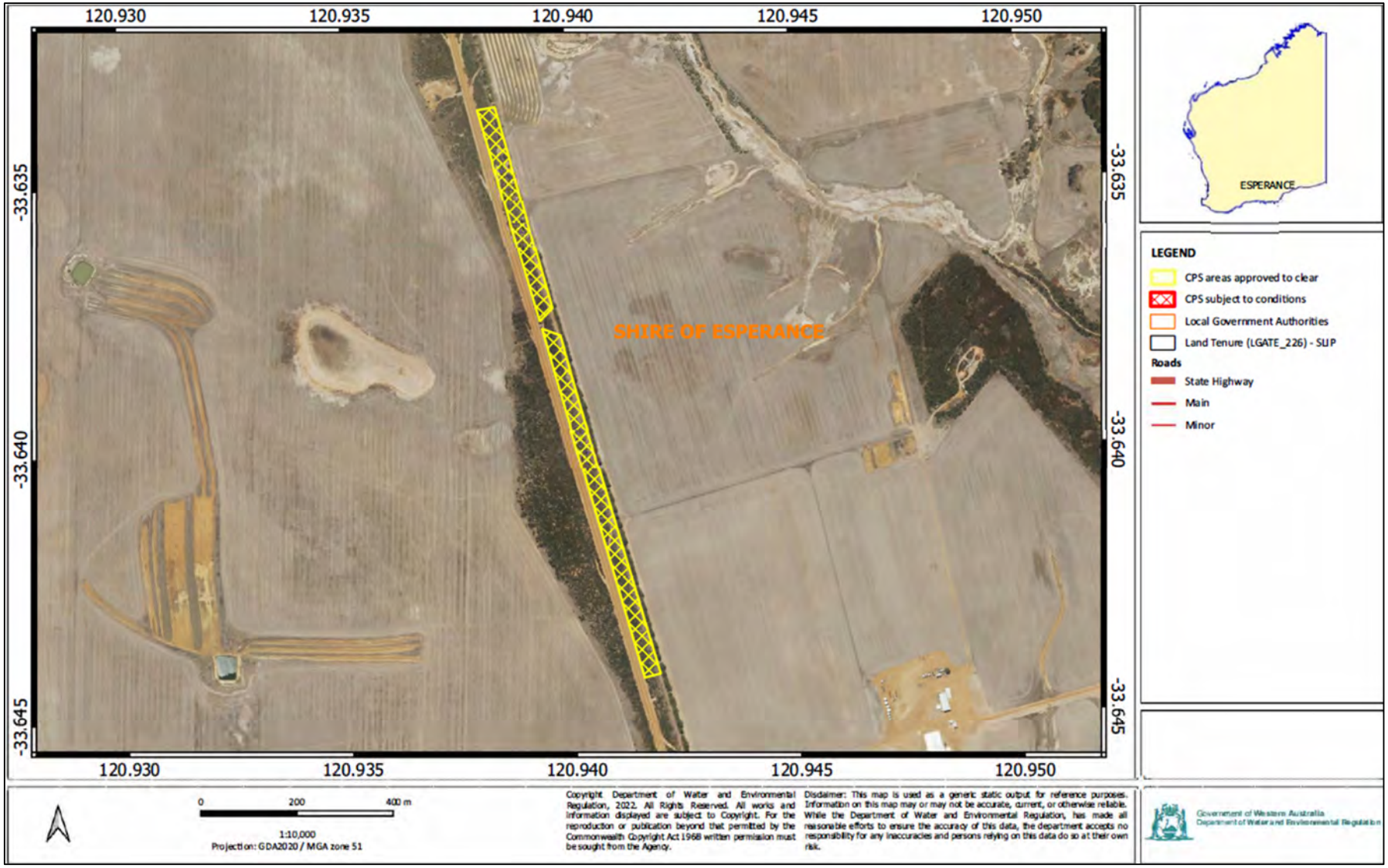


Figure 5 Map of the application area – Site D

The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

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 has 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)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Rights in Water and Irrigation Act 1914* (RiWI Act)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

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)
- *Environmental Offsets Guidelines* (August 2014)
- 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 information submitted by the applicant indicates that mitigation hierarchy has been applied with the following measures:

Avoidance

- The Shire of Esperance has initially proposed to clear at five separate sites with the total proposed clearing area of 12.67 hectares within a 45.80-hectare footprint (Shire of Esperance, 2024a).
- During the assessment process, the Shire has reduced the application area to 9.64 hectares within a 19.45-hectare footprint area by:
  - Excluding site E (proposed clearing area of 3.03 hectares within a 26.29-hectare footprint area) from this application (Shire of Esperance, 2025a).
  - Reducing the proposed clearing area at site D to increase the buffer distance to the threatened flora species *Conostylis lepidospermoides* from 10 metres to 20 metres as per DWER's request (Shire of Esperance, 2024f).
- The Shire advised that during the design process, all attempts have been made to minimise the impacts to threatened and priority flora species found in the survey areas by keeping the amount of clearing to the minimum required to meet road safety standards (Shire of Esperance, 2024f), specifically:
  - Road alignment at site A was designed to avoid the core habitat of *Persoonia spathulate (*P2), resulting in 83 plants have been avoided and only one plant to be cleared.
  - Designs at site C have been made to avoid majority of *Pityrodia chrysocalyx* (P3) population (total of 165 individuals), resulting in ten plants to be impacted. Other five threatened and priority flora species identified in the survey area will not be impacted.
- The Shire also clarified that the proposed clearing at site B and D for gravel extraction has only been applied for after all other options to source road building materials on previously cleared land within operational resource constraints and carting distance have been exhausted (Shire of Esperance, 2024f).

Mitigation

- ***Rehabilitation***

To mitigate the impacts of the proposed clearing, the Shire has proposed to undertake onsite rehabilitation and revegetation over the total area of 9.76 hectares, specifically:

- At site A: an area of 0.848 hectares of the current alignment will be ripped and revegetated after the construction of the new alignment (Shire of Esperance, 2024f).
- At site B: Total area to be cleared of 5.58 hectares will be revegetated post gravel extraction, including 5.12 hectares to provide Carnaby's cockatoo habitat, 5.58 hectares to provide malleefowl habitat (Shire of Esperance, 2024g).
- At site D: Total area to be cleared of 3.33 hectares will be revegetated post gravel extraction, including 1.5 hectares to provide Carnaby's cockatoo habitat, 3.33 hectares to provide malleefowl habitat, 2.54 hectares to provide vegetation representative of the Kwongkan Shrubland TEC, and 3.33 hectares to provide native vegetation within the extensively cleared BVA Esperance_47 (Shire of Esperance, 2024g).

- ***To mitigate the impact to the ecological linkage at site B:*** the Shire proposed to undertake staged clearing by clearing and completing the rehabilitation on one side of the road reserve prior to clearing and rehabilitating the other side (Shire of Esperance, 2025c) (see details in Section 3.2.2).

- ***Other mitigation measures***

To mitigate the potential impacts of the proposed clearing in relation to weed and dieback spreading and land degradation, the Shire proposed following measures (Shire of Esperance, 2024b, 2024c, 2024d, 2024e and 2024f):

- All vehicles and construction equipment will be cleaned prior to start works.
- Follow up spraying of emergent roadside weeds.
- Works will be carried out in the dry (summer) months to minimise spread of dieback (site A and D).
- Avoiding larger habitat trees (larger trees and trees with hollows) where possible at site C.
- Maintaining existing drainage systems, spoon drains and ensuring tracks and other infrastructure areas not disrupt or divert historic water flow pattern during the construction at site C.
- Undertaking clearing works immediately (less than 3 months) prior to the construction/extraction occurring.
- Applying standard construction dust control and mitigation measures, e.g. water trucks, during road construction period at site A and C.
- Applying gravel material over the cleared areas at site A and C to reduce wind erosion.
- Placing cleared vegetation on the rehabilitated section of closed road immediately after ripping to reduce wind erosion at site A.
- Clearing vegetation, stockpiling of topsoil and overburden will be undertaken in quick succession at site B and D to reduce the wind erosion.
- Ground disturbance and clearing of vegetation will be restricted during high winds if dust cannot be adequately controlled.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values. Relevant avoidance and mitigation measures have been enforced as conditions in the granted permit.

After consideration of avoidance and mitigation measures, it was determined that offsets to counterbalance the significant residual impacts to Carnaby's black cockatoo habitat, malleefowl habitat, Kwongkan Shrublands TEC, and significant remnant vegetation in extensively cleared landscape were necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offsets provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values (fauna, flora, biodiversity, threatened ecological community), significant remnant vegetation, and land resources. 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.

3.2.1. Biological values (flora and biodiversity) - Clearing Principles (a) and (c)

Assessment

The application area is mapped within the Mallee and Esperance plains IBRA regions. These regions fall within the South-west botanical province. According to the technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016), the ideal survey timing within this region is during Spring (September – November). The Shire conducted multiple surveys across the application area in accordance with this guidance (Shire of Esperance, 2024b, 2024c, 2024d and 2024e).

Summary of flora and vegetation values of proposed clearing areas

Site A
The proposed clearing of 0.67 hectares at site A occurs in the road reserves at the intersection of Orleans Road and Shao-Lu Road (Figure 1a). Flora and vegetation surveys were undertaken for this site in March and October 2022 (Shire of Esperance, 2024b) (see Appendix F). Two vegetation types were identified in site A (see Appendix B.1), both in (Keighery, 1994) Excellent condition. No threatened or priority ecological communities were identified within the site. No threatened flora species were recorded during the survey, however two priority flora species *Persoonia spathulata* (P2) and *Styphelia rotundifolia* (P3) were recorded within the survey area (Shire of Esperance, 2024b). No *S.rotundiofolia* plants and one *P. spathulata* (over a total population of 84) will be impacted by the proposed clearing at site A (Shire of Esperance, 2024b).

Site B
The proposed clearing of 5.58 hectares at site B occurs along River Road Reserve ((Figure 1b). Flora and vegetation surveys were undertaken for this site in August and September 2023 (Shire of Esperance, 2024c) (Appendix F). The survey identified three vegetation types within site B in Good to Excellent (Keighery, 1994) condition, with majority in Excellent condition (Appendix B.1). No threatened or priority ecological communities were identified within the site. No threatened flora species but one Priority flora species *Acrotriche platycarpa* (P1) with ten individuals were recorded within the survey area (Shire of Esperance, 2024c). However, the proposed clearing has avoided these priority plants with a buffer of 10 metres (Shire of Esperance, 2024c).

Site C
The proposed clearing of 0.06 hectares at site C occurs along Circle Valley Road Reserve ((Figure 1c). Flora and vegetation surveys were conducted for this site in September and November 2022 (Shire of Esperance, 2024d) (Appendix F). The survey identified one vegetation type within site C in Very Good to Completely Degraded (Keighery, 1994) condition (Appendix B.1). No threatened or priority ecological communities were identified to be relevant with vegetation within the site. One threatened flora species *Eucalyptus merrickiae* and five priority flora species *Acacia bartlei* (P3), *A. glaucissima* (P3), *Persoonia cymbifolia* (P3), *Pityrodia chrysocalyx* (P3) and *Melaleuca fissurata* (P4) were recorded within the survey area (Shire of Esperance, 2024d). The proposed clearing at this site will impact 10 plants of *P. chrysocalyx* out of the 165 individuals identified within the survey area (Shire of Esperance, 2024d).

Site D
The proposed clearing of 3.33 hectares at site D occurs along Famers Road Reserve ((Figure 1d). A flora and vegetation survey was conducted for this site in September 2023 (Shire of Esperance, 2024e) (Appendix F). Three vegetation types were identified within site D in Excellent to Completely Degraded (Keighery, 1994) condition, with majority in Very Good condition (Appendix B.1). An area of 2.54 hectares of Kwongkan Shrublands TEC was recorded within the site. Two individuals of the threatened flora species *Conostylis lepidospermoides* were recorded during the survey (Shire of Esperance, 2024e). The proposed clearing area at this site avoided these two threatened plants with a buffer of 20 metres provided (Shire of Esperance, 2024f).

Threatened and priority flora
Flora and vegetation surveys (Shire of Esperance, 2024b, 2024c, 2024d and 2024e) undertaken for the four sites across the application area identified two threatened and eight priority flora species within the footprint area:

- *Conostylis lepidospermoides* (T),
- *Eucalyptus merrickiae* (T),
- *Acrotriche platycarpa* (P1),
- *Persoonia spathulata* (P2),
- *Acacia bartlei* (P3),
- *Acacia glaucissima* (P3),
- *Pityrodia chrysocalyx* (P3),
- *Persoonia cymbifolia* (P3),
- *Styphelia rotundifolia* (P3), and
- *Melaleuca fissurata* (P4).

Conostylis lepidospermoides is a perennial small herb, only recorded in the Mallee and Esperance IBRA bioregions (FloraBase, 1998-). There are 14 records of this species have been mapped within the local area, with one record being within the application area. Two individuals *C. lepidospermoides* were observed during the flora and vegetation survey (Shire of Esperance, 2024e). The applicant initially proposed to avoid these two individuals with a buffer distance of 10 metres. During the assessment process, the application area at this site has been revised to increase the buffer distance to 20 metres as per the Department's request to mitigate potential impacts from clearing and subsequent activities to these threatened plants. With the revised application area and relevant condition imposed in the permit, this species is not likely to be impacted by the proposed clearing.

Eucalyptus merrickiae was recorded within the footprint area at site C during the flora and vegetation surveys with a total of 38 individuals observed, in which two plants have been recorded in the existing maintenance zone of the road (Table 1) (Shire of Esperance, 2024d). Although the footprint area at this site is relatively large (7.30 hectares), the proposed clearing area is small in extent (0.06 hectares) and mainly around bends (Shire of Esperance, 2024d). The applicant has informed that no individuals of *E. merrickia* will be disturbed for the proposed works at site C (Shire of Esperance, 2024d).

Acacia bartlei, *Acacia glaucissima*, *Persoonia cymbifolia*, *Pityrodia chrysocalyx* and *Melaleuca fissurata* were also observed within the footprint at site C (see Table 1) (Shire of Esperance, 2024d).

Table 1. Summary of conservation significant flora species recorded at site C (Shire of Esperance, 2024d)

Species	Number of plants observed	Number of plants in existing maintenance zone	Number of plants to be disturbed
Eucalyptus merrickiae	40	2	0
Acacia bartlei	2	0	0
Acacia glaucissima	167	15	0
Persoonia cymbifolia	2	0	0
Pityrodia chrysocalyx	165	20	10
Melaleuca fissurata	1	0	0

Except for *Pityrodia chrysocalyx,* individuals of other priority flora species within the application area at site C will not be impacted by the proposed works (Shire of Esperance, 2024d). Within the local area, four records of *P. chrysocalyx* have been mapped with the closest mapped record 4.7 kilometres from the application area. Noting the limited number of records in the local area, the population of *P. chrysocalyx* identified at site C can be considered locally significant. However, noting that approximately six per cent (10/165) of the local population is proposed to be clear, the clearing is unlikely to significantly impact the conservation status of this Priority 3 species.

In addition to the above species, in communications with the Department of Biodiversity, Conservation and Attractions (DBCA) regarding the requirement of a Section 40 Authorisation to Take, under the *Biodiversity Conservation Act* 2016, for threatened flora for road work at site C, DBCA has advised that two other priority flora species *Acacia dissona* var. *indoloria* (P3)*, Eucalyptus Brockwayi* (P3) may also be impacted by the proposed works (DBCA, 2024). Considering that these two species have not been recorded within 20-kilometre radius from application area and the clearing area is small in extent, the potential of these species occurring within the clearing area and impacted is minimal.

Acrotriche platycarpa was recorded within the survey area at site B and surrounding areas during the flora and vegetation surveys with a total of 12 individuals observed (Shire of Esperance, 2024c). The application area at this site has been designed to avoid these individuals with a distance of at least 10 metres (Shire of Esperance, 2024c). No *A. platycarpa* plants will be directly impacted by the proposed clearing.

Persoonia spathulata and *Styphelia rotundifolia* were recorded at site A and surrounding areas during the flora and vegetation surveys, in which only *P. spathulata* was observed within the proposed clearing footprint, *S. rotundifolia* was outside the application area and will not be impacted (Shire of Esperance, 2024b). The population of *P. spathulata* at site A comprises 84 individuals, and only one plant could not be avoided and is proposed to be removed (Shire of Esperance, 2024b). Noting that the majority of the population of *P. spathulata* will be avoided, the impact of the proposed clearing on this species is unlikely to be significant.

Threatened ecological community (TEC)

According to available databases, application area at site B and D are mapped within occurrences of the Kwongkan Shrublands TEC. The Kwongkan Shrublands TEC is listed as Endangered under the EPBC Act and regarded by DBCA as a priority 3 PEC. This ecological community is found in the south coast region of Western Australia dominated by flowering shrub species from the Proteaceae family (e.g. *Banksia*, *Grevillea*, *Hakea*). It is facing a high

level of threat due to fragmentation that has resulted in a severe reduction in its integrity across its geographic distribution. The remaining areas of this TEC are vulnerable to the impacts of threats such as dieback due to *Phytophthora cinnamomi*, changing fire regimes, land clearing, invasive species, and climate change (DOE, 2014). The areas considered critical to the survival of the Kwongkan Shrubland TEC cover all patches that meet the key diagnostic characteristics and condition thresholds for the ecological community, and the buffer zones, particularly where this comprises surrounding native vegetation (DOE, 2014).

The flora and vegetation surveys identified the existence of Proteaceae species in vegetation proposed to be cleared at site A, B and D (Shire of Esperance, 2024b, 2024c and 2024e). Vegetation at site A included 22 *Proteaceae* species, however none of two vegetation types identified at this site met the diagnostic threshold of 30 per cent *Proteaceae* species cover. Therefore, vegetation at site A has been identified as not comprise Kwongkan Shurblands TEC (Shire of Esperance, 2024b)

At site B, three vegetation types have been identified including: (1) Mixed mallee over *Hakea laurina* open shrubland; (2) Mixed mallee over *Banksia media* open shrubland; and (3) Scattered mallee over dense *Melaleuca* shrubland (Shire of Esperance, 2024c). Vegetation type 1 did not resemble Kwongkan Shrublands TEC as its dominant shrubland species *Hakea laurina* is not a diagnostic Kwongkan species. Vegetation type 2 had two diagnostic Kwongkan species including *Banksia media* and *Isopogon Formosus* but the predominant species in the shrubland layer of this vegetation type were from the *Cupressaceae*, *Myrtaceae*, and *Fabaceae* families (Shire of Esperance, 2024c). None of three vegetation types at site B met the diagnostic criterion of at least 30 per cent cover of *Proteaceae* species (DOE, 2014), therefore the vegetation at site B has been identified as not comprise Kwongkan Shrublands TEC (Shire of Esperance, 2024c).

Kwongkan Shrublands TEC was confirmed to be present at site D. A total area of 2.54 hectares of vegetation in Good to Excellent condition found to meet the guidelines for this TEC will be impacted by the proposed clearing at this site (Shire of Esperance, 2024e).

The applicant has advised that revegetation and rehabilitation of at least 2.54 hectares of Kwongkan Shrublands TEC at site D, after completing the gravel extraction will be undertaken (Shire of Esperance, 2024g) and has provided a revegetation plan.

Weed invasion was recorded at all sites (Shire of Esperance, 2024b, 2024c, 2024d and 2024e). The proposed clearing may increase the distribution of weeds along roads and within adjacent vegetation that may represent the Kwongkan Shrublands TEC. Additionally, the spread of dieback into adjacent areas is considered a risk as vegetation at all sites (except for site C) are susceptible to dieback (Shire of Esperance, 2024b, 2024c and 2024e). Given this, it is considered likely that the proposed clearing will increase the risk of distribution of dieback along the application areas and within adjacent vegetation that may represent the Kwongkan Shrublands TEC.

Conclusion

Given the above, the proposed clearing will lead to the loss of 2.54 hectares of Kwongkan Shrublands TEC and constitute a significant residual impact. This significant residual impact has been addressed through the conditioning of environmental offset requirement. Whilst the proposed clearing will remove one individual of Priority 2 flora species *Persoonia spathulate* and ten individuals of Priority 3 flora species *Pityrodia chrysocalyx*, the impacts are unlikely to be significant noting majority of local populations has been avoided. The proposed clearing may increase the risks of introduction and spread of weeds and dieback.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoid and minimise clearing, to reduce the direct impacts to native vegetation.
- weed and dieback management to manage potential impacts to adjacent vegetation as a result of the proposed clearing.
- undertaking revegetation at site D to restore at least 2.54 hectares of Kwongkan Shrublands TEC.
- provision of an offset to counterbalance the remaining significant impact to Kwongkan TEC (see section 4).

3.2.2. Biological values (fauna and biodiversity) - Clearing Principle (a) and (b)

Assessment

According to available databases, 38 conservation significant fauna species have been recorded within the combined local area (combined 20-kilometre radius of each site). A number of these records are associated with marine, estuarine or freshwater habitats that do not occur within the application area.

Basic reviews of fauna values were undertaken across all sites the application area (Shire of Esperance, 2024b, 2024c, 2024d and 2024e). Based on the results of the desktop assessment and the findings of the reviews, the application area is considered likely to comprise suitable habitat for seven conservation significant species. Including five bird and two mammal species, as follows:

- Carnaby's black cockatoo (*Zanda latirostris* - Endangered)
- Malleefowl (*Leipoa ocellata* – Vulnerable)
- Grey falcon (*Falco hypoleucos* – Vunerable)
- Peregrine falcon (*Falco peregrinus* - Other specially protected species)
- Western rosella (inland) (*Platycercus icterotis xanthogenys* – Pirority 4)
- Chuditch (*Dasyurus geoffroii* - Vulnerable)
- Quenda (*Isoodon fusciventer* - Priority 4)

Bird species

Carnaby's black cockatoo (*Zanda latirostris*)

Carnaby's black cockatoo was once abundant in Western Australia. Since the late 1940s, the species has suffered a 30 per cent contraction in range, a 50 per cent decline in population, and disappeared from more than a third of its breeding range between 1968 and 1990 (Saunders, 1990; Johnstone and Storr, 1998; Saunders and Ingram, 1998; Garnett et al. 2011). One of the major reasons for this decline is the loss of nesting trees and foraging habitat (Commonwealth of Australia, 2022).

There are three key components of Carnaby's BC habitat: foraging habitat; roosting habitat; and breeding habitat. Any tall trees, generally close to a riparian environment, can provide potential roosting habitat for BC (Commonwealth of Australia, 2022). A tree suitable for BC breeding is defined as a tree with a diameter of 50 centimetres or greater at a height of 1.5 metres above the ground. Carnaby's BC generally forages within six kilometres of a night roost site and, while nesting, within a 12-kilometre radius of their nest site (Commonwealth of Australia, 2022). Carnaby's BC forages on the seeds, nuts and flowers of a large variety of plants including *Proteaceou*s species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008). Critical habitat for Carnaby's BC includes any habitat that provides feeding, watering, regular night roosting, or potential for breeding (DPAW, 2013).

Sites A, B and D are located within the known distribution range of Carnaby's cockatoo (non-breeding range). Foraging evidence of Carnaby's BC has been observed within the application area at site B and in a close proximity to site D (Shire of Esperance, 2024c and 2024e). A total of 7.29 hectares of suitable foraging habitat for Carnaby's was recorded across these three sites (Shire of Esperance, 2024b, 2024c and 2024e). The suitable habitat was largely due to the presence of the Proteaceae-rich vegetation across these sites, in particular, vegetation representative of the Kwongkan Shrublands TEC at site D that is known to provide high quality foraging habitat (Commonwealth of Australia, 2022).

According to available datasets, the application area is located outside of the predicted breeding range for Carnaby's and is over 90 kilometres from the nearest breeding record for Carnaby's cockatoo. Given the application area is not mapped within the breeding range of this species and the distance to the closest known breeding site, the vegetation within the application area is unlikely to be supporting foraging by breeding individuals.

The closest known roost sites are recorded about 12.5 kilometres from site A, 17.8 kilometres from site B and over 35 kilometres from site D. Within 15 kilometres from site B, numerous pine plantations and pine windbreaks are present which provide opportunistic roosting habitat for BC (Shire of Esperance, 2024c). Immediately outside the application area at site D, planted *Eucalyptus gomphocephala* and *E. Camaldulensis* along the eastern edge of the Farmers Road reserve provide potential roosting habitat for Carnaby's (Shire of Esperance, 2024e). During the non-breeding period, BC will mainly forage in areas up to 20 kilometres from night roosting habitat, and in some cases this distance is greater. Given this and the available water sources in close proximity (see Appendix B.1), vegetation proposed to be cleared at these sites is likely to support foraging by roosting individuals.

The ongoing and historic loss and fragmentation of black cockatoo habitat has been a major contributor to the decline in populations of Carnaby's, in particular the loss of nesting trees, loss of foraging habitat and fragmentation of breeding habitat from foraging resources. Therefore, remnant patches of vegetation are considered important in maintaining black cockatoo habitat connectivity across the landscape. An advice received from DBCA for a strategic clearing permit application of the Shire of Esperance has highlighted the conservation values of remnant vegetation in the area on black cockatoo habitat, specifically the proteaceous and myrtaceous woodlands which are an important food source for Carnaby's cockatoos (DBCA, 2023).

Given the above, it is considered that the 7.29 hectares of foraging habitat within the application area is significant for Carnaby's cockatoo due to the dominance of preferred foraging species (native proteaceous plant species), the

Good to Excellent condition of the majority of the vegetation across the sites, and the highly cleared nature of the surrounding local areas.

To mitigate the loss of black cockatoo foraging habitat, the Shire has committed to revegetate site B and D post gravel extraction to achieve the areas of Carnaby's foraging habitat at least equal to those pre-clearing, including at least 5.12 hectares at site B and 1.5 hectares at site D (Shire of Esperance, 2024g). However, based on the offset calculations consistent with the WA Environmental Offset Metric, the proposed rehabilitation is insufficient to counterbalance 100% of significant residual impacts to foraging habitat for Carnaby's BC caused by the proposed clearing and an offset is therefore required.

Malleefowl (*Leipoa ocellata*)

According to available databases, malleefowl has been recorded within the local areas of site B, C and D with the closest record is mapped at 14.6, 6.1 and 7.0 kilometres from the application area at each site, respectively. Habitat for malleefowl includes arid and semi-arid areas dominated by mallee eucalypts on sandy soils (DPaW, 2016). They are known to also occur in mulga (*Acacia aneura*), broombush (*Melaleuca uncinata*), scrub pine (*Callitris verrucosa*), Eucalyptus woodlands and coastal heathlands. Malleefowls require a sandy substrate and abundant leaf litter for the successful construction of nest mounds (DPaW, 2016).

Suitable habitat for malleefowl has been identified at site B and D due to the presence of long un-burnt semi-arid woodland and/or mallee shrublands/heathlands with abundance of leaf litter and sandy substrate for mound-building (Shire of Esperance, 2024c and 2024e). Meanwhile, noting the small clearing size along an existing road which has been impacted by the edge effects, the vegetation proposed to be cleared at site C is unlikely to provide suitable habitat for malleefowls. A total of 8.91 hectares of vegetation mainly in Good (Keighery, 1994) or better conditions providing suitable breeding habitat for malleefowl is proposed to be cleared across the application area (within sites B and D).

Advice received from DBCA regarding the significance of the clearing of malleefowl habitat in the Shire of Esperance stated that the proposed clearing within a highly cleared landscape would be considered significant due to cumulative impacts (DBCA, 2022). Approximately 16.37 hectares of malleefowl habitat have been impacted by the Shire's previous clearing permits[1]. Given this, the impacts of the proposed clearing to malleefowl habitat are considered significant.

To mitigate the loss of malleefowl habitat, the Shire has committed to revegetate 8.91 hectares at site B and D post gravel extraction (Shire of Esperance, 2024f and 2024g). However, based on the offset calculations consistent with the WA Environmental Offset Metric, the proposed rehabilitation is insufficient to 100 % counterbalance the significant residual impacts to malleefowl habitat caused by the proposed clearing and an offset is therefore required.

Grey falcon (*Falco hypoleucos*) and Peregrine falcon (*Falco peregrinus*)

The grey falcon occurs in arid and semi-arid inland Australia and is associated with timbered lowland plains such as tussock grassland, open woodland, and particularly Acacia shrublands that are crossed by tree-lined watercourses (TSSC, 2020). The grey falcon roosts and nests in the tallest trees along watercourses, particularly river red gum (*Eucalyptus camaldulensis*) and coolibah (*Eucalyptus coolabah*) (TSSC, 2020). There is one no record of grey falcon mapped at 18.8 kilometres from site A (QGIS database). Considering the absence of grey falcon's preferred nesting tree species and perennial watercourses in close proximity to the application at site A, the proposed clearing area may not be a preferable habitat for this species.

The peregrine falcon is found Australia-wide and occurs in a range of habitats including woodlands, grasslands and coastal cliffs, usually near watercourses (DAWE, 2020). Preferred roosting and breeding habitat for the peregrine falcon includes granite outcrops and coastal cliffs, but in the absence of these habitats, the species has been known to utilise the nests of other bird species or tree hollows for breeding (Marchant & Higgins, 1993). Peregrin falcons have been recorded within 20-kilometres radius from most of the sites, except for site C (See Table B.4). It is considered that the habitat present across the application area may also provide suitable transient foraging habitat for this species as individuals migrate through the landscape. However, noting that the peregrine falcon is a highly mobile species with a large home range that does not rely on specialised niche habitats, it is unlikely that the vegetation proposed to be cleared represents significant habitat for peregrine falcon and the proposed clearing is not likely to significantly impact this species, noting the availability of larger remnants of suitable foraging habitat within the surrounding areas.

Western rosella (inland) (*Platycercus icterotis xanthogenys*)

The Western rosella is the smallest species of rosellas and only distributed in the southwest of Western Australia (Australian Museum, 2025). This species' habitat is associated with open eucalyptus forests and timbered areas, and their diet includes seeds, fruits, flowers, insects and insects' larvae (Australian Museum, 2025). Two records of this bird species are mapped within the local area of site C, with the closest one mapped at 8.1 kilometres from the application area. Consider that vegetation at site C does not comprise the western rosella's preferred habitat, the proposed clearing is unlikely to impact this species.

Mammal species

Chuditch (*Dasyurus geoffroii*)

Chuditch are known to occupy a range of habitats including jarrah forests, eucalypt woodlands, mallee shrublands and heathland. The species uses denning habitat types such as hollow logs, burrows or rock crevices (DEC, 2012a). According to available databases, two records occur within the local area of site C with the closest record 7.6 kilometres from the application area. Noting the small extent of clearing at this site, the proposed clearing is unlikely to significantly impact to chuditch's habitat. However, the areas proposed to be cleared may provide linkage between remnant vegetation across the landscape, especially at site B (Shire of Esperance, 2024c).

Quenda *(Isoodon fusciventer*)

Quendas are ground-dwelling marsupials, typically associated with forest or woodlands near watercourses, where understorey consists of dense scrub and leaf litter is abundant (DEC, 2012b). This species has a wide coastal distribution from Guilderton to east of Esperance with a patchy distribution within the jarrah and karri forests and the Swan Coastal Plain (DEC, 2012b). This species is known from four records within the local area of site D, with the closest record approximately 7.9 kilometres from this site. The dense vegetation within site D provides suitable habitat for quendas and digging evidence has been observed further south along the same road reserve (Shire of Esperance, 2024e). Noting this, quendas are likely to utilise the vegetation as site D and the proposed clearing is likely to impact to this species habitat. However, given the linear nature of the proposed clearing at this site and the proximity to an active road, this site is not considered to provide significant habitat for the species. Furthermore, noting that the area proposed to be cleared will be revegetated after gravel extraction, the proposed clearing is not likely to impact quenda's habitat in long term. The clearing activities may have direct impact on the quenda individuals if they are utilising the application area at the time of clearing which can be mitigated by the implementation of slow, directional clearing to allow any individuals to move into adjacent suitable habitat in the local area.

Ecological linkages

The proposed clearing is located along roadsides which may contribute to ecological linkage function enabling fauna to move between areas of remnant vegetation. Noting the nature of the proposed clearing at site A, C and D which is only part/or one side of the remnant vegetation along the road reserves proposed to be cleared and/or the rehabilitation will be undertaken when the construction/extraction works complete (see section 3.1), the ecological linkage function is not expected to be severed by the proposed clearing at these sites.

However, the proposed clearing at site B is likely to significantly impact to the ecological linkage function as the clearing will remove the vegetation on both sides of the road. This would sever the ecological linkage and prevent the movement of fauna along this corridor in short-term until the area to be rehabilitated. To mitigate the impact to the ecological linkage at this site, the applicant proposed to undertake staged clearing by firstly clearing the northern side of the road then rehabilitating the cleared area after gravel extraction. When the rehabilitation of the northern side completes, the area on southern side will then be cleared and rehabilitated consequently (Shire of Esperance, 2025c). This approach is considered to be able to maintain the ecological linkage available for fauna dispersal at this site for the whole period of the extraction activities and has been enforced as the permit's conditions.

The proposed clearing may cause degradation of adjacent and nearby remnant native vegetation by facilitating the spread of weeds and dieback.

Referral to the Commonwealth Department of Climate Change, the Environment, Energy and Water (DCCEEW)

Noting that the proposed clearing at site B and site D may impact the habitat for fauna species that are protected under the EPBC Act, the Shire of Esperance has submitted referrals to DCCEEW. The outcomes of the referral decision are not controlled actions (Shire of Esperance, 2025b).

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 7.29 hectares of significant foraging habitat for Carnaby's cockatoo and 9.81 hectares of suitable malleefowl habitat. The proposed clearing is considered to contribute to the cumulative impacts on Carnaby's cockatoo and malleefowl habitat in the Shire of Esperance. For

the reasons set out above, it is considered that the impacts of the proposed clearing on Carnaby's cockatoo foraging habitat and malleefowl habitat constitutes a significant residual impact. In accordance with the *Environmental Offsets Policy* (2011) and *Environmental Offsets Guidelines* (2014), this significant residual impact has been addressed through the conditioning of environmental offset requirements, as outlined under Section 4.

The proposed clearing is considered unlikely to contain significant habitat for the remaining conservation significant fauna that have been recorded in the local area. However, individuals may utilise the application area for dispersal through the landscape. Slow, directional clearing will allow fauna species to disperse into other areas of remnant vegetation.

The proposed clearing at site B may significantly impact the ecological linkage function. This impact can be mitigated by applying staged clearing to maintain vegetation on one side of the road reserve at any time for fauna dispersal. The clearing also has the potential to increase the risk of introduction and spread of weeds and dieback into adjacent vegetation impacting the quality of fauna habitat which can be minimised by applying weed and dieback management measures.

Conditions

To address the above impacts, the following measures will be required as conditions on the clearing permit:

- weed and dieback management to manage potential impacts to adjacent vegetation,
- slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity,
- staged clearing at site B to maintain vegetation on one side of the road reserve at any time for fauna dispersal,
- revegetation of 5.58 hectares at site B and 3.33 hectares at site D post gravel extraction in accordance with the Shire's Revegetation Management Plans to achieve at least 6.62 hectares of Carnaby's black cockatoo foraging habitat and 8.91 hectares of malleefowl habitat, and
- provision of offsets (see section 4).

3.2.3. Environmental value: Significant remnant vegetation - Clearing Principles (e)

Assessment

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The application area is located within the Mallee and Esperance plains IBRA regions. The vegetation system Esperance _47 mapped at site C retains 14.9 per cent of their pre-European extent. The vegetation within the local area of site C retains 12.1 per cent of the pre-European extent (see section B.2). Given this, sites C and D are considered to be located within an extensively cleared landscape. A total of 3.39 hectares of vegetation proposed to be cleared at site C and D is considered as significant remnants in areas that have been extensively cleared.

To mitigate the loss of significant remnant vegetation, the Shire has committed to revegetating site D post gravel extraction (Shire of Esperance, 2024g). However, based on the offset calculations consistent with the WA Environmental Offset Metric, the proposed rehabilitation is insufficient to counterbalance the significant residual impacts to significant remnant vegetation caused by the proposed clearing and offsets are required.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 3.39 hectares of native vegetation that is a significant remnant within extensively cleared landscapes, including 3.33 hectares of the BVA Esperance_47 (site D), and 0.06 hectares within a highly cleared local area (site C). It is considered that the impacts of the proposed clearing on significant remnant vegetation constitutes a significant residual impact.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- provision of offsets (see section 4).

3.2.4. Environmental value: Land resource - Clearing Principles (g)

Assessment

The mapped soils are prone to wind erosion and subsurface acidification. Taking into consideration that the cleared areas at site A and C will be replaced with a hard surface road, the risk of wind erosion is considered to be minor

and temporary. The wind erosion risk at site B and D for gravel extraction is also likely to be not significant, provided that the clearing and stockpiling topsoil activities will be undertaken in quick succession (Shire of Esperance, 2024f). The potential impacts of wind erosion can be managed through a condition on the permit requiring construction/extraction works to begin with three months of clearing, which will prevent the prolonged exposure of bare sandy soils.

Subsurface acidification of the soil can be promoted by the degradation of additional organic material, including the debris associated with the clearing activities. However, this risk can be minimised if the cleared plant material is removed from the clearing area and disposed appropriately. For sites A and C, where clearing extents are small and the final land use is for roads, the risk of land degradation due to subsurface acidification is considered negligible.

In contrast, gravel extraction at sites B and D may increase the risks of subsurface acidification by exposing deeper acidic soil layers. To mitigate these potential impacts, the applicant is recommended to develop a gravel extraction management plan with targeted measures, such as:

- Conducting soil acidification assessments at multiple depths to detect potential risks.
- Avoiding unnecessary excavation into deeper clay or loamy subsoils that may worsen acidity.
- Providing training for relevant Shire officers and extraction operators on recognizing indicators of acidic soils.
- Halting extraction immediately if acidic soils are encountered, with expert engagement for appropriate remediation (e.g., lime application).

The applicant has confirmed that all construction/extraction activities will occur above the groundwater table, ensuring groundwater will not be impacted (Shire of Esperance, 2024f). According to the available database, no watercourses are present within the application area across all sites. Noting the above, the risk that the surface and groundwater to be impacted is considered low.

Conclusion

Based on the above assessment, the proposed clearing may result in land degradation through wind erosion. This can be managed through a condition on the permit, requiring undertaking the works over the cleared area within three months of the date of clearing.

The proposed works following the clearing at site B and D may result in land degradation risks due to subsurface acidification. As the impacts of the subsequent works are beyond the native vegetation clearing permit application assessment, no specific clearing permit conditions are applied. However, it is strongly recommended that the applicant develops an extraction management plan to minimise the potential impacts of subsurface acidification.

Conditions

To address the impact of wind erosion, a condition has been imposed which requires activities for which clearing is authorised to commence within three months of clearing.

3.2.5. Relevant planning instruments and other matters

The clearing permit application was advertised on DWER's website on 4 July 2024, inviting submissions from the public within a 21-day period. No submissions were received.

No Aboriginal sites of significance have been mapped within the application 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.

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts (SRI) remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- the loss of 7.29 hectares of native vegetation that provides foraging habitat for Carnaby's cockatoo (*Zanda latirostris*),
- the loss of 8.91 hectares of suitable breeding habitat for malleefowl (*Leipoa ocellata*),
- the loss of 2.54 hectares of native vegetation that is representative of the Kwongkan Shrublands TEC,
- the loss of 3.39 hectares of significant remnant vegetation, including:
    - the loss of 0.06 hectares of native vegetation in an extensively cleared landscape, and
    - the loss of 3.33 hectares of vegetation mapped as and representative of highly cleared BVA Esperance_47.

The applicant proposed following offset measures:

- Utilizing an existing banked offset at the Crown Reserve 26912 (Lot 1536 on Deposited Plan 209681) to offset the impacts to malleefowl habitat. The Reserve 26912 is currently vested as 'Recreation and Parklands', which is in the process of vesting changing to 'conservation' in accordance with the clearing permit CPS 10158/1.
- Changing the vesting of the Crown Reserve 27355 (Lot 80 on Deposited Plan 207664) from 'Parkland' to 'Conservation' (Shire of Esperance, 2024g) to offset the impacts to Carnaby's cockatoo foraging habitat, Kwongkan Shrublands TEC and BVA Esperance_47.
- Revegetation of 0.32 hectares to a Very Good (Keighery, 1994) condition and changing the vesting of 15.14 hectares of the Crown Reserve 24007 (Lot 1499 on Deposited Plan 91061) (including the revegetation area) from 'Parkland' to "Environmental Conservation" (Shire of Esperance, 2025d) to offset the impacts to significant remnant vegetation at site C.

In support of the above offset proposal, the Shire has provided site assessment reports and associated data for Crown Reserves 26912 and 27355 (See Table 2) (Shire of Esperance, 2023 and 2024g). For the revegetation offset within Crown Reserve 24007, a revegetation plan has also been provided with measurable completion criteria (Shire of Esperance, 2024f). The Shire also informed that the proposed revegetation at Crown Reserve 24007 has been commenced in May-June 2025 (Shire of Esperance, 2025d). The Shire is not penalised for undertaking the revegetation prior to the permit to be granted.

Table 2. Summarised information of proposed land acquisition offsets

Proposed offset sites	Crown Reserve 27355 (Lot 80 on Deposited Plan 207664) (new offset)	Reserve 26912 (Lot 1536 on Deposited Plan 209681) (banked offset)
Size	99.73 hectares, with 95.86 hectares of native vegetation.	Total area: 1,661.7 hectares, with approximately 60% was burnt in 2016. • 153.3 hectares used for offsetting impacts to BVA 512 under CPS 8608/1. • 91.1 hectares used for offsetting impacts to BVA 512 under CPS 8884/1. • 87.16 hectares used for offsetting impacts to malleefowl habitat and significant remnant vegetation under CPS 9524/1. • 14.62 hectares used for offsetting impacts to malleefowl habitat and significant remnant vegetation under CPS 10158/1. • Remaining area: 1,315.5 hectares, including approximately 411.2 hectares of unburnt vegetation that provides suitable habitat for malleefowl.
Location	Shire of Esperance, 50 to 137 kilometres from the proposed clearing sites	Shire of Esperance, 26 to 150 kilometres from the proposed clearing sites
Vesting	Current purpose is 'Parkland', the purpose will be changed to 'Conservation'	The purpose of the reserve will be changed from 'Recreation and Parklands' to 'Conservation'.
Site values	According to the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024): • The majority (67%) of the reserve is in Excellent (Keighery, 1994) condition, with remaining areas varying from Very Good to Completely Degraded (Keighery, 1994) condition. • Vegetation consists of two vegetation types (VT): o VT A: *Eucalyptus occidentalis* woodland over dense *Anarthria laevis* sedgeland ~ BVA Esperance 931. o VT B: Scattered *Nuytsia floribunda* over Myrtaceous and Proteaceous mallee-heath ~ BVA Esperance 47. • 22.18 hectares represents the Kwongkan Shrublands TEC (VT B), in Excellent to Very Good (Keighery, 1994) condition. • 68.70 hectares represents the Swamp Yate (*Eucalyptus occidentalis)* woodlands in seasonally inundated clay basins (South Coast) PEC (VT A), in Excellent to Very Good (Keighery, 1994) condition. • Contains suitable habitat for: o Carnaby's Black Cockatoo - *Zanda latirostris* – Endangered (90.88 hectares of high-quality foraging habitat and 68.7 hectares of night roosting habitat). o Quenda - *Isoodon obesulus fusciventer* - Priority 4 • Contains Priority 3 flora species *Acacia bartlei*.	According to the Offset Proposal under CPS 9524/1 (Shire of Esperance, 2023): • Majority vegetation in Pristine to Excellent (Keighery, 1994) condition. • Vegetation consists of four VT: o VT A: Mixed Mallee woodland over mixed Melaleuca shrubland o VT B: *Eucalyptus occidentalis* woodland with central seasonally inundated basin o VT C: *Eucalyptus salmonophloia* woodland with *Eucalyptus loxophleba* with sparse *Melaleuca* and *Acacia* shrubland over sedges o VT D: *Melaleuca strobophylla* dominated salt lake with *Melaleuca calycina* and *Austrostipa elegantissima* • Mapped with BVA 51, 482, 924 and the restricted vegetation association 512. • Suitable malleefowl habitat (VT A).

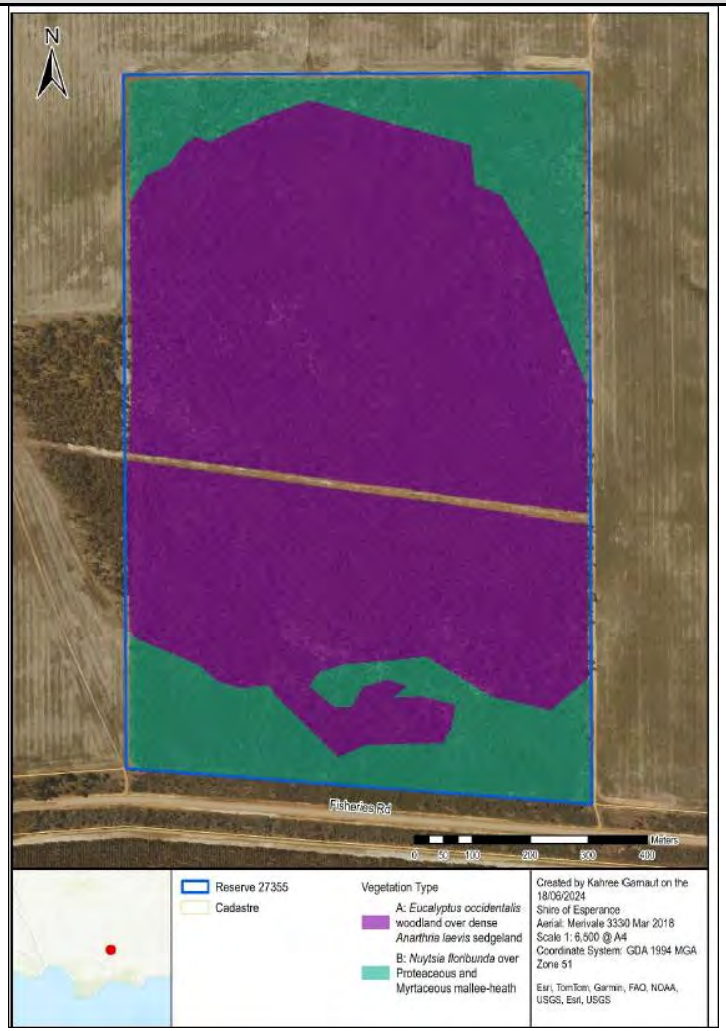
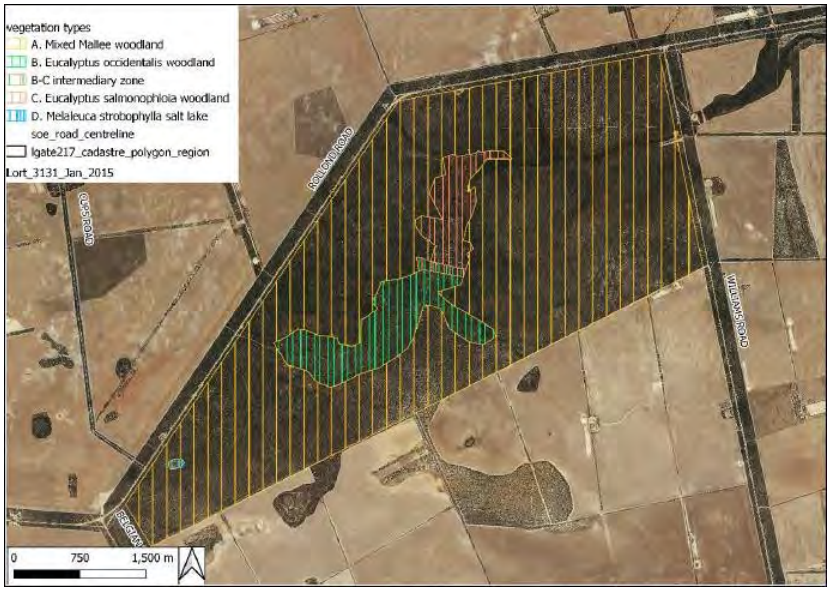
Proposed offset sites	Crown Reserve 27355 (Lot 80 on Deposited Plan 207664) (new offset)	Reserve 26912 (Lot 1536 on Deposited Plan 209681) (banked offset)
Vegetation type map	 **Figure 6. Map of vegetation type within Reserve 27355**	 **Figure 7. Map of vegetation type within Reserve 26912**

Figure 8. Map of the proposed offset sites (crosshatched red) in relation to the application area (crosshatched yellow)

Based on the summary information in Table 2, the proposed offset sites at Crown Reserves 27355 and 26912 are considered to be appropriate to offset the significant residual impacts to Carnaby's black cockatoo habitat, malleefowl habitat, Kwongkan Shrublands TEC and BVA Esperance_47 of the proposed clearing. The proposed revegetation area within Crown Reserve 24007, which is located approximately 450 metres from Site C, is adequate to offset the impacts to significant remnant vegetation at site C.

In assessing whether the proposed offsets are adequate and proportionate to the significance of environmental values being impacted, calculations using the *WA State Offset Metric* were undertaken. The calculations indicated that:

- The conservation of 36.98 hectares of native vegetation in Crown Reserve 27355, in Very Good (or better) (Keighery, 1994) condition, that provides high-quality foraging habitat for Carnaby's cockatoo, would counterbalance 100% of the SRI to Carnaby's cockatoo foraging habitat.
- The conservation of 34.88 hectares of native vegetation in Crown Reserve 26912, in Excellent (or better) (Keighery, 1994) condition, in the unburnt vegetation that provides suitable habitat for malleefowl, would counterbalance 100% of the SRI to malleefowl habitat.
- The conservation of 17.3 hectares of native vegetation in Crown Reserve 27355, in Very Good (or better) (Keighery, 1994) condition, that is representative of the Kwongkan Shrublands TEC would counterbalance 100% of the SRI to the Kwongkan Shrublands TEC.
- The conservation of 9.43 hectares of Vegetation Type B in Crown Reserve 27355 (comprising 9.02 hectares in Excellent (Keighery, 1994) condition and 0.41 hectares in Very Good (Keighery, 1994) condition), that is a representative of 'BVA Esperance_47', would counterbalance 100% of the SRI to 'BVA Esperance_47'.
- The revegetation of 0.10 hectares in Crown Reserve 24007 to a Very Good (Keighery, 1994) condition and conservation in perpetuity, would counterbalance 100% of the SRI to the extensively cleared landscape at Site C.

The remaining revegetated area of 0.22 hectares in Crown Reserve 24007 and remaining land acquisition areas within Crown Reserve 27355, 26912 and 24007 will be banked for the Shire's future clearing permit applications, if applicable at the time of such future assessments.

The Delegated Officer considers that this adequately counterbalances the significant residual impacts listed above. The justification for the values used in the offset calculation is provided in 0

End

Appendix A. Additional information provided by applicant

During the assessment, the applicant responded to requests for information which is presented in the following table.

Request for information	Further information provided
Avoidance and mitigation measures, including the avoidance of the threatened flora species *Conostylis lepidospermoides* with the buffer distance of 20 metres.	Details of avoidance and mitigation measures were provided by the applicant. This information is presented in Section 3.1 of the Decision Report.
Revision of revegetation plans	The revegetation plans have been revised with measurable completion criteria which have been enforced as the permit conditions. The information regarding proposed revegetation plans is presented in Sections 3 and 4 of the Decision Report.
Mitigation of land degradation risks due to wind erosion and subsurface acidification resulting from the proposed clearing	The applicant provided further mitigation measures which is presented in Section **Error! Reference source not found.** of the Decision Report.
Supporting documentation for proposed offset sites	The applicant provided offset proposals and supporting documents for the newly proposed offset site Crown Reserve 27355, revegetation plan and offset proposal for a portion of Crown Reserve 24007. This information is presented in Section 4 and 0 of the Decision Report.

Appendix B. Site characteristics

B.1. 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 DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix C.

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td>Local context</td><td>The area proposed to be cleared includes four separate sites which are part of native vegetation tracts in the intensive land use zone of Western Australia. The vegetation proposed to be cleared is located on road reserves. Site B, C is adjacent to agricultural lands.

Aerial imagery indicates the local areas (20-kilometre radius from the centre of the sites proposed to be cleared) retain approximately 12.1 percent (for site C), and from 30.9 to 40.5 per cent (for the remaining sites) of the original native vegetation cover (see B.2).</td></tr>
<tr><td>Ecological linkage</td><td>The sites within application area occur along roadsides which partly form linkages mapped under the Roadside Conservation layer.</td></tr>
<tr><td>Conservation areas</td><td>There are no mapped conservation areas within the application sites. The nearest conservation area to the application area is an unnamed conservation covenant which is located approximately four kilometres from site C.</td></tr>
<tr><td>Vegetation description</td><td>Biological surveys (Shire of Esperance, 2024b, 2024c, 2024d, and 2024e) indicate the vegetation within the proposed clearing area consists of following vegetation types:
<table>
<tr><th>Site</th><th>Vegetation type</th></tr>
<tr><td>A</td><td>• Type 1: Scattered Eucalyptus angulosa over mixed heath with myrtaceous and Allocasuarina shrubs (0.409 hectares);
• Type 2: Scattered Eucalyptus occidentalis over mixed Melaleuca shrubland with Hakea cinerea (0.263 hectares).</td></tr>
<tr><td>B</td><td>• Type 1: Mixed mallee over Hakea laurina open shrubland (1.62 hectares);
• Type 2: Mixed mallee over Banksia media open shrubland (3.50 hectares);
• Type 3: Scattered mallee over dense Melaleuca shrubland (0.46 hectares).</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td></td><td>
<table>
<tr><td>C</td><td>• Mixed mallee woodland over open mixed shrubland (0.06 hectares).</td></tr>
<tr><td>D</td><td>• Type 1: Scattered Nuytsia floribunda over Eucalyptus pleurocarpa and Eucalyptus tetraptera over mixed myrtaceous and proteaceous closed heathland (1.50 hectares);
• Type 2: Eucalyptus leptocalyx and Eucalyptus micranthera woodland with open heathland (0.60 hectares);
• Type 3: Scattered Nuytsia floribunda over Eucalyptus pleurocarpa over Acacia myrtifolia dominated shrubland (1.23 hectares).</td></tr>
</table>

Representative photos are available in Appendix F.

This is partially consistent with the mapped vegetation types:
• Esperance_1047, which is described as Mixed heath with scattered mallee e.g. tallerack Eucalyptus tetragona (Site A);
• Oldfield_47, which is described as Mixed heath with scattered mallee e.g. tallerack Eucalyptus tetragona.(site B);
• Salmon gums_486, which is described as Mosaic: Medium woodland; salmon gum & red mallee / Shrublands; mallee scrub Eucalyptus eremophila (Site C);
• Esperance_47, which is described as Mixed heath with scattered mallee e.g. tallerack Eucalyptus tetragona (Site D) (Shepherd et al, 2001).

The mapped vegetation types retain approximately 85.2, 43.8, 35.5 and 14.9 per cent of the original extent, respectively (Government of Western Australia, 2019).</td></tr>
<tr><td>Vegetation condition</td><td>Biological surveys (Shire of Esperance, 2024b, 2024c, 2024d, and 2024e) indicate the vegetation within the proposed clearing area is in Excellent to Completed Degraded (Keighery, 1994) condition, specifically:
• Site A: Excellent condition.
• Site B: Excellent to Good condition.
• Site C: Very good to Completed degraded condition.
• Site D: Excellent to Degraded condition.

The full Keighery (1994) condition rating scale is provided in Appendix D. Representative photos are available in Appendix F.</td></tr>
<tr><td>Climate</td><td>The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers.

Climate: Mean maximum temperature is 21.9 degrees Celsius.
Mean minimum temperature is 12.1 degrees Celsius.

Rainfall: Mean annual rainfall is 617.1 millimetres.

(Esperance station, BOM, 2024)</td></tr>
<tr><td>Soil and landform description</td><td>The soils across the application area are mapped as:
<table>
<tr><th>Site</th><th>Code</th><th>Name</th><th>Landform and soil type</th></tr>
<tr><td>A</td><td>245Es_6</td><td>Esperance 6 Subsystem</td><td>Level plain with occasional subdued sandsheets. Alkaline grey deep sandy duplex soils and grey deep sandy (gravelly) duplex soils with associated pale deep sand.</td></tr>
<tr><td>B</td><td>246Sc_6</td><td>Scaddan 6 Subsystem</td><td>Gently undulating plain with fixed shallow incised stream channels flowing in a unidirectional pattern towards the major rivers. Alkaline grey shallow sandy duplex soils associated calcareous loamy earths plus other minor soils.</td></tr>
</table>
</td></tr>
</table>

Characteristic	Details			
	C	246Ha_1	Halbert 1 Subsystem	Gently to undulating plain with many small playas. Lunettes and sand dunes are common on eastern side of lakes. Alkaline grey deep and shallow sandy duplex & associated salt lake soils, pale deep sands and calcareous loamy earths
	D	245Mu_1	Munglinup 1 Subsystem	Externally drained plains and rises with gently inclined slopes some small level plains on upper slopes and catchment divides. Grey deep and shallow sandy duplex (gravelly) minor pale deep sands and gravelly duplex and deep sandy gravels
Land degradation risk	All sites proposed to clear has low land degradation risks due to salinity, flooding, water erosion, water logging and phosphorus export. Meanwhile, wind erosion and subsurface acidification are the common land degradation risks of all sites (see Appendix B.5) (DPIRD, 2024).			
Waterbodies	The desktop assessment and aerial imagery indicated that no watercourses transect the area proposed to be cleared. The closest watercourse at each site are as follows: • Site A: A non-perennial waterbody, approximately 370 metres away • Site B: A man-made perennial waterbody, approximately 50 metres away • Site C: A non-perennial waterbody, approximately 30 metres away • Site D: A non-perennial minor river, approximately 200 metres away			
Hydrogeography	The application area is not located within any public drinking water sources areas or groundwater areas proclaimed under the RiWI Act. Groundwater salinity varies among sites. Site D is mapped with the lowest salinity of 7,000-14,000 milligrams per litre total dissolved solids (mg/l TDS). Sites A and B are mapped with salinity of 14,000-35,000 mg/l TDS; while this value is larger than 35,000 mg/l TDS for site C.			
Flora	A total of 101 conservation significant flora species are mapped within the combined local area, including nine threatened and 92 priority species. There are 52 species found on the same soil types and 62 species found in the same vegetation types as of the application area. The closest record is *Eucalyptus merrickiae* (threatened) which was mapped within the footprint of site C. The Shire has stated that no *E.merrickiae* plants will be impacted by the proposed clearing at this site (Shire of Esperance, 2024d). The surveys (Shire of Esperance, 2024b, 2024c, 2024d and 2024e) observed several threatened and priority flora species within the application area and surrounding areas, including *Conostylis lepidospermoides* (Threatened), *Eucalyptus merrickiae* (Threatened), *Acrotriche platycarpa* (Priority 1), *Persoonia spathulata* (Priority 2), *Acacia bartlei* (Priority 3), *Acacia glaucissima* (Priority 3), *Persoonia cymbifolia* (Priority 3), *Pityrodia chrysocalyx* (Priority 3), *Styphelia rotundifolia* (Priority 3), and *Melaleuca fissurata* (Priority 4). The proposed clearing (if granted) will remove one plant *Persoonia spathulate* at site A and 10 plants of *Pityrodia chrysocalyx* at site D.			
Ecological communities	Portions of sites B and D are mapped within the Kwongkan Shurblands TEC, listed as Endangered under EPBC Act. The survey (Shire of Esperance, 2024e) identified approximately 2.54 hectares of Kwongan TEC at site D.			
Fauna	The desktop assessment identified that a total of 38 threatened or priority fauna species have been recorded within the combined local area, including 13 threatened fauna species, eight priority fauna species, and 17 specially protected fauna species. Species with the closest record is the Priority 4 species hooded plover (*Thinornis cucullatus*), recorded approximately one kilometre from site D. Sites A, B, and D are mapped within the distribution range of Carnaby's black cockatoos (*Zanda latirostris*); however, no breeding sites and roosting sites have been mapped within			

Characteristic	Details
	the local areas of all sites. The surveys (Shire of Esperance, 2024e) observed evidence of Carnaby's black cockatoos foraging within site B and in close proximity to site D.

B.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Esperance Plains (Site A and D)	2,899,941	1,494,451	51.5	55.1	28.4
Mallee (Site B and C)	7,395,894	4,180,938	56.5	1,289,384	17.4
Vegetation association*					
Esperance_1047 (Site A)	217,777	185,587	85.2	-	-
Oldfield_47 (Site B)	24,126	10,563	43.8	-	-
Salmon gums_486 (Site C)	278,641	98,998	35.5	-	-
Esperance_47 (Site D)	408,773	60,834	14.9		
Local area (20km radius)					
Site A	50,835	125,544	40.5	-	-
Site B	45,401	129,565	35.0	-	-
Site C	18,219	151,126	12.1	-	-
Site D	40,332	130,684	30.9	-	-

*Government of Western Australia (2019)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records in the local area	Are surveys adequate to identify? [Y, N, N/A]
Site A							
Persoonia spathulata	P2	Y	Y	Y	0.07	3	Y
Styphelia rotundifolia	P3	Y	N	N	14.93	2	Y
Site B							
Acrotriche platycarpa	P1	Y	Y	Y	16.02	1	Y
Site C							
Acacia bartlei	P3	Y	Y	Y	1.50	3	Y
Acacia glaucissima	P3	Y	Y	N	8.64	8	Y
Eucalyptus merrickiae	T	Y	Y	Y	0.00	47	Y
Melaleuca fissurata	P4	Y	N	Y	19.10	3	Y
Pityrodia chrysocalyx	P3	Y	Y	Y	4.74	4	Y
Persoonia cymbifolia	P3				>20	0	Y
Acacia dissona var. *indoloria*	P3				>20		N

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records in the local area	Are surveys adequate to identify? [Y, N, N/A]
Eucalyptus Brockwayi	P3				>20		N
Site D							
Conostylis lepidospermoides	T		Y	Y	0.00	14	Y

T: threatened, P: priority

B.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records in local areas	Are surveys adequate to identify? [Y, N, N/A]
Site A						
Grey falcon (*Falco hypoleucos*)	VU	Y	Y	18.6	1	N/A
Peregrine falcon (*Falco peregrinus*)	OS	Y	Y	13.8	2	N/A
Carnaby's cockatoo (*Zanda latirostris*)	EN	Y	Y	10.3	20	N/A
Site B						
Malleefowl (*Leipoa ocellata*)	VU	Y	Y	14.6	4	N/A
Carnaby's cockatoo (*Zanda latirostris*)	EN	Y	Y	13.4	2	N/A
Chuditch (*Dasyurus geoffroii*)	VU	Y	Y	>20	4	N/A
Site C						
Chuditch (*Dasyurus geoffroii*)	VU	Y	Y	7.6	2	N/A
Peregrine falcon (*Falco peregrinus*)	OS	Y	Y	19.5	4	N/A
Western rosella (inland) (*Platycercus icterotis xanthogenys*)	P4	Y	Y	8.1	2	N/A
Sire D						
Peregrine falcon (*Falco peregrinus*)	OS	Y	Y	9.9	4	N/A
Quenda (Isoodon fusciventer)	P4	Y	Y	7.9	4	N/A
Malleefowl (*Leipoa ocellata*)	VU	Y	Y	7.0	6	N/A
Carnaby's cockatoo (*Zanda latirostris*)	EN	Y	Y	5.1	45	Y

OS: other specially protected, EN: endangered, VU: vulnerable, P: priority

B.5. Land degradation risk table

Risk categories	Site A	Site B	Site C	Site D
Wind erosion	H1	H1	H1	H2
Water erosion	L1	L1	L1	L1
Salinity	L1	L1	M1	L1
Subsurface Acidification	H2	H1	H1	H2
Flood risk	L1	L1	L1	L1
Water logging	L2	L1	M1	L1
Phosphorus export risk	L2	L1	L1	L1

Note:

L1 <3% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)

L2 3-10% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)

M1 10-30% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)
M2 30-50% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)
H1 50-70% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)
H2 >70% of map unit has a moderate/high to high/extreme (or is presently acid/saline for the risk of subsurface acidification/salinity)

(DPIRD, 2024).

Appendix C. 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 area proposed to be cleared contains conservation significant flora species, suitable habitat for conservation significant fauna species, and threatened and priority ecological communities.	At variance	Yes *Refer to Section 3.2.1 and 3.2.2, above.*
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 area proposed to be cleared contains habitat for several conservation significant fauna species.	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain threatened flora species.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
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: The area proposed to be cleared contains species that can indicate the Kwongkan Shrubland TEC.	At variance	Yes *Refer to Section 3.2.1, above.*
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 the mapped vegetation type and native vegetation in the local area is inconsistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is considered to be part of a significant ecological linkage in the local area.	At variance	Yes *Refer to Section 3.2.3, above.*

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: Given the distance to the nearest conservation areas, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.	Not likely to be at variance	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: Given no watercourses/wetlands are mapped within the application area, the proposed clearing is not associated with a watercourse or wetland.	Not likely to be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are highly susceptible to wind erosion and subsurface acidification. Noting the extent of the application area and the condition of the vegetation, the proposed clearing is likely to have an appreciable impact on land degradation.	May be at variance	Yes *Refer to Section 3.2.4, 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: Given no watercourses are mapped within the application area and the application area is not mapped within any public drinking water sources areas or groundwater areas proclaimed under the RiWI Act, the proposed clearing is unlikely to impact the quality of surface or underground water.	Not likely to be at variance	No
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 mapped soils and topographic contours in the surrounding area of all sites do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.	Not likely to be at variance	No

Appendix D. 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 Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E. Offset calculator value justification

WA Environmental Offsets Calculators
Rationale for scores used in the offset calculators

Calculation 1 - Carnaby's black cockatoo habitat

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description		
Significant impact	Clearing of native vegetation that comprises suitable foraging habitat for Carnaby's cockatoo	Significant impact (hectares)	7.29
		Quality (scale)	7.00
		Total quantum of impact	5.10

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit	Onsite revegetation of native vegetation that provides foraging habitat for Carnaby's cockatoo	Proposed rehabilitation (area in hectares)	6.62	Time until ecological benefit (years)	15.00
		Current quality of rehabilitation site (scale)	1.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	1.00	Rehabilitation credit	2.21
		Future quality WITH rehabilitation (scale)	6.00		

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	5.10
	Rehabilitation credit	2.21
	Significant residual impact	2.89

Environmental value (step 1)	7.29 hectares of native vegetation that provides significant foraging habitat for Carnaby's cockatoo	Significant impact (step 2, part A)	7.29
		Rehabilitation credit (step 2, part B)	2.21
		Significant residual impact (step 2, part C)	2.89

***Area* (offset site)**

Offset calculation *Area*

	Description						
Offsets calculation	Change in vesting and conservation in perpetuity of significant foraging habitat for Carnaby's cockatoo	Proposed offset (area in hectares)	36.98	Duration of offset implementation (maximum 20 years)	20.00	Offset value	2.89
		Current quality of offset site (scale)	8.00	Time until offset site secured (years)	2.00	What-if Analysis	100.0%
		Future quality WITHOUT offset (scale)	8.00	Risk of future loss WITHOUT offset (%)	15.0%		
		Future quality WITH offset (scale)	8.00	Risk of future loss WITH offset (%)	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	1.00				
		Confidence in offset result (%)	90.0%			OFFSET ADEQUATE?	YES

Calculation	Score (Area)	Rationale
Conservation significance		
Description	BC habitat	Clearing of 7.29 hectares of native vegetation that provides significant foraging habitat for Carnaby's cockatoo.
Type of environmental value	Species (flora/fauna)	BC species are listed as a threatened fauna species under the Commonwealth EPBC Act and state BC Act.
Conservation significance of environmental value	Endangered	Carnaby's cockatoo is listed as Endangered under both the EPBC Act and BC Act.
Landscape-level value impacted	yes/no	The impact is to an area of foraging habitat in area.
Significant impact		
Description	Clearing of native vegetation that provides suitable habitat for Carnaby's black cockatoo	7.29 hectares of native vegetation (6.05 hectares of high quality and 1.24 hectares of low quality) that provides suitable foraging habitat for Carnaby's cockatoo is proposed to be cleared for road upgrades and gravel extraction.
Significant impact (hectares) / Type of feature	7.29	Based on the available information from environmental assessments of the four sites, the proposed clearing area includes a total of approximately 7.29 hectares of native vegetation that provides suitable foraging habitat for Carnaby's cockatoo (approximately 0.67 hectares at Site A, 5.12 hectares at Site B, and 1.5 hectares at Site D).
Quality (scale) / Number	7.00	Based on the available information from environmental assessments of the four sites, the proposed clearing area includes 6.05 hectares of high quality and 1.24 hectares of low-quality foraging habitat. Evidence of Carnaby's cockatoo foraging was observed at Site B and in close proximity to Site D.
Rehabilitation credit		
Description	Onsite revegetation of native vegetation that provides foraging habitat for Carnaby's cockatoo	The Shire proposes to undertake revegetation within the gravel pit areas at Site B and Site D, following clearing and extraction, utilising species that provide significant foraging habitat for Carnaby's cockatoo in the region.
Proposed rehabilitation (area in hectares)	6.62	The total area proposed to be revegetated onsite at site B and D is 8.91 hectares, comprising 5.58 hectares at Site B and 3.33 hectares at Site D. The Shire has committed to return at least 5.12 hectares of Carnaby's cockatoo foraging habitat at Site B and 1.5 hectares at Site D. Therefore, the total extent of Carnaby's cockatoo foraging habitat to be returned through onsite revegetation is 6.62 hectares.
Current quality of rehabilitation site / Start number (of type of feature)	1.00	The areas to be revegetated within Sites B and D will be largely devoid of native vegetation following clearing and gravel extraction. However, noting site context which has had evidence of BC foraging within the site or in proximity, a start value of 1 is applied.
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	1.00	Given the areas to be revegetated within Sites B and D will be largely devoid of native vegetation following clearing and gravel extraction, it is reasonable to assume there will be no change in quality in the absence of onsite revegetation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plans for Sites B and D, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing composition of foraging habitat for Carnaby's cockatoo within Sites B and D. Therefore, with best practice

Calculation	Score (Area)	Rationale
		revegetation methodology, it is assumed that the revegetation areas will improve the quality of foraging habitat for Carnaby's cockatoo to at least moderate quality. The future quality with offset also considers the contextual factors of the revegetation site as habitat for Carnaby's cockatoo.
Time until ecological benefit (years)	15.00	It is assumed that the benefits of revegetation of black cockatoo foraging habitat will be available after 15 years. This is a conservative measure based on available literature (e.g., Lee et al. (2013) who identified evidence of foraging on marri and Banksia in rehabilitated mine pit areas, ranging from 8-14 years of age) and the understanding that the species to be planted include Proteaceous species and Myrtaceous shrubs and mallees that may mature and provide calorific benefit over a shorter period of time. An extra five years has been allowed to account for the delay in commencement of the revegetation. The Shire has confirmed that the revegetation at site B and D will occur within 5 years of permit start date (Shire of Esperance, 2024g).
Confidence in rehabilitation result (%)	0.8	There is a moderate to high level of confidence that the quality of Carnaby's cockatoo habitat within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plans for Sites B and D, including measurable completion criteria based on the pre-clearing composition of foraging habitat for Carnaby's cockatoo within Sites B and D.
Offset		
Description	Change in vesting and conservation in perpetuity of significant foraging habitat for Carnaby's cockatoo	The Shire has proposed to alter the vesting of Lot 80 on Deposited Plan 207664 (Crown Reserve 27355) to Conservation in perpetuity, which contains suitable roosting habitat for Carnaby's cockatoo.
Proposed offset (area in hectares)	36.98	The area required to be conserved in perpetuity to counterbalance the significant residual impacts to native vegetation that provides significant foraging habitat for Carnaby's cockatoo by 100%.
Current quality of offset site	8.00	Based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024), high-quality foraging habitat for Carnaby's cockatoo occurs within Crown Reserve 27355 and is in Very Good to Excellent (Keighery, 1994) condition.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	8.00	Given native vegetation within Crown Reserve 27355 contains Carnaby's cockatoo foraging habitat in Very Good to Excellent (Keighery, 1994) condition and is not currently subject to any ongoing management measures or significant threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	8.00	Given native vegetation within Crown Reserve 27355 is currently in Very Good to Excellent (Keighery, 1994) condition and the proposed offset consists of conservation of the existing native vegetation in perpetuity with no ongoing land management proposed to improve vegetation quality, it is likely that the quality of Carnaby's cockatoo foraging habitat will be maintained with the offset.
Time until ecological benefit (years)	1.00	As the proposed offset relates to conserving an existing area of native vegetation in perpetuity, the minimum of one year for this field is applied.
Confidence in offset result (%)	0.9	There is a high level of confidence that the offset will be achieved, and that conservation of the offset site (in perpetuity) would successfully mitigate the future risk of loss of the site and maintain its current quality.

Calculation	Score (Area)	Rationale
Duration of offset implementation (maximum 20 years)	20.00	Crown Reserve 27355 will be vested in Conservation in perpetuity. Therefore, the maximum duration of 20 years is applied.
Time until offset site secured (years)	2.00	It is assumed that the change in vesting to Conservation of Crown Reserve 27355 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 27355 is currently vested as "Parkland" and therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	5%	The Shire intends to change the vesting of Crown Reserve 27355 to Conservation and manage the area for conservation long-term, which will reduce the risk of loss.

Calculation 2 - Malleefowl habitat

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	Clearing of native vegetation that comprises suitable habitat for Malleefowl	Significant impact (hectares)	8.91
		Quality (scale)	7.00
		Total quantum of impact	6.24

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit	Onsite revegetation of native vegetation that provides habitat for Malleefowl	Proposed rehabilitation (area in hectares)	8.91	Time until ecological benefit (years)	15.00
		Current quality of rehabilitation site (scale)	1.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	1.00	Rehabilitation credit	3.46
		Future quality WITH rehabilitation (scale)	6.00		

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	6.24
	Rehabilitation credit	3.46
	Significant residual impact	2.78

Environmental value (step 1)	8.91 hectares of native vegetation that provides suitable habitat for Malleefowl	Significant impact (step 2, part A)	8.91
		Rehabilitation credit (step 2, part B)	3.46
		Significant residual impact (step 2, part C)	2.78

***Area* (offset site)**

Offset calculation
Area

Offsets calculation							
	Description	**Proposed offset (area in hectares)**	34.88	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**2.78**
	Change in vesting and conservation in perpetuity of suitable habitat for Malleefowl	**Current quality of offset site (scale)**	8.00	**Time until offset site secured (years)**	2.00	What-if Analysis	**100.0%**
		Future quality WITHOUT offset (scale)	8.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	1.00				
		Confidence in offset result (%)	90.0%			**OFFSET ADEQUATE?**	**NO**

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Malleefowl habitat	Clearing of 8.91 hectares of native vegetation that provides suitable habitat for malleefowl.
Type of environmental value	Species (flora/fauna)	Malleefowl is listed as a threatened fauna species under the Commonwealth EPBC Act and state BC Act.
Conservation significance of environmental value	Vulnerable	Malleefowl is listed as Vulnerable under both the EPBC Act and BC Act.
Landscape-level value impacted	yes/no	The impact is to an area of habitat in hectares.
Significant impact		
Description	Clearing of native vegetation that provides suitable habitat for malleefowl	8.91 hectares of native vegetation that provides suitable habitat for malleefowl is proposed to be cleared for road upgrades and gravel extraction.
Significant impact (hectares) / Type of feature	8.91	Based on the available information from environmental assessments, the proposed clearing area includes approximately 8.91 hectares of native vegetation that provides suitable habitat for maleefowl (approximately 5.58 hectares at Site B and 3.33 hectares at Site D).
Quality (scale) / Number	7.00	Based on the available information from environmental assessments, the proposed clearing area includes suitable habitat for Mallefowl in Very Good to Excellent (Keighery, 1994) condition. The proposed clearing area at Sites B and D is likely to provide foraging and dispersal habitat for Mallefowl, however no active mounds were identified during the environmental assessments.
Rehabilitation credit		

Calculation	Score (Area)	Rationale
Description	Onsite revegetation of native vegetation that provides foraging habitat for malleefowl	The Shire proposes to undertake revegetation within the gravel pit areas at Site B and Site D, following clearing and extraction, utilising species that provide suitable habitat for malleefowl.
Proposed rehabilitation (area in hectares)	8.91	The total area proposed to be revegetated onsite is 8.91 hectares, comprising 5.58 hectares at Site B and 3.33 hectares at Site D.
Current quality of rehabilitation site / Start number (of type of feature)	1.00	The areas to be revegetated within Sites B and D will be largely devoid of native vegetation following clearing and gravel extraction. However, noting site context of being within ecological linkages which provide locally significant dispersal habitat for malleefowl, a start value of 1 is applied.
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	1.00	Given the areas to be revegetated within Sites B and D will be largely devoid of native vegetation following clearing and gravel extraction, it is reasonable to assume there will be no change in quality in the absence of onsite revegetation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plans for Sites B and D, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing composition of suitable habitat for malleefowl within Sites B and D. Therefore, with best practice revegetation methodology, it is assumed that the revegetation offsets areas will improve the quality of habitat for malleefowl to a Good to Very Good (Keighery, 1994) condition.
Time until ecological benefit (years)	15.00	It is assumed that the benefits of revegetation of malleefowl habitat will be available after 15 years. This is a conservative measure based the understanding that the species to be planted include Proteaceous species and Myrtaceous shrubs and mallees that may mature and provide calorific benefit within 10 years. An extra five years has been allowed to account for the delay in commencement of the revegetation. The Shire has confirmed that the revegetation at site B and D will occur within 5 years of permit start date (Shire of Esperance, 2024g).
Confidence in rehabilitation result (%)	0.8	There is a moderate to high level of confidence that the quality of malleefowl habitat within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plans for Sites B and D, including measurable completion criteria based on the pre-clearing composition of suitable habitat for malleefowl within Sites B and D.
Offset		
Description	Change in vesting and conservation in perpetuity of significant foraging habitat for Malleefowl	The Shire has proposed to alter the vesting of Lot 1536 on Deposited Plan 209681 (Crown Reserve 26912) to Conservation in perpetuity, which contains suitable habitat for malleefowl.
Proposed offset (area in hectares)	34.88	The area required to be conserved in perpetuity to counterbalance the significant residual impacts to native vegetation that provides suitable foraging habitat for malleefowl by 100%.
Current quality of offset site	8.00	Based on the Offset Proposal for Crown Reserve 26912 (Shire of Esperance, 2023) supplied for Clearing Permit CPS 9524/1, high-quality unburnt habitat for malleefowl (Yate forest, Melaleuca shrublands and Mallee woodlands) occurs within Crown Reserve 26912 in Excellent (Keighery, 1994) condition.

Calculation	Score (Area)	Rationale
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	8.00	Given native vegetation within Crown Reserve 26912 contains malleefowl habitat in Excellent (Keighery, 1994) condition and is not currently subject to any ongoing management measures or significant threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	8.00	Given native vegetation within Crown Reserve 26912 is currently in Excellent (Keighery, 1994) condition and the proposed offset consists of conservation of the existing native vegetation in perpetuity with no ongoing land management proposed to improve vegetation quality, it is likely that the quality of malleefowl habitat will be maintained with the offset.
Time until ecological benefit (years)	1.00	As the proposed offset relates to conserving an existing area of native vegetation in perpetuity, the minimum of one year for this field is applied.
Confidence in offset result (%)	0.9	There is a high level of confidence that the offset will be achieved, and that conservation of the offset site (in perpetuity) would successfully mitigate the future risk of loss of the site and maintain its current quality.
Duration of offset implementation (maximum 20 years)	20.00	Crown Reserve 26912 will be vested in Conservation in perpetuity. Therefore, the maximum duration of 20 years is applied.
Time until offset site secured (years)	2.00	It is assumed that the change in vesting to Conservation of Crown Reserve 26912 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 26912 is currently vested as "Parkland" and therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	5%	The Shire intends to change the vesting of Crown Reserve 26912 to Conservation and manage the area for conservation long-term, which will reduce the risk of loss.

Calculation 3 - Kwongkan Shurblands TEC

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	2.54 hectares of native vegetation that is representative of the Kwongkan shrublands TEC	Significant impact (hectares)	2.54
		Quality (scale)	8.00
		Total quantum of impact	2.03

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit	Onsite revegetation of native vegetation that is commensurate with the Kwongkan shrublands TEC.	Proposed rehabilitation (area in hectares)	2.54	Time until ecological benefit (years)	15.00
		Current quality of rehabilitation site (scale)	1.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	1.00	Rehabilitation credit	0.85
		Future quality WITH rehabilitation (scale)	6.00		

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	2.03
	Rehabilitation credit	0.85
	Significant residual impact	1.18

Environmental value (step 1)	2.54 hectares of native vegetation that is representative of the Kwongkan shrubland TEC.	Significant impact (step 2, part A)	2.54
		Rehabilitation credit (step 2, part B)	0.85
		Significant residual impact (step 2, part C)	1.18

***Area* (offset site)**

Offset calculation
Area

Offsets calculation	**Description**	**Proposed offset (area in hectares)**	17.30	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**1.18**
	Change in vesting and conservation in perpetuity of native vegetation that is representative of the Kwongkan shrublands TEC	**Current quality of offset site (scale)**	7.00	**Time until offset site secured (years)**	2.00	What-if Analysis	**100.0%**
		Future quality WITHOUT offset (scale)	7.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	1.00				
		Confidence in offset result (%)	90.0%			**OFFSET ADEQUATE?**	**YES**

Calculation	Score (Area)	Rationale
Conservation significance		
Description	2.54 hectares of native vegetation that is representative of the Kwongkan Shrubland TEC	Clearing of 2.54 hectares of native vegetation that is representative of the Kwongkan Shrublands TEC.
Type of environmental value	Ecological community	The Kwongkan Shrublands ecological community is listed as a threatened ecological community under the Commonwealth EPBC Act and considered a priority ecological community by DBCA.
Conservation significance of environmental value	Endangered	The Kwongkan Shrublands TEC is listed as Endangered under the EPBC Act and is considered a Priority 3 ecological community in Western Australia by DBCA.
Landscape-level value impacted	yes/no	The impact is to an area of Kwongkan Shrubland TEC in hectares.
Significant impact		
Description		2.54 hectares of native vegetation that is representative of the Kwongkan Shrublands TEC is proposed to be cleared for gravel extraction at site D.
Significant impact (hectares) / Type of feature	2.54	Based on the available information from the environmental assessment of site D, the proposed clearing area at this site includes 2.54 hectares of native vegetation that is representative of the Kwongkan Shrubland TEC.
Quality (scale) / Number	8.00	Based on the available information from the environmental assessment of site D, the occurrences of the Kwongkan Shrublands TEC within the proposed clearing area are in Very Good to Excellent (Keighery, 1994) condition. Positive samples of Phytophthora cinnamomi (dieback) have been recorded along the same road reserve which increases the likelihood of dieback presenting within the application area.

Calculation	Score (Area)	Rationale
Rehabilitation credit		
Description	Onsite revegetation of native vegetation that is commensurate with the Kwongkan Shrublands TEC.	The Shire proposes to undertake revegetation within the gravel pit area at Site D, following clearing and extraction, utilising species that are commensurate with the Kwongkan Shrublands TEC.
Proposed rehabilitation (area in hectares)	2.54	The total area proposed to be revegetated onsite at Site D is 3.33 hectares. The Shire committed to return the Kwongkan Shrublands TEC within site D to the pre-clearing extent (2.54 hectares)
Current quality of rehabilitation site / Start number (of type of feature)	1.00	The area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction. However, the site context as a buffer zone to remaining TEC will be unchanged and a start value of 1 is applied.
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	1.00	Given the area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction, it is reasonable to assume there will be no change in quality in the absence of onsite revegetation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing composition of Kwongkan Shrublands TEC within Site D. Therefore, with best practice revegetation methodology, it is assumed that the revegetation offsets areas establish native vegetation that is commensurate with the Kowngkan shrublands TEC to a Good to Very Good (Keighery, 1994) condition.
Time until ecological benefit (years)	15.00	Given the proteaceous nature of the species required to be revegetated to resemble the Kwongkan Shrublands TEC and the starting condition of the revegetation offset area, it is assumed that vegetation commensurate with the Kwongkan Shrublands TEC in Good to Very Good (Keighery, 1994) condition will be achieved within 10 years. An extra five years has been allowed to account for the delay in commencement of the revegetation. The Shire has confirmed that the revegetation at site B and D will occur within 5 years of permit start date (Shire of Esperance, 2024g).
Confidence in rehabilitation result (%)	0.8	There is a moderate to high level of confidence that the quality of native vegetation commensurate with the Kwongkan Shrublands TEC within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, including measurable completion criteria based on the pre-clearing composition of Kwongkan Shrublands TEC within Site D.
Offset		
Description	Change in vesting and conservation in perpetuity of native vegetation that is representative of the Kwongkan shrublands TEC	The Shire has proposed to alter the vesting of Lot 80 on Deposited Plan 207664 (Crown Reserve 27355) to Conservation in perpetuity, which contains 22.18 hectares of native vegetation that is representative of the Kwongkan Shrublands TEC based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024).

Calculation	Score (Area)	Rationale
Proposed offset (area in hectares)	17.30	The area required to be conserved in perpetuity to counterbalance the significant residual impacts to native vegetation that is representative of the Kwongkan Shrublands TEC by 100%.
Current quality of offset site	7.00	Based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024), the native vegetation that is representative of the Kwongkan Shrublands TEC within Crown Reserve 27355 is in Very Good to Excellent (Keighery, 1994) condition.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	7.00	Given native vegetation within Crown Reserve 27355 that is representative of the Kwongkan Shrublands TEC is in Very Good to Excellent (Keighery, 1994) condition and is not currently subject to any ongoing management measures or significant threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	7.00	Given native vegetation within Crown Reserve 27355 that is representative of the Kwongkan Shrublands TEC is in Very Good to Excellent (Keighery, 1994) condition and the proposed offset consists of conservation of the existing native vegetation in perpetuity with no ongoing land management proposed to improve vegetation quality, it is likely that the quality of native vegetation that is representative of the Kwongkan Shrublands TEC will be maintained with the offset.
Time until ecological benefit (years)	1.00	As the proposed offset relates to conserving an existing area of native vegetation in perpetuity, the minimum of one year for this field is applied.
Confidence in offset result (%)	0.9	There is a high level of confidence that the offset will be achieved, and that conservation of the offset site (in perpetuity) would successfully mitigate the future risk of loss of the site and maintain its current quality.
Duration of offset implementation (maximum 20 years)	20.00	Crown Reserve 27355 will be vested in Conservation in perpetuity, the maximum duration of 20 years is applied.
Time until offset site secured (years)	2.00	It is assumed that the change in vesting to Conservation of Crown Reserve 27355 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 27355 is currently vested as "Parkland" and therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	5%	The Shire intends to change the vesting of Crown Reserve 27355 to Conservation and manage the area for conservation long-term, which will reduce the risk of loss.

Calculation 4.1 - BVA Esperance_47 – Excellent vegetation in Reserve 27355 – 96.2%

***Area* (impact site)**

Part A: Significant impact calculation *Area*			
Significant impact	Description	Quantum of impact	
	3.33 hectares of native vegetation that is representative of BVA Esperance_47	Significant impact (hectares)	3.33
		Quality (scale)	7.00
		Total quantum of impact	2.33

Part B: Rehabilitation credit calculation *Area* (onsite)					
Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)	3.33	Time until ecological benefit (years)	10.00
	Onsite revegetation of native vegetation that is representative of BVA Esperance_47.	Current quality of rehabilitation site (scale)	0.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	0.00	Rehabilitation credit	1.58
		Future quality WITH rehabilitation (scale)	6.00		

Part C: Significant residual impact calculation *Area*		
Significant residual impact	Total quantum of impact	2.33
	Rehabilitation credit	1.58
	Significant residual impact	0.75

Environmental value (step 1)	3.33 hectares of native vegetation that is representative of the extentensively cleared BVA Esperance_47	Significant impact (step 2, part A)	3.33
		Rehabilitation credit (step 2, part B)	1.58
		Significant residual impact (step 2, part C)	0.75

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	9.02	Duration of offset implementation (maximum 20 years)	20.00	Offset value	0.72
	Change in vesting and conservation in perpetuity of native vegetation that is representative of BVA Esperance_47	Current quality of offset site (scale)	8.00	Time until offset site secured (years)	2.00	What-if Analysis	96.2%
		Future quality WITHOUT offset (scale)	8.00	Risk of future loss WITHOUT offset (%)	15.0%		
		Future quality WITH offset (scale)	8.00	Risk of future loss WITH offset (%)	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	1.00				
		Confidence in offset result (%)	90.0%			OFFSET ADEQUATE?	NO

Calculation	Score (Area)	Rationale
Conservation significance		
Description	3.33 hectares of native vegetation that is representative of BVA Esperance_47	Clearing of 3.33 hectares of native vegetation that is representative of the extensively cleared Beard Vegetation Association (BVA) Esperance_47.
Type of environmental value	Vegetation/habitat	BVA Esperance_47 is a mapped vegetation association.
Conservation significance of environmental value	Terrestrial native vegetation complex <30% extent remaining in the bioregion	BVA Esperance_47 retains approximately 14.9 percent of its pre-European extent and falls below the 30 per cent threshold outlined in the national objectives and targets for biodiversity conservation in Australia.
Landscape-level value impacted	yes/no	The impact is to an area of BVA Esperance_47 in hectares.
Significant impact		
Description	3.33 hectares of native vegetation that is representative of BVA Esperance_47	3.33 hectares of native vegetation that is representative of the extensively cleared BVA Esperance_47 is proposed to be cleared for road upgrades and gravel extraction.
Significant impact (hectares) / Type of feature	3.33	Based on the available information from environmental assessments of the four sites, the proposed clearing area includes 3.3 hectares of native vegetation that is representative of BVA Esperance_47 at Site D.
Quality (scale) / Number	7.00	Based on the available information from environmental assessments of the four sites, native vegetation that is representative of BVA Esperance_47 within the proposed clearing area are in Completely Degraded to Excellent (Keighery, 1994) condition, with the majority (3.1 hectares) in Very Good (Keighery, 1994) condition or better.
Rehabilitation credit		
Description	Onsite revegetation of native vegetation that is representative of BVA Esperance_47.	The Shire proposes to undertake revegetation within the gravel pit area at Site D, following clearing and extraction, utilising species that are representative of BVA Esperance_47.
Proposed rehabilitation (area in hectares)	3.33	The total area proposed to be revegetated onsite at Site D is 3.33 hectares.
Current quality of rehabilitation site / Start number (of type of feature)	0.00	The area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction.
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00	Given the area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction, it is reasonable to assume there will be no change in quality in the absence of onsite revegetation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing composition of native vegetation that is representative of BVA Esperance_47 within Site D. Therefore, with best practice revegetation methodology, it is assumed that the revegetation offsets areas establish native vegetation that is representative of BVA Esperance_47 to a Good to Very Good (Keighery, 1994) condition.
Time until ecological benefit (years)	10.00	Given the nature of the species required to be revegetated to resemble BVA Esperance_47 and the starting condition of the

Calculation	Score (Area)	Rationale
		revegetation offset area, it is assumed that vegetation representative of BVA Esperance_47 in Good to Very Good (Keighery, 1994) condition will be achieved within 5 years. An extra five years has been allowed to account for the delay in commencement of the revegetation. The Shire has confirmed that the revegetation at site D will occur within 5 years of permit start date (Shire of Esperance, 2024g).
Confidence in rehabilitation result (%)	0.8	There is a moderate to high level of confidence that the quality of native vegetation that is representative of BVA Esperance_47 within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, including measurable completion criteria based on the pre-clearing composition of native vegetation that is representative of BVA Esperance_47 within Site D.
Offset		
Description	Change in vesting and conservation in perpetuity of native vegetation that is representative of BVA Esperance_47	The Shire has proposed to alter the vesting of Lot 80 on Deposited Plan 207664 (Crown Reserve 27355) to Conservation in perpetuity, which contains native vegetation that is representative of BVA Esperance_47.
Proposed offset (area in hectares)	9.02	Based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024f), 9.02 hectares of native vegetation that is representative of BVA Esperance_47 in Excellent (Keighery, 1994) condition occurs within Crown Reserve 27355. This area counterbalances 96.2% of the significant residual impact. Noting Very Good (Keighery, 1994) condition vegetation counterbalances 3.8% of the significant residual impact, the combined area counterbalances the significant residual impacts by 100%.
Current quality of offset site	8.00	Based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024), this area of native vegetation that is representative of BVA Esperance_47 within Crown Reserve 27355 is in Excellent (Keighery, 1994) condition.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	8.00	Given this area of native vegetation within Crown Reserve 27355 that is representative of BVA Esperance_47 is in Excellent (Keighery, 1994) condition and is not currently subject to any ongoing management measures or significant threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	8.00	Given this area of native vegetation within Crown Reserve 27355 that is representative of BVA Esperance_47 is in Excellent (Keighery, 1994) condition and the proposed offset consists of conservation of the existing native vegetation in perpetuity with no ongoing land management proposed to improve vegetation quality, it is likely that the quality of native vegetation that is representative of BVA Esperance_47 will be maintained with the offset.
Time until ecological benefit (years)	1.00	As the proposed offset relates to conserving an existing area of native vegetation in perpetuity, the minimum of one year for this field is applied.
Confidence in offset result (%)	0.9	There is a high level of confidence that the offset will be achieved, and that conservation of the offset site (in perpetuity) would successfully mitigate the future risk of loss of the site and maintain its current quality.
Duration of offset implementation (maximum 20 years)	20.00	Crown Reserve 27355 will be vested in Conservation in perpetuity, the maximum duration of 20 years is applied.

Calculation	Score (Area)	Rationale
Time until offset site secured (years)	2.00	It is assumed that the change in vesting to Conservation of Crown Reserve 27355 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 27355 is currently vested as "Parkland" and therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	5%	The Shire intends to change the vesting of Crown Reserve 27355 to Conservation and manage the area for conservation long-term, which will reduce the risk of loss.

Calculation 4.2 - BVA Esperance_47 – Very Good vegetation in Reserve 27355 – 96.2%

***Area* (impact site)**

Part A: Significant impact calculation *Area*			
Significant impact	Description	Quantum of impact	
	3.33 hectares of native vegetation that is representative of BVA Esperance_47	Significant impact (hectares)	3.33
		Quality (scale)	7.00
		Total quantum of impact	2.33

Part B: Rehabilitation credit calculation *Area* (onsite)					
Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)	3.33	Time until ecological benefit (years)	10.00
	Onsite revegetation of native vegetation that is representative of BVA Esperance_47.	Current quality of rehabilitation site (scale)	0.00	Confidence in rehabilitation result (%)	80.0%
		Future quality WITHOUT rehabilitation (scale)	0.00	Rehabilitation credit	1.58
		Future quality WITH rehabilitation (scale)	6.00		

Part C: Significant residual impact calculation *Area*		
Significant residual impact	Total quantum of impact	2.33
	Rehabilitation credit	1.58
	Significant residual impact	0.75

Environmental value (step 1)	3.33 hectares of native vegetation that is representative of the extentensively cleared BVA Esperance_47	Significant impact (step 2, part A)	3.33
		Rehabilitation credit (step 2, part B)	1.58
		Significant residual impact (step 2, part C)	0.75

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	0.41	Duration of offset implementation (maximum 20 years)	20.00	Offset value	0.03
	Change in vesting and conservation in perpetuity of native vegetation that is representative of BVA Esperance_47	Current quality of offset site (scale)	7.00	Time until offset site secured (years)	2.00	What-if Analysis	3.8%
		Future quality WITHOUT offset (scale)	7.00	Risk of future loss WITHOUT offset (%)	15.0%		
		Future quality WITH offset (scale)	7.00	Risk of future loss WITH offset (%)	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	1.00				
		Confidence in offset result (%)	90.0%			OFFSET ADEQUATE?	NO

Calculation	Score (Area)	Rationale
Conservation significance		
Description	3.33 hectares of native vegetation that is representative of BVA Esperance_47	Clearing of 3.33 hectares of native vegetation that is representative of the extensively cleared Beard Vegetation Association (BVA) Esperance_47.
Type of environmental value	Vegetation/habitat	BVA Esperance_47 is a mapped vegetation association.
Conservation significance of environmental value	Terrestrial native vegetation complex <30% extent remaining in the bioregion	BVA Esperance_47 retains approximately 14.9 percent of its pre-European extent and falls below the 30 per cent threshold outlined in the national objectives and targets for biodiversity conservation in Australia.
Landscape-level value impacted	yes/no	The impact is to an area of BVA Esperance_47 in hectares.
Significant impact		
Description	3.33 hectares of native vegetation that is representative of BVA Esperance_47	3.33 hectares of native vegetation that is representative of the extensively cleared BVA Esperance_47 is proposed to be cleared for road upgrades and gravel extraction.
Significant impact (hectares) / Type of feature	3.33	Based on the available information from environmental assessments of the four sites, the proposed clearing area includes 3.3 hectares of native vegetation that is representative of BVA Esperance_47 at Site D.
Quality (scale) / Number	7.00	Based on the available information from environmental assessments of the four sites, native vegetation that is representative of BVA Esperance_47 within the proposed clearing area are in Completely Degraded to Excellent (Keighery, 1994) condition, with the majority (3.1 hectares) in Very Good (Keighery, 1994) condition or better.
Rehabilitation credit		
Description	Onsite revegetation of native vegetation that is representative of BVA Esperance_47.	The Shire proposes to undertake revegetation within the gravel pit area at Site D, following clearing and extraction, utilising species that are representative of BVA Esperance_47.
Proposed rehabilitation (area in hectares)	3.33	The total area proposed to be revegetated onsite at Site D is 3.33 hectares.
Current quality of rehabilitation site / Start number (of type of feature)	0.00	The area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction.
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00	Given the area to be revegetated within Site D will be largely devoid of native vegetation following clearing and gravel extraction, it is reasonable to assume there will be no change in quality in the absence of onsite revegetation.
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing composition of native vegetation that is representative of BVA Esperance_47 within Site D. Therefore, with best practice revegetation methodology, it is assumed that the revegetation offsets areas establish native vegetation that is representative of BVA Esperance_47 to a Good to Very Good (Keighery, 1994) condition.
Time until ecological benefit (years)	10.00	Given the nature of the species required to be revegetated to resemble BVA Esperance_47 and the starting condition of the

Calculation	Score (Area)	Rationale
		revegetation offset area, it is assumed that vegetation representative of BVA Esperance_47 in Good to Very Good (Keighery, 1994) condition will be achieved within 5 years. An extra five years has been allowed to account for the delay in commencement of the revegetation. The Shire has confirmed that the revegetation at site D will occur within 5 years of permit start date (Shire of Esperance, 2024g).
Confidence in rehabilitation result (%)	0.8	There is a moderate to high level of confidence that the quality of native vegetation that is representative of BVA Esperance_47 within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site D, including measurable completion criteria based on the pre-clearing composition of native vegetation that is representative of BVA Esperance_47 within Site D.
Offset		
Description	Change in vesting and conservation in perpetuity of native vegetation that is representative of BVA Esperance_47	The Shire has proposed to alter the vesting of Lot 80 on Deposited Plan 207664 (Crown Reserve 27355) to Conservation in perpetuity, which contains native vegetation that is representative of BVA Esperance_47 .
Proposed offset (area in hectares)	0.41	The area of native vegetation that is representative of BVA Esperance_47 in Very Good (Keighery, 1994) condition within Crown Reserve 27355 that is required to counterbalance the significant residual impacts by 3.8%. Noting Excellent (Keighery, 1994) condition vegetation counterbalances 96.2% of the significant residual impact, the combined area counterbalances the significant residual impacts by 100%.
Current quality of offset site	7.00	Based on the Reserve Biodiversity Assessment Report (Shire of Esperance, 2024f), this area of native vegetation that is representative of BVA Esperance_47 within Crown Reserve 27355 is in Very Good (Keighery, 1994) condition.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	7.00	Given this area of native vegetation within Crown Reserve 27355 that is representative of BVA Esperance_47 is in Very Good (Keighery, 1994) condition and is not currently subject to any ongoing management measures or significant threatening processes, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	7.00	Given this area of native vegetation within Crown Reserve 27355 that is representative of BVA Esperance_47 is in Very Good (Keighery, 1994) condition and the proposed offset consists of conservation of the existing native vegetation in perpetuity with no ongoing land management proposed to improve vegetation quality, it is likely that the quality of native vegetation that isrepresentative of BVA Esperance_47 will be maintained with the offset.
Time until ecological benefit (years)	1.00	As the proposed offset relates to conserving an existing area of native vegetation in perpetuity, the minimum of one year for this field is applied.
Confidence in offset result (%)	0.9	There is a high level of confidence that the offset will be achieved, and that conservation of the offset site (in perpetuity) would successfully mitigate the future risk of loss of the site and maintain its current quality.
Duration of offset implementation (maximum 20 years)	20.00	Crown Reserve 27355 will be vested in Conservation in perpetuity, the maximum duration of 20 years is applied.

Calculation	Score (Area)	Rationale
Time until offset site secured (years)	2.00	It is assumed that the change in vesting to Conservation of Crown Reserve 27355 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 27355 is currently vested as "Parkland" and therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	5%	The Shire intends to change the vesting of Crown Reserve 27355 to Conservation and manage the area for conservation long-term, which will reduce the risk of loss.

Calculation 4.3 – Extensively cleared landscape at site C

***Area* (impact site)**

Part A: Significant impact calculation *Area*			
Significant impact	Description	Quantum of impact	
	0.06 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape	Significant impact (hectares)	0.06
		Quality (scale)	8.00
		Total quantum of impact	0.05

Part B: Rehabilitation credit calculation *Area* (onsite)					
Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
	None proposed.	Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*		
Significant residual impact	Total quantum of impact	0.05
	Rehabilitation credit	0.00
	Significant residual impact	0.05

Environmental value (step 1)	0.06 hectares of native vegetation within an extensively cleared landscape	Significant impact (step 2, part A)	0.06
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	0.05

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	0.10	Duration of offset implementation (maximum 20 years)	20.00	Offset value	0.05
	Revegetation of native vegetation within an extensively cleared landscape	Current quality of offset site (scale)	0.00	Time until offset site secured (years)	2.00	What-if Analysis	100.0%
		Future quality WITHOUT offset (scale)	0.00	Risk of future loss WITHOUT offset (%)	15.0%		
		Future quality WITH offset (scale)	6.00	Risk of future loss WITH offset (%)	5.0%	What-if Analysis Reinstate Formula	
		Time until ecological benefit (years)	11.00				
		Confidence in offset result (%)	80.0%			OFFSET ADEQUATE?	NO

Calculation	Score (Area)	Rationale
Conservation significance		
Description	0.06 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape	Clearing of 0.06 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape.
Type of environmental value	Vegetation/habitat	Impact is to an area of vegetation that is significant as a remnant within an extensively cleared landscape.
Conservation significance of environmental value	Terrestrial native vegetation complex <30% extent remaining in the bioregion	Site C occurs within an extensively cleared local area (10-kilometre radius of the proposed clearing area) which retains 12 per cent of its pre-European extent and falls below the 30 per cent threshold outlined in the national objectives and targets for biodiversity conservation in Australia.
Landscape-level value impacted	yes/no	The impact is to an area of remnant vegetation in hectares.
Significant impact		
Description	0.06 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape	0.06 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape is proposed to be cleared at Site C for road upgrades.
Significant impact (hectares) / Type of feature	0.06	The total extent of native vegetation clearing at Site C is 0.06 hectares within an extensively cleared local area.
Quality (scale) / Number	8.00	Based on the available information from environmental assessments of the site, native vegetation at Site C is in Excellent (Keighery, 1994) condition.
Rehabilitation credit		
Description	N/A	Onsite revegetation at Site C is not proposed.
Offset		
Description	Revegetation of native vegetation within an extensively cleared landscape	The Shire has proposed to revegetate historic tracks within Lot 1499 on Deposited Plan 91061 (Crown Reserve 24007), utilising local provenance species and then change the zoning of a portion of the Reserve from "parkland" to "environmental conservation". The revegetation has been completed in May-June 2025. The Shire is not penalised for undertaking the revegetation prior to the permit to be granted.
Proposed offset (area in hectares)	0.10	The area of revegetation within Crown Reserve 24007 required to mitigate the residual significant impact to significant remnant vegetation within an extensively cleared landscape by 100%.
Current quality of offset site	0.00	Revegetation will be undertaken in historic tracks within Crown Reserve 24007 which are currently devoid of native vegetation.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	0.00	Given revegetation will be undertaken in historic tracks within Crown Reserve 24007 that are currently be devoid of native vegetation, it is reasonable to assume no change in quality in the absence of the offset.
Future quality WITH offset (scale) / Future number WITH offset	6.00	It is assumed that the revegetation will be undertaken in accordance with the Project Revegetation Plan for Site C, prepared in accordance with DWER's Guide to preparing revegetation plans for clearing permits (2018), including measurable completion criteria based on the pre-clearing

Calculation	Score (Area)	Rationale
		composition of native vegetation at Site C in an Excellent (Keighery, 1994) condition. Therefore, with best practice revegetation methodology and the completion criteria specified, it is assumed that the revegetation action will establish native vegetation in Very Good (Keighery, 1994) condition.
Time until ecological benefit (years)	11.00	Given the nature of the species required to be revegetated to resemble locally significant remnant vegetation at Site C, the starting condition of the revegetation offset area, and the completion criteria specified in the Project Revegetation Plan for Site C, it is assumed that vegetation in Very Good (Keighery, 1994) condition will be achieved within 11 years as per the Shire's estimation.
Confidence in offset result (%)	0.8	There is a moderate to high level of confidence that the quality of native vegetation within the revegetation offset site will improve given the revegetation will be undertaken in accordance with the Project Revegetation Plan, including measurable completion criteria based on the pre-clearing composition of native vegetation at Site C in an Excellent (Keighery, 1994) condition.
Duration of offset implementation (maximum 20 years)	20.00	The Shire has proposed to change the zoning of the northern portion of the Reserve 24007 (including the revegetation area) to "Environmental Conservation" under Local Scheme Planning No. 24 and will offer the site to DBCA for incorporation into the conservation estate. Therefore, the maximum value of 20 is applied.
Time until offset site secured (years)	2.00	It is assumed that the change in zoning to Environmental Conservation of Crown Reserve 24007 will occur within two years.
Risk of future loss WITHOUT offset (%)	15.0%	Crown Reserve 24007 is currently vested as "Parkland" and zoned as "Public Open Space", therefore currently has a moderate to low risk of loss.
Risk of future loss WITH offset (%)	10%	The Shire has proposed to change the zoning of the northern portion of the Reserve 24007 (including the revegetation area) to "Environmental Conservation" under Local Scheme Planning No. 24 and will offer the site to DBCA for incorporation into the conservation estate.

Appendix F. Biological survey information excerpts

Figure F1. Vegetation type 1 identified at Site A, described as “Scattered *Eucalyptus angulosa* over mixed heath with myrtaceous and *Allocasuarina* shrubs” (Shire of Esperance, 2024b)

Figure F2. Vegetation type 2 identified at Site A, described as “Scattered *Eucalyptus occidentalis* over mixed *Melaleuca* shrubland with *Hakea cinerea*” (Shire of Esperance, 2024b)

Figure F3. Vegetation type 1 identified at Site B, described as “Mixed mallee over *Hakea laurina* open shrubland” (Shire of Esperance, 2024c)

Figure F4. Vegetation type 2 identified at Site B, described as “Mixed mallee over *Banksia media* open shrubland” (Shire of Esperance, 2024c)

Figure F5. Vegetation type 3 identified at Site B, described as “Scattered mallee over dense *Melaleuca* shrubland” (Shire of Esperance, 2024c)

Figure F6. Vegetation type identified at Site C, described as “Mixed mallee woodland over open mixed shrubland” (Shire of Esperance, 2024d)

Figure F7. Vegetation type 1 (burned) identified at Site D, described as “Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* and *Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland” (Shire of Esperance, 2024e)

Figure F8. Vegetation type 1 (unburned) identified at Site D, described as “Scattered *Nuytsia floribunda* over *Eucalyptus pleurocarpa* and *Eucalyptus tetraptera* over mixed myrtaceous and proteaceous closed heathland” (Shire of Esperance, 2024e)

Figure F9. Vegetation type 2 (unburned) identified at Site D, described as "*Eucalyptus leptocalyx* and *Eucalyptus micranthera* woodland with open heathland" (Shire of Esperance, 2024e)

Figure F10. Vegetation type 3 (unburned) identified at Site D, described as "Scattered Nuytsia floribunda over Eucalyptus pleurocarpa over Acacia myrtifolia dominated shrubland" (Shire of Esperance, 2024e)

Appendix G. Sources of information

G.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)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- 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 – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

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)

G.2. References

Bureau of Meteorology (BOM) (2024). *Climate statistics for Australian locations – Esperance station*. Available from: http://www.bom.gov.au/climate/averages/tables/cw_009789.shtml (Accessed in July 2024)

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

Commonwealth of Australia (2022) *Referral guidelines for three WA threatened black cockatoo species. Carnaby's Cockatoo (Zanda latirostris), Baudin's Cockatoo (Zanda baudinii) and the Forest Red-tailed Black-cockatoo (Calyptorhynchus banksii naso)*. Available from https://www.dcceew.gov.au/sites/default/files/documents/referral-guideline-3-wa-threatened-black-cockatoo-species-2022.pdf

Department of Biodiversity, Conservation and Attractions (DBCA) (2022) *Species and Communities Branch advice for clearing permit application CPS 9524/1*, received 22 July 2022. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT641901).

Department of Biodiversity, Conservation and Attractions (DBCA) (2023) *Species and Communities Branch advice for clearing permit application CPS 10158/1*, received 15 September 2023. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT836946).

Department of Biodiversity, Conservation and Attractions (DBCA) (2024*) Correspondence in relation to Section 40 Authorisation to take threatened flora Eucalyptus merrickiae - Circle valley Road SLK 0-7.68*, received 26 August 2024. Department of Biodiversity, Conservation and Attractions, Western Australia. (DWER Ref: DWERDT1109642).

Department of Agriculture, Water and the Environment (DAWE) (2020) *The Peregrine Falcon (Falco peregrinus)*. Canberra, Australia. Available from: https://www.environment.gov.au/resource/peregrinefalconfalcoperegrinus

Department of Environment and Conservation (DEC) (2012a) *Fauna profiles: Chuditch – Dasyurus geoffroii (Gould, 1841)*. Canberra, Australia. Available from: https://www.environment.gov.au/resource/peregrinefalconfalcoperegrinus

Department of Environment and Conservation (DEC) (2012b) *Fauna profiles: Quenda, Isoodon obesulus fusciventer*. Department of Environment and Conservation, Western Australia. Retrieved from: https://www.dpaw.wa.gov.au/images/documents/conservation-management/pestsdiseases/quenda_2012.pdf

Department of the Environment (DOE) (2014). *Approved Conservation Advice for Proteaceae Dominated Kwongkan Shrublands of the southeast coastal floristic province of Western Australia*. Canberra: Department of the Environment. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/126-conservation-advice.pdf

Department of Environment Regulation (DER) (2013). *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf.

Department of Parks and Wildlife (DPAW) (2013). *Carnaby's cockatoo (Calyptorhynchus latirostris) Recovery Plan*. Department of Parks and Wildlife, Perth, Western Australia. Available from: https://www.agriculture.gov.au/sites/default/files/documents/carnabys-cockatoo-recovery-plan.pdf

Department of Parks and Wildlife. (2016). *Fauna profiles: Malleefowl Leipoa ocellata*. Available from: https://library.dbca.wa.gov.au/FullTextFiles/926972.pdf

Department of Primary Industries and Regional Development (DPIRD) (2024). *NRInfo Digital Mapping. Department of Primary Industries and Regional Development.* Government of Western Australia. URL: https://maps.agric.wa.gov.au/nrm-info/. (Accessed in July 2024)

Department of Water and Environmental Regulation (DWER) (2019). *Procedure: Native vegetation clearing permits*. Joondalup. Available from: https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.PDF.

Environmental Protection Authority (EPA) (2016). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Available from: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf.

Environmental Protection Authority (EPA) (2016). *Technical Guidance – Terrestrial Fauna Surveys.* Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf.

Garnett, S., Szabo, J. and Dutson, G. (2011) *The Action Plan for Australian Birds 2010*. CSIRO Publishing, Melbourne, Victoria.

Government of Western Australia. (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019.* WA Department of Biodiversity, Conservation and Attractions. https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

Johnstone, R.E. and Storr, G.M. (1998) *Handbook of Western Australian Birds, Volume I, Non-passerines (Emu to Dollarbird)*. Western Australian Museum, Perth.

Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Marchant, S. & Higgins, P.J. (1993) *Handbook of Australian, New Zealand & Antarctic birds. Volume 2: Raptors to Lapwings*. Oxford University Press, USA.

Saunders, D.A. (1990) *Problems of survival in an extensively cultivated landscape: the case of Carnaby's cockatoo Calyptorhynchus funereus latirostris*. Biological Conservation. 54: 277-290.

Saunders, D.A. and Ingram, J.A. (1998) *Twenty-eight years of monitoring a breeding population of Carnaby's cockatoo*. Pacific Conservation Biology. 4: 261-270.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Shire of Esperance (2023) *Offset proposal – Reserve 26912 "Robert Swamp" – Shire of Esperance Strategic Purpose Permit CPS 9524/1*. IBSA number: IBSA-2023-0274.

Shire of Esperance (2024a) *Clearing permit application CPS 10602/1 and supporting document*, received 30 April 2024 (DWER Ref: DWERDT917867).

Shire of Esperance (2024b) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2024-25 Strategic Purpose Permit – Site A - Shao Lu and Orleans Road Intersection*. Received 30 April 2024. IBSA number: IBSA-2024-0196.

Shire of Esperance (2024c) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2024-25 Strategic Purpose Permit – Site B - River Road Gravel Pits*. Received 30 April 2024. IBSA number: IBSA-2024-0174.

Shire of Esperance (2024d) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2024-25 Strategic Purpose Permit – Site C – Circle Valley Road, SLK 1.32-7.68*. Received 30 April 2024. IBSA number: IBSA-2024-0198.

Shire of Esperance (2024e) *Vegetation, Flora, Fauna and Environmental Considerations Report – Shire of Esperance 2023-24 Strategic Purpose Permit – Site D - Farmers Road Gravel Pit*. Received 30 April 2024. IBSA number: IBSA-2024-0197.

Shire of Esperance (2024f) *Response to DWER's request for further information letter dated 23 August 2024 for the clearing permit application CPS 10602/1*, *providing the updated revegetation management plan at Site A – Shao Lu and Orleans Road Intersection*, *providing the Reserve Biodiversity Assessment Report for Crown Reserve 27355,* received 20 September 2024 (DWER Ref: DWERDT1009870).

Shire of Esperance (2024g) *Response to DWER's request for further information dated 25 November 2024 for the clearing permit application CPS 10602/1, providing the updated revegetation management plans at Site B – River Road Gravel Pits and at site D – Farmers Road Gravel Pit, and providing offset proposal for Crown Reserve 27355,* received 4 December 2024 (DWER Ref: DWERDT1049537).

Shire of Esperance (2025a) *Proposal to exclude site E from the clearing permit application CPS 10602/1 and confirmation on the revised application area,* received 24 March 2025 (DWER Ref: DWERDT1094623).

Shire of Esperance (2025b) *Providing outcomes of referral to the Commonwealth Department of Climate Change, the Environment, Energy and Water for the proposed clearing at site B, D and E in the clearing permit application CPS 10602/1,* received 21 February 2025 (DWER Ref: DWERDT1082924).

Shire of Esperance (2025c) *Proposal to undertake staged clearing at site B in the clearing permit application CPS 10602/1 to mitigate the impacts on the ecological linkages,* received 14 April 2025 (DWER Ref: DWERDT1107614).

Shire of Esperance (2025d) *Offset proposal for Crown Reserve 24007 and areas of black cockatoos to be achieved in each rehabilitation stage at site B under the clearing permit application CPS 10602/1,* received 20 June 2025 (DWER Ref: DWERDT1148963).

Threatened Species Scientific Committee (TSSC) (2020) *Conservation Advice Falco hypoleucos Grey Falcon*. Department of the Environment, Canberra, ACT. Available from: https://www.environment.gov.au/biodiversity/threatened/species/pubs/929-conservation-advice-09072020.pdf.

Valentine, L.E. and Stock, W. (2008) *Food Resources of Carnaby's Black Cockatoo (Calyptorhynchus latirostris) in the Gnangara Sustainability Strategy Study Area*. Edith Cowan University and Department of Environment and Conservation. December 2008.

Western Australian Herbarium (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions, Western Australia. https://florabase.dpaw.wa.gov.au/ (Accessed May 2025)