



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9042/1
Permit Holder:	City of Armadale
Duration of Permit:	From 24 July 2021 to 24 July 2026

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 infrastructure maintenance.

2. Land on which clearing is to be done

Lot 44 on Plan 226029 Forrestdale
Lot 61 on Plan 7748 Forrestdale
Nicholson Road Reserve (PINs 11874636
Easement (PIN 11430453) Forrestdale
Forrest Road Reserve (PINs 11358140 and 11358132) Haynes
Gracefield Boulevard Road Reserve (PIN 12304513) Harrisdale
Balanup Road Reserve (PIN 11358139) Haynes
Lot 1212 on Plan 77482 Piara Waters
Lot 651 on Plan 409800 Piara Waters
Lot 1087 on Plan 67225 Piara Waters
Lot 1551 on Plan 401607 Piara Waters
Lot 523 on Plan 250220 Roleystone
Lot 3400 on Plan 91493 Roleystone
Lot 608 on Plan 413494 Harisdale
Rowlet Road Reserve (PIN 11358152) Hilbert
Champion Drive Road Reserve (PIN 12255005) Champion Lakes
Champion Drive Road Reserve (PIN 11845104) Kelmscott
McNeill Road Reserve (PIN 11857497) Champion Lakes
Turner Road Reserve (PIN 11193247) Kelmscott
Lot 290 on Plan 245522 Kelmscott

V Crown Land (PIN 1161597) Roleystone
Lot 459 on Plan 217551 Forrestdale
Mneill Road Reserve (PIN 11871371) Champion Lakes
Unnamed Road Reserve (PIN 11717232) Kelmscott
Lot 225 on Plan 47107 Roleystone
Lot 3877 on Plan 19191 Mount Richon
Lot 90 on Plan 51150 Bedfordale
Lot 226 on Plan 33627 Bedfordale
Lot 614 on Plan 26328 Bedfordale
Lot 3 on Plan 14397 Roleystone
Lot 701 on Plan 19662 Roleystone
Lot 801 on Plan 46407 Karragullen
Lot 63 on Plan 46554, Roleystone
Lot 4010 on Plan 56083 Bedfordale
Lot 3735 on Plan 16206 (Crown Reserve 3735) Kelmscott
Lot 2632 on Plan 9386 (Crown Reserve 2632) Champion Lakes
Lot 808 on Plan 46407 Karragullen
Lot 2524 on Plan 10069 Kelmscott
Lot 3230 on Plan 58518 (Crown Reserve 3230) Kelmscott
Lot 611 on Plan 26328 Bedfordale
Lot 609 on Plan 26328 Bedfordale
Lot 801 on Plan 69228 Bedfordale
Lot 811 on Plan 46407 Karragullen
Lot 4043 on Plan 89016 (Crown Reserve 44324) Mount Richon
Lot 4031 on Plan 20672 (Crown Reserve 43933) Mount Richon
Lot 4036 on Plan 87648 Brookdale
Lot 3790 on Plan 18493 (Crown Reserve 42700) Mount Richon
Lot 555 on Plan 53741 Armadale
Lot 8106 on Plan 68520 Harrisdale
Lot 8005 on Plan 50041 Harrisdale
Lot 8002 on Plan 63674 Piara Waters
Lot 803 on Plan 59970 Bedfordale
Lot 8007 on Plan 73479 (Crown Reserve 51203) Harrisdale
Lot 700 on Plan 76720 Piara Waters
Lot 4010 on Plan 19662 Roleystone
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Lot 978 on Plan 75190 Piara Waters
Lot 233 on Plan 71611 Bedfordale
Lot 204 on Plan 79232 Roleystone
Lot 3991 on Plan 79232 (Crown Reserve 46259) Roleystone
Lot 28 on Plan 68683 Seville Grove
Lot 302 on Plan 58348 Bedfordale
Lot 303 on Plan 58348 Bedfordale
Lot 212 on Plan 65199 Kelmscott

Corfield Street Road Reserve (PIN 12332611) Champion Lakes
Lot 5038 on Plan 38736 Roleystone
Lot 84 on Plan 35336 Kelmscott
Lot 4249 on Plan 19474 (Crown Reserve 35336) Kelmscott
Lot 8018 on Plan 401238 Piara Waters
Lot 8017 on Plan 401238 Piara Waters
Lot 8011 on Plan 403456 Piara Waters
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Lot 325 on Plan 58348 Bedfordale
Road Reserve (PIN 11779914) Vincent Lookout Bedfordale
Lot 9008 on Plan 412687 Hilbert
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Lot 500 on Plan 414517 Piara Waters
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Lot 8001 on Plan 405134 Forrestdale
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Allen Road Reserve (PIN 12170774) Forrestdale
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Balannup Road Reserve (PIN 11843233) Harrisdale
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Pipeline Boulevard Road Reserve (PIN 11945269) Piara Waters
Lot 1004 on Plan 57001 Champion Lakes
Lot 1002 on Plan 57001 Champion Lakes
Dorney Esplanade Road Reserve (PIN 11743394) Champion Lakes
Lot 1003 on Plan 57001 Champion Lakes
Lot 8001 on Plan 56131 Seville Grove
Da Vinci Way Road Reserve (PIN 11841454) Forrestdale
Edison Circuit Road Reserve (PINs 11780875 and 11841455) Forrestdale
Mcgill Pass Road Reserve (PIN 11841451) Forrestdale
Hensbrook Loop Road Reserve (PINs 11841452 and 11841419) Forrestdale
Mccook Street Road Reserve (PIN 11879301) Forrestdale
Mccook Street Road Reserve (PIN 11841453) Forrestdale
Einstein Link Road Reserve (PIN 11841450) Forrestdale

Road Reserve, Cartwright Drive (PIN 11841449) Forrestdale
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Lot 500 on Plan 61227 Forrestdale
Lot 8016 on Plan 55492 Forrestdale
Lot 4119 on Plan 19888 (Crown Reserve 44920), Mount Richon
Lot 8012 on Plan 55492 Forrestdale
Lot 8013 on Plan 55488 Forrestdale
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Alex Wood Drive Road Reserve (PINs 11841070,11841042,11841222,11819476 and
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Lot 4120 on Plan 19888 (Crown reserve 44918) Mount Richon
Lot 201 on Plan 49526 Armadale
Lot 4037 on Plan 20258 (Crown Reserve 43920) Brookdale
Lot 321 on Plan 5862 Roleystone
Lot 322 on Plan 5862 Roleystone
Lot 323 on Plan 5862 Roleystone
Lot 324 on Plan 5862 Roleystone
Lot 2079 on Plan 33582 (Crown Reserve 28630) Kelmscott
Lot 4839 on Plan 27788 Bedfordale
Lot 4402 on Plan 95902 (Crown Reserve 46054) Hilbert
Lot 2377 on Plan 187069 (Crown Reserve 31139) Roleystone
Brookton Highway Road Reserve (PIN 11879354) Roleystone
Lot 2486 on Plan 43826 Roleystone
Lot 4559 on Plan 23686 Roleystone
Lot 4527 on Plan 195167 (Crown Reserve 28728) Roleystone
Slab Gully Road Reserve (PIN 11866552) Roleystone
Lot 830 on Plan 62604 Roleystone
Lot 4694 on Plan 23935 Bedfordale
Lot 8003 on Plan 412970 Piara Waters
Lot 300 on Plan 412970 Piara Waters
Lot 601 on Plan 74054 Piara Waters
Lot 8101 on Plan 58342 Harrisdale
Lot 610 on Plan 26328 Bedfordale
Lot 4163 on Plan 22162 (Crown Reserve 45366) Mount Richon
Lot 201 on Plan 402532 Hilbert
Stillwell Circuit Road Reserve (PIN 12225865) Hilbert
Lot 199 on Plan 406077 Hilbert
Lot 197 on Plan 406077 Hilbert
Lot 201 on Plan 402532 (Crown Reserve 52393) Hilbert
Lot 202 on Plan 402532 (Crown Reserve 52393) Hilbert
Normandie Way Road Reserve (PINs 12225867 and 12236070), Hilbert
Lot 200 on Plan 406847 Hilbert

Westland Way Road Reserve (PIN 12236071) Hilbert

Lot 201 on Plan 402694 Forrestdale

Lot 202 on Plan 402694 Forrestdale

Lot 203 on Plan 402694 Forrestdale

Lot 204 on Plan 402694 Forrestdale

Lot 205 on Plan 402694 Forrestdale

Lot 206 on Plan 402694 Forrestdale

Lot 207 on Plan 402694 Forrestdale

Lot 1 on Plan 77306 Forrestdale

Unnamed Road Reserve (PIN 11207770) Armadale

Lot 1689 on Plan 401574 Piara Waters

Lot 1550 on Plan 401607 Piara Waters

Lot 8002 on Plan 407088 Piara Waters

Lot 8000 on Plan 68108 Piara Waters

3. Clearing authorised

The permit holder must not clear more than 5 hectares of *native vegetation* within the area cross-hatched yellow in Figures 1 to 24 of Schedule 1.

PART II – MANAGEMENT CONDITIONS

4. 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.

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

6. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner from one direction to another or towards the outer edge of the *asset* to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

7. Erosion management

The permit holder must conduct clearing when the *asset* is *dry*.

8. Fauna management

- (a) The permit holder must inspect the area authorised to be cleared under this permit prior to works commencing and for the duration of clearing for any native fauna that may be present.
- (b) Where fauna have been identified under condition 8(a), works must cease until the fauna have escaped into adjacent habitat ahead of the clearing activity or translocated into adjacent *native vegetation*.
- (c) Where *Westralunio carteri* (Carter's freshwater mussel) is identified under condition 8(a), the area is to be avoided and clearing is not to occur.

PART III - RECORD KEEPING AND REPORTING

9. 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	<ul style="list-style-type: none">(a) the species composition, structure, and density of the cleared area;(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;(c) the date that the area was cleared;(d) the direction that clearing occurred;(e) the size of the area cleared (in hectares);(f) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 4;(g) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 5;(h) photographic evidence that the <i>asset</i> is <i>dry</i>; and(i) actions taken in accordance with condition 8.

10. Reporting

The permit holder must provide to the *CEO* the records required under condition 9 of this permit when requested by the *CEO*.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
asset	means the infrastructure that the City of Armadale is responsible for maintaining on an annual basis including drainage corridors, drainage basins, drainage swales, roadside swales/biofilters, road bridges, pedestrian bridges and fauna underpasses.
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
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.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
dry	means the deepest point of the basin or swale is dry.
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.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; 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



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

30 June 2021

Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (



Figure 1 to 24).

Plan A

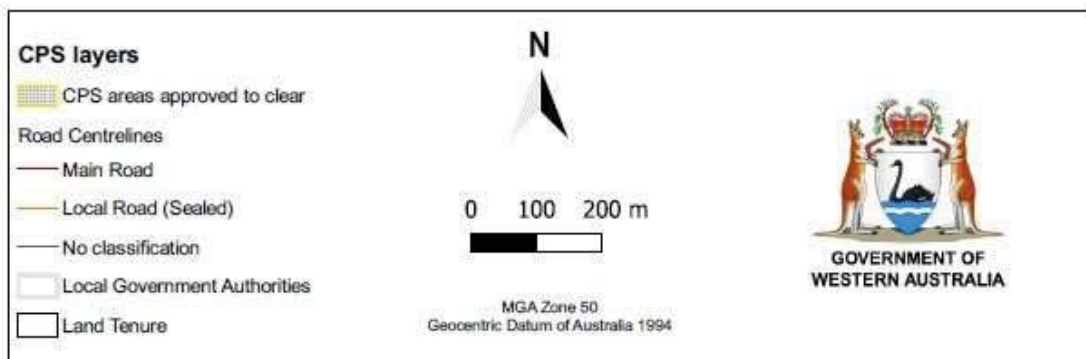


Figure 1: Map of the boundary of the area within which clearing may occur.

Plan B

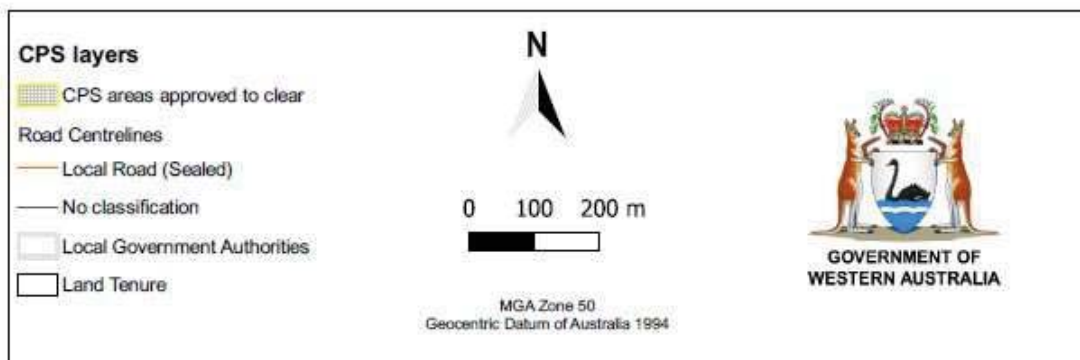


Figure 2: Map of the boundary of the area within which clearing may occur.

Plan C

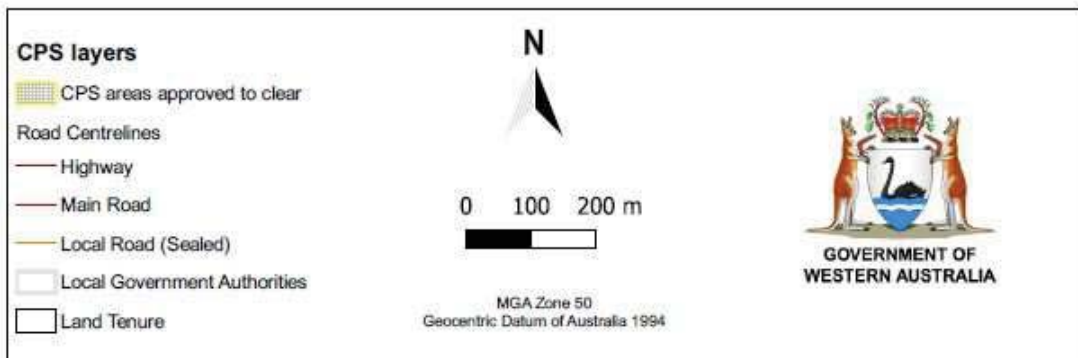


Figure 3: Map of the boundary of the area within which clearing may occur.

Plan D

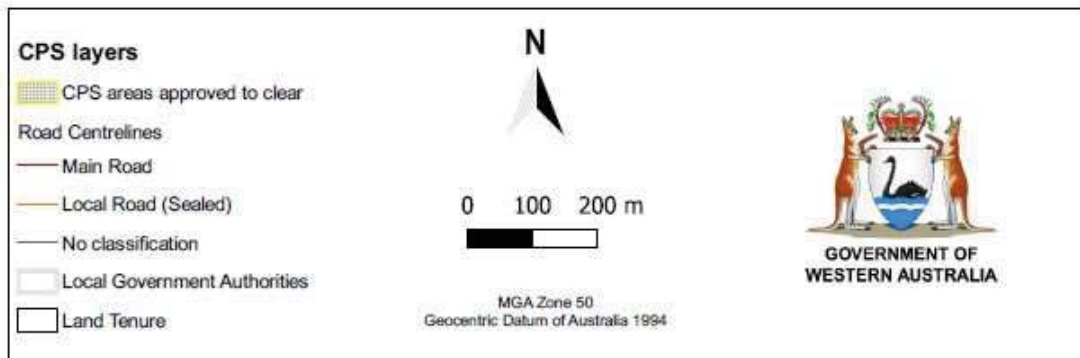


Figure 4: Map of the boundary of the area within which clearing may occur.

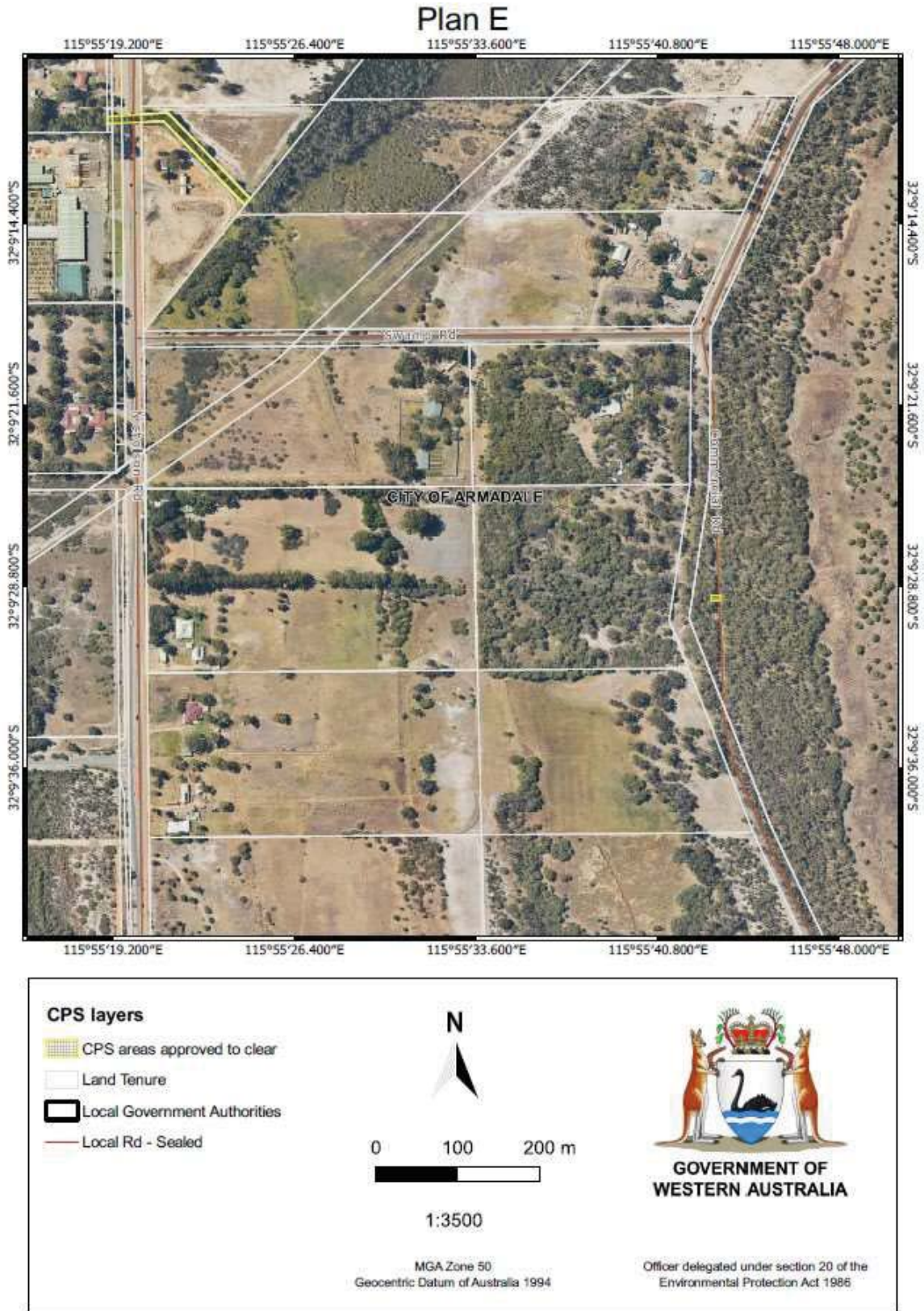


Figure 5: Map of the boundary of the area within which clearing may occur.

Plan G

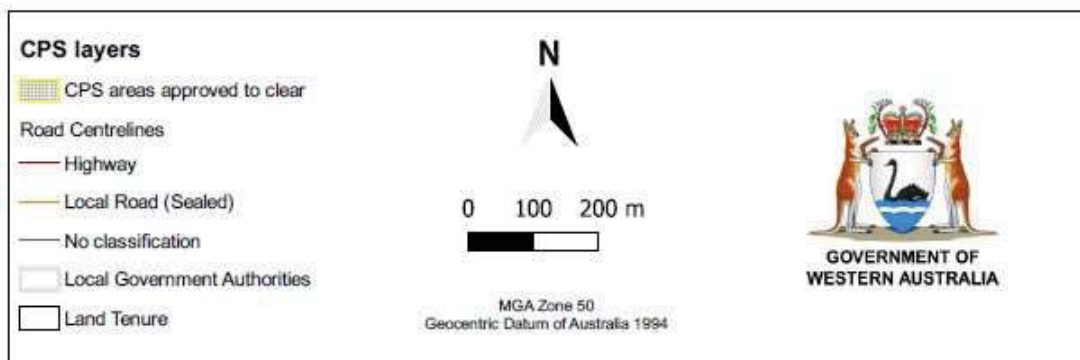


Figure 7: Map of the boundary of the area within which clearing may occur.

Plan H

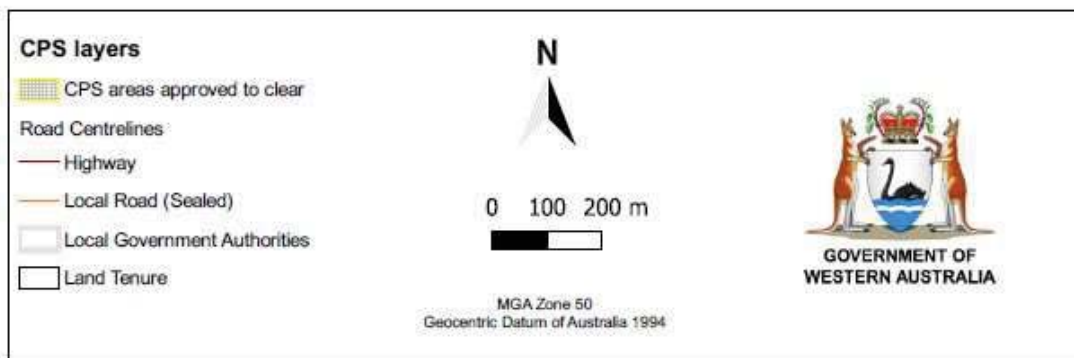


Figure 8: Map of the boundary of the area within which clearing may occur.

Plan I

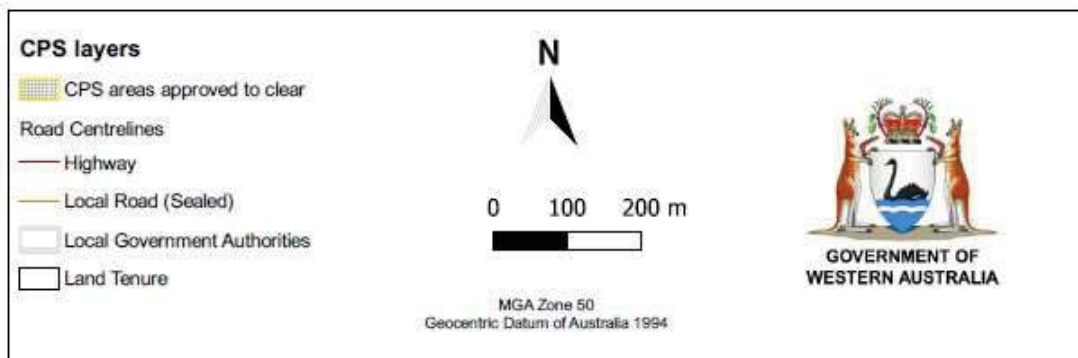


Figure 9: Map of the boundary of the area within which clearing may occur.

Plan J

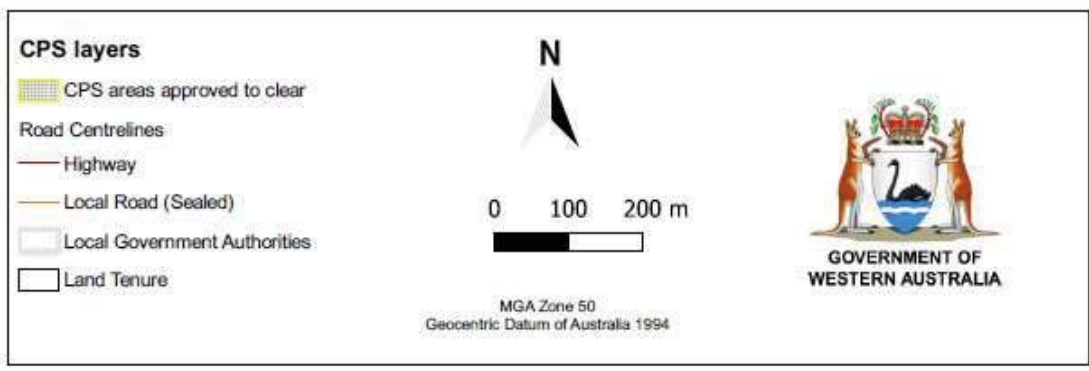


Figure 10: Map of the boundary of the area within which clearing may occur.

Plan K

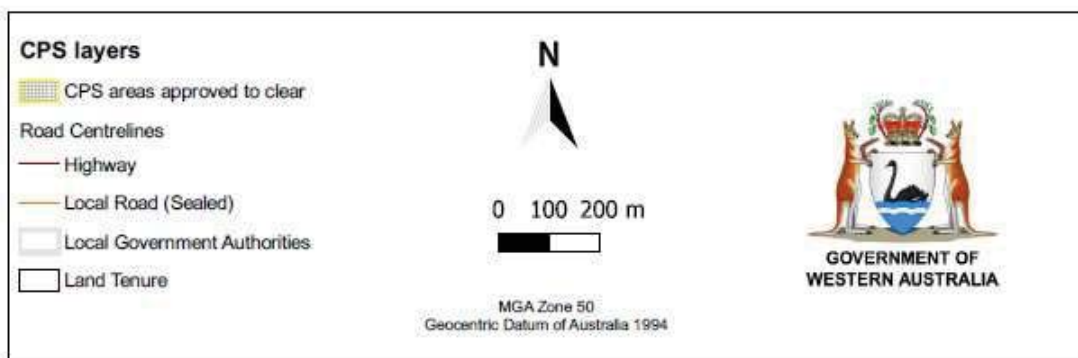


Figure 11: Map of the boundary of the area within which clearing may occur.

Plan L

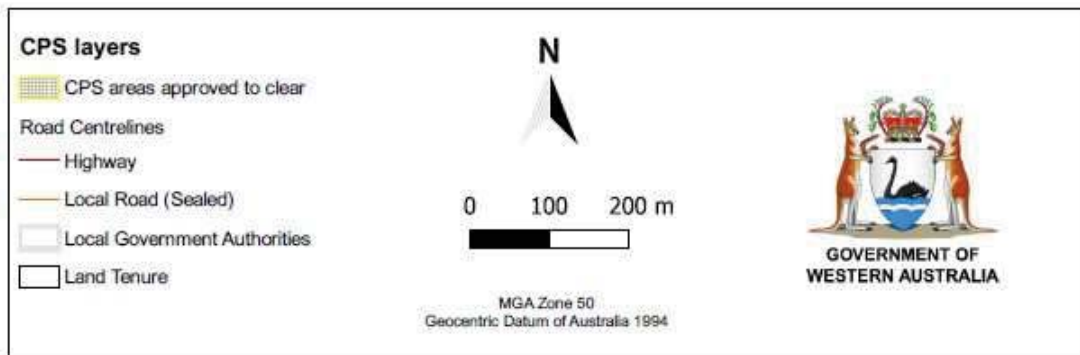


Figure 12: Map of the boundary of the area within which clearing may occur.

Plan M

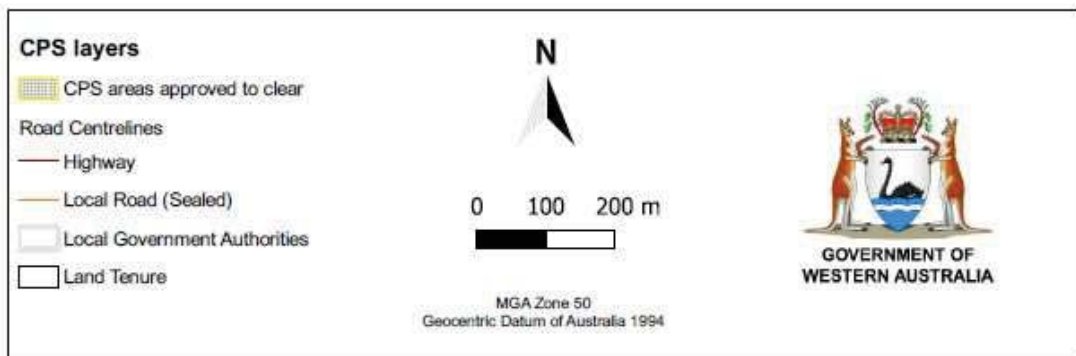


Figure 13: Map of the boundary of the area within which clearing may occur.

Plan N

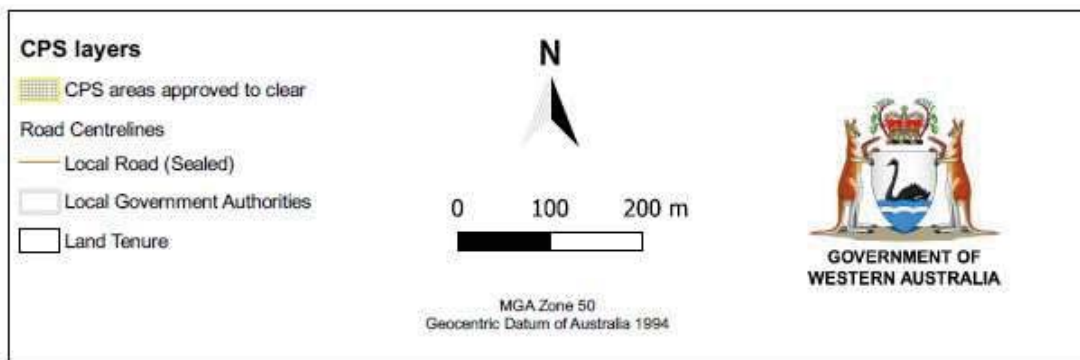


Figure 14: Map of the boundary of the area within which clearing may occur.

Plan O

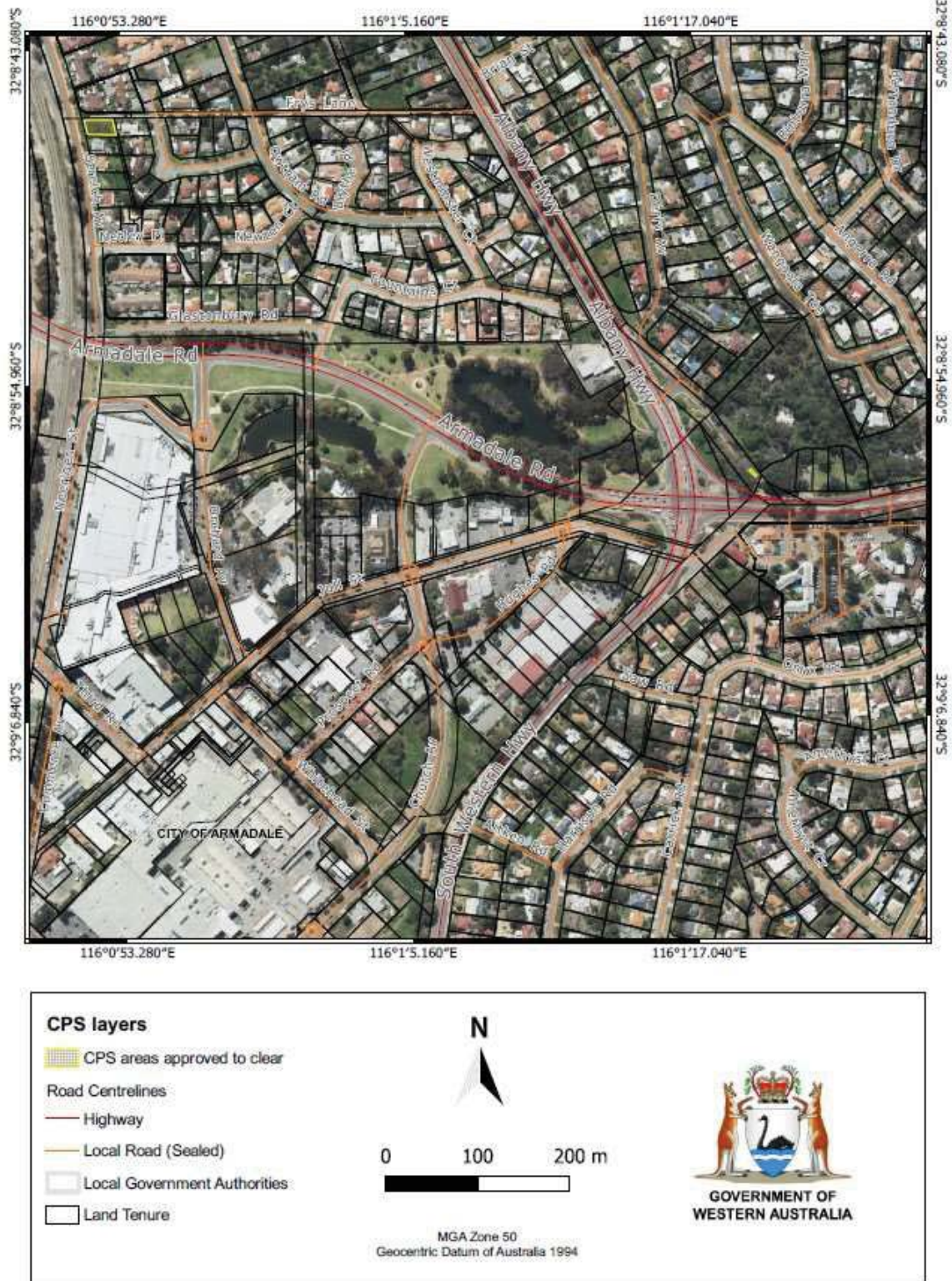


Figure 15: Map of the boundary of the area within which clearing may occur.

Plan P

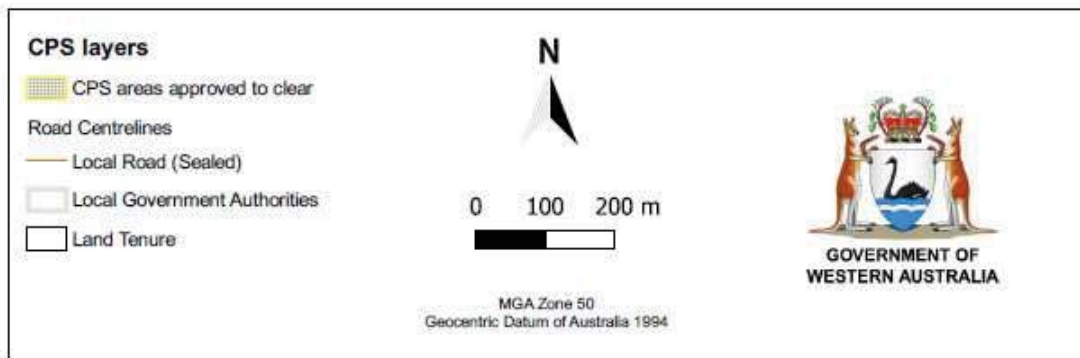


Figure 16: Map of the boundary of the area within which clearing may occur.

Plan Q

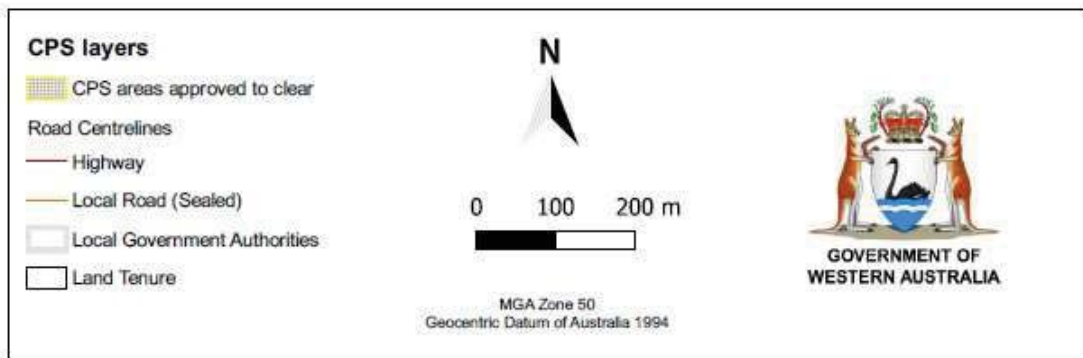


Figure 17: Map of the boundary of the area within which clearing may occur.

Plan R

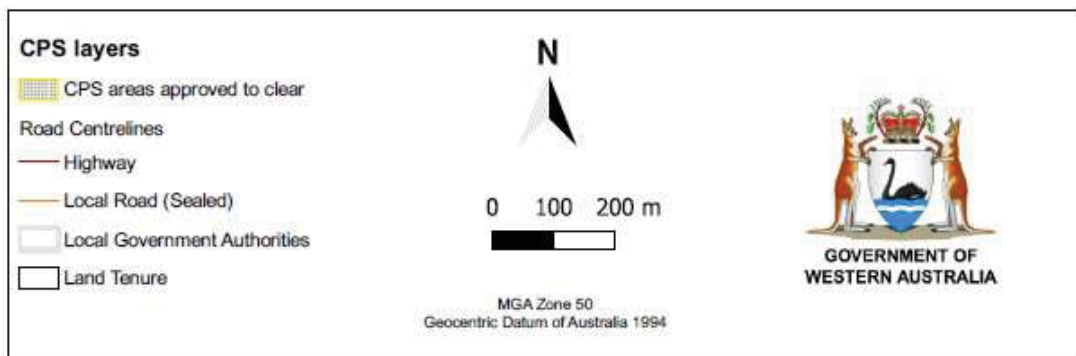


Figure 18: Map of the boundary of the area within which clearing may occur.

Plan S

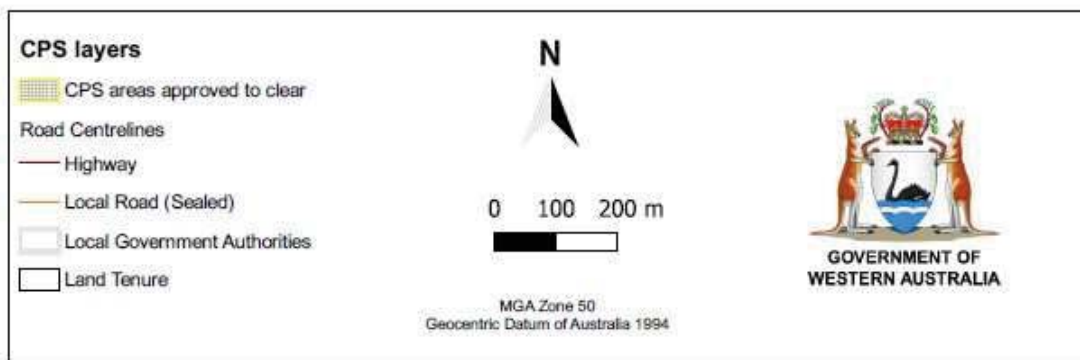


Figure 19: Map of the boundary of the area within which clearing may occur.

Plan T

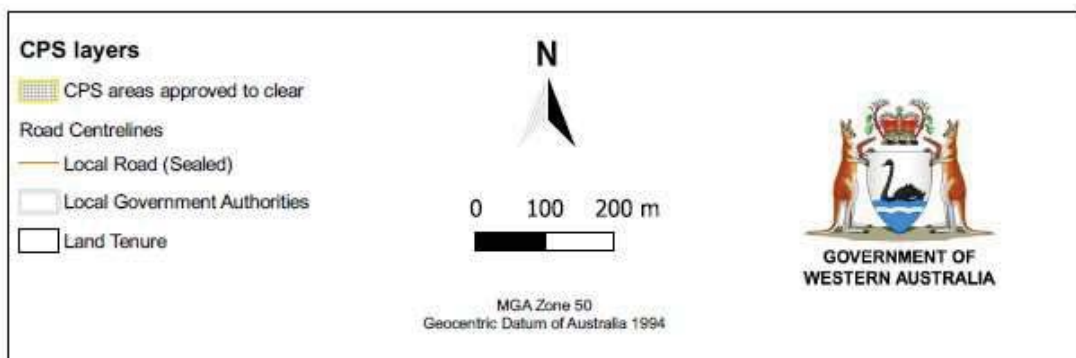


Figure 20: Map of the boundary of the area within which clearing may occur.

Plan U

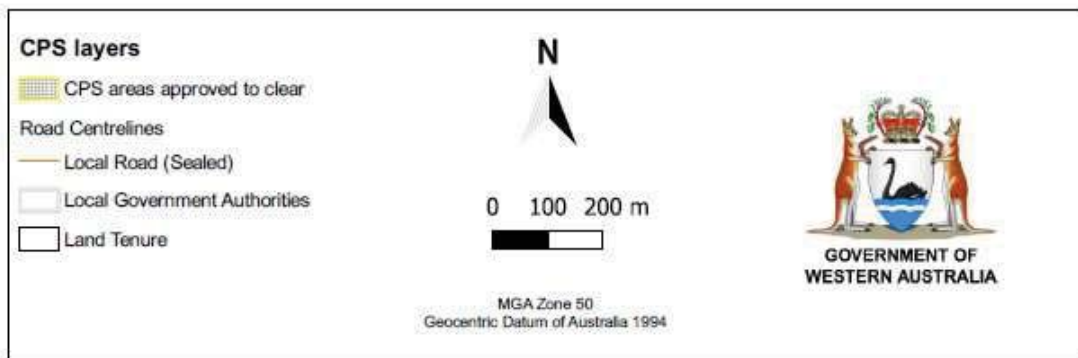


Figure 21: Map of the boundary of the area within which clearing may occur.

Plan V

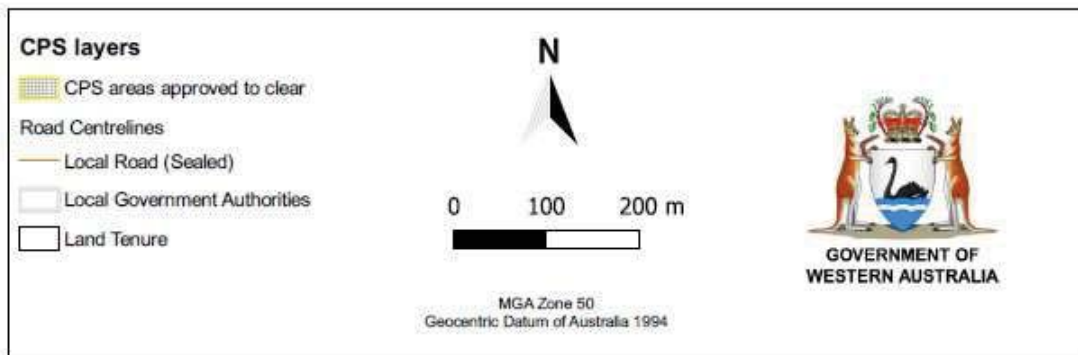
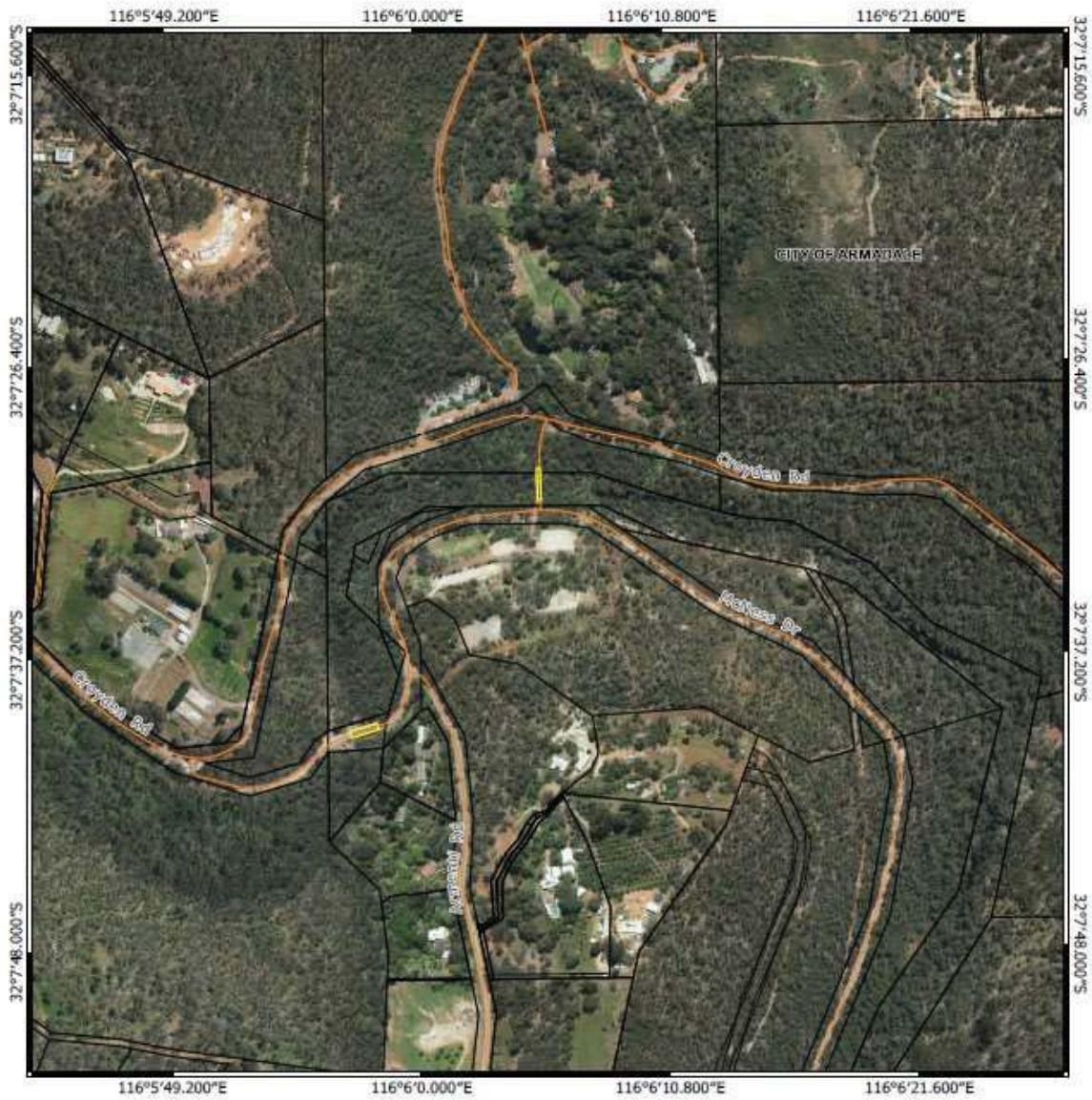


Figure 22: Map of the boundary of the area within which clearing may occur.

Plan W

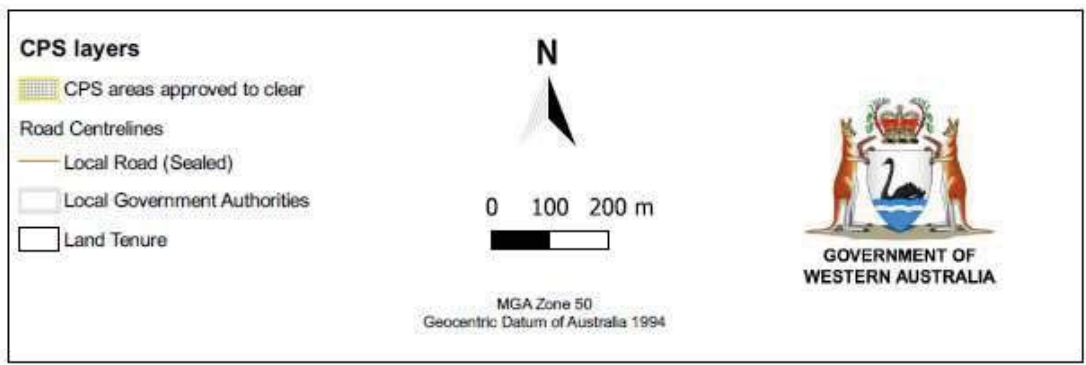


Figure 23: Map of the boundary of the area within which clearing may occur.



Property	Locality
Lot 44 on Plan 226029	Forrestdale
Lot 61 on Plan 7748	Forrestdale
Nicholson Road Reserve (PINs 11874636)	Forrestdale
Easement (PIN 11430453)	Forrestdale
Forrest Road Reserve (PINs 11358140 and 11358132)	Haynes
Gracefield Boulevard Road Reserve (PIN 12304513)	Harrisdale
Balanup Road Reserve (PIN 11358139)	Haynes
Lot 1212 on Plan 77482	Piara Waters
Lot 651 on Plan 409800	Piara Waters
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Lot1551 on Plan 401607	Piara Waters
Lot 523 on Plan 250220	Roleystone
Lot 3400 on Plan 91493	Roleystone
Lot 608 on Plan 413494	Harisdale
Rowlet Road Reserve (PIN 11358152)	Hilbert
Champion Drive Road Reserve (PIN 12255005)	Champion Lakes
Champion Drive Road Reserve (PIN 11845104)	Kelmscott
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Turner Road Reserve (PIN 11193247)	Kelmscott
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Lot 4031 on Plan20672 (Crown Reserve 43933)	Mount Richon
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Lot 8002 on Plan 63674	Piara Waters
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Lot 8007 on Plan73479 (Crown Reserve 51203)	Harrisdale
Lot 700 on Plan 76720	Piara Waters
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Lot 8001 on Plan 405134 Forrestdale	Forrestdale
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Lot 1003 on Plan 57001	Champion Lakes
Lot 8001 on Plan 56131	Seville Grove
Da Vinci Way Road Reserve (PIN 11841454)	Forrestdale
Edison Circuit Road Reserve (PINs 11780875 and 11841455)	Forrestdale
Mcgill Pass Road Reserve (PIN 11841451)	Forrestdale
Hensbrook Loop Road Reserve (PINs 11841452 and 11841419)	Forrestdale
Mccook Street Road Reserve (PIN 11879301)	Forrestdale
Mccook Street Road Reserve (PIN 11841453)	Forrestdale
Einstein Link Road Reserve (PIN 11841450)	Forrestdale
Road Reserve, Cartwright Drive (PIN 11841449)	Forrestdale
Lot 4851 on Plan 29950	Forrestdale
Lot 500 on Plan 61227	Forrestdale
Lot 8016 on Plan 55492	Forrestdale
Lot 4119 on Plan19888 (Crown Reserve 44920),	Mount Richon
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Lot 8013 on Plan 55488	Forrestdale
Lot 8014 on Plan 55488	Forrestdale
Lot 8015 on Plan 55490	Forrestdale
Alex Wood Drive Road Reserve (PINs 11841070,11841042,11841222,11819476 and 11841036)	Forrestdale
Remisko Drive Road Reserve (PINs 11841071 and 11841290)	Forrestdale

Lot 4120 on Plan19888 (Crown reserve 44918)	Mount Richon
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Lot 321 on Plan 5862	Roleystone
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Lot 323 on Plan 5862	Roleystone
Lot 324 on Plan 5862	Roleystone
Lot 2079 on Plan 33582 (Crown Reserve 28630)	Kelmescott
Lot 4839 on Plan 27788	Bedfordale
Lot 4402 on Plan 95902 (Crown Reserve 46054)	Hilbert
Lot 2377 on Plan 187069 (Crown Reserve 31139)	Roleystone
Brookton Highway Road Reserve (PIN 11879354)	Roleystone
Lot 2486 on Plan 43826	Roleystone
Lot 4559 on Plan 23686	Roleystone
Lot 4527 on Plan195167 (Crown Reserve 28728)	Roleystone
Slab Gully Road Reserve (PIN 11866552)	Roleystone
Lot 830 on Plan 62604	Roleystone
Lot 4694 on Plan 23935	Bedfordale
Lot 8003 on Plan 412970	Piara Waters
Lot 300 on Plan 412970 Piara Waters	Piara Waters
Lot 601 on Plan 74054	Piara Waters
Lot 8101 on Plan 58342	Harrisdale
Lot 610 on Plan 26328	Bedfordale
Lot 4163 on Plan22162 (Crown Reserve 45366)	Mount Richon
Lot 201 on Plan 402532	Hilbert
Stillwell Circuit Road Reserve (PIN 12225865)	Hilbert
Lot 199 on Plan 406077	Hilbert
Lot 197 on Plan 406077	Hilbert
Lot 201 on Plan402532 (Crown Reserve 52393)	Hilbert
Lot 202 on Plan402532 (Crown Reserve 52393)	Hilbert
Normandie Way Road Reserve (PINs 12225867 and 12236070)	Hilbert
Lot 200 on Plan 406847	Hilbert
Westland Way Road Reserve (PIN 12236071)	Hilbert
Lot 201 on Plan 402694	Forrestdale
Lot 202 on Plan 402694	Forrestdale
Lot 203 on Plan 402694	Forrestdale
Lot 204 on Plan 402694	Forrestdale
Lot 205 on Plan 402694	Forrestdale
Lot 206 on Plan 402694	Forrestdale
Lot 207 on Plan 402694	Forrestdale
Lot 1 on Plan 77306	Forrestdale
Unnamed Road Reserve (PIN 11207770)	Armadale
Lot 1689 on Plan 401574	Piara Waters
Lot 1550 on Plan 401607	Piara Waters
Lot 8002 on Plan 407088	Piara Waters
Lot 8000 on Plan 68108	Piara Waters



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9042/1
Permit type:	Purpose permit
Applicant name:	City of Armadale
Application received:	10 September 2020
Application area:	5 hectares of native vegetation within a 26.2 hectares footprint
Purpose of clearing:	Infrastructure maintenance-Typha control
Method of clearing:	Mechanical
Property:	List of properties attached
Location (LGA area/s):	City of Armadale
Localities (suburb/s):	Within multiple properties in Armadale, Bedforddale, Brookdale, Camillo, Champion Lakes, Forrestdale, Harrisdale, Haynes, Hilbert, Karragullen, Kelmscott, Mount Richon, Piara Waters, Roleystone and Seville Grove

1.2. Description of clearing activities

The proposed clearing is for a strategic purpose permit, targeting the removal of two species of robust herbaceous native reed, *Typha domingensis* and *T. orientalis*. Clearing will take place at a number of properties within the City of Armadale municipality. The clearing area consists of 170 separate areas or reed stands, occurring within ephemeral water courses, lakes, pools, manmade drainage corridors and stormwater basins (see Figure 1, in Section 1.5). Each of the 170 separate areas may comprise one or both species of reed, for the purpose of this report, the above species will be referred to collectively as Typha. Within and adjacent to each stand, all other native vegetation will be retained where possible. In the majority of cases the slashing of vegetation will be the only maintenance activity required. For drainage corridors, the proposed clearing will be carried out between the edges of the drainage corridor to keep the channel clear from obstructions. Other vegetation, in addition to Typha may be included if occurring near bridges and underpasses to ensure the structure is kept free of overhanging vegetation which may pose a risk to road/pedestrian users and impact on the structural integrity of the asset (City of Armadale 2020a).

The proposed clearing is for five hectares within a 26.2-hectare footprint. The applicant proposes to utilise the larger area to strategically clear up to five hectares of native vegetation, including vegetation that may emerge and clog drainage infrastructure during the authorised period of the permit.

1.3. Decision on application

Decision:	Granted
Decision date:	30 June 2021
Decision area:	5 hectares of native vegetation, within a 26.2 hectares 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 (DWER) advertised the application for 21 days and no submissions were received. Additional sites were added during the course of the assessment, with the application re-advertised for an additional seven days on two separate occasions. No submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the Environmental Management Plan (City of Armadale 2020a), the clearing principles set out in Schedule 5 of the EP Act (see 0), 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, to remove *Typha*, an invasive native species capable of aggressive invasions that can transform ecosystems and clog drainage channels unless it is actively managed (Western Australian Herbarium 1998-). It is not expected that the removal of *Typha* and any additional vegetation, in order to maintain drainage assets, will result in significant impacts to environmental values in the application area. Given the previously disturbed nature of the majority of the assets where *Typha* is required to be removed, it is considered unlikely that trees or any flora of conservation significance would be located in or adjacent to infrastructure.

The Environmental Management Plan (City of Armadale 2020a) contains a number of measures to avoid and minimise impacts to fauna and flora associated with *Typha* removal and other works. Management measures include the timing of the proposed works, methods of removal to be used, hygiene management and inspections for fauna.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Sections 3.1), the Delegated Officer decided to grant a clearing permit subject to the following requirements conditioned on the clearing permit, to manage and address the impacts of clearing:

- 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.
- Scheduling works when the asset is dry to minimise the amount of native fauna that may be utilising the asset at the time of clearing.
- Undertake slow, progressive one directional clearing or towards the outer edge of the asset to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity.
- Pre-clearing site inspections prior to works commencing and ongoing during works for any fauna that may be present. If found and are not able to escape into adjacent habitat, the City of Armadale is to cease works until the identified fauna has been translocated.

1.5. Site maps

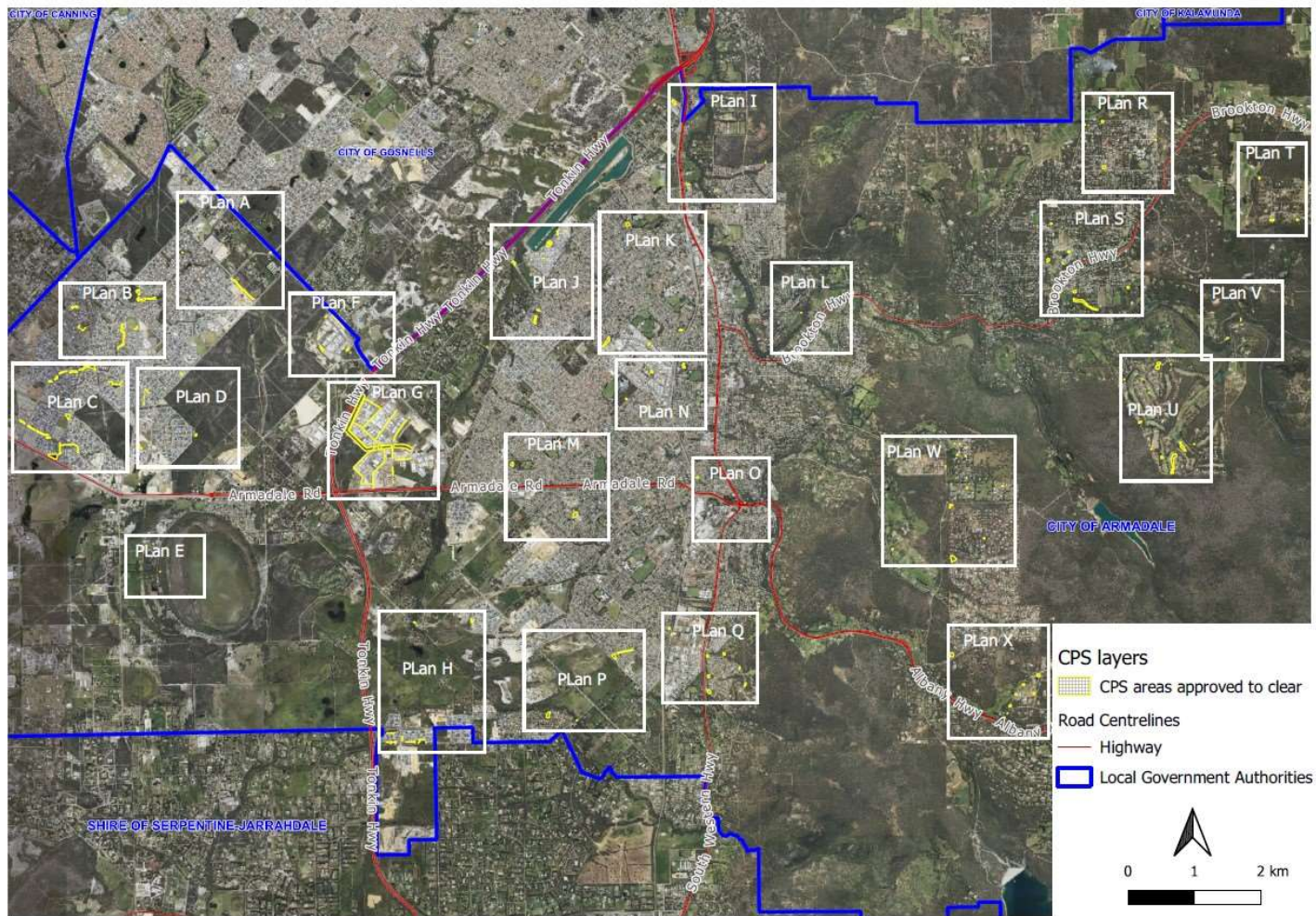


Figure 1 Context map of the application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan A

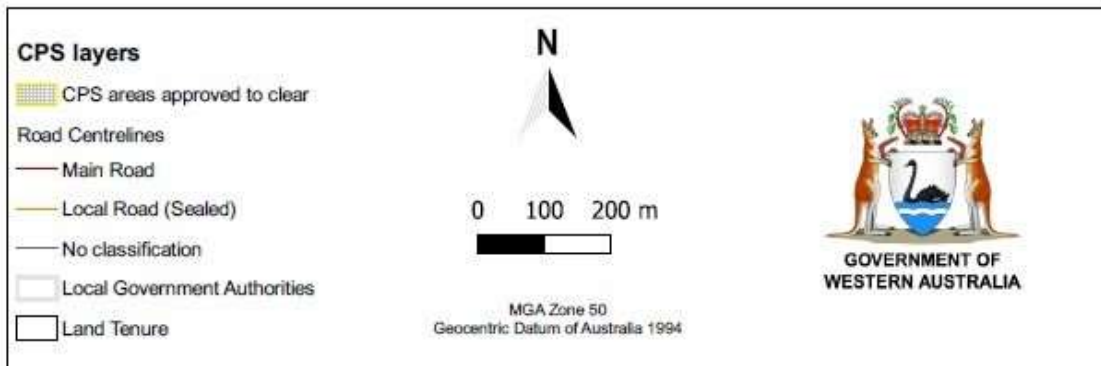


Figure 2 Plan A of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan B

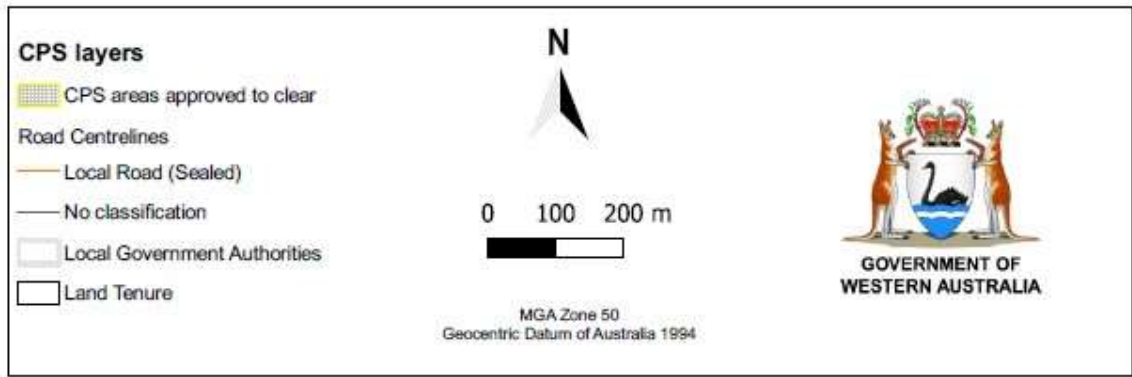


Figure 3 Plan B of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan C

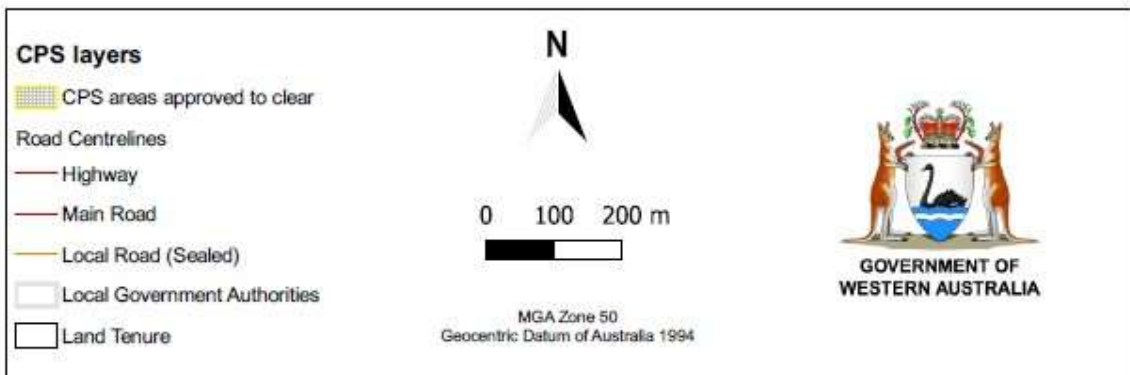


Figure 4 Plan C of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan D

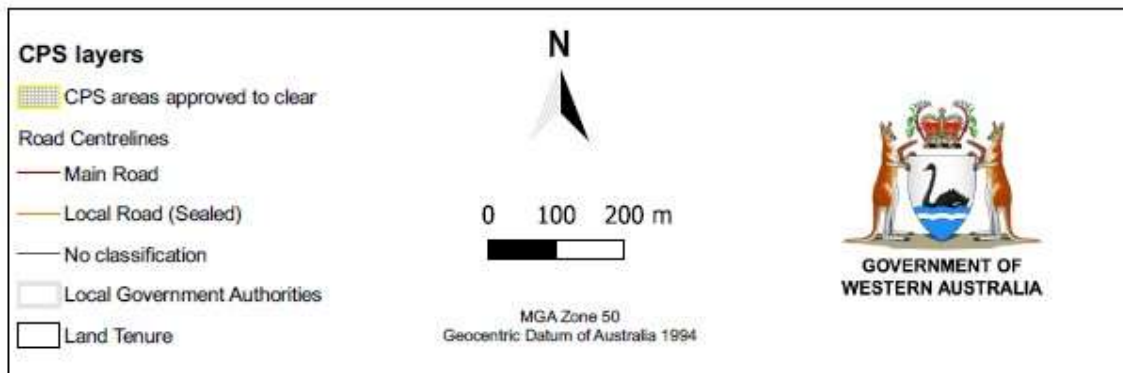


Figure 5 Plan D of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan E

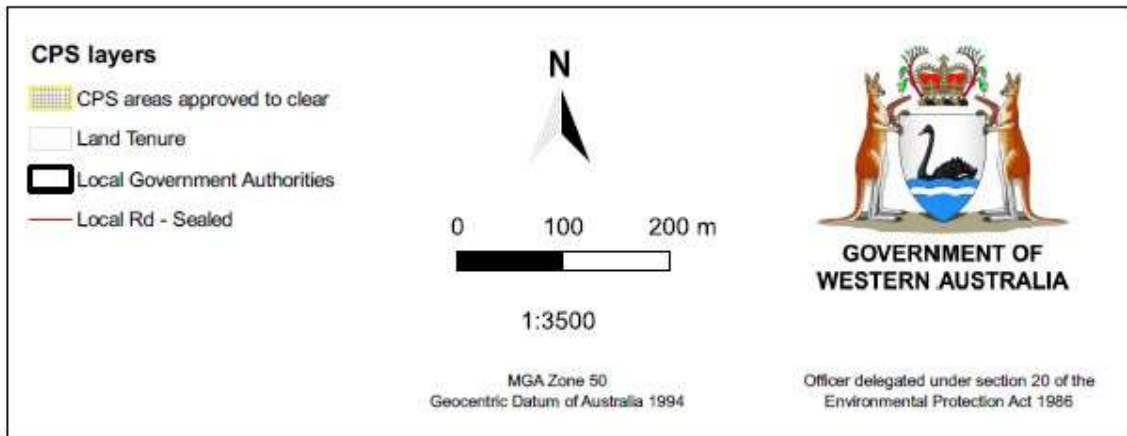


Figure 6 Plan E of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan F

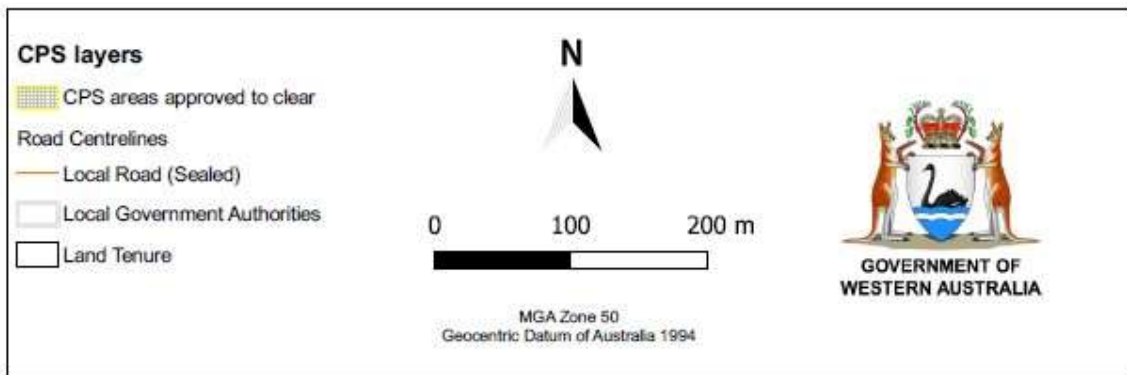


Figure 7 Plan F of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan G

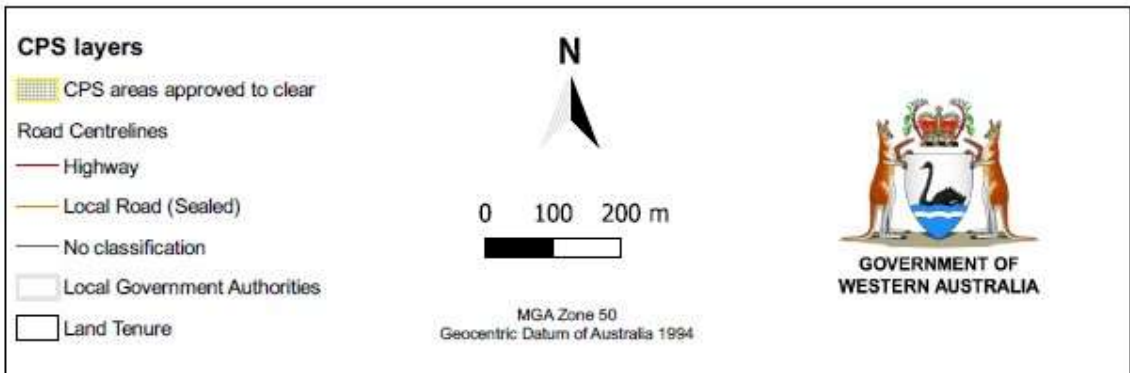


Figure 8 Plan G of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan H

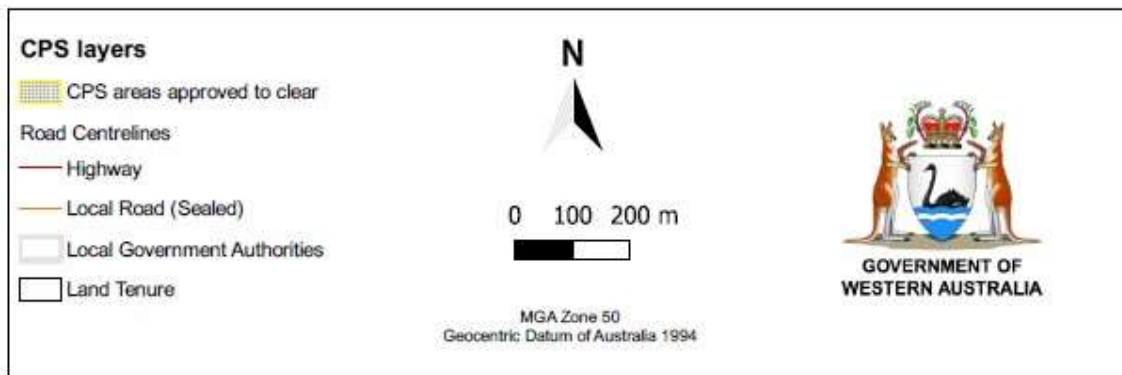


Figure 9 Plan H of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan I

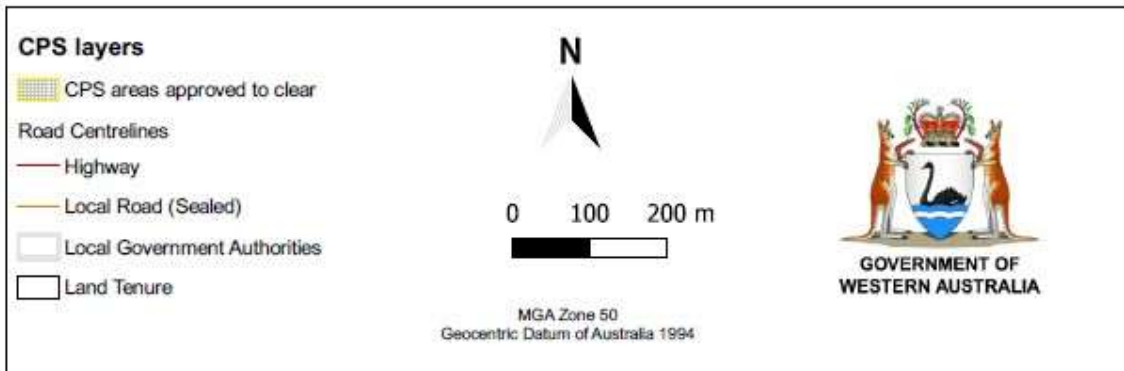



Figure 10 Plan I of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

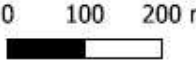
Plan J




CPS layers	
	CPS areas approved to clear
Road Centrelines	
	Highway
	Local Road (Sealed)
	Local Government Authorities
	Land Tenure



0 100 200 m



MGA Zone 50
Geocentric Datum of Australia 1994



GOVERNMENT OF WESTERN AUSTRALIA

Figure 11 Plan J of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit

Plan K

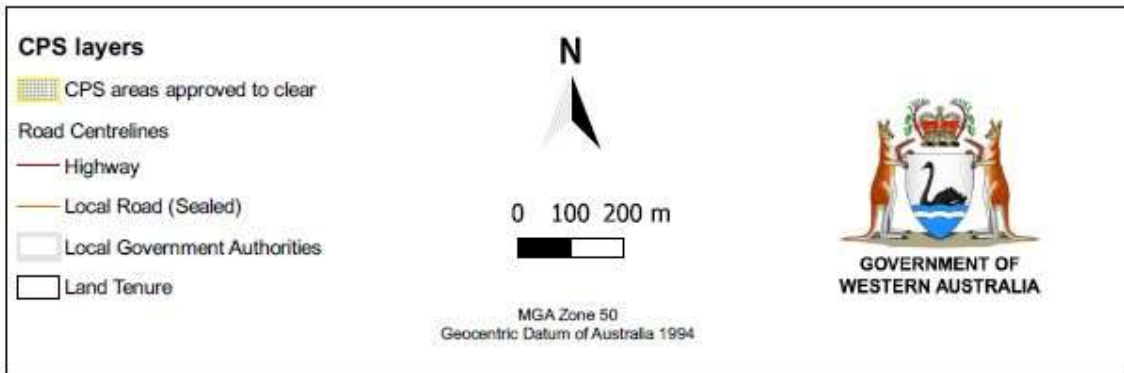








Figure 12 Plan K of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

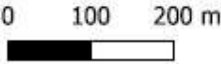
Plan L




CPS layers

-  CPS areas approved to clear
- Road Centrelines
 -  Highway
 -  Local Road (Sealed)
-  Local Government Authorities
-  Land Tenure





MGA Zone 50
Geocentric Datum of Australia 1994



**GOVERNMENT OF
WESTERN AUSTRALIA**

Figure 13 Plan L of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan M

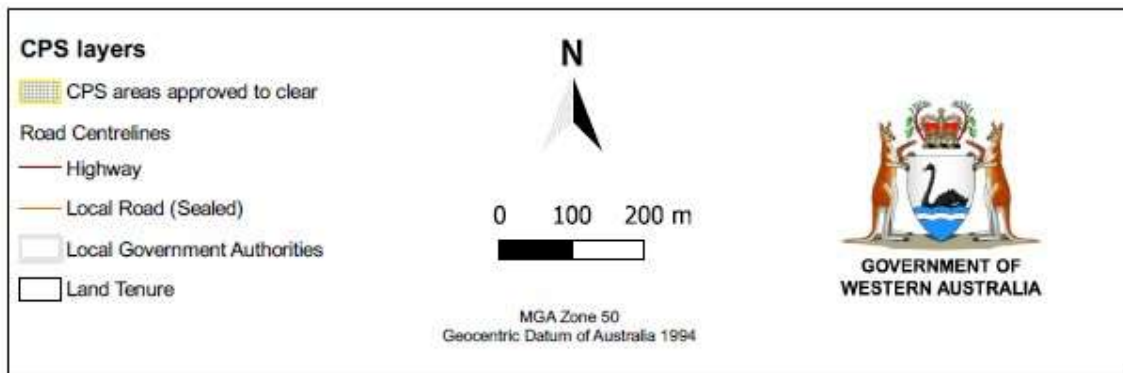


Figure 14 Plan M of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan N

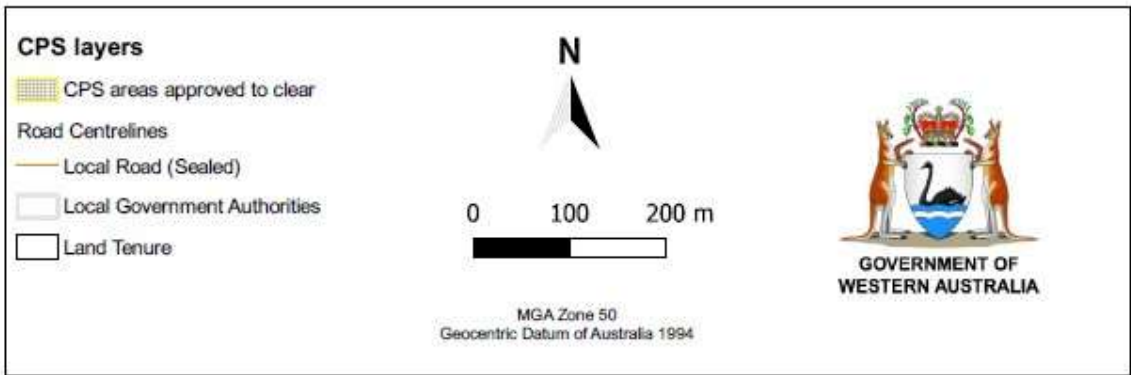


Figure 15 Plan N of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan O

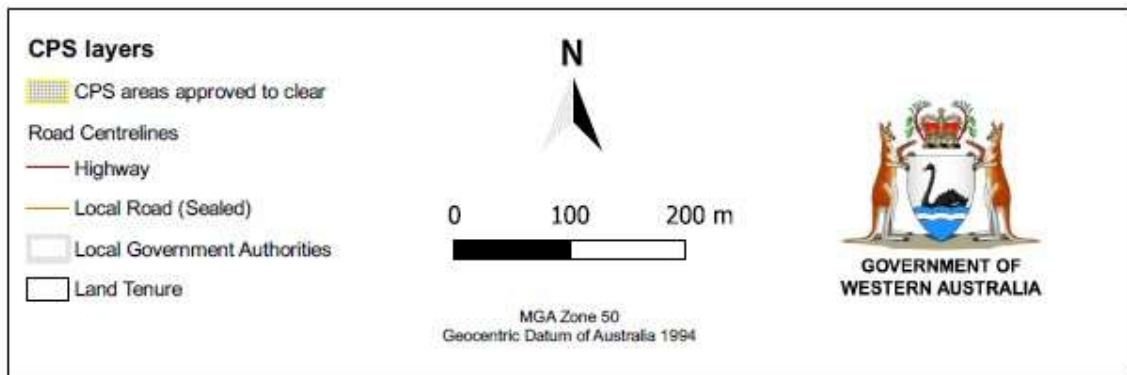


Figure 16 Plan O of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan Q

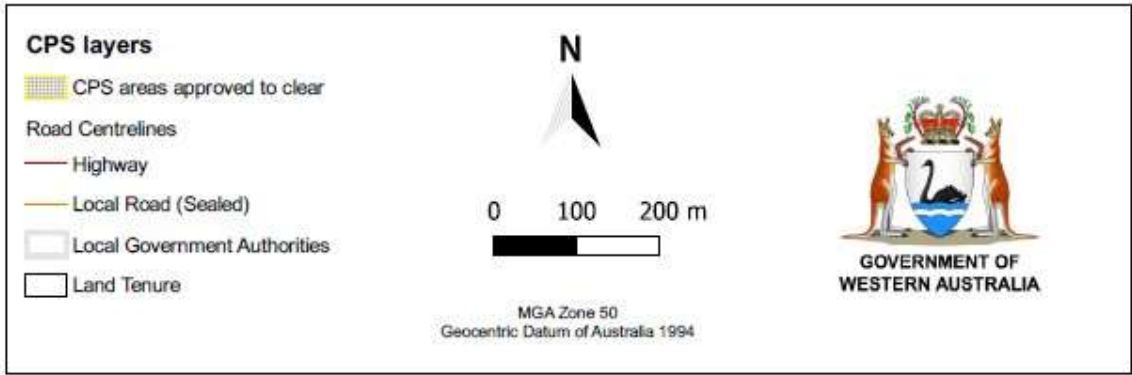


Figure 18 Plan Q of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan R



CPS layers

- CPS areas approved to clear
- Road Centrelines
- Highway
- Local Road (Sealed)
- Local Government Authorities
- Land Tenure

N

**GOVERNMENT OF
WESTERN AUSTRALIA**

0 100 200 m

MGA Zone 50
Geocentric Datum of Australia 1994

Figure 19 Plan R of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan S

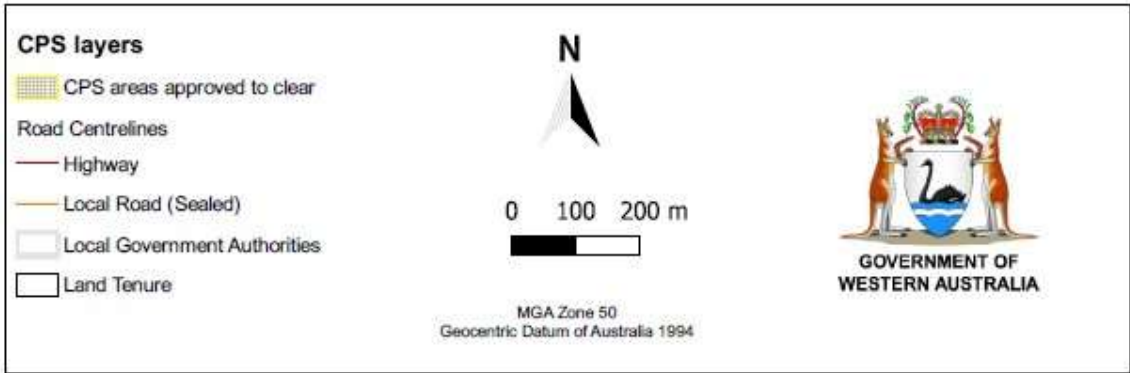


Figure 20 Plan S of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan T

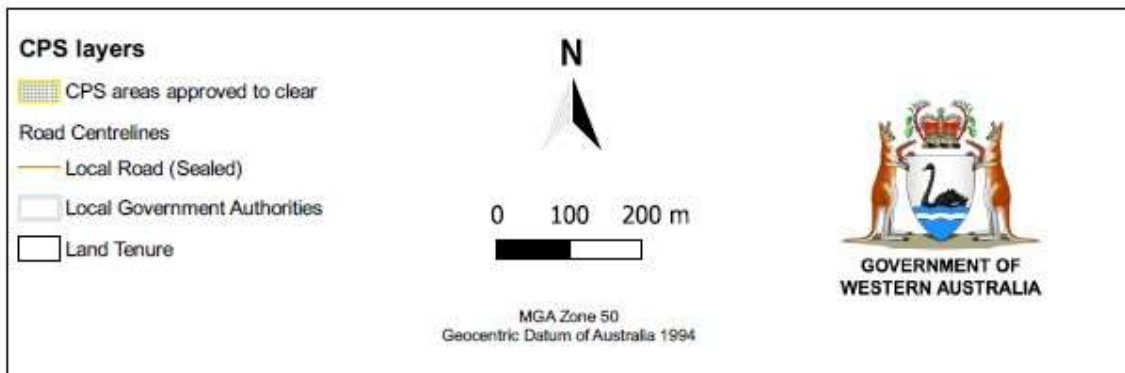


Figure 21 Plan T of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan V

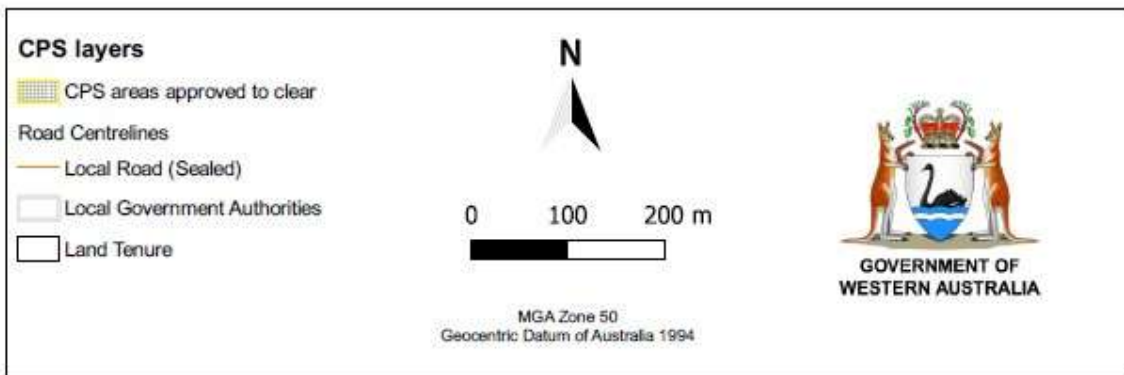
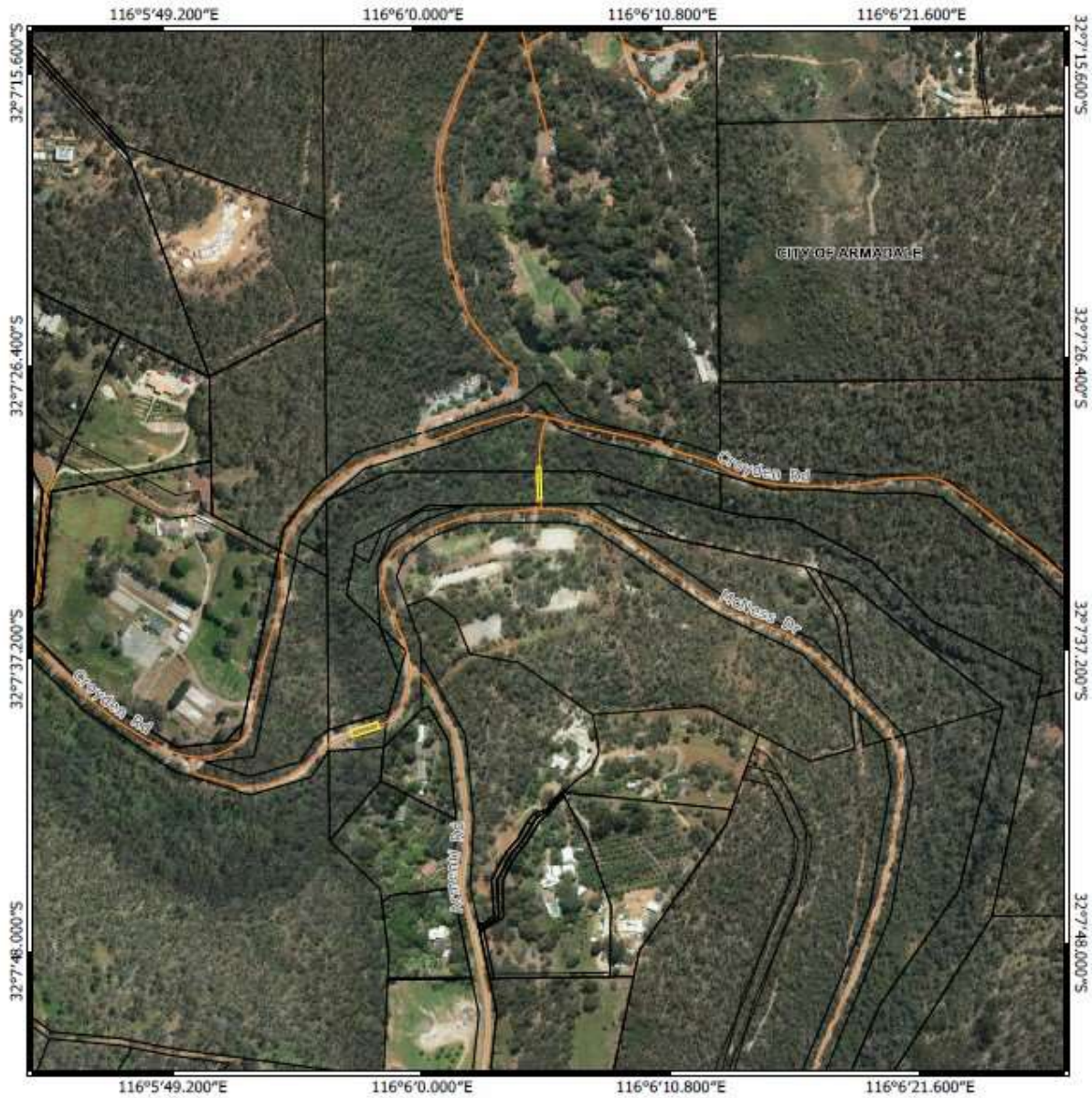


Figure 23 Plan V of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan W

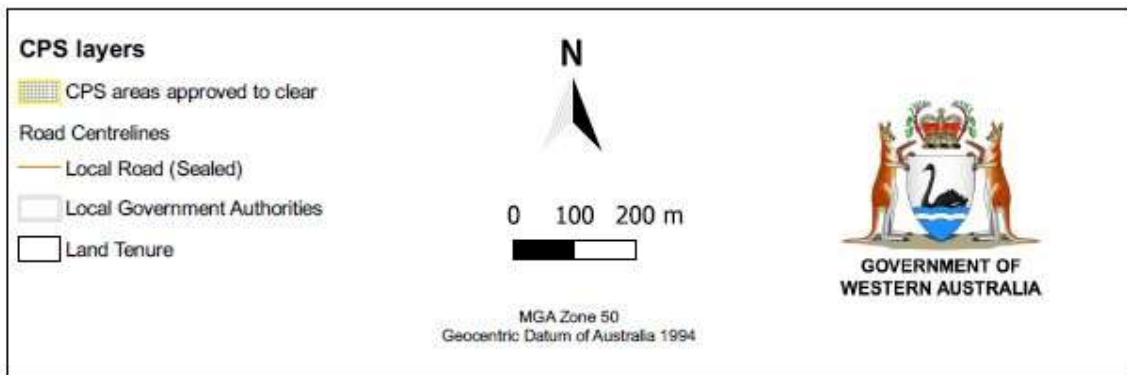


Figure 24 Plan W of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Plan X

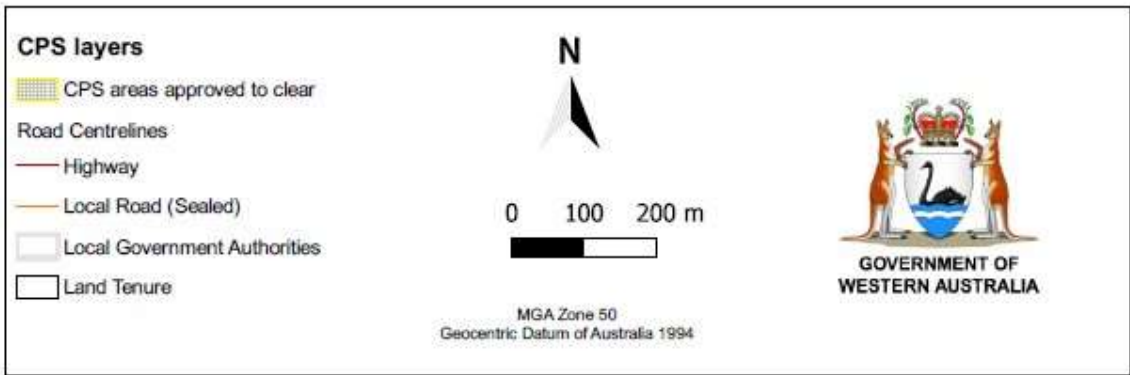


Figure 25 Plan X of application area. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

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)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

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.

According to available databases, two populations of *Westralunio carteri* (Carter's freshwater mussel) occurred downstream from two stands of Typha proposed to be cleared on the Canning River. The two stands covered a total area of 0.13 hectares and occurred 468 and 216 meters respectively, downstream from the two mussel populations.

The Department of Biodiversity Conservation and Attractions (DBCA) advised that the size and demographics of the above population was unknown, but if present could be crushed or damaged (DBCA 2021). The applicant was advised that if present within the works area, mussels were to be collected and held until works had finished and conditions had returned to normal.

As an avoidance measure, the applicant deemed the two stands of Typha occurring on the Canning river as a low requirement for maintenance and requested the aforementioned portions of the application area were removed (City of Armadale 2021a).

The applicant provided an Environmental Management Plan (City of Armadale 2020a), outlining measures to avoid and minimise impacts to fauna and flora associated with Typha removal and other works. Measures relevant to this report include:

- Ensure clearing and slashing of vegetation is confined to the area required for maintenance only.
- Schedule works when the asset is dry (i.e. deepest point of the basin or swale is completely dry).
- The maintenance area will be inspected prior to works commencing and ongoing during works for any obvious fauna (frogs, turtles, reptiles, small mammals) or fauna habitat (large logs, hollows, nests etc). Contact the City's Environment Department if anything is found, or if any fauna are observed during works that are not able to escape or are otherwise injured or distressed.
- Stockpiles, vehicle parking and clean down areas are not to be located on native vegetation.
- Cleared vegetation must not be pushed or dumped onto vegetation identified to be retained, or outside the approved clearing area.
- All clearing and slashing will be done progressively towards adjacent vegetated or towards the outer edge of the asset to enable fauna to escape away from the machinery noise.
- All vehicles, footwear and tools are to be free of mud, soil, and plant material including seeds before arriving at Site to prevent introduction of weeds and dieback.
- Removed vegetation will not be stockpiled on other areas of vegetation and will be removed from the site as soon as possible.

Considering the above avoidance and mitigation measures, 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.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see **Error! Reference source not found.**) 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 **Error! Reference source not found.**) identified that the impacts of the proposed clearing may present a risk to fauna and land and water 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 (fauna) - Clearing Principles (b)

Assessment

The Priority 4 *Oxyura australis* (Blue-billed duck), has 361 records within the local area. Approximately 80 of these records occur in direct proximity to Typha stands. Blue-billed duck breeds in secluded, densely vegetated situations with the nest constructed in Typha beds or other vegetation, generally over water. Nests are usually constructed from dead Typha leaves and sometimes thinly lined with down (Birdlife Australia, 2020). Considering the small size of the water bodies and associated Typha stands included in the proposed clearing, it is unlikely these areas are utilised as breeding sites by Blue billed duck. Better quality breeding habitat occurs within the local area, as listed in Appendix A3. The City of Armadale has plans to carry out pre-clearing site inspections, as mitigation to avoid disturbance on environmental values, including to nesting birds (City of Armadale 2020a).

Westralunio carteri (Carter's freshwater mussel), is listed as 'Vulnerable' under the EPBC Act and BC Act, and has 43 records within the local area. The current distribution of Carter's freshwater mussel is bounded by Gingin Brook in the north to the Kent, Goodga and Waychinicup Rivers in the south, within 50-100 kilometres of the coast. The species has been found to have undergone a 49 per cent reduction in extent of occurrence in less than three generations, due primarily to secondary salinisation. Apart from salinity, perenniality of stream flow was identified to be the other major limiting variable in the distribution of Carter's freshwater mussel, suggesting that habitat drying, inadequate provision of environmental stream flows and dewatering could pose further conservation constraints on the species (Klunzinger et al. 2015).

According to available datasets, Carter's freshwater mussel does not occur within the application area, however suitable habitat may occur. The aforementioned site inspections proposed by the City of Armadale should mitigate impact to Carter's freshwater mussel if present within the application area. The applicant has plans to carry out preclearing site inspections and avoid any area where Carter's freshwater mussel are detected (City of Armadale 2021a). In addition, the applicant deemed the two stands of Typha occurring the nearest to two known populations of Carter's freshwater mussel as a low requirement for maintenance and requested the aforementioned portions of the application area removed (City of Armadale 2021a).

Noting the assets being impacted, the proposed clearing area tends to hold or is adjacent to water. Due to the density of Typha and presence of water, a range of native fauna species may be present at the time of the clearing activity. In addition, *Isoodon fusciventer* (quenda, southwestern brown bandicoot), has been recorded 60 meters from the proposed clearing. However, impacts on this species are likely to be minimal. Undertaking clearing in a slow progressive manner towards adjacent vegetation or towards the outer edge of the asset will mitigate any potential impacts to fauna. Scheduling works when the asset is dry will also decrease the likelihood of fauna being present at the time of clearing.

The adjacent vegetation is susceptible to weed invasion and dieback in which the clearing process may exacerbate, thereby reducing habitat quality.

Conclusion

Blue-billed duck is known to use Typha as a nesting material, however the small size of water bodies associated with the proposed clearing is unlikely to provide suitable breeding habitat for this species. Carter's freshwater mussel may be present. If this species is detected during a preclearing site inspection, the area will be avoided. Other native fauna species may be present at the time of the clearing activity.

Conditions

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

- Conduct clearing in a slow progressive manner towards adjacent vegetation or towards the outer edge of the asset to allow fauna to escape ahead of the clearing activity.

- Pre-clearing site inspections prior to works commencing and ongoing during works for any fauna that may be present. If found and are not able to escape into adjacent habitat, the City of Armadale is to cease works until the identified fauna has been translocated. If Carter's freshwater mussel, the area is to be avoided.
- Scheduling works when the asset is dry.
- Take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

3.2.2. Environmental values (land and water resources) - Clearing Principle (f,g and i)

Assessment

The proposed clearing is for the purpose of controlling the occurrence of Typha due to its invasive nature and adverse impacts on wetlands in the absence of management. Given the proposed clearing will target Typha or areas where Typha infestation is anticipated, the proposed clearing is not likely to result in any long-term impact to the ecological values of the riparian vegetation communities and associated wetlands within the application area.

All soils units mapped within the local area indicated a high risk of subsurface acid sulphate soil, (see Section 3.3 for a listing of known sites). However, it is not expected that the proposed clearing will impact acid sulphate soils, as clearing will be confined to slashing Typha at the soil surface and will not involve ground disturbance.

The removal of Typha has the potential release trapped sediment, increasing erosion and turbidity within wetlands and drainage assets within the application area. This may lead to land degradation and impact surface water quality, particularly if portions of the application area are mapped as having a high risk of water erosion. To mitigate this risk the applicant has proposed the following measures:

- Clearing and slashing will be done progressively.
- Scheduled works will commence when the clearing area is dry, (i.e. deepest point of basin or swale is dry).
- In some cases where silt has built up in stormwater basins and drainage corridors, with impact to its function, accumulated silt will be excavated from the base of the asset, after vegetation slashing.
- Excavation is typically performed using a bobcat or excavator to dig out the base of the channel or basin to the minimum level required when dry.
- Stockpiled silt material will be kept at a sufficient setback from any natural watercourses/wetlands, native vegetation or conservation reserves.
- Removed material will be appropriately disposed of at an approved disposal site (City of Armadale 2020a).

Conclusion

The proposed clearing will target Typha and given the above mitigation measures it is unlikely the proposed clearing will cause land degradation or a deterioration in the quality of surface or underground water. To minimise the risk, scheduling works when the clearing area is dry will reduce impacts on water quality and water erosion.

Conditions

To address the above impacts, scheduling works when the clearing area is dry will be required as a condition on the clearing permit.

3.3. Relevant planning instruments and other matters

On 17 December 2020, the City of Armadale requested an additional 14 Typha stands were added to the application (City of Armadale 2020b). The application was readvertised on 19 December 2020 for seven days and no public submissions were received. The application was further readvertised on 18 June 2021 for seven days due to additional sites being added and no public submissions were received.

Advice provided by Contaminated Sites (DWER 2020) identified 15 sites with acid sulphate soils present and 22 sites remediated for restricted use, within the application area (See Appendix A.5). See table 3.3.1 below for further details. The method of clearing proposed would not likely impact acid sulphate soils.

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.

Appendix A. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to 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 B.

A.1. Site characteristics

Characteristic	Details
Local context	The application area comprises a total of 170 Typha stands distributed across the Armadale municipality, including a portion of the Swan Coastal Plain and Darling Scarp foothills. The above Typha stands are situated in a broad range of settings, including manmade drainage corridors occurring within light industrial and urban areas, to stormwater basins and minor drainage channels fringed by remnants of native vegetation.
Ecological linkage	The proposed clearing does not include any significant portion of an ecological linkage.
Conservation areas	<p>The proposed clearing does not include native vegetation occurring within conservation areas. A 5 hectare stand of Typha occurring along Edison Crescent is adjacent to Forrestdale Lakes Nature Reserve mapped as Banksia woodlands of the Swan Coastal Plain Threatened Ecological Community (See section 1.5, Figure 8 Plan G).</p> <p>A small portion (0.008 hectares) of the application area is adjacent to Forrestdale Lake (see Section 1.5, Figure 6 Plan F), listed as a RAMSAR Wetland.</p> <p>Two portions of the application area intersect a Bush Forever site including, Bob Blackburn Reserve (0.032 hectares), and an unnamed reserve south of Champion Lakes (0.093 hectares).</p>
Vegetation description	<p>A proportion of the proposed clearing will target the removal of Typha growing in association with manmade drainage corridors and stormwater basins. Aerial imagery and photographs supplied by the applicant (see Appendix D), indicate these sites occur in highly degraded vegetation. Listed below is a summary of vegetation types, associated with portions of the application area occurring within natural vegetation remnants.</p> <p>Swan Coastal Plain vegetation complexes as described and mapped by Heddle <i>et al.</i> (1980) as updated by Webb <i>et al.</i> (2016) within the application area include:</p> <ul style="list-style-type: none"> Forrestfield Complex, 29: Vegetation ranges from open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) to open forest of <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) - <i>Allocasuarina fraseriana</i> (Sheoak) - Banksia species. Fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) in the gullies that dissect this landform. Swan Complex, 33: Fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) with localised occurrence of low open forest of <i>Casuarina obesa</i> (Swamp Sheoak) and <i>Melaleuca cuticularis</i> (Saltwater Paperbark). Southern River Complex, 42: Open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - Banksia species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds. <p>Mattiske and Havel (1998) as updated by Webb <i>et al.</i> have described the mapped vegetation complexes within the eastern portion of the application area as:</p> <ul style="list-style-type: none"> Helena 1, He1: Mosaic of open forest of <i>Corymbia calophylla</i>-<i>Eucalyptus patens</i>-<i>Eucalyptus marginata</i> subsp. <i>marginata</i> with some <i>Eucalyptus rudis</i> on

Characteristic	Details																																																
	<p>the deeper soils ranging to closed heath and lithic complex on shallow soils associated with granite on steep slopes of valleys in humid and subhumid zones.</p> <ul style="list-style-type: none"> • Darling Scarp, DS2: Mosaic of open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata-Corymbia calophylla</i>, with some admixtures with <i>Eucalyptus laevis</i> in the north (subhumid zone), with occasional <i>Eucalyptus marginata</i> subsp. <i>elegantella</i> (mainly in subhumid zone) and <i>Corymbia haematoxylon</i> in the south (humid zone) on deeper soils adjacent to outcrops, woodland of <i>Eucalyptus wandoo</i> (subhumid and semiarid zones), low woodland of <i>Allocasuarina huegeliana</i> on shallow soils over granite outcrops, closed heath of Myrtaceae-Proteaceae species and lithic complex on or near granite outcrops in all climate zones. • Dwellingup, D2: Open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata-Corymbia calophylla</i> on lateritic uplands in subhumid and semiarid zones. <p>The extent of the mapped remanent native vegetation in the local area represents 23.7 percent of its, original extent (Government of Western Australia 2019) .</p>																																																
Vegetation condition	<p>Arial imagery and photographs supplied by the applicant (see Appendix D), indicate the majority of vegetation occurring within the applicant area is considered to be in 'Completely Degraded' (Keighery,1994) condition. Portions of the application area associated with mapped native vegetation remnants considered to be in Good (Keighery 1994) condition are listed below.</p> <table border="1" data-bbox="467 856 1432 1402"> <thead> <tr> <th>Figure No. (see section 1.5)</th> <th>Nearest street address</th> <th>Vegetation Complex</th> </tr> </thead> <tbody> <tr> <td>Figure 1</td> <td>Reilly Road</td> <td>Southern River Complex, 42</td> </tr> <tr> <td>Figure 3</td> <td>Nicholson Road</td> <td>Southern River Complex, 42</td> </tr> <tr> <td>Figure 4</td> <td>Grasby way</td> <td>Southern River Complex, 42</td> </tr> <tr> <td>Figure 5</td> <td>Commercial Road</td> <td>Southern River Complex, 42</td> </tr> <tr> <td>Figure 9</td> <td>Turner Road</td> <td>Forrestfield Complex, 29</td> </tr> <tr> <td>Figure 10</td> <td>Champion drive</td> <td>Southern River Complex, 42</td> </tr> <tr> <td>Figure 12</td> <td>Bernard Street</td> <td>Darling Scarp, DS2</td> </tr> <tr> <td>Figure 14</td> <td>Williams Road</td> <td>Forrestfield Complex, 29</td> </tr> <tr> <td>Figure 15</td> <td>Albany Highway</td> <td>Forrestfield Complex, 29</td> </tr> <tr> <td>Figure 17</td> <td>Richon hights</td> <td>Darling Scarp, DS2</td> </tr> <tr> <td>Figure 21</td> <td>Country Club Avenue</td> <td>Dwellingup, D2</td> </tr> <tr> <td>Figure 22</td> <td>Croyden road/McNess Drive</td> <td>Helena 1, He1</td> </tr> <tr> <td>Figure 22</td> <td>McNess Drive</td> <td>Helena 1, He1</td> </tr> <tr> <td>Figure23</td> <td>Paul View</td> <td>Dwellingup, D2</td> </tr> <tr> <td>Figure23</td> <td>Frances Gregory Drive</td> <td>Dwellingup, D2</td> </tr> </tbody> </table> <p>The full Keighery (1994) condition rating scale is provided in Appendix C.</p>	Figure No. (see section 1.5)	Nearest street address	Vegetation Complex	Figure 1	Reilly Road	Southern River Complex, 42	Figure 3	Nicholson Road	Southern River Complex, 42	Figure 4	Grasby way	Southern River Complex, 42	Figure 5	Commercial Road	Southern River Complex, 42	Figure 9	Turner Road	Forrestfield Complex, 29	Figure 10	Champion drive	Southern River Complex, 42	Figure 12	Bernard Street	Darling Scarp, DS2	Figure 14	Williams Road	Forrestfield Complex, 29	Figure 15	Albany Highway	Forrestfield Complex, 29	Figure 17	Richon hights	Darling Scarp, DS2	Figure 21	Country Club Avenue	Dwellingup, D2	Figure 22	Croyden road/McNess Drive	Helena 1, He1	Figure 22	McNess Drive	Helena 1, He1	Figure23	Paul View	Dwellingup, D2	Figure23	Frances Gregory Drive	Dwellingup, D2
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Climate and landform	<ul style="list-style-type: none"> • Mean annual rainfall: 866 millimetres • Temperature: mean annual minimum: 25 Degrees centigrade • Temperature: mean annual maximim:27.5 Degrees centigrade 																																																
Soil description	<p>Mapped soil types (Schoknecht et al, 2013) include:</p> <ul style="list-style-type: none"> • Bassendean B4 Phase: Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron-organic hardpan. • Bassendean B3 Phase. Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands 																																																

Characteristic	Details
	<p>with an iron-organic pan, or clay subsoil. Surfaces are dark grey sand or sandy loam.</p> <ul style="list-style-type: none"> • Bassendean B2 Phase: Flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m. • Pinjarra B1 Phase: Extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m; Banksia dominant. • Pinjarra P6a Phase: Very gently undulating alluvial terraces and low rises contiguous with the plain, with deep moderately well to well drained soils associated with major current river systems and larger streams. Acidic red and yellow duplex soils, less common. • Pinjarra P8 Phase: Broad poorly drained flats and poorly defined stream channels with moderately deep to deep sands over mottled clays; acidic or less commonly alkaline grey and yellow duplex soils to uniform bleached or pale brown sands over clay. • Pinjarra Phase Gf2: Very gently undulating plain with imperfectly drained mottled yellow duplex soils with sand to sandy loam topsoil. Low woodland of <i>Eucalyptus wandoo</i>, <i>Eucalyptus rudis</i> along streams <i>Casuarina obesa</i> on salt affected land. • EnvGeol Cs Phase: Sandy clay, white-grey to brown, fine to coarse-grained, subangular to rounded sand, clay of moderate plasticity gravel and silt layers near scarp. • EnvGeol S10 Phase: Sand, relatively thin veneer over sandy clay to clayey sand. Of eolian origin. • EnvGeol S8 Phase: Sand, very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin. • Swan brown alluvial loams Sw2: Low level, occasionally flooded, alluvial terraces with imperfectly drained variable alluvial soils with loamy surfaces. • Murray Valleys System 255Mv: Western Darling Range from the Avon Valley to Harvey. Deeply incised valleys with Red loamy earths, shallow duplexes and rock outcrop and Jarrah-marri-wandoo forest and woodland with mixed shrubland. • Yarragil 1 Phase 255DpYG1: Very gentle to moderately inclined concave side slopes. Moderately well drained yellow duplex soils and yellow and brown massive earths and gravels. Woodland of <i>Eucalyptus wandoo</i>, <i>Eucalyptus marginata</i>, and <i>Eucalyptus accedens</i>. <i>Casuarina obesa</i> on salt affected areas. • Yarragil Subsystem 255DpYG: Shallow, narrow, upper valleys of the deeply dissected Murray, Bindoon and Helena units. Alluvial, clay and loam soils, moderately well drained, often gravelly, with some sands and loams. Salt prone. Woodland of <i>Eucalyptus wandoo</i>, <i>Eucalyptus accedens</i>. • Dwellingup 2 Phase 255DpDW2: Very gently to gently undulating terrain (<10%) with well drained, shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands overlying lateritic duricrust.

Characteristic	Details																																								
	<ul style="list-style-type: none"> Dwellingup 3 Phase 255DpDW3: Gentle to moderately inclined slopes (3-20%) with well drained shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands overlying lateritic duricrust. 																																								
Land degradation risk	All soils within the application area are recoded as a high risk to subsurface acidification, with a range between 87-100 percent of the mapped land unit recorded as high risk (see section 3.3 for advice on acid sulphate soils). Most soils within the application area had low to moderate water erosion risk, with water erosion occurrence, between 0-45 percent. See the table in C.4 for a full analysis of soil risks.																																								
Waterbodies	<p>Water bodies of significance within the local area are listed below. The majority of water bodies occurring within the local area are manmade and include unnamed drainage corridors and storm water basins (See section 1.5 for Map references).</p> <table border="1"> <thead> <tr> <th>Map reference</th> <th>Nearest street address</th> <th>Name/type of water body</th> <th>Stand size</th> </tr> </thead> <tbody> <tr> <td>Figure 5</td> <td>Commercial Road</td> <td>Forrestdale lake, RAMSAR site</td> <td>0.005 ha</td> </tr> <tr> <td>Figure 10</td> <td>Champion Drive</td> <td>Unnamed, minor river, nonperennial</td> <td>0.067 ha</td> </tr> <tr> <td>Figure 12</td> <td>Bernard Street</td> <td>Canning River, major river, perennial</td> <td>0.056 ha</td> </tr> </tbody> </table>	Map reference	Nearest street address	Name/type of water body	Stand size	Figure 5	Commercial Road	Forrestdale lake, RAMSAR site	0.005 ha	Figure 10	Champion Drive	Unnamed, minor river, nonperennial	0.067 ha	Figure 12	Bernard Street	Canning River, major river, perennial	0.056 ha																								
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Hydrogeography	<p>The application area intersects two RIWI ground water areas. Those portions of the application area occurring within areas represented by Figure 3 and 4, fall within the Jandakot RIWI Groundwater Area. Area covered by Figure 2 and Figure 5 through 18, intersect the Perth RIWI Groundwater Area. (See section 1.5 for Map references).</p> <p>Typha stands that intersect flood plain areas are listed below</p> <table border="1"> <thead> <tr> <th>Map reference</th> <th>Nearest street address</th> <th>Fpm flood plain area</th> <th>Stand size</th> </tr> </thead> <tbody> <tr> <td>Figure 9</td> <td>Stillwell Circuit</td> <td>(1%) AEP</td> <td>0.339 ha</td> </tr> <tr> <td>Figure 9</td> <td>Forrest Road</td> <td>(1%) AEP</td> <td>0.039 ha</td> </tr> <tr> <td>Figure 10</td> <td>Turner Place</td> <td>(10%) AEP</td> <td>0.056 ha</td> </tr> <tr> <td>Figure 11</td> <td>Champion drive</td> <td>(1%) AEP</td> <td>0.093 ha</td> </tr> <tr> <td>Figure 11</td> <td>McNeill Road</td> <td>(1%) AEP</td> <td>0.016 ha</td> </tr> <tr> <td>Figure 13</td> <td>Orlando street</td> <td>(10%) AEP</td> <td>0.074 ha</td> </tr> <tr> <td>Figure 13</td> <td>Gilwel Avenue</td> <td>(10%) AEP</td> <td>0.056 ha</td> </tr> <tr> <td>Figure 13</td> <td>Bernerd Street</td> <td>(10%) AEP</td> <td>0.003 ha</td> </tr> <tr> <td>Figure 17</td> <td>Rowley Road</td> <td>(1%) AEP</td> <td>0.014 ha</td> </tr> </tbody> </table> <p>FPM-Flood plain Mapping, AEP- Annual exceedance probability</p>	Map reference	Nearest street address	Fpm flood plain area	Stand size	Figure 9	Stillwell Circuit	(1%) AEP	0.339 ha	Figure 9	Forrest Road	(1%) AEP	0.039 ha	Figure 10	Turner Place	(10%) AEP	0.056 ha	Figure 11	Champion drive	(1%) AEP	0.093 ha	Figure 11	McNeill Road	(1%) AEP	0.016 ha	Figure 13	Orlando street	(10%) AEP	0.074 ha	Figure 13	Gilwel Avenue	(10%) AEP	0.056 ha	Figure 13	Bernerd Street	(10%) AEP	0.003 ha	Figure 17	Rowley Road	(1%) AEP	0.014 ha
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Flora	A total of 19 species of conservation significant flora occur within the local area. There are seven species of priority flora known to be associated with wetland habitats and four of which could possibly occur with Typha stands. Refer to the Flora Analysis table section Appendix C3 for further flora analysis of the four wetland species.																																								
Ecological communities	Vegetation within the application area is dominated by stands of Typha and does not contain species that resemble any listed threatened or priority ecological community. A 5 hectare portion of the application area occurs along Edison Crescent (section 1.5 Figure 8) is adjacent to an area of the Banksia woodlands of the Swan Coastal Plain Threatened Ecological Community, forming part of a DBCA crown freehold.																																								
Fauna	A total of 33 conservation significant fauna species have been recorded in the local area. The nearest record is for <i>Isoodon fusciventer</i> (quenda, southwestern brown bandicoot), occurring 60 meters from the proposed clearing. Fauna species most likely to occur in habitats associated with Typha include <i>Westralunio carteri</i> (Carter's freshwater mussel) and <i>Oxyura australis</i> (Blue-billed duck) occurring 0.2 kilometres and 0.6 kilometres from the application area respectively. The aforementioned species are considered further in Section C3.																																								

A.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), and images provided by the applicant, 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 (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Hydrocotyle lemnoides</i>	P4	no	Yes	No	7.24	1	N/A
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	P3	no	Yes	No	7.55	1	N/A
<i>Schoenus capillifolius</i>	P3	no	Yes	No	7.55	1	N/A
<i>Aponogeton hexatepalus</i>	P4	no	no	No	7.61	1	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.3. 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 (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Oxyura australis</i> (Blue-billed duck)	P4	No	Yes	0	361	N/A
<i>Ctenotus delli</i> (Carter's freshwater mussel)	VU	No	No	1.9	43	no

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Land degradation risk table

Soil System	Bassendean B4 Phase	Bassendean B3 Phase	Bassendean B2 Phase	Pinjarra B1 Phase	Pinjarra P6a Phase	Pinjarra P8 Phase	Pinjarra Phase Gf2	EnvGeol Cs Phase
Percentage of mapped soil unit								
Wind erosion	15	5	40	100	5	20	0	0
Water erosion	0	40	0	0	0	0	0	30
Salinity	0	0	0	0	0	0	0	0
Subsurface Acidification	100	100	100	100	100	100	70	62
Water logging	95	91	5	20	20	100	100	65
Phosphorus export risk	93	97	90	70	20	20	0	50
Flood risk	10-30	30-50	0	0	3-10	0	0	10-30
Soil System	EnvGeol S10 Phase	EnvGeol S8 Phase	Swan brown alluvial loams Sw2	Sw1 Swan poorly drained mixed alluvials	Murray Valleys System 255Mv	Yarragil 1 Phase 255DpYG1	Dwellingup 2 Phase 255DpDW2	Dwellingup 3 Phase 255DpDW3
Percentage of mapped soil unit								
Wind erosion	39	65	0	0	26	26	87	90
Water erosion	20	0	45	100	35	0	5	5
Salinity	8	0	0	0	2	0	0	0
Subsurface Acidification	87	100	80	70	74	100	98	100
Water logging	66	5	100	100	2	2	2	0
Phosphorus export risk	43	50	75	70	60	8	2	50
Flood risk	10-30	0	50-70	50-70	0	0	0	0

A.5. Contaminated sites recorded within the application area

Site DESCRIPTION	CLASSIFICATION	CSB Comment
Waste Water Pumping Station and DN750 Gravity Sewer, Armadale. LOT 9001 ON PLAN 403754, Hilbert.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
LOT 9058 ON PLAN 75188 Lot 1000 Wright Rd, Piara Waters, Mason Green.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Precinct 8 - Newhaven, Precinct 4F, Stockland WA Development.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Lots 107, 108 and 138, Forrest Rd, Hilbert. Sienna Wood, Wungong Urban Water Management Area Eleventh Road, Haynes.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Request for Advice - Lot 7 Wright Rd, Piara Waters Lots 4, 5, 6, 7 and 9000 Wright Road, Piara Waters Peregrine Estate.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Lot 9502, 380 Nicholson Road, Piara Waters WA 6112. Madox Sewer Works.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Waste Water Pumping Station and DN750 Gravity Sewer, Armadale. LOT 9001 ON PLAN 403754, Hilbert.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulfate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Road and Drainage Reserves Forrestdale Business Park	Remediated for restricted use	Fragments of asbestos-containing material may be present in deeper soils. Ground conditions, including ground cover vegetation, should be maintained where possible to avoid erosion. If soil disturbance or excavation is required it should be undertaken as per the <i>Forrestdale Business Park Road and Drainage Reserve Asbestos Management Plan</i> (GHD, July 2009).
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Site DESCRIPTION	CLASSIFICATION	CSB Comment
Lot 837, 11 Jolley Ave, Piara Waters. Lot 456 Aspiri, Piara Waters 110 Rossiter Ave, Piara Waters Lot 362 (108) Rossiter Ave, Piara Waters.	Acid Sulphate Soil	Contact Contaminated Sites Branch
Road and Drainage Reserves Forrestdale Business Park	Remediated for restricted use	Fragments of asbestos-containing material may be present in deeper soils. Ground conditions, including ground cover vegetation, should be maintained where possible to avoid erosion. If soil disturbance or excavation is required it should be undertaken as per the <i>Forrestdale Business Park Road and Drainage Reserve Asbestos Management Plan</i> (GHD, July 2009).
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Lot 837, 11 Jolley Ave, Piara Waters. Lot 456 Aspiri, Piara Waters 110 Rossiter Ave, Piara Waters Lot 362 (108) Rossiter Ave, Piara Waters.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Hensbrook Loop. Cnr Tonkin Highway and Armadale Road, Forrestdale Business Park. Form G Da Vinci Way, Forrestdale.	Remediated for restricted use	The site is classified "remediated for restricted use" under the <i>Contaminated Sites Act 2003</i> . An appropriate occupational health and safety plan addressing asbestos management is required for any excavation and disturbance of natural or reworked soils below the yellow sand fill horizon and/or existing concrete foundations and hardstand areas.
Hensbrook Loop. Cnr Tonkin Highway and Armadale Road, Forrestdale Business Park. Form G Da Vinci Way, Forrestdale.	Remediated for restricted use	The site is classified "remediated for restricted use" under the <i>Contaminated Sites Act 2003</i> . An appropriate occupational health and safety plan addressing asbestos management is required for any excavation and disturbance of natural or reworked soils below the yellow sand fill horizon and/or existing concrete foundations and hardstand areas.
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Lot 837, 11 Jolley Ave, Piara Waters. Lot 456 Aspiro, Piara Waters 110 Rossiter Ave, Piara Waters Lot 362 (108) Rossiter Ave, Piara Waters.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
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Request for Advice - Lot 7 Wright Rd, Piara Waters Lots 4, 5, 6, 7 and 9000 Wright Road, Piara Waters Peregrine Estate.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Lot 45 Wright Road, Piara Waters. Holland Park.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Lots 107, 108 and 138, Forrest Rd, Hilbert. Sienna Wood, Wungong Urban Water Management Area Eleventh Road, Haynes.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Lot 801 Anstey Rd, Forrestdale. Forrestdale Business Park West.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Road and Drainage Reserves Forrestdale Business Park	Remediated for restricted use	Fragments of asbestos-containing material may be present in deeper soils. Ground conditions, including ground cover vegetation, should be maintained where possible to avoid erosion. If soil disturbance or excavation is required it should be undertaken as per the <i>Forrestdale Business Park Road and Drainage Reserve Asbestos Management Plan</i> (GOD, July 2009).
Lot 837, 11 Jolley Ave, Piara Waters. Lot 456 Aspire, Piara Waters 110 Rossiter Ave, Piara Waters Lot 362 (108) Rossiter Ave, Piara Waters.	Acid Sulphate Soil	Please refer to Department of Water and Environmental Regulation's (DWER) acid sulphate soil guidelines for information to assist with the management of ground and/or groundwater disturbing works. https://www.der.wa.gov.au/your-environment/acid-sulfate-soils/69-acidsulfatesoils-guidelines
Hensbrook Loop. Cnr Tonkin Highway and Armadale Road, Forrestdale Business Park. Form G Da Vinci Way, Forrestdale.	Remediated for restricted use	No comment required

Site DESCRIPTION	CLASSIFICATION	CSB Comment
Hensbrook Loop. Cnr Tonkin Highway and Armadale Road, Forrestdale Business Park. Form G Da Vinci Way, Forrestdale.	Remediated for restricted use	No comment required
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Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The proposed clearing will target stands of Typha. This species is capable of aggressive invasions that can transform ecosystems unless it is actively managed (Western Australian Herbarium, 2019). Typha can develop quickly into a monoculture (see Appendix D Figure 32) and cover an entire water body. Given the application area, comprises predominantly of Typha, it is not anticipated that the proposed clearing will significantly impact biodiversity within the application area. Given the disturbed nature of the proposed clearing areas and dominance of Typha, it is unlikely that flora species of conservation significance or Threatened or Priority Ecological Communities occur.</p>	Not at variance	No
<p><u>Principle (b):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared may contain habitat for the Priority 4 Blue-billed duck and, the Threatened Carter's freshwater mussel. Impacts to individuals that may be present at the time of clearing may occur.</p>	May be at variance	Yes <i>(Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The threatened flora <i>Lepidosperma rostratum</i> and <i>Eleocharis keigheryi</i> are recorded as occurring in association with non-perennial drainage lines and winter wet areas. These species are mostly confined to wetland conservation reserves with vegetation in good to excellent (Keighery, 1994) condition, such as the Brixton Street wetlands complex. The application area is comprised of mostly manmade water bodies and drainage corridors and culverts with degraded or completely degraded (Keighery, 1999 Forrestdale lake 4) vegetation. Therefore it is unlikely that Threatened flora occur within the application area.</p>	Not at variance	No
<p><u>Principle (d):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species that indicate a threatened ecological community.</p>	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>Considering the targeted nature of Typha removal, the proposed clearing is unlikely to further degrade remnants of native vegetation in an area that has been extensively cleared. The application areas are not considered to be significant as a remnant.</p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment</u></p> <p>The proposed clearing does not include native vegetation occurring within conservation areas. A portion of the application area occurs adjacent to Forrestdale Lakes Nature Reserve and Forrestdale Lake This portion of the proposed clearing is associated with a road culvert targeted for Typha removal, as part of managing the hydrology of the site. Also, Two portions of the application area intersect Bushforever sites including, Bob Blackburn Reserve, and an unnamed reserve south of Champion Lakes. Clearing will be targeting Typha and only vegetation overhanging roads and other infrastructure, therefore, the removal of Typha from within or adjacent to these sites is unlikely to significantly impact the above conservation areas.</p>	Not at variance	No
Environmental value: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Typha forms a natural component of native wetland and watercourse, vegetation. Therefore, the proposed clearing is associated with a watercourse or wetland. However, Typha can dominate wetland ecosystems and reduce biodiversity. Given the nature of the proposed clearing it is unlikely to impact on- or off-site hydrology and water quality.</p>	At variance	Yes <i>Refer to Section 3.2.2, above</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>Advice from the Contaminated Sites Branch (DWER 2020) identified 15 occurrences of acid sulphate soils within the application area. A number of Typha stands occur within the Sw1 soil unit which is mapped as a high risk of water erosion and moderate to high nutrient export. The proposed clearing may also involve the excavation of accumulated sediment. The method and targeted nature of the proposed clearing, is unlikely to result in land degradation.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (i):</u> <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.”</i></p> <p><u>Assessment:</u></p> <p>Given the clearing may include excavation as stated above and a large portion of the clearing will occur in water courses and wetlands, the proposed clearing may impact surface or ground water quality.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>Given the purpose of the clearing is improve the flow of water through drains and storm water basins, the proposed clearing is not likely to exacerbate, the incidence or intensity of flooding.”</p>	Not at variance	No

Appendix C. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from:

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 D. Photographs of the vegetation

Examples of vegetation types and condition, at selected storm basins and drainage corridors within the application area (City of Armadale 2021b).



Figure 26, Drainage corridor on Gillum Drive (see Figure 12, Plan K)



Figure 27, Storm water Basin on Cammillo Read (see Figure 12, Plan K)



Figure 28, Drainage corridor on Harbour Drive (see Figure 17, Plan P)



Figure 29, Storm water drainage basin on Chevin Road (see Figure 19, Plan R)



Figure 30, Storm water drainage basin on Slab Gully Road (see Figure 20, Plan S)



Figure 31, Storm water drainage basin on Maclean Street (see Figure 20, Plan S)



Figure 32 Typha inundation at Warbler Park, Wright Road Figure 3 Plan B.

Appendix E. Sources of information

E.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)

- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- 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)
- Imagery
- Native Title (ILUA) (LGATE-067)
- 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)

E.2. References

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