GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 10398/1
Permit Holder:	Town of Bassendean
Duration of Permit:	From 23 February 2024 to 23 February 2029

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 control of Typha species.

2. Land on which clearing is to be done

Lot 120 on Plan 4504, Eden Hill
Harcourt Street Road reserve (PIN 11403168), Bassendean
Lot 108 on Plan 1911, Bassendean
Lot 109 on Plan 1911, Bassendean
Lot 10 on Plan 1911, Bassendean
Lot 111 on Plan 1911, Bassendean
Lot 112 on Plan 1911, Bassendean
Lot 134 on Plan 1911, Bassendean
Lot 135 on Plan 1911, Bassendean
Lot 144 on Diagram 76640
Lot 12 on Diagram 64959, Ashfield
Woolcott Court (PIN 1210951), Ashfield

3. Clearing authorised

The permit holder must not clear more than 0.2 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 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:

(a) conduct clearing 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.

7. Fauna Management

(a) prior to undertaking any clearing authorised under this permit, 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 7(a), works must cease until the fauna have escaped into adjacent habitat ahead of the clearing activity or translocated into *native vegetation*.

8. Chemical Management

Undertake spraying of chemical solution during the driest period of the year when the water level is at its lowest and during calm conditions

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	(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 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) direction of clearing; (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 *weeds* and *dieback* in accordance with condition 5; (h) fauna management actions undertaken in accordance with condition 7; and (i) the date that chemical control occurred and associated wind conditions 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 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of *Phytophthora* species on native vegetation.
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.
EP Act	*Environmental Protection Act 1986* (WA)
fill	means material used to increase the ground level, or to fill a depression.

Term	Definition
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 *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

Mathew Gannaway
A/SENIOR MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

30 January 2024

Schedule 1

Plan 10398/1

The boundary of the area authorised to be cleared is shown in the maps below (Figure 1-5).

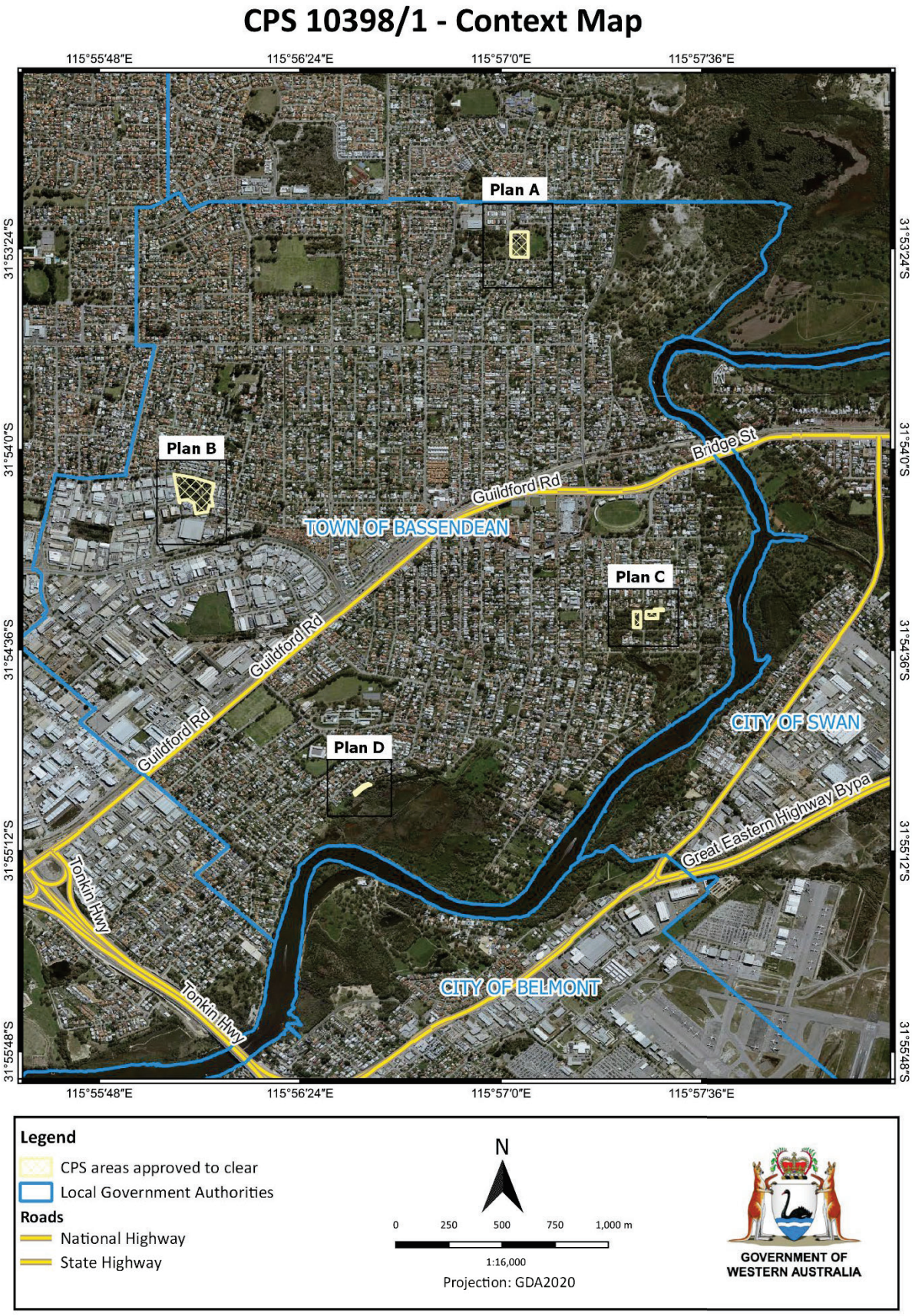

Figure 1: Context Map of the boundary of the area within which clearing may occur

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

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

CPS 10398/1 - Plan C

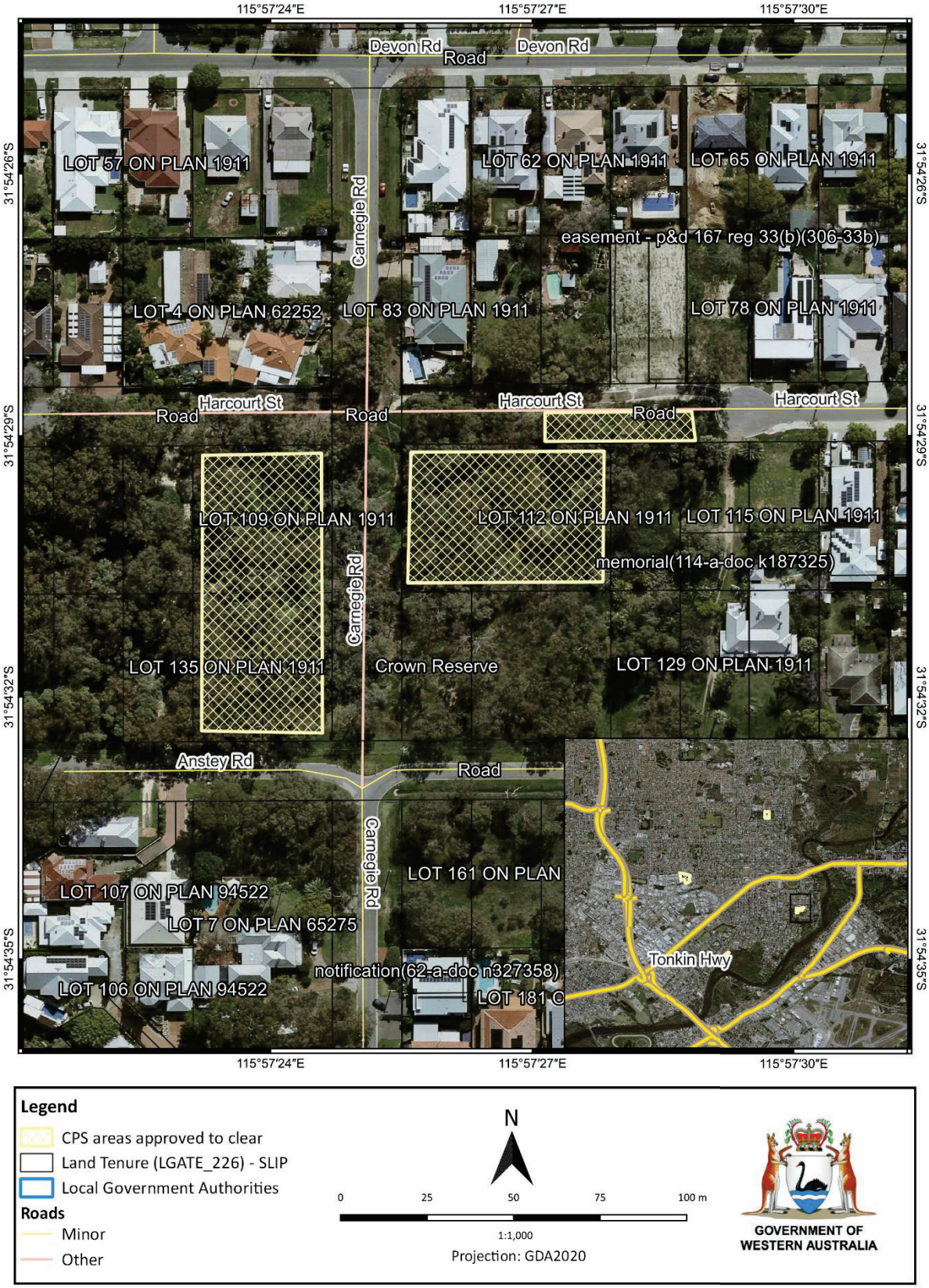

Figure 4: Map of the boundary of the area within which clearing may occur

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

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 10398/1
Permit type:	Purpose permit
Applicant name:	Town of Bassendean
Application received:	31 October 2023
Application area:	0.2 hectares of native vegetation
Purpose of clearing:	Control of Typha species
Method of clearing:	Mechanical
Property:	Lot 120 on Plan 4504 Harcourt Street Road reserve (PIN 11403168) Lot 108 on Plan 1911 Lot 109 on Plan 1911 Lot 10 on Plan 1911 Lot 111 on Plan 1911 Lot 112 on Plan 1911 Lot 134 on Plan 1911 Lot 135 on Plan 1911 Lot 144 on Diagram 76640 Lot 12 on Diagram 64959 Woolcott Court (PIN 1210951)
Location (LGA area/s):	Town of Bassendean
Localities (suburb/s):	Eden Hill, Bassendean and Ashfield

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained in four separate areas (see Figure 1, Section 1.5). The application is to selectively clear Typha species that are blocking the water flow of drains and allow for revegetation works to establish. The clearing will involve mechanical removal using mechanical brush cutting and manual removal and chemical weed control through spraying or wiping (Shire of Bassendean, 2023).

1.3. Decision on application

Decision:	Granted
Decision date:	30 January 2024
Decision area:	0.2 hectares of native vegetation, 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 14 days and 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 clearing principles set out in Schedule 5 of the EP Act (see Appendix B), 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 is to improve water flow and assist in revegetation of the areas.

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable habitat for the Blue billed duck (*Oxyura australis*)
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have significant impacts on the blue billed duck. The areas are planned to be revegetated following the removal of Typha species.

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

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback
- undertake spraying of herbicide during the driest period of the year when the water level is at its lowest and during calm conditions
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity; and
- 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 to adjacent habitat, the Town of Bassendean is to cease works until the identified fauna has been translocated.

1.5. Site maps

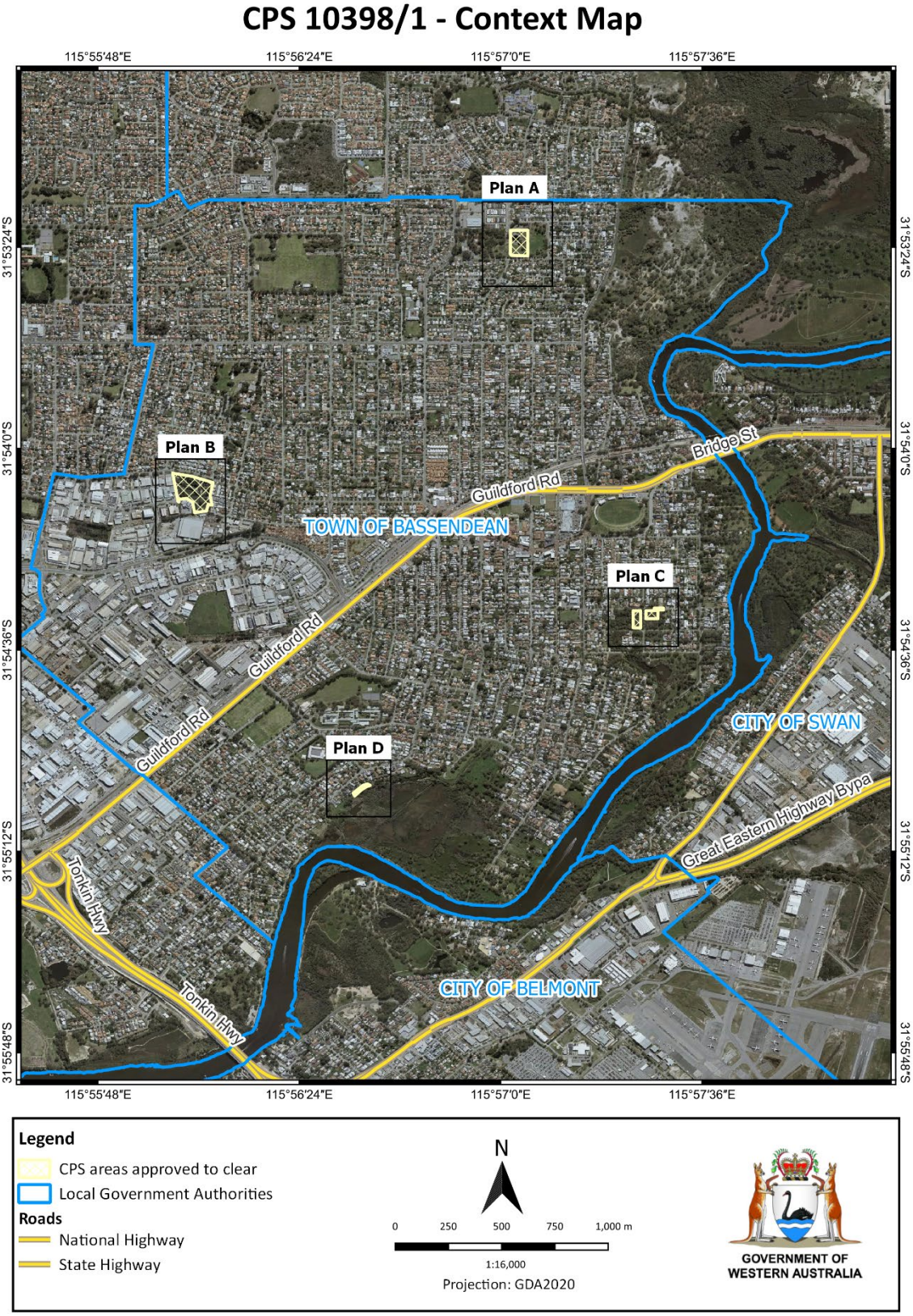

Figure 1 Context Map of the application area

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

CPS 10398/1 - Plan A

Figure 2 Plan A of the application area

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

CPS 10398/1 - Plan B

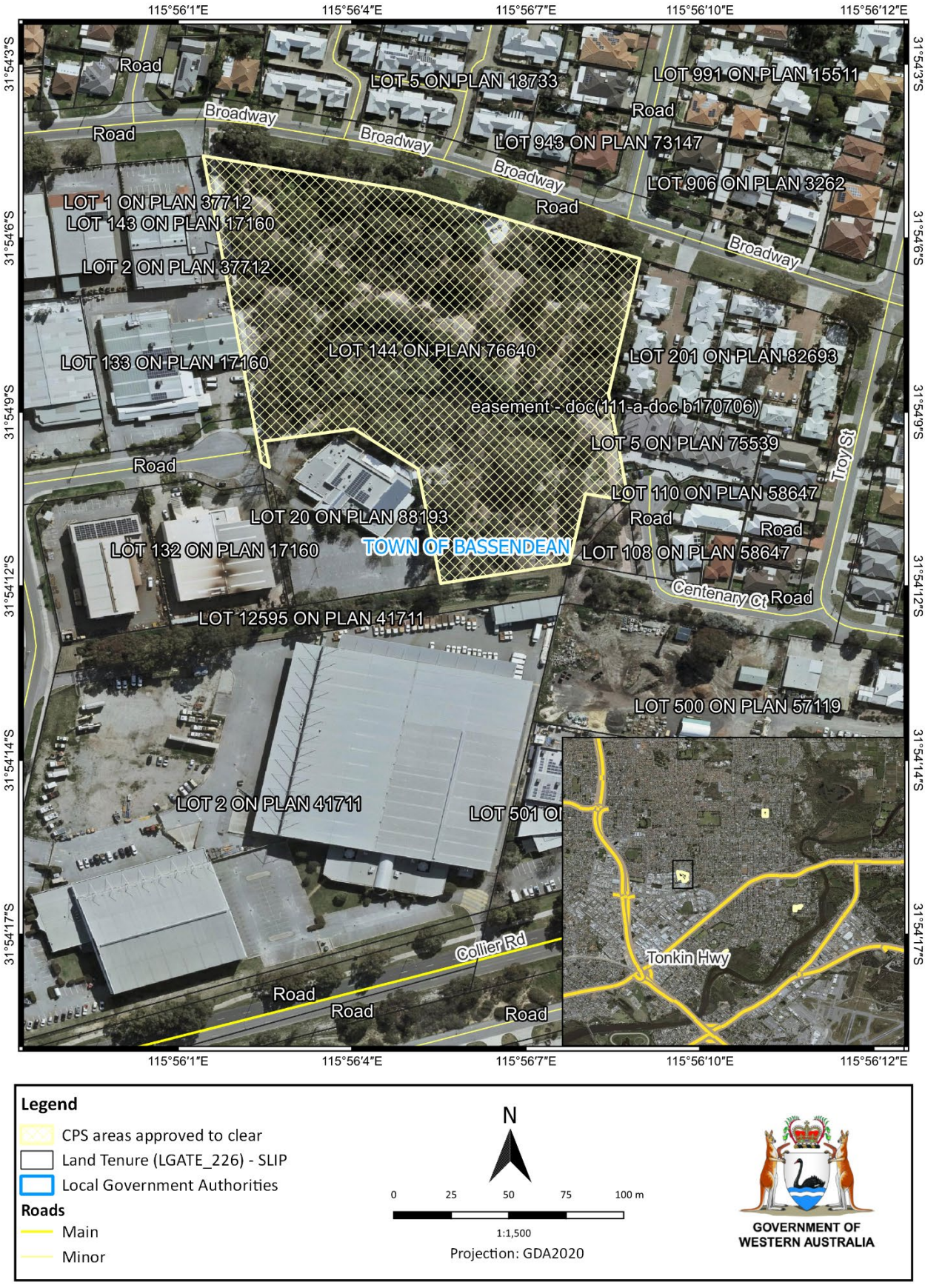

Figure 3 Plan B of the application area

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

CPS 10398/1 - Plan C

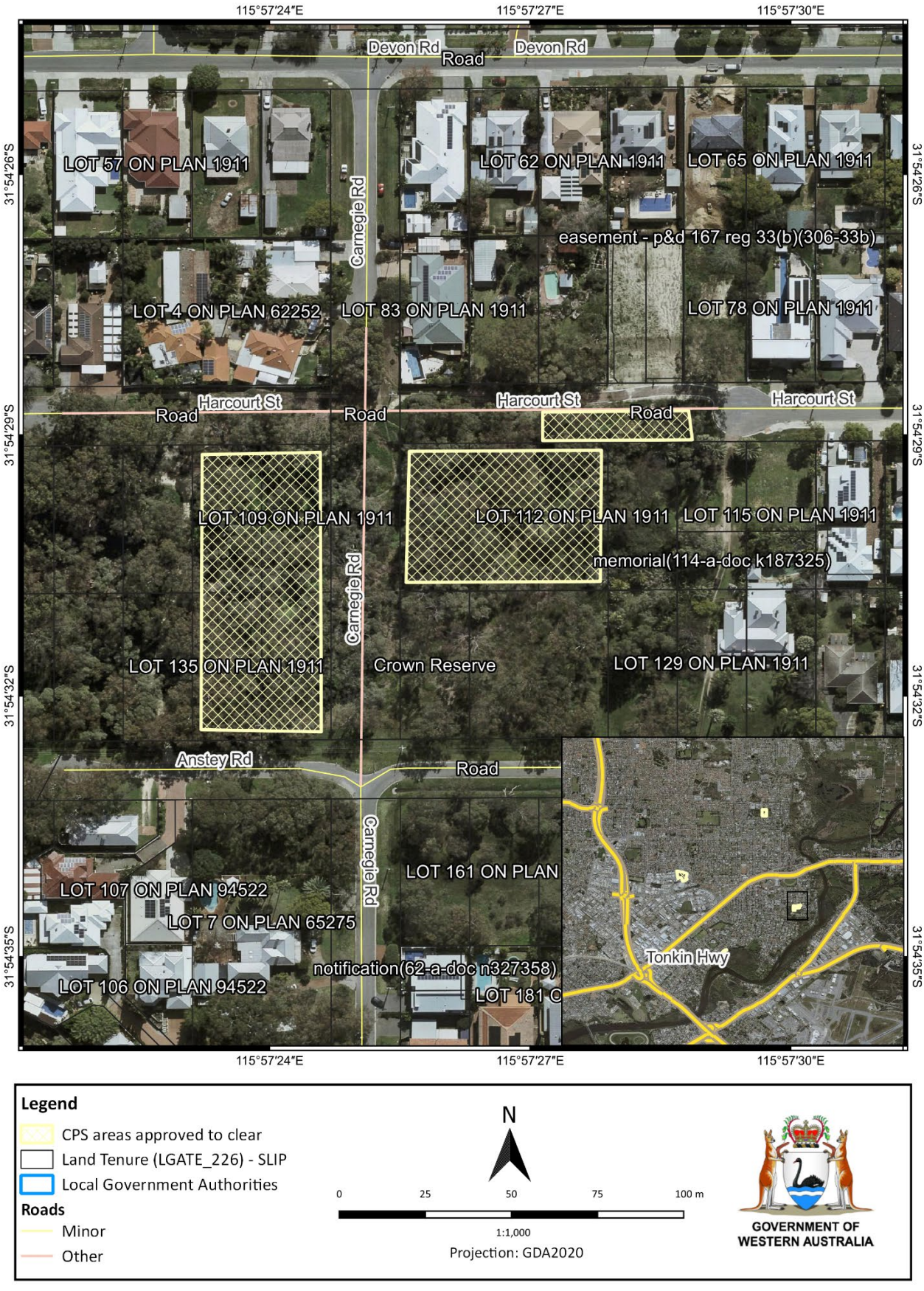

Figure 4 Plan C of the application area

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

CPS 10398/1 - Plan D

Figure 5 Plan D of the application area

The areas crosshatched yellow indicates 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 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, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant will only be targeting Typha and retain other native vegetation in the area. These areas are being revegetated and the Typha may outcompete revegetation works and block water flow (Town of Bassendean, 2023).

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 Appendix A) 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 B) identified that the impacts of the proposed clearing present a risk to biological values (fauna and adjacent flora), 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 (a) and (b)

Assessment

According to available databases, 25 conservation significant fauna occur in a similar riparian habitat type to the application area. These include 23 birds, one mammal and one invertebrate.

The application area may provide habitat for the following 20 migratory or wetland bird species. These species are:

- *Apus pacificus* (fork-tailed swift)
- *Calidris acuminata* (sharp-tailed sandpiper)
- *Calidris canutus* (red knot)
- *Calidris ferruginea* (curlew sandpiper)
- *Calidris melanotos* (pectoral sandpiper)
- *Calidris ruficollis* (red-necked stint)
- *Calidris tenuirostris* (great knot)
- *Falco peregrinus* (peregrine falcon)
- *Hydroprogne caspia* (caspian tern)
- *Ixobrychus flavicollis australis* (southwest subpop.) (black bittern)
- *Limosa lapponica* (bar-tailed godwit)
- *Limosa limosa* (black-tailed godwit)

- *Numenius madagascariensis* (eastern curlew)
- *Pandion haliaetus* (osprey)
- *Plegadis falcinellus* (glossy ibis)
- *Pluvialis squatarola* (grey plover)
- *Thalasseus bergii* (crested tern)
- *Tringa glareola* (wood sandpiper)
- *Tringa nebularia* (common greenshank)
- *Tringa stagnatilis* (marsh sandpiper)

The abovementioned migratory or wetland bird species do not depend exclusively on foraging in habitats prone to Typha infestation, however, may be present at the time of clearing. The application area is not likely to provide significant habitat for these species, therefore impacts on these species are likely to be minimal.

Botaurus poiciloptilus (Australasian bittern) is an endangered species with three records in the local area. This species favours permanent freshwater wetlands with tall, dense vegetation, particularly *Eleocharis* spp. (Spike rushes) and Typha (DBCA, 2018). The species is known to breed in Spring-Summer, with egg laying known to occur in September to December (DBCA, 2021). There is a possibility of the species occurring within the application area but it is unlikely to have significant impacts on the Australasian bittern.

Ixobrychus dubius (Australian little bittern) is a Priority 4 species with one record in the local area. This species has similar habitat requirements to the Australasian bittern mainly where tall rushes, reeds, Typha, shrub thickets or other dense cover is inundated by at least 30 centimetres of water. It can be found in extensive swamps, but often inhabits small patches of dense wetland vegetation such as Typha along drains or in small urban lakes (Bird life Australia, 2020a). The little bittern can occur as a migrant in south-west Australia from late August to early April, breeding in the north of the state in winter. Little bittern may visit wetlands on the Swan Coastal Plain (DBCA, 2021). There is a possibility of the species occurring within the application area but it is unlikely to have significant impacts on the Australian little bittern.

Oxyura australis (blue-billed duck) is a Priority 4 species with 346 records in the local area. This species can breed from August to March, mostly between October to January (DBCA, 2021). Breeding habitat is typically secluded densely vegetated situations, with the nest constructed in Typha beds or other vegetation, in permanent water. Nests are usually constructed from dead Typha leaves and sometimes thinly lined with down (Birdlife Australia, 2020b). Therefore, the proposed clearing may impact the breeding habitat of this species.

Hydromys chrysogaster (rakali) is a Priority 4 species with 15 records in the local area. Rakali are amphibious or semiaquatic mammals reaching up to 70 centimetres in length (from nose to end of the tail), feeding largely underwater, on a wide range of prey including large insects, crustaceans, mussels and fishes, and even frogs, lizards, small mammals and water birds. Although dependent on water for foraging, Rakali live on land, in burrows on low banks of rivers, lakes, wetlands, and estuaries including coastal areas. Intact riparian vegetation and associated bank stability is critical to their survival (DWER, 2021). While not present in the application area, they may range through the application area, as ranging territory can be up to four kilometres of riverbank (DWER, 2021).

Westralunio carteri (Carter's freshwater mussel) is a Vulnerable species with 17 records in the local area. The records are located in different tributaries of the Swan River and so are unlikely to be impacted by the proposed clearing.

Conclusion

Based on the above assessment, stands of Typha may provide breeding habitat and a source of nest building material for the Blue billed duck. There is a low probability that Australasian bittern, Australian little bittern and Rakali may temporarily use the application area as foraging habitat. It is considered that the impacts of the proposed clearing can be managed by conducting slow directional clearing. Scheduling works when the asset is dry will also decrease the likelihood of fauna being present at the time of clearing.

Conditions

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

- undertake slow, progressive one directional clearing to allow fauna to move into adjacent habitat ahead of the clearing activity
- undertake spraying of herbicide during the driest period of the year when the water level is at its lowest and during calm conditions

- 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 to adjacent habitat, the Town of Bassendean is to cease works until the identified fauna has been translocated.

3.2.2. Biological values (flora) – Clearing Principles (a) and (c)

Assessment

According to available databases, 22 conservation significant flora have been recorded in similar habitat to the application area. Two of these, *Melaleuca viminalis* (Priority 2) and *Bolboschoenus fluviatilis* (Priority 1) are noted near Typha, although only the Melaleuca is found in the same soil type as the application area. *Melaleuca viminalis* is a Priority 2 slender erect shrub up to 4 metres high and two individuals have been recorded 120 metres from the application area (Western Australian Herbarium 1998-). Given the large size of the species, even if it does occur within the Typha stand, it is unlikely to be impacted due to the targeted nature of the clearing.

Typha is capable of aggressive invasions that can transform ecosystems unless it is actively managed (Western Australian Herbarium 1998-). Without management, Typha can develop quickly into a monoculture and cover an entire water body. As the proposed clearing will only target Typha, it is unlikely any conservation significant flora will be negatively impacted during removal, due to the nature of the clearing. In addition, removing Typha will likely benefit the health of the ecosystem.

Conclusion

Based on the above assessment, the proposed clearing is unlikely to result in a significant loss in biodiversity or impact significant populations of threatened and priority flora. Suitable habitat for species listed in Appendix A.2 is unlikely to be significantly impacted by the proposed clearing.

Conditions

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

- Avoid and minimise clearing, to minimise the direct impacts to native vegetation
- undertake spraying of herbicide during the driest period of the year when the water level is at its lowest and during calm conditions
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback

3.2.3. Land and water resources - Clearing Principles (f), (g), (i) and (j)

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, 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.

The mapped soil units had a moderate to high risk of wind erosion, water erosion, subsurface acidification and phosphorus export risk in some soil types. Given the selective clearing and that Typha has been found to assist in neutralising acidity on rewetting in areas that are prone to acid sulphate soils, the proposed clearing is unlikely to cause an appreciable increase to the existing risks (DBCA, 2019).

The removal of Typha has the potential to increase sedimentation and turbidity of the water within the application area, thereby possibly impacting surface water quality. Given the invasiveness of Typha, the proposed clearing may improve drainage of water and reduce the incidence or intensity of flooding.

Conclusion

The proposed clearing will not significantly impact the vegetation and is expected to enhance the habitat within the application area through the removal of Typha as the increased water drainage will reduce the risk of flooding. The selective clearing of Typha within the application area is not likely to lead to appreciable land degradation in the form of subsurface acidification, phosphorus export, water or wind erosion. No management conditions are required in relation to this environmental value.

3.3. Relevant planning instruments and other matters

The application area is within the RIWI Perth groundwater area as proclaimed under the *Rights in Water and Irrigation Act 1914*. DWER's Water licencing branch advised that a water licence or permit may be required to undertake the proposed clearing (DWER, 2023). The applicant confirmed that no groundwater would be removed to clear the Typha species.

The application area falls within the Swan River Development Control area managed by DBCA. The proposed impact of Typha removal from the firebreak within the Swan River Development Control area was not deemed significant as it will improve the area.

Several Aboriginal sites of significance, Nyibra Swamp, Bennet Brook and Helena River, 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.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a series of drains or wetland areas in the Town of Bassendean that is being outcompeted with Typha species. The areas are in parklands surrounded by residential and industrial zoning in the intensive land use zone of Western Australia. Aerial imagery indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 12.48 per cent of the original native vegetation cover, although as it is within the constrained area it is above the 10 per cent threshold.
Ecological linkage	The application area is 70 metres from a Perth regional ecological linkage. As the clearing targets only Typha species the ecological linkage will not be impacted by the clearing.
Conservation areas	One part of the application area at Ashfield Flats is within a Bush forever area. As the clearing targets only Typha species the Bush Forever Area will not be significantly impacted by the clearing.
Vegetation description	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area consists of Typha species. Representative photos are available in Appendix D. This is mostly consistent with the mapped vegetation types: • Swan Complex – which is described as fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) with localised occurrence of low open forest of *Casuarina obesa* (Swamp Sheoak) and *Melaleuca cuticularis* (Saltwater Paperbark). • Bassendean Complex – Central and South – which is described as vegetation ranges from woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - *Banksia* species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus marginata* (Jarrah) to *Eucalyptus todtiana* (Pricklybark) in the vicinity of Perth. The mapped vegetation types retain approximately 13.57 and 26.87 per cent respectively of their original extent (Government of Western Australia, 2019).
Vegetation condition	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area is in degraded to completely degraded (Keighery, 1994) condition. The full Keighery (1994) condition rating scale is provided in Appendix C. Representative photos are available in Appendix D.
Climate and landform	The nearest weather station is the Perth Airport approximately 3.9 kilometres from application area (BOM, 2023). The mean maximum temperature is highest in February at 32 degrees Celsius and lowest at 18 degrees Celsius in July. The mean minimum temperature is highest in February at 17.6 degrees and lowest at 8.1 degrees in July and August. The annual rainfall is 759.3 mm. The application area is mostly flat between 25 metres to 5 metres above sea level. The application area is in the Pinjarra System which is described as Swan Coastal Plain from Perth to Capel. Poorly drained coastal plain with variable alluvial and aeolian soils. The Bassendean system which is described as Swan Coastal Plain from Busselton to Jurien with sand dunes and sandplains with pale deep sand, semi-wet and wet soil.
Soil description	The soil is mapped as:

Characteristic	Details
	• EnvGeol Ms4 Phase which is described as sandy silt, light yellow brown, blocky mottled • EnvGeol S10 Phase which is described as sand over sandy clay to clayey sand • EnvGeol S8 Phase which is described as very light grey sand at surface and yellow at depth
Land degradation risk	The application area has high subsurface acidification risk and has high erosion risk for wind erosion, water erosion, water repellence, flood risk, water logging and phosphorus export risk in various soil types.
Waterbodies	The desktop assessment and aerial imagery indicated that two areas of the application have water bodies and the others near floodplain areas.
Hydrogeography	The application area is within the Perth groundwater area as proclaimed under the RIWI Act.
Flora	There are 91 conservation significant flora records in the local area with the closest *Bolboschoenus fluviatilis* 750 metres from the application area. There are records of 44 conservation significant flora in the same vegetation type and 39 in the same soil type. Twenty-two are in the same habitat type and have a high likelihood of occurring in the application area.
Ecological communities	There is one Subtropical and Temperate Coastal Saltmarsh Priority ecological community mapped within the application area. There are 12 conservation significant ecological communities within the local area. Considering the clearing will target Typha species, no conservation significant community will be significantly impacted by the proposed clearing.
Fauna	There are 50 conservation significant fauna records in the local area with the closest, Carnaby's cockatoo 90 metres from the application area. There are 39 conservation significant fauna in the same vegetation type as the application area. Twenty-five are in the same habitat type and have a high likelihood of occurring in the application area.

A.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), 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]
Bolboschoenus fluviatilis	1	Y	Y		0.75	4	N/A
Byblis gigantea	3	Y	Y	Y	2.19	11	N/A
Calytrix breviseta subsp. *breviseta*	T	Y	Y		5.59	3	N/A
Carex tereticaulis	3	Y	Y		1.59	3	N/A
Conospermum undulatum	T	Y	Y	Y	2.58	144	N/A
Cyathochaeta teretifolia	3	Y	Y	Y	3.52	7	N/A
Dampiera triloba	3	Y	Y	Y	3.53	2	N/A
Diuris drummondii	T	Y	Y		1.20	1	N/A
Drosera patens	1	Y	Y	Y	2.19	2	N/A
Drosera x *sidjamesii*	1	Y		Y	4.29	1	N/A
Hydrocotyle lemnoides	4	Y	Y		2.19	1	N/A
Hydrocotyle striata	1	Y	Y		2.19	4	N/A
Levenhookia preissii	1	Y	Y	Y	2.19	8	N/A
Meionectes tenuifolia	3	Y	Y		1.59	3	N/A
Melaleuca viminalis	2	Y		Y	7.36	1	N/A
Myriophyllum echinatum	3	Y	Y		2.55	2	N/A
Ornduffia submersa	4	Y		Y	5.78	2	N/A

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]
Schoenus pennisetis	3	Y		Y	4.04	3	N/A
Stylidium longitubum	4	Y	Y	Y	4.65	5	N/A
Stylidium paludicola	3	Y	Y	Y	3.53	1	N/A
Trithuria occidentalis	T	Y	Y		4.07	6	N/A
Verticordia lindleyi subsp. *lindleyi*	4	Y	Y	Y	1.20	27	N/A

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

A.3. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), impacts to the following conservation significant fauna required further consideration.

Species name (Common name)	Class	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]
Apus pacificus (fork-tailed swift)	BIRD	MI	Y	Y	2.08	1	N/A
Botaurus poiciloptilus (Australasian bittern)	BIRD	EN	Y	Y	2.06	3	N/A
Calidris acuminata (sharp-tailed sandpiper)	BIRD	MI	Y	Y	2.06	3	N/A
Calidris canutus (red knot)	BIRD	EN	Y	Y	2.06	1	N/A
Calidris ferruginea (curlew sandpiper)	BIRD	CR	Y	Y	2.06	12	N/A
Calidris melanotos (pectoral sandpiper)	BIRD	MI	Y		3.68	1	N/A
Calidris ruficollis (red-necked stint)	BIRD	MI	Y	Y	2.06	17	N/A
Calidris tenuirostris (great knot)	BIRD	CR	Y	Y	2.06	1	N/A
Falco peregrinus (peregrine falcon)	BIRD	OS	Y	Y	0.41	52	N/A
Hydromys chrysogaster (rakali)	MAMMAL	P4	Y	Y	1.56	15	N/A
Hydroprogne caspia (caspian tern)	BIRD	MI	Y	Y	3.47	3	N/A
Ixobrychus dubius (Australian little bittern)	BIRD	P4	Y	Y	6.65	1	N/A
Ixobrychus flavicollis australis (southwest subpop.) (black bittern)	BIRD	P2	Y	Y	1.39	1	N/A
Limosa lapponica (bar-tailed godwit)	BIRD	MI	Y	Y	2.06	5	N/A
Limosa limosa (black-tailed godwit)	BIRD	MI	Y	Y	2.06	1	N/A
Numenius madagascariensis (eastern curlew)	BIRD	CR	Y		9.75	1	N/A
Oxyura australis (blue-billed duck)	BIRD	P4	Y	Y	1.66	346	N/A

Species name (Common name)	Class	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]
Pandion haliaetus (osprey)	BIRD	MI	Y	Y	0.42	14	N/A
Plegadis falcinellus (glossy ibis)	BIRD	MI	Y	Y	4.90	2	N/A
Pluvialis squatarola (grey plover)	BIRD	MI	Y	Y	2.06	19	N/A
Thalasseus bergii (crested tern)	BIRD	MI	Y	Y	0.25	171	N/A
Tringa glareola (wood sandpiper)	BIRD	MI	Y		6.97	1	N/A
Tringa nebularia (common greenshank)	BIRD	MI	Y	Y	2.06	10	N/A
Tringa stagnatilis (marsh sandpiper)	BIRD	MI	Y	Y	2.06	1	N/A

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

A.4. Land degradation risk table

Risk categories	*EnvGeol Ms4 Phase*	*EnvGeol S10 Phase*	*EnvGeol S8 Phase*
Wind erosion	M1	M2	H1
Water erosion	H1	M1	L1
Water repellence	M1	M1	H2
Salinity	L1	M1	L1
Subsurface Acidification	H2	H2	H2
Flood risk	Floodplain: H1	M2	L1
Water logging	H2	H1	L2
Phosphorus export risk	H1	M2	M2

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared contains suitable habitat for conservation significant flora and fauna.	May be 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 may contain significant habitat for conservation significant fauna.	May be at variance	Yes *(Refer to Section 3.2.1, above.)*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."*	May be at variance	Yes

Assessment against the clearing principles	Variance level	Is further consideration required?
Assessment: The area proposed to be cleared may contain habitat for threatened flora species.		*(Refer to Section 3.2.2, 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 does not contain species that can indicate a threatened ecological community.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of native vegetation in the local area is not consistent with the national objectives and targets for biodiversity conservation in Australia. However, as it is within the constrained area as defined by the EPA, it is above the revised 10 per cent threshold target. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not likely to be at variance	No
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: A portion of the application area falls within a Bush forever site 214. Given the purpose of the clearing is to improve water flow and enable native rehabilitation, it is not likely to have an impact on the environmental values of the conservation area.	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: Typha forms a natural component of native wetland and watercourse vegetation. However, Typha can dominate wetland ecosystems. Given the nature of the proposed clearing, it is unlikely to significantly impact wetlands or watercourses.	At variance	Yes *(Refer to Section 3.2.3, above.)*
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 moderately to highly susceptible to wind, water erosion, nutrient export and subsurface acidification. The method and targeted nature of the proposed clearing is unlikely to result in land degradation.	May be at variance	Yes *(Refer to Section 3.2.3, 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."*	May be at variance	Yes

Assessment against the clearing principles	Variance level	Is further consideration required?
Assessment: Given the application area intersects water courses and wetlands, as Typha is a riparian species, the proposed clearing may impact surface or ground water quality.		*(Refer to Section 3.2.3, above.)*
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 purpose of the clearing permit is to remove Typha to increase water flow which would reduce the likelihood, incidence and intensity of flooding in the area	Not likely to be at variance	Yes *(Refer to Section 3.2.3, above.)*

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

Excerpt of photos submitted with the application (Town of Bassendean, 2023).

Typha infestation at Mary Crescent Reserve, September 2023

Typha infestation at Bindaring Park in September 2023, in drain coming off Harcourt Road into the reserve

Typha infestation at Broadway Reserve in September 2023

Current incidences of Typha growing within 3 m of the fire track, residential properties to the north of the fire track

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)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- 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)
- 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
- Wheatbelt Wetlands Stage 1 (DBCA-021)

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)

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