Preliminary Clearing Impact Assessment

We're working for Western Australia.

M008 Vasse Hwy [000 to 008.20 SLK] Bussell Hwy to Sues Road - Seal Widening

March 2021

EOS 1972

D21#304909

Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Contractor Environment	Draft v1	23 March 2021
Reviewer:	Senior Environment Officer	Rev 0	23 March 2021

1 SUMMARY

1.1 Proposal Information

Proposal Name: M008 Vasse Hwy [000 to 008.20 SLK] Bussell Hwy to Sues Road - Seal Widening

Proposal Location(s): Vasse Hwy between the intersections of Bussell Hwy (Bovell) and Sues Road (Yoongarillup), within the City of Busselton.

Proposal Purpose / Components: The proposal includes minor road widening of the Vasse Highway (M008) between 0.0 SLK (Bussell Highway) and 8.2 SLK (Sues Road). The widening will extend the existing circa 8m wide pavement and seal to 10m wide, using low cost widening treatments, to achieve increase road safety outcomes.

Area Proposed to be Cleared: 0.22 ha.

Temporary Clearing Required: None.

A Preliminary Clearing Impact Assessment (PCIA) of the proposed clearing activities was undertaken. The PCIA outlined the key activities associated with the proposal, the existing environment and an assessment of native vegetation clearing. This assessment provided an evaluation of the vegetation clearing impacts associated with the proposal using the ten Clearing Principles and strategies used to manage vegetation clearing. Key clearing impact assessment points are listed below.

- The proposed clearing is not likely to be (a, b, c, d, e, g, h), or not (f, i, j) at variance with the 10 clearing principles.

- Seven vegetation units will be cleared (totalling 0.22 ha), all in completely degraded to degraded condition.

- The Banksia Woodlands of the Swan Coastal Plain TEC (vegetation unit KgBa) occurs and 0.027 ha of this vegetation in a Degraded condition will be cleared. While vegetation in poorer than Good condition does not in its own right meet the criteria for inclusion in the TEC, Degraded areas within a wider patch mapped as Good or better that also meet the other diagnostic criteria for the TEC are included in the TEC, as is the case here. The patch extends beyond the road verge and totals approximately 7.4 ha.

- Two other vegetation units (CcEmBg and Mo) potentially of high conservation value but not formally listed under federal or state legislation or policy also occur within the footprint, in a degraded and completely degraded condition. A small area of each will be cleared, 0.035 ha and 0.032 ha respectively.

- Impacts on fauna was assessed as being none to low. The footprint may contain suitable habitat for four threatened fauna; Forest Red-tailed Black-cockatoo, Baudin's Cockatoo, Carnaby's Cockatoo, and Western Ringtail Possum (WRP). Approximately three Marri and three Flooded gums will be cleared with DBH >50cm. No hollow bearing trees will be cleared. No black cockatoo-breeding habitat will be cleared. Black cockatoo foraging habitat will be restricted to less than 10 Marri trees in total, which is negligible across the proposal extent. No direct evidence of WRP use of the proposal area or WRP dreys were

observed. Although WRP may use vegetation within the site as part of a larger patch, the loss of individual trees or small patches at any one location will be unlikely to impact on WRP.

- A known population of *Verticordia plumosa var vassensis* (Threatened) occurs near the intersection with Acton Park Road, with no impacts proposed. No other Threatened flora will be impacted.

- Two Priority flora species, *Acacia semitrullata* (P4) and *Synaphea hians* (P3) occur within or immediately adjacent to the survey area. No *Synaphea hians* (P3) plants will be impacted. Approximately six *Acacia semitrullata* (P4) plants will be cleared.

- Five species of other significant flora were recorded within the survey area, during sampling for quadrats (Stream Environment and Water 2021): *Daviesia divaricata, Hakea marginata, Hemiandra pungens, Melaleuca osullivanii* and *Melaleuca acutifolia*. These species are not formally listed under legislation or policy as of elevated significance, but they have specific habitat requirements, restricted distributions, were recorded at the limit of the range and/or are part of a disjunct population. None of the plants recorded are located within the clearing footprint. These species were not surveyed for specifically along the full proposal extent, however, due to the small scale of clearing (0.22 ha) and the clearing being located in degraded to completely degraded areas, the likelihood of impacting on them is considered low.

- The proposal will impact on Vegetation Associations 990, 1000 and 1136 which are generally under represented and under reserved at all scales apart from 990 state-wide and 1000 within the City of Busselton LGA (Government of Western Australia, 2019a).

- The proposal will impact on Abba Complex (under represented), Cokelup Complex (under represented), Southern River Complex (under represented), and Yoongarillup Complex (well represented).

- None of the vegetation in the clearing footprint is mapped in the Native Vegetation Extent (NVE) (DPIRD 2020) dataset. The NVE layer maps representative vegetation used to calculate the vegetation representation referred to above.

- The vegetation removal will be of a very minor scale, including the clearing of individual trees or small pockets in a degraded to completely degraded condition. Due to the poor condition, they are no longer considered representative of these vegetation Associations or Complexes. No clearing of vegetation in a good or better condition will be required, nor are any of the patches being cleared considered significant as a remnant of native vegetation.

- Two declared pest plants under the *Biosecurity and Agriculture Management Act 2007*, *Asparagus asparagoides* (bridal creeper) and *Zantedeschia aethiopica* (Arum lily) occur at the site. The remaining introduced species are considered environmental weeds and reflective of adjoining land use for agriculture. Weeds will be managed through Main Roads CEMP.

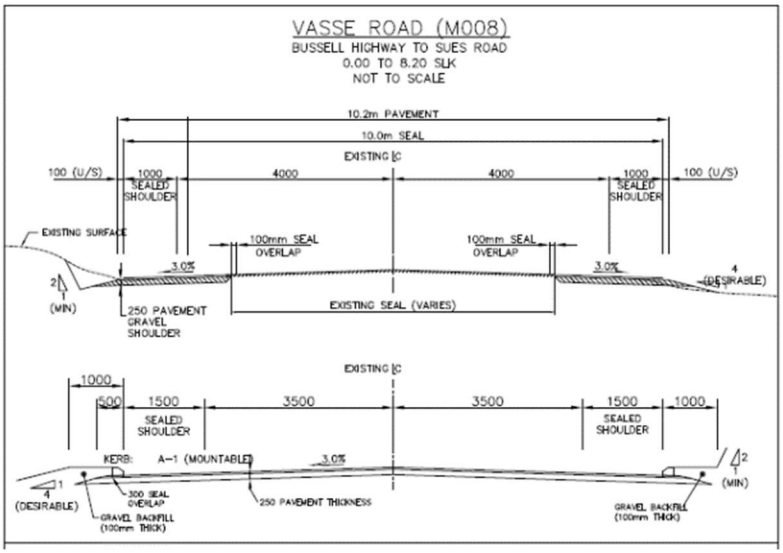
Main Roads Statewide Purpose Clearing Permit CPS 818 will be used to undertake native vegetation clearing for the proposal. Clearing will be undertaken in accordance with the conditions of CPS 818 and detailed records of native vegetation clearing will be maintained as required under the permit.

2 ASSESSMENT SCOPE

This preliminary clearing impact assessment involved a desktop analysis of environmental aspects and impacts, a site investigation, and an assessment of native vegetation clearing impacts. The study area is confined to a local area of a 5 km radius. This preliminary assessment determined whether further assessment through a Clearing Impact Assessment (CIA) is necessary, the need to seek submissions and develop and obtain approvals from the Department of Water and Environmental Regulation (DWER) for a Revegetation Plan, a Vegetation Management Plan (VMP), a Dieback Management Plan or an Offset Proposal.

3 PROPOSAL DESCRIPTION

The proposal includes minor road widening of the Vasse Highway (M008) between 0.0 SLK (Bussell Highway) and 8.2 SLK (Sues Road). The widening will extend the existing circa 8m wide pavement and seal to 10m wide, using low cost widening treatments, as per Main Roads 2031 – Typical Cross Section map (below).



Selective clearing will be required to achieve the appropriate seal width (approximately 0.22 ha). Minor culvert extensions may be required, with one requiring clearing of a single tree at 2.24 SLK (RHS). Guardrail will be installed to protect the culverts if required.

To accommodate the widening, minor property resumption will be required at ~5.75 SLK (RHS), along with the realignment of the existing Water Corporation drain and installation of a new fence.

Table 1 describes the proposal in detail, including the full extent of the proposed work and all the components of the proposal.

Table 1. Proposal Description

Proposal Components	Clearing Required (Y/N)	Estimated Clearing Area (ha)
Road Widening/Overtaking lanes/Realignment SLK 0 – 8.2 SLK	☒	0.22 ha
Intersection Upgrades	☐	
Public Shared Pathways (PSP)	☐	

Proposal Components	Clearing Required (Y/N)	Estimated Clearing Area (ha)
Material Pits	☐	
Access/Side Tracks	☐	
Connecting Roads	☐	
Pre-construction works/service Relocations	☐	
Bridges/Structures	☐	
Stockpiles Aggregate/Waste/Material	☐	
Camp sites	☐	
Fencing	☒	0.002

3.1 Proposal Location

The proposal area is located Vasse Highway (M008) between 0.0 SLK (Bussell Highway) and 8.2 SLK (Sues Road), in the localities of Bovell and Yoongarillup, within the City of Busselton (Figure 1).

MGA reference: E348700 N6274045 to E353845 N6268420.

The study area (5km radius) is shown in Figure 2.

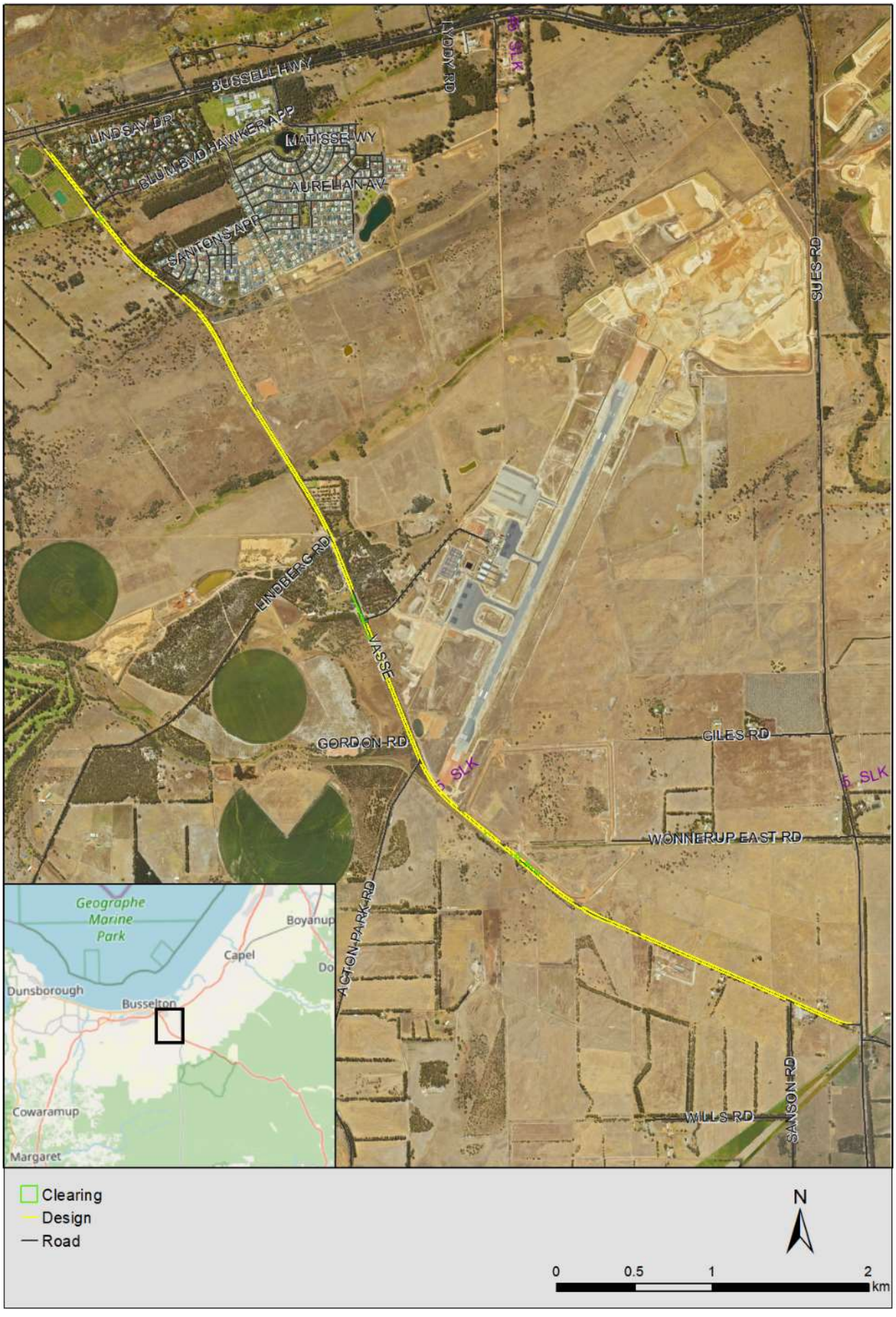


Figure 1. Proposal Area

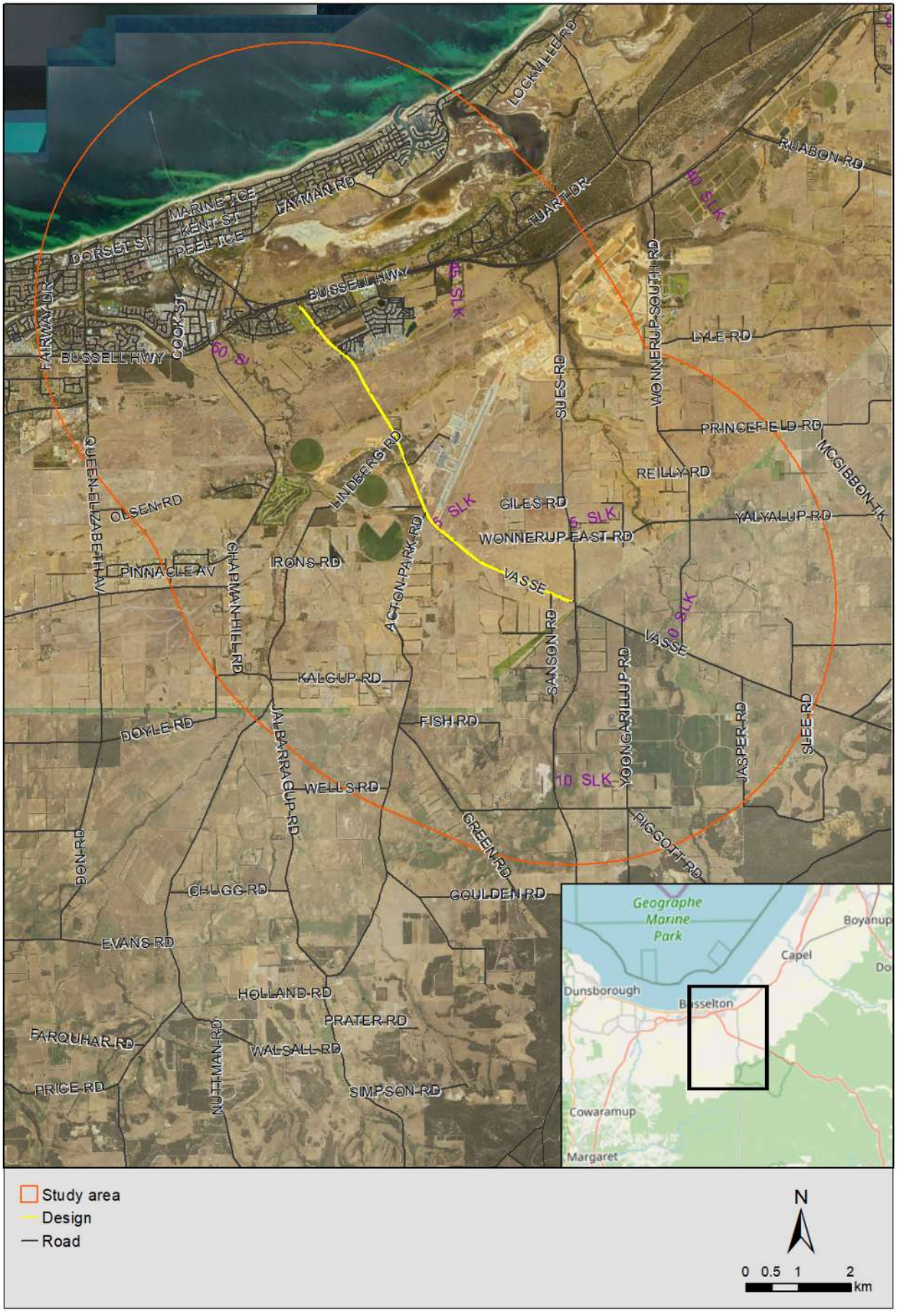


Figure 2. Proposal Location and Study Area

4 Methodology

4.1 Preliminary Desktop Study

A preliminary assessment of the proposal area and an assessment of native vegetation clearing were undertaken by reviewing a number of government agency managed databases, viewing GIS shapefiles and consulting with relevant stakeholders where necessary. Results from searches can be found in the relevant Appendix.

GIS layer viewing and mapping is done using ArcMap and referencing of the GIS layers accessed is done under the relevant methodology section of each clearing principle. All government managed databases that were searched to locate additional information (i.e. further information on contaminated sites, such as basic summary of records). Where these databases were searched, references are provided in the Section 8.

5 Clearing of Native Vegetation

Native vegetation describes all indigenous aquatic and terrestrial vegetation (living or dead). The term does not include vegetation that was intentionally sown, planted or propagated unless it was required under a statutory condition.

Apart from activities that are exempt under the clearing regulation (Section 5 – Prescribed Clearing), all native vegetation clearing completed by Main Roads will be undertaken using a permit.

5.1 Measures to Avoid, Minimise, Mitigate and Manage Proposal Clearing Impacts

The design and management measures implemented to avoid and minimise the proposal clearing impacts are provided in Table 2.

Table 2. Justification of Avoiding, Minimising, Mitigating and Managing Proposal Clearing Impacts

Design or Management Measure	Applied to Current Design	Discussion and Justification
Steepen batter slopes	Yes	Using the existing mostly cleared pavement batters and road formation to facilitate the widening of the seal, with the existing geometry to be retained.
Installation of safety barriers	Yes	Roadside safety barriers will be installed adjacent to multi barrel culverts, and adjacent to the section of Water Corporation stormwater drain that is to be re-aligned.
Alignment to one side of existing road	No	As a result of the width of the existing road formation (unsealed shoulder) the majority of the widening is planned to be undertaken equally on each side throughout the proposal.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	No	This road widening proposal will retain the same road geometry, with the majority of the widening planned to be undertaken equally on each side throughout the proposal.
Installation of kerbing	Yes	There will be some sections of kerbing installed, however these will be limited to adjacent guardrail across the multi barrel culvert and Water Corp drain realignment.
Simplification of design to reduce number of lanes and/or complexity of intersections	Yes	With the proposal retaining the same road geometry throughout, with only one intersection to receive a basic right turn treatment at Neville Hyder Drive (Airport Access road).
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Yes	There are existing cleared parking bay facilities that are a sufficient size for stockpiling and construction site offices.
Drainage modification	Yes	Culvert extensions will be carried out as a part of this proposal, with isolated vegetation impacts identified and inspected on site.

5.2 Vegetation Details

5.2.1 Proposal Site Vegetation Description

The flora and vegetation survey of Vasse Highway by Stream Environment and Water (2021) (TRIM D21#338843) found that native vegetation within the survey area has been extensively cleared. Some sections of native vegetation in Good to Very Good condition remain however; the majority of remnant native vegetation within the road reserve was in Degraded to Completely Degraded condition. The survey area traverses three geomorphological units, Spearwood dunes, Bassendean Dunes and Pinjarra Plain and soils and native vegetation where present reflected the diversity of soils and landforms, including Marri and Peppermint woodlands, Banksia Woodlands and wetland vegetation units.

The survey mapped and described 11 vegetation units within the survey area, including eight native vegetation units (Table 3). The vegetation units described were consistent with vegetation complexes mapped for the survey area. Only a small proportion of the vegetation within the survey area will be impacted by the proposal – refer to Table 4.

Table 3. Vegetation units described for the survey area (extrapolated from Stream Environment and Water, 2021), and clearing impacts. Blue shaded rows show areas to be cleared.

Unit Code	Description	Conservation status	Condition	Area (ha) surveyed	Area (ha) impacted
Af parkland	Very open woodland of *Agonis flexuosa* over cleared parkland		Completely Degraded	0.2	0
BaCcEm	Woodland of *Banksia attenuata, Corymbia calophylla* and *Eucalyptus marginata* over shrubland of *Hibbertia hypericoides* subsp. *hypericoides* and *Gastrolobium praemorsum*.	TEC EN EPBC Act PEC (P3) WA (Banksia Woodlands TEC)	Good	0.05	0
CcAfEr	Open woodland of *Corymbia calophylla, Agonis flexuosa* and *Eucalyptus rudis* over mixed introduced grasses and herbs		Completely Degraded	2.1	0.013
CcEmBg	Woodland of *Eucalyptus marginata* and *Corymbia calophylla* over low open woodland of *Banksia grandis* and *Agonis flexuosa* over shrubland of *Hibbertia hypericoides* subsp. *hypericoides*, *Acacia extensa*, *Lomandra integra* and *Xanthorrhoea brunonis*		Very Good - Good Degraded	0.5	0 0.035
CcKaXp	Very open woodland of *Corymbia calophylla* over scattered *Kingia australis* and *Xanthorrhoea preissii* over introduced grasses		Completely Degraded	0.8	0.038
CcXp	Woodland of *Corymbia calophylla* over *Xanthorrhoea preissii* and *Xanthorrhoea brunonis* over *Acacia*	Potential TEC VU WA BC Act (FCT01b)	Good	0.3	0

Unit Code	Description	Conservation status	Condition	Area (ha) surveyed	Area (ha) impacted
	extensa, *Gastrolobium praemorsum* and *Ehrharta calycina*				
KgBa	Shrubland of *Kunzea glabrescens* and *Banksia attenuata* over *Lyginia imberbis, Dasypogon bromelifolius, Patersonia occidental*is and *Stirlingia latifolia*	Potential TEC EN EPBC Act PEC (P3) WA (Banksia Woodlands TEC)	Good- Very Good	0.7	0
			Degraded		0.027
Mo	Shrubland of *Melaleuca preissiana* and *Melaleuca osullivanii* over introduced grasses and herbs		Completely Degraded	1.5	0.030
			Degraded		0.002
MrEr	Open woodland of *Melaleuca rhaphiophylla* with *Eucalyptus rudis* over introduced herbs and grasses		Completely Degraded	0.2	0.006
Mixed Shrubland	Shrubland of *Viminaria juncea, Acacia saligna* and *Melaleuca osullivanii* over low closed shrubland of *Watsonia meriana* subsp. *bulbillifera, Baumea juncea* and *Leptocarpus scariosus*	Potential TEC CE EPBC Act TEC VU WA BC Act (FCT09)	Degraded	0.1	0
Cleared	Cleared or predominantly cleared		NA	19.0	0.075
TOTAL					0.224

Three TECs were identified as occurring or potentially occurring within the survey area based on FCT analysis of the vegetation units described and mapped:

- The Banksia Woodlands of the Swan Coastal Plain TEC/PEC occurs within the survey area. The TEC is listed as Endangered under the EPBC Act and as a PEC (P3) under state policy. Two vegetation units (**BaEmCc** and **KgBa**) met the diagnostic characteristics of the TEC/PEC and a patch assessment confirmed the occurrence of the community across 0.8 ha within the survey area. The total patch size is 7.4 ha. **Only 0.027 ha of degraded vegetation unit KgBa will be cleared, comprising 0.36% of the patch. The patch will still meet the criteria for inclusion in the TEC after clearing.**

- Vegetation unit **CcXp** is likely to be representative of the *Corymbia calophylla* Woodlands on heavy soils FCT1b TEC. This vegetation unit occurred across 0.3 ha within the survey area and was mapped predominantly in Good condition. The TEC is listed as Vulnerable under the state BC Act. **No impacts proposed.**

- The **Mixed Shrubland** vegetation unit is considered to potentially align with FCT 09 Dense shrublands on clay flats TEC. This TEC was not identified through database searches (as potentially occurring within the desktop search area) however it was included in the analysis based on FCTs identified in Webb *et al.* (2009) as potentially occurring on the southern Swan Coastal Plain. The TEC is listed as Critically Endangered under the EPCB Act and

Vulnerable under the BC Act. Further surveys (sampling and analysis of additional quadrats) are required to confirm the status of this vegetation unit. **No impacts proposed.**

Two other vegetation units were identified as potentially of high conservation value although not formally listed under federal or state legislation or policy:

- The **CcEmBg** community occurring on yellow sands opposite the Busselton cemetery is an unusual vegetation community for the location on the Bassendean Dunes. Webb et al. (2009) identifies this vegetation unit as having affinities with vegetation more typically found on the Whicher Scarp. Similar areas (of this soil and vegetation type) have been impacted by clearing for mineral sands mining and there are few remaining vegetated areas. The unit is considered to be of high conservation value given it is representative of an unusual/disjunct vegetation type, which has otherwise been extensively cleared (Webb et al. 2009). **Approximately 0.035 ha of degraded CcEmBg vegetation unit will be cleared.**

- Vegetation unit **Mo** was highly disturbed and the understorey dominated by introduced species. Due to the poor condition of vegetation in this unit, this unit was sampled using relevés only. As a result, the units were not included in FCT analysis. However, the vegetation unit is analogous with Melaleuca shrublands on the Cokelup Swamps (Spearwood Dune/Pinjarra Plain interface wetlands) described by Webb *et al* (2009) and identified as of high conservation value given the extensive clearing of vegetation of this type. The unit is likely to be considered of high conservation value despite it relatively poor condition. **Approximately 0.032 ha of completely degraded Mo vegetation unit will be cleared.**

The remaining vegetation units are not considered to be of significance, mainly due to their poor condition:

- Af parkland
- CcAfEr
- CcEmBg
- CcKaXp
- MrEr
- Cleared

Vegetation and other constraints are mapped in Appendix D.

Table 4. Summary of Proposal Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s) (Government of Western Australia, 2019)	**Clearing Description**	**Vegetation Condition** (EPA 2016)	**Comments**
Vegetation Association 990 described as a Low forest: peppermint (*Agonis flexuosa*).	Clearing of a single Melaleuca (0.001 ha) for road widening / culvert extension	Degraded	Vegetation description and condition

Table 4. Summary of Proposal Area's Mapped Pre-European Vegetation Associations

Vegetation Association 1000 described as a Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low forest; teatree (Melaleuca spp.).	Clearing of two Marri trees (0.01 ha) for road widening	Completely Degraded	determined from Main Roads site visit on 28/07/2020 and aerial imagery.
Vegetation Association 1136 described as a Medium woodland; marri with some jarrah, wandoo, river gum and casuarina.	Clearing of individual trees or edges of pockets (0.21 ha) for road widening	Degraded to Completely Degraded	

Table 5. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
990	**Statewide**	18,691.48	14,417.65	77.13	56.39
	IBRA Bioregion Swan Coastal Plain (SWA)	1,951.76	319.75	16.38	1.89
	IBRA Sub-region Perth (SWA02)	1,951.76	319.75	16.38	1.89
	Local Government Authority City of Busselton	4,225.41	1,176.78	27.85	5.04
1000	**Statewide**	99,835.86	27,768.84	27.81	5.19
	IBRA Bioregion Swan Coastal Plain (SWA)	94,175.31	24,869.20	26.41	5.06
	IBRA Sub-region Perth (SWA02)	94,175.31	24,869.20	26.41	5.06
	Local Government Authority City of Busselton	12,034.21	4,244.00	35.27	6.84
1136	**Statewide**	48,124.57	3,345.51	6.95	0.27
	IBRA Bioregion Swan Coastal Plain (SWA)	48,118.01	3,341.18	6.94	0.27
	IBRA Sub-region Perth (SWA02)	48,118.01	3,341.18	6.94	0.27
	Local Government Authority City of Busselton	38,946.49	2,640.77	6.78	0.21

5.2.2 Vegetation Complexes and Representation

Table 6. Vegetation Complexes (Heddle/Mattiske) within the Proposal Area

Heddle/Mattiske Veg Complex	Area in Proposal extent (ha)	Pre-European Extent (ha)	Current Extent	% Remaining
Abba Complex	0.13 ha	50,892.78	3,326.20	6.54
Cokelup Complex	0.001 ha	3,010.98	315.75	10.49
Southern River Complex	0.074 ha	58,781.48	10,832.18	18.43

Yoongarillup Complex	0.013 ha	27,977.93	10,018.14	35.81

5.3 Assessment against the Ten Clearing Principles

In assessing whether the proposal's proposed clearing is likely to have a significant impact on the environment, the proposal was assessed against the ten clearing principles (EP Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation'.

The proposed clearing is not likely to be (a, b, c, d, e, g, h), or not (f, i, j) at variance with the 10 clearing principles.

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments	**Proposed clearing is** not likely to be at **variance to this Principle**
	The proposal is located within the Southern Swan Coastal Plain, in the catchment of the Vasse and Sabina Rivers, an area that has been historically over-cleared. Approximately 1897 ha (12%) of native vegetation remains within the 5km study area. The catchment has a long history of agricultural land use, which began with European settlement in the 1830s (DWER 2020). The Proposal will require the clearing of 0.22 ha of road verge vegetation. The road verge is typical of vegetation within the catchment containing small patches of native vegetation, or scattered trees, but mostly cleared. Vegetation types within the verge are dominated by Jarrah, Marri, Peppermint, Flooded Gum and Melaleuca shrubland along the roadside drain. Generally, the intact vegetation is set back within the road reserve well outside of the clearing footprint. <u>Flora</u> The Proposal area traverses three geomorphological units, Spearwood dunes, Bassendean Dunes and Pinjarra Plain. The field survey recorded 134 taxa of vascular plants from 36 families. Of the taxa recorded, 24 are introduced. The native vegetation where present reflects the diversity of soils and landforms, and the flora species recorded and families represented were generally consistent with those expected for the area. <u>Threatened Fauna and Flora</u> In their desktop assessment, Stream Environment and Water (2021) identified 19 Threatened flora species potentially occurring within their wider survey area. Only one of these, *Verticordia plumosa* var. *vassensis* (listed as Threatened under the BC Act and Endangered under the EPBC Act), was recorded (none individuals) during the field survey, none of which are inside the clearing area. The application area may contain suitable habitat for four threatened fauna; • *Calyptorhynchus banksii subsp. naso* (Forest Red-tailed Black-cockatoo) • *Calyptorhynchus baudinii* (Baudin's Cockatoo) • *Calyptorhynchus latirostris* (Carnaby's Cockatoo), and • *Pseudocheirus occidentalis* (Western Ringtail Possum) (WRP).

No hollow trees are located within the proposal footprint, and no black cockatoo breeding habitat will be cleared. Clearing of black cockatoo foraging habitat will be negligible across the proposal extent.

WRP occur locally, and are most likely to occur in the northern part of the site. There were no WRP dreys or hollows observed within or close to the clearing. Although WRP may use vegetation within the site as part of a larger patch, the loss of individual trees or small patches at any one location will be unlikely to impact on WRP. A fauna spotter to be onsite during clearing operations in WRP habitat.

Prority Fauna and Flora

The Naturemap (2020) database search identified over 93 Priority plants, one fungi (*Amanita walpolei*) P2 and 14 Priority or Specially protected terrestrial fauna (and several other marine birds not included below) from within 5 km of the proposal:

- *Bothriembryon irvineanus* (Irvine's bothriembryontid land snail (Cape Naturaliste)) P2
- *Cacatua pastinator subsp. pastinator* (Muir's Corella) S
- *Elapognathus minor* (Short-nosed Snake) P2
- *Falco peregrinus* (Peregrine Falcon) S
- *Falsistrellus mackenziei* (Western False Pipistrelle, Western Falsistrelle) P4
- *Hydromys chrysogaster* (Water-rat, Rakali) P4
- *Isoodon fusciventer* (Quenda, southwestern brown bandicoot) P4
- *Lerista lineata* (Perth Slider, Lined Skink) P3
- *Notamacropus irma* (Western Brush Wallaby) P4
- *Oxyura australis* (Blue-billed Duck) P4
- *Pachysaga strobila* (Vasse Pachysaga (Busselton-Donnybrook), cricket) P1
- *Phascogale tapoatafa* (Brush-tailed Phascogale) S
- *Pseudomys occidentalis* (Western Mouse) P4
- *Tyto novaehollandiae subsp. novaehollandiae* (Masked Owl (southwest)) P3

The fauna above would either not occur within the road reserve due to a lack of suitable habitat, do not have habitat requirements consistent with the habitat within the clearing footprint, or are wide ranging and unlikely to be directly impacted due to the small amount of vegetation to be cleared. As no hollow bearing trees will be cleared, direct impacts to hollow dependant fauna are unlikely to occur (Muir's Corella, Western False Pipistrelle, Brush-tailed Phascogale and Masked Owl).

Two Priority flora species, *Acacia semitrullata* (P4) and *Synaphea hians* (P3) also occur within or immediately adjacent to the survey area. No *Synaphea hians* (P3) plants will be impacted. Approximately six *Acacia semitrullata* (P4) plants will be cleared.

Five species of other significant flora were recorded within the survey area, during sampling for quadrats (Stream Environment and Water 2021). These were *Daviesia divaricata, Hakea marginata, Hemiandra pungens, Melaleuca osullivanii* and *Melaleuca acutifolia*. These species are not formally listed under legislation or policy as of elevated significance, but they have specific habitat requirements, restricted distributions, were recorded at the limit of the range and/or are part of a disjunct population. None of the plants recorded are located within the clearing footprint. These plants were not surveyed for specifically along the full proposal extent, however, due to the small areas of clearing in Degraded to Completely Degraded areas, the likelihood of impacting on them is considered low.

Priority Ecological Communities

Banksia Woodlands of the Swan Coastal Plain Commonwealth listed TEC and State level P3 PEC was mapped within the survey area (vegetation units BaEmCc and KgBa) (Stream Environment and Water 2021). The total patch was estimated to be approximately 7.4 ha in extent and based on observation of vegetation condition in the survey area and adjoining areas was considered likely to be predominantly in Good condition, therefore meeting the minimum criteria.

Based on the patch assessment, vegetation mapped as part of unit KgBa on the western side of the highway was included as part of the patch (0.8 ha). Within the survey area this section of vegetation was mapped as Degraded to Completely Degraded. On its own these patches would not satisfy the requirements of the TEC/PEC, however, because it is within 30 m of other intact vegetation (within the survey area on the eastern side of the Vasse Highway and to the west outside of the survey area) it is considered part of the same patch and occurrence.

Only 0.027 ha of KgBa Degraded vegetation unit will be cleared. This represents 0.36 % of the total patch. The portion of the patch to be cleared is less than 4.5m wide and spread over 70m – given the Degraded condition, and small area, it is unlikley to be representative of native vegetation comprised of a high level of biological diversity and therefore not likely to trigger variance to this clearing principle.

Photo 1 Several small trees and shrubs along the front edge opposite and north of Neville Hyder Drive, mapped as KgBa (Degraded) (TEC/PEC).

Photo 2 Same patch of road verge vegetation (TEC) showing the fire break. Note the narrow vegetation extent.

Other vegetation units

Two other vegetation units were identified as potentially of high conservation value although not formally listed under federal or state legislation or policy:

- The CcEmBg community occurring on yellow sands opposite the Busselton cemetery is an unusual vegetation community for the location on the Bassendean Dunes. Webb et al. (2009) identifies this vegetation unit as having affinities with vegetation more typically found on the Whicher Scarp. Similar areas (of this soil and vegetation type) have been impacted by clearing for mineral sands mining and there are few remaining vegetated areas. The unit is considered to be of high conservation value given it is representative of an unusual/disjunct vegetation type, which has otherwise been extensively cleared (Webb et al. 2009). Approximately 0.035 ha of Degraded CcEmBg vegetation unit will be cleared.

- Vegetation unit Mo was highly disturbed and the understorey dominated by introduced species. Due to the poor condition of vegetation in this unit, this unit was sampled using relevés only. As a result, the units were not included in FCT analysis. However, the vegetation unit is analogous with Melaleuca shrublands on the Cokelup Swamps (Spearwood Dune/Pinjarra Plain interface wetlands) described by Webb et al (2009) and identified as of high conservation value given the extensive clearing of vegetation of this type. The unit is likely to be considered of high conservation value despite it relatively poor condition. Approximately 0.032 ha of Completely Degraded Mo vegetation unit will be cleared.

Summary

	The clearing accounts for 0.24 ha from at least 6 discreet patches over the 8.2 km proposal length. Vegetation within the clearing footprint has a low biodiversity value due to the poor condition and small amount being cleared at any one location. The selective clearing proposed is limited to individual roadside trees or edges of roadside pockets, most of which are in a Degraded to Completely Degraded condition (EPA 2016). The small scale and selective clearing of Degraded to Completely Degraded vegetation is not likely to result in the clearing of vegetation with a high level of biological diversity. The proposed clearing is therefore not likely to be at variance to this clearing principle.
Methodology	DBCA and WA Herbarium threatened flora record shapefiles (2020) EPA (2016) Government of WA (2013) Main Roads GIS Shapefiles Main Roads Site Inspection (28/07/2020) NatureMap (Accessed 12/08/2020) Stream Environment and Water (2021) (TRIM D21#338843)

(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 indigenous to Western Australia.

Comments	**Proposed clearing is** not likely to be at **variance to this Principle**
	Fauna habitat within the road easement is similar in type and condition to other areas within the study area – degraded patches of remnant vegetation (mostly jarrah/marri regrowth), paddock trees, and Melaleuca shrubland through the drainage lines. It may be used by a variety of locally common fauna, mostly as part of a larger patch. Numerous threatened fauna taxa have been recorded locally, 31 Threatened and 18 protected under International Agreements. Most of these fauna are coastal or marine species and associated with Geographe Bay, rather than the terrestrial habitats found at the site. Others have restricted habitats that are not associated with the site *Lepidogalaxias salamandroides* (Salamanderfish) or are locally extinct (*Macrotis lagotis* (Bilby), *Setonix brachyurus* (Quokka), and *Leipoa ocellata* (Malleefowl). *Botaurus poiciloptilus* (Australasian Bittern), *Galaxiella munda* (Mud Minnow) and *Westralunio carteri* (Carter's Freshwater Mussel) are unlikely to occur due to the lack of intact wetlands or water features. Crustaceans *Engaewa pseudoreducta* (Margaret River Burrowing Crayfish) and *Engaewa reducta* (Dunsborough Burrowing Crayfish) and *Engaewa similis* (Walpole Burrowing Crayfish) have been found to the west of the study area, but not as far east as the proposal site (DEC 2008). The application area may contain suitable habitat for four threatened fauna; • *Calyptorhynchus banksii subsp. naso* (Forest Red-tailed Black-cockatoo) • *Calyptorhynchus baudinii* (Baudin's Cockatoo) • *Calyptorhynchus latirostris* (Carnaby's Cockatoo), and • *Pseudocheirus occidentalis* (Western Ringtail Possum) (WRP). Approximately three Marri (*Corymbia calophylla*) and three Flooded gums (*Eucalyptus rudis*) will be cleared with DBH >50cm, none of which are hollow. As no hollow trees are located within the proposal footprint, no active black cockatoo breeding habitat will be cleared. Black cockatoo foraging habitat cleared for the Proposal will be restricted to less than 10 Marri trees in total, which is negligible across the proposal extent.

	While no direct evidence of WRP was observed during the site inspection, the species may occur locally, most likely in the northern part of the site where vegetation is in better condition and more connected across the landscape. There were no WRP dreys or hollows observed within or close to the clearing. Although WRP may use vegetation within the site as part of a larger patch, the loss of individual trees or small patches at any one location will be unlikely to impact on WRP. The CEMP will include provision for the presence of a fauna spotter to be onsite during clearing operations in WRP habitat. The proposed clearing is not likely to comprise significant habitat for any local fauna. The proposed clearing is therefore not likely to be at variance to this clearing principle.
Methodology	Main Roads Site Inspection (28/07/2020) DBCA Shapefiles DBCA website DEC (2008) EPA (2016)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments	**Proposal is** not at **variance to this Principle**
	Flora surveys identified a known population of *Verticordia plumosa var. vassensis* (T/EN) on the western side of highway near the intersection with Acton Park Road. The proposal does not require any clearing at this location and the plants are located several metres from the verge, therefore no impacts are anticpated. No other Threatened flora were found or will be impacted. The proposed clearing is therefore not likely to be at variance to this clearing principle.
Methodology	DBCA shapefiles Main Roads Site Inspection (28/07/2020) Stream Environment and Water (2021) (TRIM D21#338843)

(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.

Comments	**Proposed clearing is** not at **variance to this Principle**
	Stream Environment and Water (2021) identified the potential presence of several TECs within the road verge and in adjacent areas. Due to the generally poor condition of vegetation, a lack of sufficient data for analysis meant that some of these TECs could not be confirmed however advice from DBCA indicates that the following TECs are likely to be present: • Vegetation unit CcXp is likely to be representative of the *Corymbia calophylla* Woodlands on heavy soils FCT1b TEC. This vegetation unit occurred across 0.3 ha within the survey area and was mapped predominantly in Good condition. The TEC is listed as Vulnerable under the state BC Act. Vegetation unit CcXp will not be impacted.

	• The Mixed Shrubland vegetation unit is considered to potentially align with FCT 09 Dense shrublands on clay flats TEC. This TEC was not identified through database searches (as potentially occurring within the desktop search area) however it was included in the analysis based on FCTs identified in Webb *et al.* (2009) as potentially occurring on the southern Swan Coastal Plain. The TEC is listed as Critically Endangered under the EPCB Act and Vulnerable under the BC Act. Further surveys (sampling and analysis of additional quadrats) are required to confirm the status of this vegetation unit. Mixed Shrubland vegetation unit will not be impacted. No state listed TECs will be impacted. The proposed clearing is not at variance to this clearing principle.
Methodology	DBCA shapefiles Main Roads Site Inspection (28/07/2020) Stream Environment and Water (2021) (TRIM D21#338843)

(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.

Comments	**Proposed clearing is** not likely to be at **variance to this Principle**
	The EPA and Commonwealth government via the national objectives and targets for biodiversity conservation have targets to prevent clearance of ecological communities with an extent below 30% of pre-European levels and to be reserved at over 10% (EPA 2000, Commonwealth of Australia 2001). Vegetation representation is presented in Tables 3 to 5 summarised below. Vegetation Associations 990, 1000 and 1136 are generally under represented and under reserved at all scales apart from 990 state-wide and 1000 with the City of Busselton LGA (Government of Western Australia, 2019a). See below and refer to Section 5.2.1.

Vegetation Association	Clearing proposed	Scale	Representation	Remaining in DBCA reserves
990	Single Melaleuca (<0.01 ha), Degraded.	Statewide	Well represented	Well reserved
		Swan Coastal Plain (SWA)	Under represented (<30% remaining)	Under reserved (<10% reserved)
		Perth (SWA02)	Under represented (<30% remaining)	Under reserved (<10% reserved)
		City of Busselton	Under represented (<30% remaining)	Under reserved (<10% reserved)
1000	Two Marri trees (0.01 ha), Completely Degraded	Statewide	Under represented (<30% remaining)	Under reserved (<10% reserved)
		Swan Coastal Plain (SWA)	Under represented (<30% remaining)	Under reserved (<10% reserved)
		Perth (SWA02)	Under represented (<30% remaining)	Under reserved (<10% reserved)
		City of Busselton	Well represented	Under reserved (<10% reserved)

	1136	Individual trees or edges of pockets (0.21 ha), Degraded to Completely Degraded	Statewide	Under represented (<30% remaining)	Under reserved (<10% reserved)
			Swan Coastal Plain (SWA)	Under represented (<30% remaining)	Under reserved (<10% reserved)
			Perth (SWA02)	Under represented (<30% remaining)	Under reserved (<10% reserved)
			City of Busselton	Under represented (<30% remaining)	Under reserved (<10% reserved)

Vegetation Complexes Abba, Cokelup and Southern River are also under represented on the Swan Coastal Plain, with only the Yoongarillup Complex having over 30% remaining (Government of Western Australia, 2019b). See below and refer to Section 5.2.2.

Heddle/Mattiske Veg Complex	Clearing proposed (approximate)	% Remaining
Abba Complex	0.13 ha	Under represented (<30% remaining)
Cokelup Complex	<0.01 ha	Under represented (<30% remaining)
Southern River Complex	0.07 ha	Under represented (<30% remaining)
Yoongarillup Complex	0.01 ha	Well represented

The vegetation removal will be of a very minor scale, including the clearing of individual trees or small pockets in a Degraded to Completely Degraded condition. Due to the poor condition, they are no longer considered representative of these vegetation Associations or Complexes. No clearing of vegetation in Good or better condition will be required, nor are any of the patches being cleared considered significant as a remnant of native vegetation.

None of the vegetation in the clearing footprint is mapped in the Native Vegetation Extent (NVE) (DPIRD 2020) dataset. The NVE layer maps representative vegetation and is used to calculate the vegetation representation referred to above.

Based on the above the proposed clearing is not likely to be at variance to this Principle.

Methodology	Aerial photography EPA (2016) DPIRD (2020) Government of Western Australia (2019a,b) Main Roads Site Inspection (28/07/2020)

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments	**Proposed clearing is** not at **variance to this Principle**
	The term 'wetlands' refers to damplands, estuary-peripheral and water body, floodplains, palusplain and sumplands. Wetland categories are recognised by the EPA, DWER and other decision-making authorities.

	The proposal crosses a series of Multiple Use category wetlands (Dampland, Palusplain and Sumplands) (SLIP 2020). Most of the Swan Coastal Plain around Busselton occurs within wetlands mapped as Multiple Use. Multiple Use wetlands are classified as those wetlands that have few important ecological attributes and functions remaining. Impacts to these will be negligible. The RAMSAR listed Vasse - Wonnerup Wetland System, occurs approximately 500m north of the proposal, on the northern side of the Bussell Highway intersection. The proposal will not impact this either directly or indirectly. Authorisations under s17 of the *Rights in Water and Irrigation Act 1914* (RiWI Act) relate to interference to bed and banks of proclaimed watercourses. The proposal crosses the Sabina Main Drain at 5.62 SLK, however no clearing of native vegetation will be required at this location. As the Sabina Main Drain is not within a proclaimed area under the RiWI Act a permit is not required. The proposed clearing is not at variance to this Principle.
Methodology	DWER and DBCA shapefiles Main Roads Site Inspection (28/07/2020)

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments	**Proposed clearing is** not at **variance to this Principle**
	Two declared pest plants under the *Biosecurity and Agriculture Management Act 2007*, *Asparagus asparagoides* (bridal creeper) and *Zantedeschia aethiopica* (Arum lily) were recorded during the field survey. Both species are relatively common in the local area and their record is not unusual. The remaining introduced species are considered environmental weeds and reflective of adjoining land use for agriculture. Weeds will be managed through Main Roads CEMP. In regards to Acid Sulphate Soils (ASS), the proposal is located within areas mapped by Government of Western Australia (SLIP 2019) as *High to moderate risk* (0-0.85 and 4.38-4.56 SLK)(~1km total), and *Moderate to low risk* (remaining area) (~ 7.2 km). ASS may occur at localised areas such as culvert extensions. These could be disturbed however impacts to ASS are considered low and manageable for the following reasons: • The nature of the works involving shoulder widening will result in fill be required rather than excavations. • Dewatering or lowering of the water table is unlikely to be required. Works will be undertaken where possible during the 'dry' season when the water table is lower than the areas to be excavated. • At each culvert extension point, they will be less than 100 m^3. If soils over 100 m^3 need to be excavated below the water table at any one location, a preliminary ASS investigation may be required. If not, but excavations are required over 100 m^3 then excavated materials can be stockpiled on site, and the pH tested. If required, agricultural lime can be mixed through the excavated soils with the machinery on

	site (i.e. to neutralise the soil), and then formally verified via resampling until an appropriate pH is achieved. Soils can then be reused on site (DER 2015). There are no contaminated sites within two kilometres of the proposal (SLIP 2020). A Dieback Assessment was not commissioned due to the lack of intact native vegetation and or indicator species across most of the proposal area. The proposal is not located on the edge of any DBCA lands or protectable areas of native vegetation (uninfested areas >4ha in size). The site is considered dieback uninterpretable/unprotectable, and therefore not considered a high risk. Due to the lack of protectable areas or adjacent DBCA land the preparation of a detailed Dieback Management Plan is not considered necessary, however dieback management measures will be included in the CEMP including the requirements for machinery to be clean on entry and exit and records kept. A DBCA Dieback Risk Assessment From was not prepared as the proposal is not located adjacent to any DBCA land. No other forms of land degradation are likely to arise from the proposal. The proposed clearing is not likely to cause appreciable land degradation and is not at variance to this Principle.
Methodology	DER (2015) Main Roads Site Inspection (28/07/2020) Stream Environment and Water (2021) (TRIM D21#338843)

(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.

Comments	**Proposed clearing is** not at **variance to this Principle**
	The proposal is not located near any DBCA reserves or conservation areas. The closest is the Fish Road Nature Reserve located about 2.6 km south of the proposal, which will not be impacted. Key nearby City Reserves include the Busselton Cemetery and an unnamed reserve at the intersection with Acton Park Road. Neither are specifically purposed for conservation nor will they be impacted. Proposed clearing is not at variance to this Principle.
Methodology	DBCA shapefiles EPA (2016) Main Roads Site Inspection (28/07/2020)

(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.

Comments	**Proposed clearing is** not at **variance to this Principle**
	The proposal will not directly impact any major drainage lines, watercourses or other water features. Slopes are relatively flat and not likely to be at risk of erosion or sedimentation. The minor clearing proposed will not affect the quality of local surface water, as localised roadside drainage will be managed through the proposal design minor roadside drainage improvements and kerbing, and improvement of existing culverts.

	The proposal does not cross any proclaimed Public Drinking Water Source Areas or Surface Water Areas proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947*. The proposal is located within the Busselton-Capel Groundwater Area. This area is fully allocated in the Leederville Aquifer, a multi-layered aquifer system consisting of discontinuous interbedded sequences of sand and clay ranging from 15–200m below ground level depending on the location and distance from the coast (DoW, 2009). The groundwater area is proclaimed under the RiWI Act (SLIP, 2020). If groundwater extraction is required for construction activities, a licence will be required under the RiWI Act. The proposed clearing is highly unlikely to cause deterioration in the quality of surface or underground water and is not at variance to this Principle.
Methodology	DWER and DBCA shapefiles EPA (2016) Main Roads Site Inspection (28/07/2020)

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments	**Proposed clearing is** not at **variance to this Principle**
	The small-scale vegetation clearing will occur as a long linear strip and existing drainage will be either maintained or improved. The proposal is not expected to alter drainage volumes in the local area. Consequently, the proposal will not cause or exacerbate the incidence or intensity of flooding. The proposed clearing is not at variance to this Principle.
Methodology	Main Roads Site Inspection (28/07/2020)

6 ADDITIONAL ACTIONS REQUIRED

Table 7 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 7. Summary of Additional Management Actions Required by Permit CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The PCIA indicates that the clearing is 'Seriously at Variance', At Variance' or 'May be at Variance' with one or more of the clearing principles.	**No**	No further action required.
2. The PCIA indicates that the clearing is at variance or may be at variance with clearing principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.	**No**	No further action required.
3. The proposal involves clearing for temporary works (as defined by the permit under Condition 11 of CPS 818).	**No**	No further action required.
4a. The proposal is in part of a region that has annual rainfall greater than 400mm and is south of the 26th parallel of latitude. **4b.** The proposal will require movement of soil in conditions other than dry conditions.	**Yes**	**4a.** Yes, go to number 4b**.** **4b.** Due to the lack of protectable areas or adjacent DBCA land, dieback management measures will be included in the CEMP including clean on entry and exit points.
5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback	**No**	No further action required.
6. The proposal requires referral to either the WA EPA or the Commonwealth DAWE.	**No**	No further action required. There will be minor impacts to a Degraded section of Banksia Woodlands of the Swan Coastal Plain TEC/PEC (0.027 ha, representing 0.36% of the total patch) though a self-assessment indicates the impacts will not be significant. The larger surrounding area of TEC in good condition (circa 7.4 ha) will not be impacted. The portion of the patch to be cleared is disjunct from the vegetation in Good condition, located in adjacent tenure, being separated by a cleared firebreak (see Appendix 3 of the PERA TRIM D21#134413).
7a. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition **7b.** Are weeds likely to spread to and result in environmental harm to	**No** **No**	No further action required. Weeds have been identified and will be managed through the proposal CEMP.

adjacent areas of native vegetation that are in good or better condition		

7 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A Vegetation Management Plan was not required as the proposal is not or not likely to be at variance to any of the Clearing Principles.

8 REFERENCES

CSIRO. (2014). Australian Soil Resource Information System (ASRIS) Database. Available online from http://www.asris.csiro.au Accessed <insert year>.

Department of the Environment and Conservation (DEC) (2008) Dunsborough Burrowing Crayfish (*Engaewa reducta*), Margaret River Burrowing Crayfish (*Engaewa pseudoreducta*) and Walpole Burrowing Crayfish (*Engaewa walpolea*) Recovery Plan 2007 –2016. Wildlife Management Program No. 41

Department of Natural Resources and Environment (2002). Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

Department of Primary Industries and Regional Development (DPIRD) (2020) Native Vegetation Extent (DPIRD-005) https://catalogue.data.wa.gov.au/dataset/native-vegetation-extent

Department of Water (DoW) (2009) Busselton–Capel groundwater area subarea reference sheets.

Department of Water and Environmental Regulation (2020) Healthy Rivers website, https://rivers.dwer.wa.gov.au/catchment/vasse-ludlow-rivers/

Environmental Protection Authority (2016). *Technical Guide – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (eds. K Freeman, G Stack, S Thomas and N Woolfrey). Perth, Western Australia.

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

Government of Western Australia (2019b). 2018 Swan Coastal Plain Vegetation Complex Statistics. Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth, https://catalogue.data.wa.gov.au/dataset/dbca

Havel, J.J. and Mattiske, E.M. (2000) Vegetation Mapping of South West Forest Regions of Western Australia. Prepared for CALMSCIENCE, Department of Conservation and Land Management and Environment Australia

Heddle, E. M., Loneragan, O. W., and Havel, J. J (1980) Atlas of Natural Resources Darling System, Western Australia. Department of Conservation and Environment.

Main Roads WA. (2020). Site Inspection Report 28/07/2020.

9 APPENDICES

Appendix	Title
Appendix A	Site Inspection Report (TRIM B20#25090)
Appendix B	EPBC report (TRIM D21#134389) (2021)
Appendix C	Flora and Vegetation Survey Report (Stream Environment and Water 2021) (TRIM D21#338843)
Appendix D	Constraints map (D21#346494)