Clearing Desktop Report – CPS 818

We're working for Western Australia.

NWCH Truck Bay Upgrades 233.6, 399.06, 451.87 & 526.64

March 2022

EOS 2257

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Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Environment Officer	Draft v1	14/03/2022
Reviewer:	Environment Officer	Draft v1	15/03/2022

1 PURPOSE

This Clearing Desktop Report (CDR) is a desktop assessment of native vegetation clearing that is proposed to be cleared using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

2 SCOPE

2.1 Project Scope

Project Name: NWCH Truck Bay Upgrades 233.6, 399.06, 451.87 & 526.64

Project Purpose / Components: Extend and seal four existing parking bays to HVRA standards, with light vehicle parking unsealed.

The project will involve clearing of vegetation around existing bays. Additional clearing is required at SLK 526.64 for an aggregate laydown area. Laydown areas at all other project areas will utilise previously cleared areas. Cleared laydown areas will remain after construction for light vehicle parking and future projects.

This will provide facilities for truck drivers to take mandatory rest breaks and check their vehicles, thereby reducing driver fatigue and decreasing runoff road accidents.

The proposed clearing under CPS 818 is: 4.3 ha.

HVRA location	Area to be cleared
SLK 233.6	0.8 ha
SLK 399.06	1.2 ha
SLK 451.87	1 ha
SLK 526.64	1.3 ha

The proposed temporary clearing under CPS 818 is: none.

Project Location(s): The project area is located on North West Coastal Highway (H007), SLK 233.6, 399.06, 451.87 & 526.64 in the Shire of Shark Bay (SLK 233.6) and Shire of Carnarvon as shown in Figure 1.

- SLK 233.6: 114.6137605°E 26.8160674°S
- SLK 399.06: 114.0572122°E 25.4603223°S
- SLK 451.87: 113.7971181°E 25.0523316°S
- SLK 526.64: 113.9603144°E 24.5338434°S

The location of the proposed works is at Figure 1.

2.2 Desktop Assessment Scope

The assessment area is confined to a local area of a 40 km radius surrounding each project site, as shown in Figure 1.

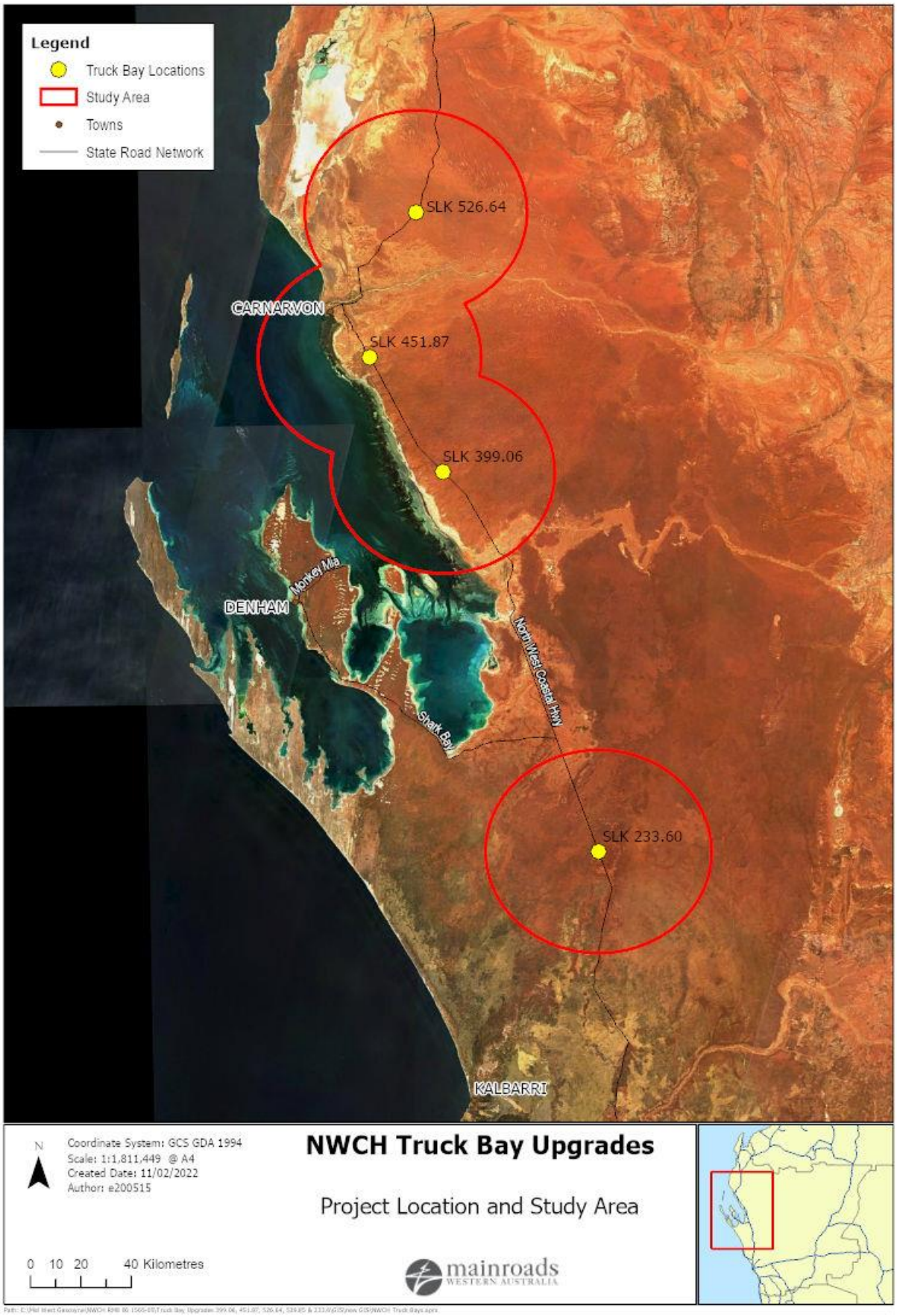

Figure 1. Project Location and Study Area

Figure 2. SLK 233.60 Project Area

Figure 3. SLK 399 Project Area

Figure 4. SLK 451 Project Area

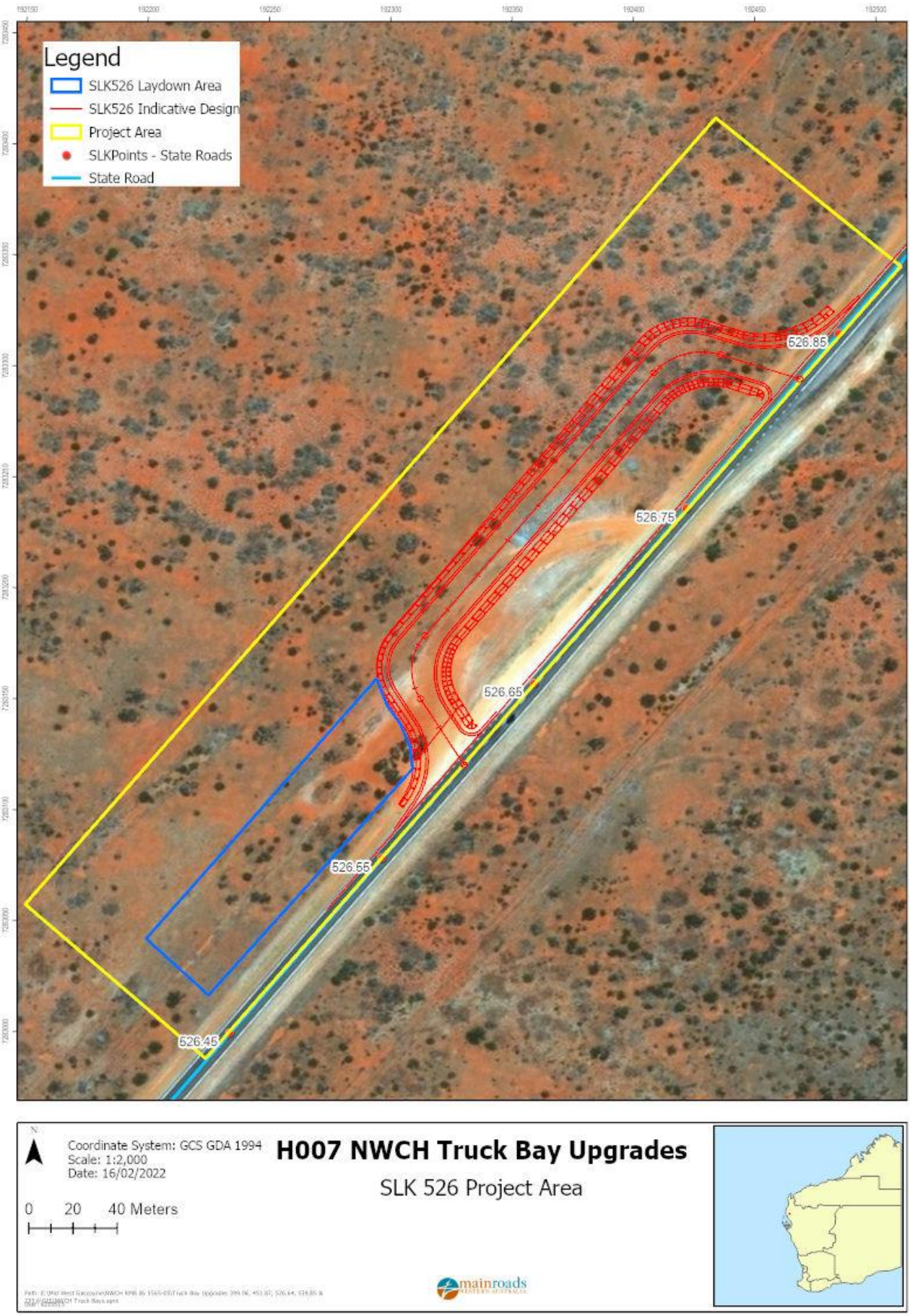

Figure 5. SLK 526 Project Area

2.3 Alternatives to Clearing

No alternatives exist to achieve the project outcome. Extension of the existing rest areas is required to meet design standards for HVRAs.

2.4 Measures to Avoid, Minimise, Mitigate and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the project clearing impacts are provided in Table 1.

Impacts to vegetation will be minimised through the implementation of the following measures:

- Location of HVRAs over existing rest areas to minimise clearing;
- Existing cleared areas will be used for laydown areas to minimise clearing;
- Clearing area will be demarcated prior to the commencement of native vegetation clearing;
- Where possible, vegetation will be pruned as opposed to removed;
- Implementation of the Main Roads Principal Environmental Management Requirements:
  - clearing and access control measures (such as demarcation of clearing boundaries);
  - weed management;
  - landscaping of earth-worked areas;
  - erosion and sediment control;
  - waste and fire management;
  - topsoil management;
  - dust control; and
  - tree and vegetation retention where possible.

Table 1. Justification of Avoiding, Minimising, Mitigating and Managing Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	Not implemented. Batter Slopes are to align with the MRWA safety and maintenance standards. At SLK 372.20 batter slopes will need to be shallower to allow access to the non-sealed light vehicle parking and aggregate laydown areas for plant equipment for future projects. The shallow batters will not significantly increase clearing as the area is largely already cleared.
Installation of safety barriers	Given that the civil elements that are being designed are truck parking bays (low speed environments), installation of safety barriers would not be justified.
Alignment to one side of existing road	Not relevant to project as each HVRA is aligned to only one side of the road.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	Truck bays are being located on existing rest areas that are partially cleared and disturbed to minimise clearing of native vegetation.
Installation of kerbing	Kerbing is not used in this design as this would lead to concentration of runoff from the project site. The preferred method to deal with runoff generated from the site is to allow runoff to sheet flow across the sealed area into pervious areas.
Simplification of design to reduce number of lanes and/or complexity of intersections	Where possible, the footprint for the HVRAs was optimised to minimise the footprint, costs and vegetation to be cleared.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	The laydown area at SLK 526 will be located on partially cleared land. This laydown area will remain after construction for light vehicle parking and future projects. Cleared areas will be utilised for any other laydown areas.
Drainage modification	Runoff generated from the sealed areas is designed to sheet across and flow into previous areas and infiltrate into sandy soils.

2.5 Approved Policies and Planning Instruments

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 1.3), Main Roads has also had regard to

EPPs

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992;
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011

Relevant other policies and guidance documents:

- The Western Australian Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DWER, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

Other Legislation of relevance for assessment of clearing and planning/other matters

- Biodiversity Conservation Act 2016 (WA) (BC Act)
- Conservation and Land Management Act 1984 (WA) (CALM Act)
- Country Areas Water Supply Act 1947 (WA) (CAWS Act)
- Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)
- Planning and Development Act 2005 (WA) (P&D Act)
- Soil and Land Conservation Act 1945 (WA)
- Rights in Water and Irrigation Act 1914
- Aboriginal Heritage Act 1972 (WA)
- Town Planning and Development Act 1928

3 Methodology

3.1 Desktop Study

A desktop assessment of the project areas 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 / or Main Roads Integrated Mapping System (IMS). Referencing of the GIS layers accessed is done under the relevant methodology section of each clearing principle. Government managed databases were searched to locate additional information, these are referenced in Section 7.

4 VEGETATION DETAILS

4.1.1 Project Site Vegetation Description

A site inspection of the project areas was undertaken on 28 April 2021 and vegetation descriptions and impacts are based on the inspection, aerial photography and a desktop assessment.

The areas under application are partly cleared and disturbed by existing vehicle resting areas. Vegetation surrounding the parking bays is in degraded condition but improves further away from parking bays. There is evidence of historical clearing and disturbance. Vegetation in the project areas is contiguous with surrounding vegetation and not confined to the road reserve.

Tables 3 and 4 provide details of the Pre-European Vegetation Associations with the project area and the remaining extents of these associations.

For a full description of the existing vegetation, refer to the Site Inspection Report in Appendix 2.

Table 2. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 242 described as Succulent steppe with scrub; snakewood over saltbush (Government of Western Australia, 2019)	Clearing of up to 0.8 ha at SLK 233 for truck bay upgrade	Degraded to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021 and aerial imagery.
Vegetation Association 243 described as Shrublands; bowgada & minnieritchie scrub (Government of Western Australia, 2019)			
Vegetation Association 346 described as Mosaic: Shrublands; *Acacia sclerosperma, A. victoriae* & snakewood scrub / Shrublands; patches of low mixed scrub (Government of Western Australia, 2019)	Clearing of up to 1.2 ha at SLK 399 for truck bay upgrade	Good to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021 and aerial imagery.

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 308 described as Mosaic: Shrublands; Acacia sclerosperma sparse scrub / Succulent steppe; saltbush & bluebush (Government of Western Australia, 2019)	Clearing of up to 2.3 ha at SLK 451 and 526 for truck bay upgrades and laydown area	Poor to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021, aerial imagery and biological survey at SLK 526 (ELA 2021)

Table 3. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 242	**Statewide**	2,395.96	2,395.96	100.00	-
	IBRA Bioregion Carnarvon	2,369.97	2,369.97	100.00	-
	IBRA Sub-region Wooramel	2,369.97	2,369.97	100.00	-
	Local Government Authority Shire of Shark Bay	2,395.96	2,395.96	100.00	-
Veg Assoc No. 243	**Statewide**	148,432.56	148,426.20	100.00	4.00
	IBRA Bioregion Carnarvon	107,786.13	107,786.13	100.00	0.23
	IBRA Sub-region Wooramel	107,786.13	107,786.13	100.00	0.23
	Local Government Authority Shire of Carnarvon	27,250.08	27,250.08	100.00	0.89
Veg Assoc No. 346	**Statewide**	61,612.38	61,610.39	100.00	0.81
	IBRA Bioregion Carnarvon	61,515.95	61,515.90	100.00	0.66
	IBRA Sub-region Wooramel	61,515.95	61,515.90	100.00	0.66
	Local Government Authority Shire of Carnarvon	61,612.38	61,610.39	100.00	0.81
Veg Assoc No. 308	**Statewide**	447,064.51	443,499.96	99.20	0.87
	IBRA Bioregion Carnarvon	446,976.92	443,483.90	99.22	0.87
	IBRA Sub-region Wooramel	446,976.92	443,483.90	99.22	0.87
	Local Government Authority Shire of Carnarvon	446,878.47	443,313.92	99.20	0.87

5 Assessment Against the Ten Clearing Principles

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (*Environmental Protection Act 1986* (EP Act), 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 at variance with the 10 Clearing Principles.

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

Proposed clearing is not likely to be at variance to this Principle

Comments

All project areas are partly cleared and disturbed by existing vehicle resting areas. Vegetation immediately adjacent to the parking areas is in a degraded condition but improves further away from parking bays. There is evidence of historical clearing and disturbance. Vegetation in the project areas is contiguous with surrounding vegetation and not confined to the road reserve.

Up to 4.3 ha of vegetation will be cleared as described below:

- SLK 233 – The project area consists of an existing parking bay that is predominantly cleared except for isolated trees and tall shrubs. Vegetation condition slightly improved away from parking bay, with an increase in vegetation composition and density, however the vegetation was still affected by historical clearing and weeds (likely historical grazing). The vegetation predominantly comprised an open mixed Acacia woodland over weedy understory in a degraded to completely degraded condition (Main Roads 2021).
- SLK 399 – The existing parking bay and surrounding 20–100 m is predominantly cleared except for scattered small and medium shrubs. Vegetation condition improved away from the existing parking bay, with patches of more intact vegetation, however the vegetation was still affected by historical clearing (likely historical grazing), noted by the high level of ground weed cover. Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve (Main Roads 2021). The vegetation predominantly comprised an open mixed Acacia woodland over weedy understory in a good to completely degraded condition (Main Roads 2021).
- SLK 451 – The project area has been previously disturbed by an existing parking bay, with a large island of vegetation in the middle. Vegetation condition was fairly consistent across the project area. Vegetation was in degraded condition and mostly comprised medium shrubs over weedy understory. Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve (Main Roads 2021).
- SLK 526 – this project area was surveyed by Ecological Australia in July 2020 (ELA 2021). The project area consists of an existing cleared parking bay surrounded by remnant vegetation. Vegetation condition that is present within the project area was assessed as Poor across the entire survey area and comprised of *Acacia xiphophylla* tall sparse shrubland over *Acacia tetragonophylla, Hakea preissii, Acacia synchronicia* mid sparse shrubland over *Maireana polypterygia, Salsola australis* low sparse chenopod shrubland and **Cenchrus ciliaris* low sparse tussock grassland (ELA 2020). Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve.

According to GIS datasets, no Rare or Priority flora have been previously recorded within the project areas. The study areas contained records of one Rare flora and 56 Priority flora species (refer to table below for numbers relevant to each project area).

HVRA location	Number of Priority flora in Study Area
SLK 233.6	38
SLK 399.06	8
SLK 451.87	14
SLK 526.64	14

A desktop assessment on likelihood of occurrence was undertaken as part of the site inspection report (Main Roads 2021). Most species were deemed unlikely to occur in the project areas due to lack of suitable habitat, with the exception of the following species:

Project area SLK	Species	Cons status	Impact
SLK 233.6	*Millotia depauperata*	P1	An annual that may have suitable habitat present (sandy loam). However, all records within the study area are not recorded in the same soil type as that which is present within the project area and the only DBCA record occurring in sandy loam is in yellow sandy loam which is also not present within the project area. Given this and the high disturbed nature of the project area, it is considered that the species is unlikely to occur.
	Acacia drepanophylla	P3	Habitat present; however, desktop assessment identified no known individuals within the project area. Species is considered to be widespread in local and regional area as more recent GHD surveys have recorded over 3500 species from over 300 locations (GHD 2015). Negligible impact expected. Proposed works are unlikely to impact conservation status of species.
	Calytrix formosa	P3	Previously recorded in reddish sandy loam approximately 5 km north of project area; however, preferred habitat has been noted by Florabase as white or yellow sand which does not occur in the project area. As such, it is considered that this species is not likely to occur.
	Triodia plurinervata	P3	Desktop assessment identified no records of known individuals in project area and no Triodia species observed during site inspection of SLK 233 Negligible impact expected. Proposed works are unlikely to impact conservation status of species.
	Triodia bromoides	P3	Desktop assessment identified no records of known individuals in project area and no Triodia species observed during site inspection of SLK 233. Negligible impact expected. Proposed works are unlikely to impact conservation status of species.
SLK 399.06	*Acacia sclerosperma* subsp. *glaucescens*	P3	Possible. Recorded in previous surveys in study area however desktop assessment identified no records of known individuals in project areas. This species is considered locally common as a result of GHD recording over 3000 plants from 315 locations north and south of NWCH SLK 313 (GHD 2015). Negligible impact. Proposed works are unlikely to impact conservation status of species.

It is considered in general that the occurrence of conservation significant flora near the existing parking bays are unlikely given the level of clearing and disturbance observed. No significant flora was observed at any of the project areas during the site inspection (Main Roads 2021) or recorded at SLK 526 during the biological survey (ELA 2021).

Two Priority Ecological Communities occur within the study area (40 km buffer):

- Priority 1 Hypersaline microbial community Number 2 (Hamelin Pool stromatolites). This PEC is located 35 km from the closest truck bay and will not be affected by the project.
- Priority 3 Subtropical and Temperate Coastal Saltmarsh, located 25 km from the closest truck bay and will not be affected by the project.

Vegetation within the project areas is not representative of either of these PECs.

The vegetation does not form part of an ecological link as it is directly adjacent to previously cleared areas and surrounded by mostly remnant vegetation.

Given the above, vegetation to be cleared is not likely to represent vegetation with a high level of biological diversity and clearing for the parking bays is not likely to be at variance to this principle.

Methodology

Main Roads/DBCA GIS Shapefiles
EPA (2016, 2020)
Government of WA (2019)
Main Roads Site Inspection (28/04/2021)

(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.

Proposed clearing is not likely to be at variance to this Principle

Comments

A site inspection (Main Roads 2021) noted that habitat values were consistent with the surrounding vegetation and no significant fauna habitat features were observed (e.g. mounds, caves, gullies, outcrops etc). As described above in Flora and Vegetation, habitat to be cleared is in a degraded condition with better quality habitat present in the surrounding area.

18 Rare and Priority fauna have been previously recorded in the study area. Of these, 12 are associated with marine, coastal and/or wetland habitats only and habitat will not be affected by the project (*Calidris ferruginea, Calidris canutus, Calidris tenuirostris, Caretta caretta, Charadrius leschenaultii, Charadrius mongolus. Chelonia mydas, Limosa lapponica menzbieri, Megaptera novaeangliae, Numenius madagascariensis, Rostratula australis, Thinornis rubricollis*). The remaining species are discussed below:

- *Amytornis textilis textilis* (Western Grasswren) P4 – Its usual habitat is open saltbush and bluebush shrublands, but in Shark Bay it prefers dense wattle shrubland (GHD 2015). The closest record is 17 km from SLK 233 and preferred habitat does not occur within the project areas as the vegetation is not dense and understorey is very weedy. Species will not be impacted.
- *Falco hypoleucos* (Grey Falcon) Vulnerable – inhabits lightly timbered country, especially stony plains and lightly timbered Acacia scrub, and generally uses standing dead trees as lookout posts (GHD 2015). Only a few records within the study area and although it might be an irregular visitor to the area, clearing for the truck bays is not likely to have a significant impact on its habitat.
- *Idiosoma incomptum* (Carnarvon shield-backed trapdoor spider) P3 – only two records within the study area with the closest record approximately 9 km from SLK 451 closer to the coast.
- *Lagostrophus fasciatus fasciatus* (banded hare-wallaby) Vulnerable – the one record in the study area is from 1910 and species is now restricted to offshore Bernier and Dorre Islands in Shark Bay.
- *Leipoa ocellata* (Malleefowl) Vulnerable – closest record is less than 2 km from SLK 233. Malleefowl require a sandy substrate and abundance of leaf litter to build nesting mounds (DotE 2021e). No malleefowl mounds or suitable habitat for mounds were observed within project areas during the

site inspection. As such the small amount clearing required for the truck bays, largely in degraded condition and adjacent to a busy highway, is unlikely to comprise habitat considered significant for the species.

- *Lerista humphriesi* (Taper-tailed West Coast slider (Murchison River)) Priority 3 – two records from 1979 in same location approximately 15 km from SLK 233. Habitat is described as Acacia shrubland on sand-plains of semi-arid mid-west coast between Shark Bay and Murchison River and shelters under embedded stumps and in loose sand under leaf litter (360 Environmental 2020). No stumps were observed during the site visit and soils are described as shallow soils over calcrete (DPIRD GIS dataset) and not likely to be preferred habitat.

The fauna survey of SLK 526 noted no direct (observations) or indirect (scats, tracks, diggings) evidence of conservation significant fauna species were recorded and of the 16 fauna species of conservation significance identified from the desktop assessment as possibly occurring, all are considered as being unlikely to occur (ELA 2021).

Given the above, clearing for the parking bays is not likely to be at variance to this principle.

Methodology
Main Roads Site Inspection (28/04/2021)
DBCA Shapefiles
DBCA website
EPA (2016, 2020)

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

Proposal is not likely to be at variance to this Principle

Comments
Only one Rare flora species has been recorded previously within 40 km of the project areas (specifically SLK 233) *Eucalyptus beardiana.* This species was not observed during the environmental site inspection (Main Roads 2021). Preferred habitat for this species is red or yellow sand on sand dunes & ridges does not occur within the project area. This species in unlikely to occur within the project area.

Proposal is not likely to be at variance to this principle.

Methodology
DBCA shapefiles
Florabase (Accessed 08/03/2022)
Main Roads Site Inspection (28/04/2021)

(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.

Proposed clearing is not at variance to this Principle

Comments
No TECs occur within or in the vicinity of the project areas. Project activities will not be at variance to this principle.

Methodology
DBCA shapefiles
Main Roads Site Inspection (28/04/2021)

(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.

Proposed clearing is not at variance to this Principle

Comments

The mapped vegetation association and table outlining the percentage of vegetation remaining are included below. From those tables it is clear that the project areas do not represent an area that has been extensively cleared as they have been classified as the three Vegetation Associations affected by the project have over 99% of its pre-European extent remaining (Government of Western Australia 2019). Only 4.3 ha will be cleared for this project over four different vegetation associations which will not significantly affect the amount of vegetation remaining.

In addition, it is noted from aerial imagery (Figure 2 to Figure 5) that the study area contains a significant proportion of remnant vegetation surrounding the project areas that is likely in a better condition and the small amount of clearing required in the road reserve is not likely to diminish any linkages of native vegetation across the landscape. As such the proposed clearing is not at variance to this principle.

Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 242 described as Succulent steppe with scrub; snakewood over saltbush (Government of Western Australia, 2019)	Clearing of up to 0.8 ha at SLK 233 for truck bay upgrade	Degraded to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021 and aerial imagery.
Vegetation Association 243 described as Shrublands; bowgada & minnieritchie scrub (Government of Western Australia, 2019)			
Vegetation Association 346 described as Mosaic: Shrublands; *Acacia sclerosperma, A. victoriae* & snakewood scrub / Shrublands; patches of low mixed scrub (Government of Western Australia, 2019)	Clearing of up to 1.2 ha at SLK 399 for truck bay upgrade	Good to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021 and aerial imagery.
Vegetation Association 308 described as Mosaic: Shrublands; Acacia sclerosperma sparse scrub / Succulent steppe; saltbush & bluebush (Government of Western Australia, 2019)	Clearing of up to 2.3 ha at SLK 451 and 526 for truck bay upgrades and laydown area	Poor to Completely Degraded (EPA 2016)	Vegetation description and condition determined from Main Roads site visit on 28/04/2021, aerial imagery and biological survey at SLK 526 (ELA 2021)

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 242	**Statewide**	2,395.96	2,395.96	100.00	-
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	IBRA Bioregion Carnarvon	107,786.13	107,786.13	100.00	0.23
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	Local Government Authority Shire of Carnarvon	27,250.08	27,250.08	100.00	0.89
Veg Assoc No. 346	**Statewide**	61,612.38	61,610.39	100.00	0.81
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	IBRA Sub-region Wooramel	446,976.92	443,483.90	99.22	0.87
	Local Government Authority Shire of Carnarvon	446,878.47	443,313.92	99.20	0.87

Methodology

Aerial photography

EPA (2016)

Government of Western Australia (2019)

Main Roads Site Inspection (28/04/2021)

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

Proposed clearing is not at variance to this Principle

Comments

A search of ArcGIS shapefiles indicates no wetlands (Ramsar, geomorphic, etc.) are located within the vicinity of the proposal area. The closest wetlands of national importance are Shark Bay East, located approximately 9 km from the closest truck bay and McNeill Claypan System, located approximately 14 km from SLK 451 and will not be affect by the proposal.

Due to the absence of wetlands and riparian vegetation from the project area, the project is not at variance to this Principle.

Methodology

DWER and DBCA shapefiles
Main Roads Site Inspection (28/04/2021)

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

Proposed clearing is not likely to be at variance to this Principle

Comments

The project is an area of low rainfall (Carnarvon mean annual rainfall is 222 mm [BoM 2022]); as such, it is unlikely that water erosion or waterlogging will be significantly increased as a result of this clearing and it is not expected that truck bays at these locations will significantly interrupt natural drainage any further than the current disturbance. The new truck bays are designed to ensure runoff generated from the sealed areas will sheet across and flow more evenly into surrounding soils, thereby reducing erosion.

As all project areas are located in previously disturbed areas that are surrounded by remnant vegetation the project is unlikely to increase wind erosion near the project areas.

The ASRIS ASS risk mapping indicates that the proposal areas are classified as either low or extremely low probability of occurrence. As no dewatering or excavation below the water table is planned, no further investigations are required.

Given that the project areas are relatively flat in a highly vegetated area it is unlikely that the clearing will increase land degradation; therefore, the project clearing is not likely to be at variance to this Principle.

Methodology

Main Roads Site Inspection (28/04/2021)
Natural Resource Management SLIP Soil Systems (Accessed 08/03/2022)
Bureau of Meteorology (Accessed 08/03/2022)

(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.

Proposed clearing is not at variance to this Principle
Comments A search of ArcGIS shapefiles indicates no nature reserves, conservation areas or Bush Forever Sites are located within the vicinity of the proposal area. The closest reserve is Shark Bay Marine Park which is 9 km from the closest truck bay and will not be affect by the proposal. As such, the project clearing is not at variance to this Principle.
Methodology DBCA shapefiles EPA (2016) Main Roads Site Inspection (28/04/2021)

(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.

Proposed clearing is not likely to be at variance to this Principle
Comments The project does not occur in any Public Drinking Water Source Areas. No watercourses transect any of the project areas. SLK 451 truck bay is located within the Gascoyne River and Tributaries Proclaimed Surface Water Area, but only a man-made drain runs past the end of the project area to the south and will not be impacted by the proposed works. The project areas are located within the Gascoyne Proclaimed Groundwater Area; however, no dewatering is required, and the proposed works are considered minor in nature. Therefore, impact on groundwater level or quality is considered unlikely in the project areas. Two licenced bores have been identified in the vicinity of the project that can be used for the project water source. Groundwater will be abstracted in accordance with existing licences. Given the above it is unlikely that this project will cause deterioration in the quality of surface or underground water. Therefore, this project is considered not likely to be at variance to this Principle.
Methodology DWER and DBCA shapefiles EPA (2016) Main Roads Site Inspection (28/04/2021)

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

Proposed clearing is not likely to be at variance to this Principle
Comments The project areas are characterised as having an arid climate area (mean annual rainfall of 222 mm [BoM 2022]). Surface water features are within or in close proximity to both project areas; however, both project areas have already been substantially modified by existing parking bays and/or vehicle tracks. As such, the additional small amount of clearing in areas that are already partly cleared but surrounded by large amounts of remnant vegetation is likely to have a negligible effect on the incidence or intensity of flooding. The proposed clearing is not likely to be at variance to this principle.
Methodology Main Roads Site Inspection (28/04/2022) Bureau of Meteorology (Accessed 08/03/2022)

6 ADDITIONAL ACTIONS REQUIRED

The clearing associated with the proposal is unlikely or not at variance with the Clearing Principles. Additional management actions under CPS 818 are detailed in Table 6.

Table 6. Summary of Additional Management Actions Required by Permit CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
2 a. Project is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted	**No**	Proceed with standard Vehicle and Plant management actions from PEMR's and Vehicle and Plant Hygiene Checklists
3. 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.
4. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition	**No**	No further action required.

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. Vegetation will be managed in accordance with the Principal Environmental Management Requirements (PEMR's).

8 REFERENCES

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9 APPENDICES

Appendix	Title
Appendix 1	Environmental Constraints Mapping
Appendix 2	Environmental Site Inspection Report

Appendix 1: Environmental Constraints Mapping

[REDACTED]

Environmental Constraints map SLK 233.60

[REDACTED]

Environmental Constraints map SLK 399.06, 451.87 and 526.64

Appendix 2: Environmental Site Inspection Report

ENVIRONMENTAL SITE INSPECTION REPORT FOR A CLEARING DESKTOP REPORT (CDR)

North West Coastal Hwy Truck Parking Bay Upgrades

EOS 2257

SITE INSPECTION DETAILS		
Date:	28/04/2021	
Location:	North West Coastal Hwy (NWCH) (H007), • Site 1 - 233.6 SLK, opposite Billabong Roadhouse in the Shire of Shark Bay • Site 2 - 399.06 SLK, 74km south of Carnarvon in the Shire of Carnarvon • Site 3 - 451.87 SLK, 22km south of Carnarvon in the Shire of Carnarvon • Site 4 - 526.64 SLK, 50km north of Carnarvon in the Shire of Carnarvon	
Region/ Directorate:	Mid West Gascoyne	
Purpose:	Collect basic biological information for CDR/PEIA.	
Attendees:	Ryan Hepworth	Environment Officer Main Roads
	Steve Ingram	Project Manager Main Roads

SITE VISIT DETAILS AND METHODOLOGY

BACKGROUND

Main Roads proposes to upgrade four existing vehicle parking bays on NWCH at 233.6, 399.06, 451.87, and 526.64 SLK. The scope of the project is to extend and seal the parking bays to Heavy Vehicle Rest Area (HVRA) standards, which will include constructing new entrance and exit points and improving drainage.

The project will require the clearing of native vegetation to facilitate extending and widening the bays. The clearing will be undertaken using Main Roads state-wide purpose clearing permit CPS 818.

The purpose of the site inspection is to collect basic vegetation, flora and fauna information about each site to complement desktop information. The information will be used in the preparation of a Clearing Desktop Report (CDR) and Project Environmental Risk Assessment (PERA).

METHODOLOGY

The site was visited on 28 April 2021 by the Mid-West Gascoyne Region Environment Officer and the Project Manager. A large envelope was inspected at each site encompassing the existing truck bay, the likely area of disturbance and surrounding vegetation. The inspection areas are shown on Figures 1-4.

The inspection comprised the following activities:

- Undertaking a desktop assessment of the surrounding study area;
- Traversing the area on foot;
- Taking representative site photos;
- Collecting site details via ArcCollector.

Limitations – The site inspection was conducted in 28 April 2021, which is within the recommended survey period for Sites 2, 3 and 4 (March – June), however earlier than the recommended survey period for Site 1 (Spring). Due to major storm activity affecting the region in February 2021, rainfall preceeding the inspection was above average. Given the disturbed nature of the sites, the implications of timing and rainfall on the site inspection outcomes are considered to be minimal.

GENERAL SITE DESCRIPTION

The four inspection areas are located in the Carvarvon IBRA bioregion and Wooramel subregion.

The primary use of the inspection areas is road reserve. The areas include the cleared road corridor for NWCH, an existing parking bay or parking bay with additional rest area, drainage infrastructure and remnant native vegetation.

The sites were all relatively flat. Soils were predominantly red sandy loams. No significant landform features were observed. There are no surface water features observed at sites 1, 2 and 4, and a man-made drain was observed at site 3.

The vegetation of the inspections areas have been broadly mapped as the following vegetation associations:

Site 1	242	Succulent steppe with scrub; snakewood over saltbush
	243	Shrublands; bowgada & minnieritchie scrub
Site 2	346	Mosaic: Shrublands; *Acacia sclerosperma*, *A. victoriae* & snakewood scrub / Shrublands; patches of low mixed scrub
Site 3	308	Mosaic: Shrublands; *Acacia sclerosperma* sparse scrub / Succulent steppe; saltbush & bluebush
Site 4		

None of the sites were located in the buffer of a known TEC or PEC.

The parking bays were predominantly cleared. Vegetation surrounding the parking bays was in degraded condition but improved moving away from parking bays. There was evidence of historical clearing and disturbance. Vegetation in the inspection area was contiguous with surrounding vegetation and was not confined to the road reserve.

Site 1 – 233.6 SLK

SITE DESCRIPTION
The existing parking bay is on the RHS of NWCH (southbound) and is approximately 300m long and 60m wide (1.6 ha) and the adjacent rest area. The parking area is adjacent to the Billabong Roadhouse and is a major stopping area for tourists to access the Shark Bay area, and freight (Photos 1, 2). The parking bay was predominantly cleared except for isolated trees and tall shrubs (Photo 3). Vegetation condition slightly improved away from parking bay, with an increase in vegetation composition and density, however the vegetation was still affected by historical clearing and weeds (likely historical grazing) (Photos 5, 6). The vegetation predominantly comprised an open mixed Acacia woodland over weedy understory. The desktop assessment identified 38 Priority flora species in the surrounding 40km. The occurrence of conservation significant flora near the existing parking bay is unlikely given the level of clearing/disturbance observed. No direct or indirect observations of fauna were recorded during the site inspection.

RESULTS			
REMNANT VEGETATION			
Area (ha):	6.1		
Number & ID of Trees:	**DBH >30cm:** 0 **Species:**	**DBH >50cm:** 0 **Species:**	**DBH >1m:** 0 **Species:**
Species:	**Trees –** ?*Hakea lorea*,		
	Shrubs – *Solanum lasiophyllum, Ptilotus obovatus, ?Acacia xiphophylla, Acacia* sp.		
Vegetation Condition:	Degraded to completely degraded		
Vegetation Structure:	Vegetation predominantly comprises open Acacia woodland		
Vegetation Composition:	80% midstory, 20% understory		
Significant flora observed/recorded:	Nil		
Fauna Habitat Values:	Fauna habitat values are consistent with surrounding vegetation. No significant fauna habitat features observed (eg. mounds, caves, gullies, outcrops etc). Dead tree branches may provide habitat for small reptiles.		
Declared weeds or Weeds of National Significance	Nil		
PLANTED VEGETATION			
None observed			

Site 2 – 399.06 SLK

SITE DESCRIPTION
The existing parking bay is on the LHS of NWCH (northbound) and is approximately 130m long and 30m wide (0.3 ha) (Photo 1). The parking bay and surrounding 20-100m was predominantly cleared except for scattered small and medium shrubs (Photos 2, 3). Vegetation condition improved away from parking bay, with patches of more intact vegetation, however the vegetation was still affected by historical clearing (likely historical grazing), noted by the high level of ground weed cover (Photos 4, 5). Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve. The vegetation predominantly comprised an open mixed Acacia woodland over weedy understory. The desktop assessment identified 8 Priority flora species in the surrounding 40km. The occurrence of conservation significant flora near the existing parking bay is unlikely given the level of clearing/disturbance observed. No direct or indirect observations of fauna were recorded during the site inspection.

RESULTS			
REMNANT VEGETATION			
Area (ha):	7.16		
Number & ID of Trees:	**DBH >30cm:** 0 **Species:**	**DBH >50cm:** 0 **Species:**	**DBH >1m:** 0 **Species:**
Species:	**Trees –**		
	Shrubs – *Acacia* sp., *Eremophila* sp.,		
Vegetation Condition:	Good to completely degraded		
Vegetation Structure:	Vegetation predominantly comprises open Acacia woodland		
Vegetation Composition:	50% midstory, 50% understory		
Significant flora observed/recorded:	Nil		
Fauna Habitat Values:	Fauna habitat values are consistent with surrounding vegetation. No significant fauna habitat features observed (eg. mounds, caves, gullies, outcrops etc). Dead tree branches may provide habitat for small reptiles.		
Declared weeds or Weeds of National Significance	Nil		
PLANTED VEGETATION			
None observed			

Site 3 – 451.87 SLK

SITE DESCRIPTION
The existing parking bay is on the RHS of NWCH (southbound) and is approximately 230m long and 60m wide (1.4 ha), with a large island of vegetation in the middle (Photos 1, 2). A man-made drain was observed 180m south of the parking bay (Photo 3). There was evidence of surface water runoff and erosion from the SE corner of the existing parking bay towards the east (Photo 4). Vegetation condition was fairly consistent across the inspection area. Vegetation was in degraded condition and mostly comprised medium shrubs over weedy understory (Photos 5, 6). Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve. The desktop assessment identified 14 Priority flora species in the surrounding 40km. The occurrence of conservation significant flora near the existing parking bay is unlikely given the level of clearing/disturbance observed. No direct or indirect observations of fauna were recorded during the site inspection.

RESULTS			
REMNANT VEGETATION			
Area (ha):	9.02		
Number & ID of Trees:	**DBH >30cm:** 0 **Species:**	**DBH >50cm:** 0 **Species:**	**DBH >1m:** 0 **Species:**
Species:	**Trees –** *Hakea sp.*,		
	Shrubs – *Solanum lasiophyllum, Acacia, sp.*		
Vegetation Condition:	Degraded to completely degraded		
Vegetation Structure:	Vegetation predominantly comprises open Acacia woodland		
Vegetation Composition:	50% midstory, 50% understory		
Significant flora observed/recorded:	Nil		
Fauna Habitat Values:	Fauna habitat values are consistent with surrounding vegetation. No significant fauna habitat features observed (eg. mounds, caves, gullies, outcrops etc). Dead tree branches may provide habitat for small reptiles.		
Declared weeds or Weeds of National Significance	Nil		
PLANTED VEGETATION			
None observed			

Site 4 – SLK 526.64

SITE DESCRIPTION
The existing parking bay is on the LHS of NWCH (northbound) and is approximately 170m long and 45m wide (0.66 ha) (Photos 1, 2). Vegetation condition was fairly consistent across the inspection area. Vegetation was in degraded condition and mostly comprised scattered medium shrubs over cleared/weedy understory (Photos 3, 4, 5). Native vegetation was contiguous with surrounding vegetation and was not restricted to the road reserve. The desktop assessment identified 14 Priority flora species in the surrounding 40km. The occurrence of conservation significant flora near the existing parking bay is unlikely given the level of clearing/disturbance observed. No direct or indirect observations of fauna were recorded during the site inspection.

RESULTS			
REMNANT VEGETATION			
Area (ha):	8.12		
Number & ID of Trees:	**DBH >30cm:** 0 **Species:**	**DBH >50cm:** 0 **Species:**	**DBH >1m:** 0 **Species:**
Species:	**Trees –** ?*Hakea lorea*		
	Shrubs – *Solanum lasiophyllum, ?Acacia xiphophylla, Acacia* sp.		
Vegetation Condition:	Degraded to completely degraded		
Vegetation Structure:	Vegetation predominantly comprises open Acacia woodland		
Vegetation Composition:	50% midstory, 50% understory		
Significant flora observed/recorded:	Nil		
Fauna Habitat Values:	Fauna habitat values are consistent with surrounding vegetation. No significant fauna habitat features observed (eg. mounds, caves, gullies, outcrops etc). Dead tree branches may provide habitat for small reptiles.		
Declared weeds or Weeds of National Significance	Nil		
PLANTED VEGETATION			
None observed			

SUMMARY

Actions:

- Submit Clearing Desktop Report (CDR) and Project Environmental Risk Assessment (PERA) to CRSP for review.

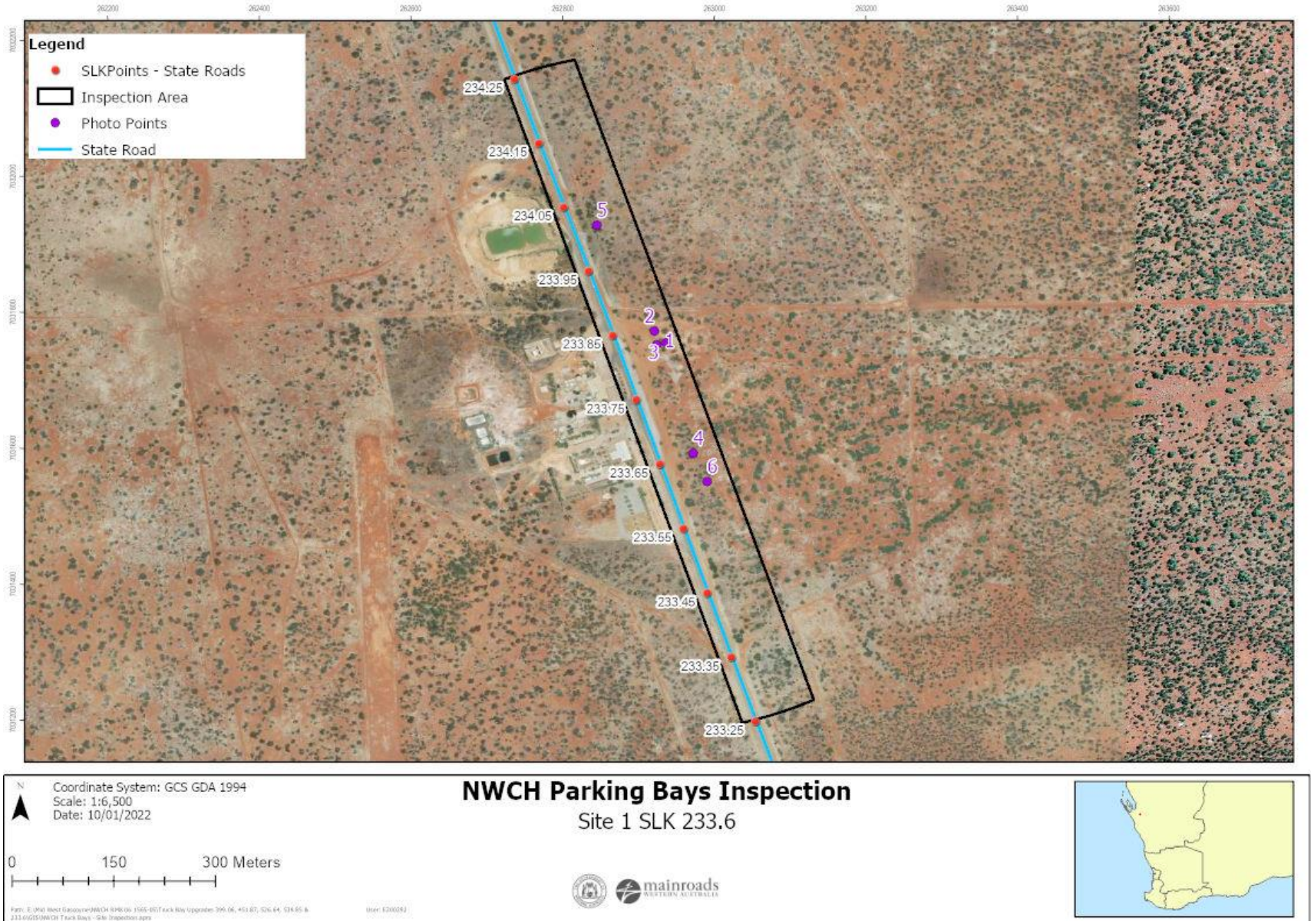
Approvals Required:

- Approval to clearing native vegetation under CPS 818.

REFERENCES

Government of Western Australia (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth.

Appendix 1 – Site Maps


Legend
SLKPoints - State Roads
Inspection Area
Photo Points
State Road
234.25
234.15
234.05
233.95
233.85
233.75
233.65
233.55
233.45
233.35
233.25
1
2
3
4
5
6
Coordinate System: GCS GDA 1994
Scale: 1:6,500
Date: 10/01/2022
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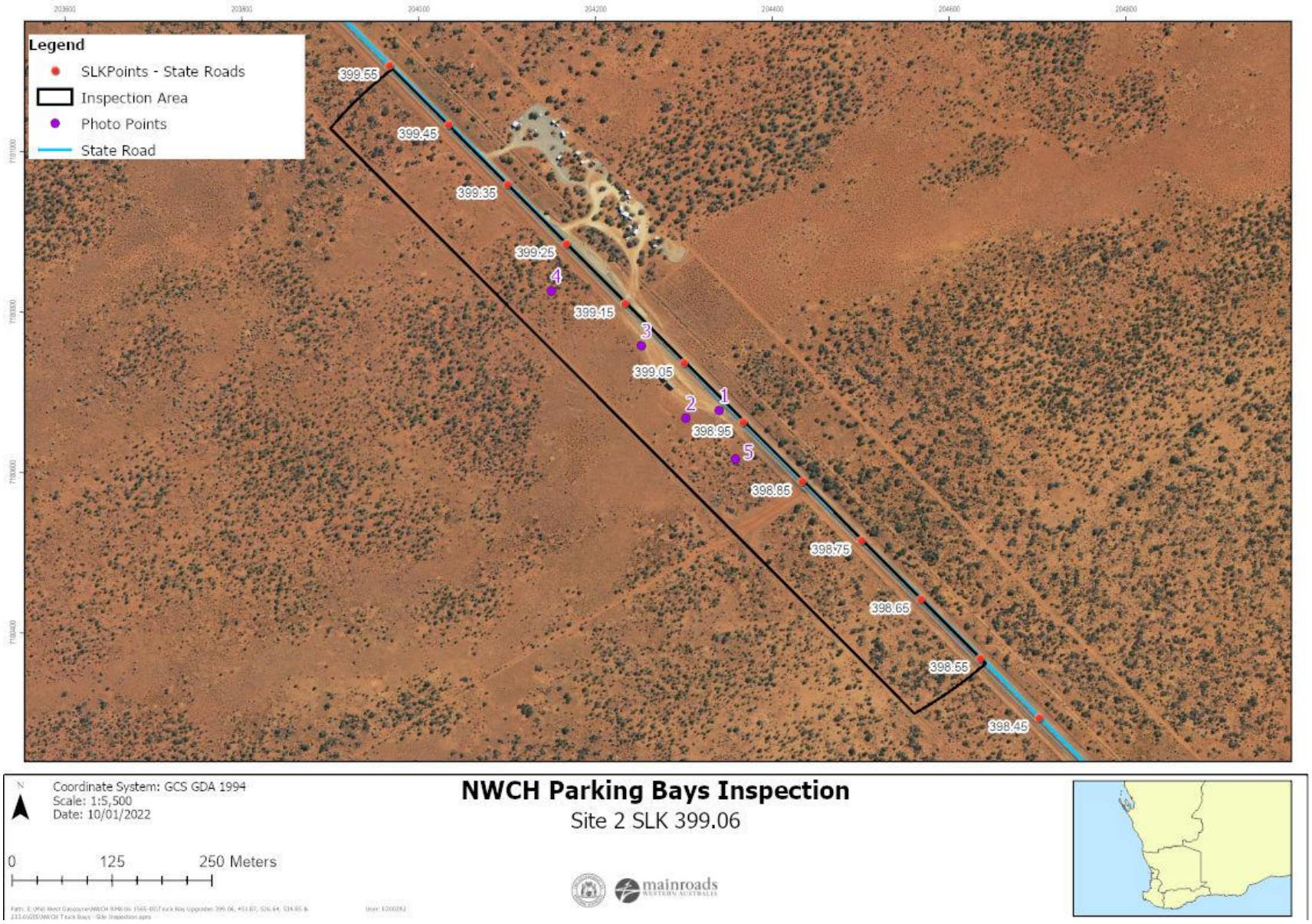
150
300 Meters
NWCH Parking Bays Inspection
Site 1 SLK 233.6
mainroads
WESTERN AUSTRALIA


Legend
SLKPoints - State Roads
Inspection Area
Photo Points
State Road
399.55
399.45
399.35
399.25
399.15
399.05
398.95
398.85
398.75
398.65
398.55
398.45
1
2
3
4
5
Coordinate System: GCS GDA 1994
Scale: 1:5,500
Date: 10/01/2022
0
125
250 Meters
NWCH Parking Bays Inspection
Site 2 SLK 399.06
mainroads
WESTERN AUSTRALIA


Legend
SLKPoints - State Roads
Inspection Area
Photo Points
State Road
452.35
452.25
452.15
452.05
451.95
451.85
451.75
451.65
451.55
451.45
451.35
1
2
3
4
5
Coordinate System: GCS GDA 1994
Scale: 1:5,500
Date: 10/01/2022
0
125
250 Meters
NWCH Parking Bays Inspection
Site 3 SLK 451.87
mainroads
WESTERN AUSTRALIA


Legend
SLKPoints - State Roads
Inspection Area
Photo Points
State Road
527.25
527.15
527.05
526.95
526.85
526.75
526.65
526.55
526.45
526.35
526.25
526.15
1
2
3, 4
5
Coordinate System: GCS GDA 1994
Scale: 1:5,500
Date: 10/01/2022
0
125
250 Meters
NWCH Parking Bays Inspection
Site 4 SLK 526.64
mainroads
WESTERN AUSTRALIA

Appendix 2 – Site Photos

Site 1 – 233.6 SLK

Photo 1 – Looking SW towards existing parking bay and Billabong Roadhouse

Photo 2 – Looking NW towards southbound entrance

Photo 3 – Looking SE towards parking bay

Photo 4 – Looking S towards southbound exit

Photo 5 – Looking W towards existing vegetation, north of truck bay

Photo 6 - Looking S towards existing vegetation, south of truck bay

Site 2 – 399.06

Photo 1 – looking NE towards existing parking bay

Photo 2 – Looking NW towards area surrounding parking bay

Photo 3 – Looking SE towards area surrounding parking bay

Photo 4 – Looking NW towards existing vegetation, north of parking bay

Photo 5 – Looking SE towards existing vegetation, south of parking bay

Site 3 – 451.87

Photo 1 – Looking SE towards southbound entrance

Photo 2 – Looking NW towards southbound exit

Photo 3 – Looking NE towards man-made drain

Photo 4 – Looking W towards surface water runoff from the parking bay

Photo 5 – Looking SE towards surrounding vegetation

Photo 6 - Looking SW towards surrounding vegetation

Site 4 – SLK 526.64

Photo 1 – Looking NE towards existing parking bay

Photo 2 – Looking NE towards existing parking bay

Photo 3 – Looking NE towards surrounding vegetation

Photo 4 – Looking SW towards surrounding vegetation

Photo 5 – Looking NE towards surrounding vegetation

Appendix 3 – Signficant Flora Likelihood of Occurrence Assessment

Taxon	Cons code	Habitat	233	399	451	526	Likelihood of occurrence
Atriplex spinulosa	P1	clay flats, slopes of creeks			✓		Unlikely to occur - habitat, soil type not present
Calandrinia butcherensis	P1	Undulating flats. Red brown clayey sand. Underlying geology unknown.* undulating sandplain with the fourth occurring on the slopes of a small dune, while all grew in red sand or red sandy loam	✓				Unlikely. Habitat not present at SLK233
Chamelaucium sp. Coolcalalaya (A.H. Burbidge 4233)	P1	Brown sandy clay over limestone.* yellow sand, sand plains (GHD 2016)	✓				Unlikely. Habitat not present at SLK233.
Chthonocephalus oldfieldianus	P1	Red sand dunes.	✓				Unlikely. Habitat not present at SLK233.
Malleostemon nerrenensis	P1	Sand dune. Red sand.*	✓				Unlikely. Habitat not present at SLK233.
Millotia depauperata	P1	Sandy loam. Granite outcrops.	✓				Possible. Sandy loam present. Annual Aug-Sep
Ptilotus unguiculatus	P1			✓			Unlikely. One record from 1970 10km from 399. Not recorded in a previous survey nearby nor listed as likely to occur
Schoenia filifolia subsp. *arenicola*	P1	Sand, red clay. Sub-coastal sand ridges.			✓		Unlikely. Biologic (2021) states species evidently confined to sandhills in the Carnarvon area. Habitat not present.
Scholtzia recurva	P1	Sand, undulating, dunes*	✓				Unlikely to occur - habitat, soil type not present
Swainsona ecallosa	P1	Stony flats.			✓	✓	Unlikely to occur - habitat, soil type not present
Thryptomene wannooensis	P1	Yellow sand on ridge.*	✓				Unlikely to occur - habitat, soil type not present
Abutilon sp. Quobba (H. Demarz 3858)	P2	Sand.			✓	✓	Unlikely to occur - habitat, soil type not present
Acacia gelasina	P2	Yellow sand. Sandplains, low rises.	✓				Unlikely to occur - habitat, soil type not present

Taxon	Cons code	Habitat	233	399	451	526	Likelihood of occurrence
Acacia leptospermoides subsp. *Obovata*	P2	Yellow/brown sand. Sandplains, sand ridges.	✓				Unlikely to occur - habitat, soil type not present
Acacia ryaniana	P2	White or red sand. Coastal sand dunes.			✓		Unlikely to occur - habitat, soil type not present
Calandrinia vernicosa	P2	Gently undulating sandplains interspersed with low hills or ridges. Soil red/ orange brown sandy loam.* Relatively narrow habitat preference of tall Acacia shrubland dominated by A. ramulosa and A. microcalyx with sparse understorey	✓				Unlikely to occur - habitat, soil type not present
Chthonocephalus muellerianus	P2	Red sand.	✓				Unlikely to occur - habitat, soil type not present
Chthonocephalus tomentellus	P2	Red sand. Undulating plains, sand dunes, near saline depressions.	✓	✓	✓	✓	Unlikely to occur - habitat, soil type not present. Quite widepsread in region. Neglibible imapct if present
Melaleuca boeophylla	P2	Yellow sand. Rises.	✓				Unlikely to occur - habitat, soil type not present
Rumex crystallinus	P2	Arid & semi-arid areas. exposed red mud, edges of large clay pan.			✓		Unlikely to occur - habitat, soil type not present
Scaevola chrysopogon	P2	Red/brown sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Scholtzia sp. Folly Hill (M.E. Trudgen 12097)	P2	Yellow or red sand. Sand dunes.	✓		✓		Unlikely to occur - habitat, soil type not present
Sondottia glabrata	P2	Saline flats.			✓		Unlikely to occur - habitat, soil type not present
Thysanotus fragrans	P2	In yellow sand.*	✓				Unlikely to occur - habitat, soil type not present
Abutilon sp. *Pritzelianum* (S. van Leeuwen 5095)	P3	Red sand dune.*		✓	✓	✓	Unlikely to occur - habitat, soil type not present
Acacia drepanophylla	P3	Red clay or loam over limestone. Flat to undulating plains, low rises.	✓				Likely habitat present in SLK 233. not observed. Widespread in local and regional area (GHD 2015)Negligible impact

Taxon	Cons code	Habitat	233	399	451	526	Likelihood of occurrence
Acacia sclerosperma subsp. *glaucescens*	P3	Sand, sandy loam, stony soils.		✓			Possible. Recorded in previous surveys in study area. GHD (2015) considers species is locally common. Negligible impact.
Anthotroche myoporoides	P3	Yellow or red sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Calytrix formosa	P3	White or yellow sand. Sandplains.	✓				soil type not present, but previously recorded in reddish sandy loam nearby. Unlikely to occur due
Carpobrotus sp. Thevenard Island (M. White 050)	P3	Coarse white sand. Dune tops, disturbed areas.			✓		Unlikely to occur - habitat, soil type not present
Chthonocephalus spathulatus	P3	Red-brown loam or sandy clay. Undulating plains.		✓		✓	Unlikely to occur SLK 399 - habitat, soil type not present at SLK 399. Not recorded at SLK 526 (ELA 2021).
Dasymalla glutinosa	P3	Sand.* Well drained, soil yellow dry sand (GHD 2016)	✓				Unlikely to occur - habitat, soil type not present
Dicrastylis linearifolia	P3	Red sand. Sandplain.	✓				Unlikely to occur - habitat, soil type not present
Dicrastylis micrantha	P3	Red sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Eremophila physocalyx	P3	Red/brown sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Goodenia sericostachya	P3	Red sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Grevillea costata	P3	Alluvial sand, clay. In or near river beds among sandstone or granite rocks.	✓				Unlikely to occur - habitat, soil type not present
Lepidium scandens	P3	Red sand, clay.		✓	✓		Unlikely to occur - habitat, soil type not present
Lepidium biplicatum	P3	Coastal regions.				✓	Unlikely to occur - habitat, soil type not present
Macarthuria intricata	P3	Red or black soil over limestone, grey sand over sandstone, sandy clay. Sandplains & sand dunes.	✓				Unlikely to occur - habitat, soil type not present
Malleostemon pentagonus	P3	In sandplain.*	✓				Unlikely to occur - habitat, soil type not present

Taxon	Cons code	Habitat	233	399	451	526	Likelihood of occurrence
Phyllanthus fuernrohrii	P3	Pale red sandy loam, near salt flat.*				✓	Does not occur (ELA 2021)
Physopsis chrysophylla	P3	Red or yellow sandy soils. Sandplains.		✓	✓		Unlikely to occur. One record from 1959. widepsread further south in Shark Bay region
Pileanthus bellus	P3	Yellow sand or shallow grey sand over sandstone. Sand dunes.	✓				Unlikely to occur - habitat, soil type not present
Scholtzia oleosa	P3	Sand, undulating, dunes*	✓				Unlikely to occur - habitat, soil type not present
Sporobolus blakei	P3	Red sandy clay, loam. Creeks.			✓		Unlikely to occur - habitat, soil type not present
Tetragonia coronata	P3	Red clay loam. Calcrete outcrops.	✓	✓			Unlikely to occur - habitat, soil type not present
Thryptomene caduca	P3	On red sand plain.*	✓				Unlikely to occur - habitat, soil type not present
Triodia plurinervata	P3	Red to orange-brown sand, limestone, sandy loam. Sand dunes & steppes, often coastal areas, drainage basins, salt lakes.	✓				Possible
Verticordia dichroma var. *dichroma*	P3	Yellow or red sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Verticordia dichroma var. *syntoma*	P3	Yellow or red sand. Sandplains.	✓				Unlikely to occur - habitat, soil type not present
Jacksonia dendrospinosa	P4	Sandy clay. Flat sandplains with Eucalyptus and Allocasuarina species.	✓				Unlikely to occur - habitat, soil type not present
Triodia bromoides	P4	Red, grey & calcareous sand. Dunes, sandplains, stony rises.	✓				Possible
Verticordia polytricha	P4	Sand, gravelly clay. Sandstone outcrops.	✓				Unlikely to occur - habitat, soil type not present
Eucalyptus beardiana	T	Red or yellow sand. Sand dunes & ridges.	✓				Not observed during the site inspection. No suitable habitat present