



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 10064/1
<b>Permit Holder:</b>	Western Australian Department of Transport
<b>Duration of Permit:</b>	From 22 June 2023 to 22 June 2028

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

### **PART I – CLEARING AUTHORISED**

**1. Clearing authorised (purpose)**

The permit holder is authorised to clear *native vegetation* for the purpose of onshore disposal of dredged material and future maintenance dredging campaigns.

**2. Land on which clearing is to be done**

Lot 1337 on Deposited Plan 91032, South Carnarvon

**3. Clearing authorised**

The permit holder must not clear more than 5.55 hectares of *native vegetation* trees within the area cross-hatched yellow in Figure 1 of Schedule 1.

**4. Period during which clearing is authorised**

The permit holder must not clear any *native vegetation* after 22 June 2028.

### **PART II – MANAGEMENT CONDITIONS**

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

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

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

## 6. Weed management

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

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

## 7. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

## 8. Wind and water erosion management

The permit holder must:

- (a) commence disposal of dredged materials no later than two (2) months after undertaking the authorised clearing activities to reduce the potential for wind and water erosion.
- (b) construction of wind/silt fences around the application area to prevent wind erosion.
- (c) install bunds to an appropriate height and width around the perimeter of the dredged materials to prevent wind and water erosion.

## 9. Cyclone erosion management

The permit holder must apply a dust suppressant to all areas of bare ground within cleared areas to reduce the potential for wind erosion prior to 01 November to 01 April (cyclone season).

## **PART III - RECORD KEEPING AND REPORTING**

### 10. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ol style="list-style-type: none"><li>(a) the species composition, structure, and density of the cleared area;</li><li>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings;</li><li>(c) the date that the area was cleared;</li><li>(d) the size of the area cleared (in hectares);</li></ol>

No.	Relevant matter	Specifications
		<ul style="list-style-type: none"> <li>(e) the direction of clearing</li> <li>(f) the date that the dredged material is disposed;</li> <li>(g) dimensions of the bunds (in meters) specified;</li> <li>(h) actions taken to avoid, minimize, and reduce the impacts and extent of clearing in accordance with condition 5;</li> <li>(i) actions taken to minimize the risk of the introduction and spread of <i>weeds</i> in accordance with condition 6;</li> <li>(j) actions taken to minimize the risk of wind and water erosion in accordance with condition 8, and</li> <li>(k) actions taken to minimize the risk of wind and water erosion in accordance with condition 9.</li> </ul>

## 11. Reporting

The permit holder must provide to the *CEO* the records required under condition 10 of this permit when requested by the *CEO*.

## DEFINITIONS

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

**Table 2: Definitions**

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
fill	means material used to increase the ground level, or to fill a depression.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – <ul style="list-style-type: none"> <li>(a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or</li> <li>(b) published in a Department of Biodiversity, Conservation and</li> </ul>

Term	Definition
	Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

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**END OF CONDITIONS**



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Mather Gannaway  
MANAGER  
NATIVE VEGETATION REGULATION

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

29 May 2023

# Schedule 1

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



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



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

Permit number:	CPS 10064/1
Permit type:	Purpose permit
Applicant name:	Western Australian Department of Transport
Application received:	30 January 2023
Application area:	5.55 hectares of native vegetation
Purpose of clearing:	Onshore disposal of dredging material and future maintenance dredging campaigns.
Method of clearing:	Mechanical
Property:	Lot 1337 on Deposited Plan 91032
Location (LGA area/s):	Shire of Carnarvon
Localities (suburb/s):	South Carnarvon

### 1.2. Description of clearing activities

The Western Australian Department of Transport is proposing to undertake the clearing of remnant native vegetation along the shore edge of Shark Bay East, South Carnarvon, reaching approximately 400 metres inland. The proposed clearing will facilitate the onshore disposal of dredged materials from the Carnarvon boat harbour and future maintenance dredging campaigns. The vegetation proposed to be cleared is contained within a single continuous area of 5.55 hectares in total (see Figure 1, Section 1.5).

### 1.3. Decision on application

Decision:	Granted
Decision date:	29 May 2023
Decision area:	5.55 hectares of native vegetation as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and two (2) submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B. The clearing permits Purpose of clearing was changed information can be found in Appendix A.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the historical use of the site and previous dredging activities (see Section 3.3).

The assessment identified that the proposed clearing would result in:

- the loss of native vegetation that is suitable roosting habitat for 26 migratory bird species

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values
- potential land degradation in the form of wind and water erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is not likely to lead to appreciable land degradation caused from wind and water erosion and will not impact significant habitat for migratory bird species. The Delegated Officer determined the impacts of the proposed clearing could be minimised and managed to not lead to unacceptable impacts on the environment.

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

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- the permit holder must commence the disposal of dredged materials no later than two (2) months after undertaking the authorised clearing activities to reduce the potential for wind and water erosion
- land and soil stabilisation measures at the clearing location before the next cyclone season
- retain the vegetative material and topsoil removed by clearing authorised under this permit and stockpile the vegetative material and topsoil in an area that has already been cleared
- revegetate and rehabilitate areas cleared for temporary works within six (6) months of the area no longer being required for the purpose of which it was cleared

1.5. Site maps

### CPS 10064/1 - Context Map



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



# CPS 10064/1 - Map



Figure 2: Map of the application area. The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

## 2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

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

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The area proposed to be cleared originally had a footprint of 9.21 hectares and has been reduced to 5.55 hectares. The application area has been selected based on former land use disturbance from previous maintenance dredging campaigns. As such, the native vegetation has an altered composition and condition in comparison to the surrounding remnant regional vegetation (Western Australian Department of Transport, 2023).

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### 3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values fauna and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

#### 3.2.1. Biological value (fauna) - Clearing Principle (b)

Assessment:

The application area is located within the Carnarvon region. The Delegated officer examined the vegetation proposed to be cleared using the site photos provided and rated the vegetation to be in a good to completely degraded condition (Trudgen, 1991).

According to the available database, 68 conservation significant fauna species have been recorded within the local area (50-kilometre radii). Twenty-five of these have been recorded within a similar soil and vegetation types to the application area and one species has been recorded within the application area. The majority of these species are migratory birds, visiting the area periodically to roost and/or forage.

Noting the habitat requirements, the distribution of the recorded species, the mapped vegetation types, and the condition of the vegetation within the application area, the application area is likely to comprise suitable habitat for the following fauna species:

- *Actitis hypoleucos* (Common Sandpiper)
- *Calidris acuminata* (Sharp-tailed sandpiper)
- *Calidris alba* (sanderling)
- *Calidris canutus* (Red knot)
- *Calidris ferruginea* (curlew sandpiper)
- *Calidris melanotos* (pectoral sandpiper)
- *Calidris ruficollis* (Red-necked stint)
- *Calidris subminuta* (Long-toed Stint)
- *Caretta caretta* (loggerhead turtle)
- *Charadrius leschenaultii* (Greater sand plover, large sand plover)
- *Charadrius mongolus* (Lesser Sand Plover)
- *Charadrius veredus* (Oriental Plover)
- *Chelonia mydas* (green turtle)
- *Limicola falcinellus* (Broad-billed sandpiper)
- *Limnodromus semipalmatus* (Asian dowitcher)
- *Limosa lapponica* (Bar-tailed godwit)
- *Limosa lapponica menzbieri* (Bar-tailed godwit (northern Siberian))
- *Limosa limosa* (Black-tailed godwit)
- *Numenius madagascariensis* (Eastern curlew)
- *Numenius phaeopus* (Whimbrel)
- *Pluvialis squatarola* (Grey plover)
- *Sternula albifrons* (Little tern)
- *Thalasseus bergii* (Crested tern)
- *Tringa brevipes* (Grey-tailed tattler)
- *Tringa nebularia* (Common greenshank, greenshank)
- *Tringa stagnatilis* (Marsh sandpiper, little greenshank)
- *Tringa totanus* (Common redshank, redshank)
- *Xenus cinereus* (Terek sandpiper)

### **Migratory birds**

Australian migratory birds change their behaviour, food preferences, and living environment during both breeding and non-breeding seasons. Migratory birds have a wide habitat range and breed in the northern hemisphere while spending their non-breeding season in the southern hemisphere. Juvenile birds that do not breed will remain in Australia and not migrate to the northern hemisphere (BirdLife International, 2023). Thus, any proposed clearing is unlikely to affect migratory breeding birds but may impact some non-breeding juvenile species.

Many shorebirds, including migratory species, favour open areas for roosting. The application area is very open and sparsely vegetated (see Appendix F), making it an ideal habitat for shorebirds to roost. Shorebirds are known to frequently use the application area during high tide when their preferred areas are flooded (Carnarvon LCDC, 2013). Although the application area has an ideal habitat for roosting shorebirds, the proposed clearing is unlikely to significantly impact these species as abundant shoreline surrounds the application area available for birds to roost. Shorebirds are sensitive to disturbance, so clearing activities should ideally be timed to avoid peak periods of migratory visitation.

### **Marine turtles**

The *Chelonia mydas* (green turtle) and *Caretta caretta* (loggerhead turtle) have been recorded approximately 2.16 kilometres from the application area. *Chelonia mydas* is an herbivorous species feeding mainly on seagrasses and macroalgae, occurring in bays and estuaries with inshore seagrass pastures in tropical and subtropical regions. The Western Australian breeding population of *Chelonia mydas* are known to nest along the Ningaloo coast (DCCEE, 2021a).

*Caretta caretta* is a carnivorous species that feeds predominantly on Medusozoa and crustaceans sp., occurring in bays and estuaries in warm tropical regions worldwide. The Western Australian breeding population *Caretta caretta* is

known to nest at Dirk Hartog island, approximately 100 kilometres west of the application (DCCEEW, 2021b). The *Caretta caretta* are unlikely to use the application area when laying eggs as they prefer steeply sloped, high-energy beaches for breeding. (Duermit, 2007).

The proposed application area clearing is unlikely to have a negative impact on *Chelonia mydas* and *Caretta caretta*. Also, it is unlikely that any egg clutches will be buried within the application area.

#### Conclusion:

Given the extent of clearing, the condition of the vegetation, and the abundance of suitable habitat surrounding the application area, the application area is not likely to comprise significant habitat for conservation significant fauna. In order to not disturb juvenile migratory birds that may be present at the time of clearing, slow, one directional clearing should be implemented to mitigate the risk to individuals. Additionally, as the clearing activities are scheduled for June 2023 it is unlikely that the clearing will impact adult migratory birds.

#### Conditions:

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

- weed and dieback management measures will be required as a condition on the clearing permit to mitigate impacts to adjacent vegetation for fauna species;
- undertake slow, progressive one, directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;

### **3.2.2. Conservation areas (Nearby Conservation area) - Clearing Principle (h)**

#### Assessment:

##### **Conservation areas**

The only conservation area within a 10-kilometre radius of the application area is the Wooramel Seagrass bank, listed on the former Register of National Estates, located approximately 0.27 hectares south from the application area. The Wooramel Seagrass Bank is a shallow marginal platform of sediment along the eastern shore of Shark Bay, composed mainly of biogenic carbonate debris mixed with terrigenous detrital grains (Department of Biodiversity, Conservation and Attractions, 2019). The structure is the largest seagrass meadow in the world with the highest species diversity assembled in one place with at least 13 species being represented. In addition to providing multiple types of habitat, the bank also supports rich and diverse marine fauna (Department of Biodiversity, Conservation and Attractions, 2019). Increased sedimentation caused by the proposed clearing activities and subsequent erosion may negatively impact the seagrass bank of international significance through turbidity and nutrients import.

#### Conclusion:

The proposed application area is in close proximity to Wooramel Seagrass bank and as such has potential to negatively impact the seagrass beds with turbidity and runoff caused from the proposed clearing. Turbidity caused by erosion can be mitigated through proper erosion management practices.

#### Conditions:

- Construct bunds within the application area to store dredged materials to prevent additional erosion.
- Construct wind/silt fences around the application area to prevent sedimentation.

### **3.2.3. Significant remnant vegetation and significant Impact to land and water resources (Environment associated with a watercourse or wetland, likely to cause deterioration in the quality of surface or underground water, Likely to cause appreciable land degradation) - Clearing Principle (f), (g) and (i).**

#### Assessment:

##### **Land degradation**

The mapped soil types across the application area are mapped as the Littoral System. However, due to historical dredging disposal along the application area, it is likely this disturbance has led to additional sandy soils being

deposited. Thus, the soil types of the application area are a mixture of the natural Littoral system soils mixed with sandy soils. The soil type across the application area is highly susceptible to land degradation from wind and water erosion. The proposed clearing will likely have a negative impact on the soil stability causing wind and soil erosion. If appropriate management measures such as ground cover and erosion management are applied, then the environmental impacts caused by wind and water erosion can be managed.

The Littoral system also has a high risk of phosphorus export into the surrounding environments. As western Australian waters are primarily nitrogen-limited (Lourey et al., 2006), it is unlikely that any phosphorus export from the proposed clearing will negatively affect the surrounding waterbodies. Any nutrients in the waters are likely to be rapidly diluted and dispersed via tidal flushing. Furthermore, due to the short time periods that each disposal site will be discharged to, elevated phosphorus levels are not expected to harm the local environment or cause algal blooms. The application area has had historical clearing and dredging activities with no negative effects. British Maritime Technology Oceanic and British Maritime Technology JFA Consulting were consulting groups that created the Carnarvon Fascine Maintenance Dredging Environmental Management Plan in October 2013. BMT installed remote imagery units capturing plume photos during maintenance dredging to monitor algae growth did not identify any significant impacts (Carnarvon LCDC, 2013). Therefore, the risk of eutrophication is expected to be very minimal.

Cyclones are known to affect the surrounding area of Carnarvon and Shark Bay on average once every five years (Bureau of Meteorology, 2023). The latest cyclone to go through the area was Olwyn, a severe tropical cyclone on 8th March 2015 (Bureau of Meteorology, 2023). Cyclones often exacerbate wind and water erosion of soils (DPIRD, 2020). If a cyclone were to impact the area, the effects of the proposed clearing will increase the negative effects of wind and water erosion, negatively impacting the surrounding areas and contaminate the Wooramel seagrass beds with increased turbidity and eutrophication (DPIRD, 2020). However, it is doubtful that a cyclone event will occur when the application area has been cleared of native vegetation, as cyclone season runs from 1st November to 30th April each year (Bureau of Meteorology, 2015). The clearing of native vegetation is likely to commence after 1st June. It is possible that the upcoming cyclone season could negatively impact the cleared application area. To mitigate potential negative impacts caused by cyclone events, implementing land and soil stabilisation measures over the cleared application area and containment bunds constructed around the dredged materials would mitigate further erosion from cyclones.

### **Surface water**

The application area is adjacent to an estuary near the mouth of the Gascoyne River. A small part of the application area is mapped within the intertidal zone of the estuary, the site is affected by tidal movements and waves (DWER, 2023b). The project involves clearing riparian vegetation that has grown alongside the watercourse. The local area receives low annual rainfall of approximately 187 millimetres but is occasionally subject to cyclonic events, as mentioned above, with heavy rain and strong winds. The vegetation in the project area is regrowth from previous clearing in 2014 and is currently completely degraded to good condition. Vegetation is known to help water filtration and stabilise soil against wind and water erosion; with the vegetation roots likely stabilising some 40 per cent of the application area. Removing vegetation from the area could lead to increased erosion and destabilisation of the bank, which could result in a silt plume (DWER, 2023b). It is worth noting that most of the project site is sandy with little to no vegetation meaning that most of the application area likely already suffers from wind and soil erosion (refer to Appendix F). Considering the size of the application area (5.55 hectares), low-lying topography that slopes into the surrounding waterbodies and the occasional exposure to events of heavy rain and the nature of the soils, the proposed clearing may result in increased sedimentation of the surface water running into the estuary, negatively affecting water quality.

### **Conclusion:**

The area where the application is located is at risk of various types of land degradation that stem from the soil type, proximity to the estuary and the impacts of cyclones. The area has a history of being cleared and underwent dredging activities as part of a clearing permit issued in 2013 (CPS 5631/2). Erosion problems can be effectively addressed through proper management practices.

### **Conditions:**

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

- the permit holder must commence the disposal of dredged materials no later than two (2) months after undertaking the authorised clearing activities to reduce the potential for wind erosion
- land and soil stabilisation measures for the dredged materials

- land and soil stabilisation measures at the clearing location before the next cyclone season
- wind/silt fences to be constructed where necessary at the application site to prevent wind erosion.

### 3.3. Relevant planning instruments and other matters

The application area occurs within an area identified as a contaminated site 'BP fuel facility', that is classified remediated for restricted use. Investigations at the vessel slipway immediately adjacent south of the proposed clearing area found no potential contaminants in soil above relevant guideline levels. Groundwater quality is not known, however it is unlikely there is an unacceptable risk to groundwater given the absence of any identified soil contamination (DWER, 2023a).

Based on the available information, DWER (2023a) advised that the site is suitable for the current commercial/industrial land use provided that the current site layout is not altered, groundwater abstraction is restricted and excavation works undertaken on-site should have appropriate site management plan. Further assessment will be required for any change in land use, and the development is likely to recommend a contamination condition for any subdivision or development applications. Assessment would include demonstrations that the dredged material is suitable for the proposed use and that its placement would not result in associated impacts such as acidity or leaching of metals (DWER, 2023a).

Spatial data indicates that no Aboriginal Heritage sites occur within the application area. Several Registered and other Aboriginal Heritage sites occur within the local area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Additional information provided by applicant

The applicant has modified the applications final use of the application area and the timeframe of the proposed clearing start and end date.

### Timeframe

Old timeframe	Modified timeframe
Start date: 31 January 2023	Start date: 1 June 2023
End date: 31 January 2025	End date: 1 June 2025

### Purpose of clearing

Old purpose	Modified purpose
Harbour purposes – proposed reclamation of land for development of public facilities.	Harbour purposes – proposed disposal area for future maintenance dredging campaigns.

## Appendix B. Details of public submissions

Summary of comments	Consideration of comment
<ul style="list-style-type: none"> <li>Not clear where the public facilities are to be built.</li> <li>The claim is made that the removal of 5.55 ha of native vegetation is considered to be minor and transitory. This does not gel with the construction of public facilities.</li> <li>In such an environment, one wouldn't expect the vegetation to be prolific. It would seem to need as little extra disturbance as possible.</li> <li>It appears to be a remnant area that is in stark relief to the mass of developed area in the precinct, hence of use for the wellbeing of people living or working in the area.</li> <li>There is no diagram showing where the dredging is to take place so I can't assess the claims of no alternative. Given the amount of poorly/unvegetated land in the area is it hard to see why any of the significant vegetation needs to be removed (Submission, 2023a).</li> </ul>	<ul style="list-style-type: none"> <li>The Shire of Carnarvon has not yet mapped the location of public facilities. The applicant is in the preliminary stages of planning and has indicated that 80 percent of the application area will be designated for public facilities, while the remaining 20 percent can be restored with vegetation.</li> <li>Public facilities has been removed from the proposed clearing purpose.</li> <li>As the application area has been disturbed historically and has regrown since the 2014 clearing, it is likely that a portion of the application area will be able to grow back naturally and also take well to revegetation activities.</li> <li>The clearing is unlikely to impact significant habitat for flora and fauna (See section 3 and Appendix B). Additionally, there is abundant vegetation within the surrounding area. The clearing is considered minimal when taking into account the abundant remnant vegetation within the surrounding environment (see appendix C.2).</li> <li>Dredging maps are provided in Figure 8, Appendix E.</li> </ul>
<p>The application area should be kept in a neat and tidy condition and that dust suppressant, or an alternative measure be applied to the cleared land to always minimise dust (Submission, 2023b).</p>	<p>The application area will have wind and water erosion management conditions to reduce the potential for impact from water and wind erosion.</p>

## Appendix C. Site characteristics

### C.1. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to the department at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

Characteristic	Details		
Local context	<p>The area proposed to be cleared is a 5.55-hectare patch of native vegetation in the extensive land use zone of Western Australia. It is surrounded by the Carnarvon boat harbor and Shark Bay East. The proposed clearing area has been historically cleared (Clearing Permit CPS 5631/2). The clearing was undertaken in 2014.</p> <p>Maintenance dredging has historically been carried out every 5-10 years since the construction of the harbor in 1973.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 90.21 per cent of the original native vegetation cover.</p>		
Ecological linkage	The application area is not part of any mapped vegetation linkages. The proposed clearing is not likely to sever or impact any vegetation linkages or functionality.		
Conservation areas	<p>One Tree Point Nature Reserve is located approximately 3.54 kilometres north and Chinamans Pool Nature Reserve is located approximately 4.18 kilometres to the northeast of the application area. Shark Bay Marine Park is located approximately 3.8 kilometres to the south of the application area. The proposed clearing is unlikely to impact upon these three conservation areas due to their distance from the project.</p> <p>Wooramel Seagrass bank, listed on the former Register of National Estates is located approximately 0.27 kilometres south of the application area.</p>		
Vegetation description	<p>Photographs supplied by the applicant indicate the vegetation within the proposed clearing area consists of a low scattered shrubland. Majority of the area is sand with minimal vegetation but with scattered <i>Atriplex bunburyana</i> and <i>Atriplex spp.</i> Representative photos are available in Appendix E.</p> <p>This is consistent with the mapped vegetation type, Carnarvon Gascoyne Marches (308):</p> <ul style="list-style-type: none"> <li>A scattered low shrubland dominated by <i>Maireana polypterygia</i>, <i>Atriplex spp.</i> and/or <i>Halosarcia spp.</i> Shrubs: <i>Acacia tetragonophylla</i>, <i>A. victoriae</i>, and <i>A. sclerosperma</i></li> </ul> <p>The mapped vegetation type retains approximately 99 per cent of the original extent (Government of Western Australia, 2019).</p>		
Vegetation condition	<p>Photographs supplied by the applicant indicate the vegetation within the proposed clearing area is in a Completely Degraded to Good (Trudgen, 1991) condition. Due to the extent of previous clearing and dredging activities most of the application area is sand with scattered areas of revegetation.</p> <p>The full Trudgen (1991) condition rating scale is provided in Appendix E. Representative photos are available in Appendix E.</p>		
Climate and landform	<p>Semi-desert Mediterranean climate, characterised by hot summers and mild winters, can be described as arid. Approximately 187 millimetres of rainfall per annum. The evaporation potential is 2,180 mm per annum. (Beard 1976, Wells et.al., 1992).</p> <p>The application area is relatively flat and low-lying with a topography of 5 metres Isohyet across the whole application area that slopes into the estuary.</p>		
Soil description	<p>The application areas soil type is mapped and described by Wells et.al.,1992 as:</p> <table border="1" data-bbox="343 1982 1388 2027"> <tr> <td>Name</td> <td>Littoral disturbed Urban Phase</td> </tr> </table>	Name	Littoral disturbed Urban Phase
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Characteristic	Details																																		
	Soils	238Li																																	
	Description	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests.																																	
	<p>The mapped salinity levels of the littoral system is 3000-7000 total dissolved solids milligrams per litre.</p> <p>The soils have evidence of heavy metals (copper, zinc and tributyl tin). This is a result from boat maintenance activities from other properties (Western Australian Department of Transport, 2023). However, it is at such minor levels as to not impact the surrounding environment.</p>																																		
Land degradation risk	<p>The degradation risk factors mapped over the application area are detailed below:</p> <table border="1"> <thead> <tr> <th colspan="2">Littoral System</th> </tr> </thead> <tbody> <tr> <td>Wind erosion</td> <td>H1: 50-70% high to extreme risk</td> </tr> <tr> <td>Water erosion</td> <td>H1: 50-70% high to extreme risk</td> </tr> <tr> <td>Salinity risk</td> <td>M2: 30-50% high to extreme wind erosion risk</td> </tr> <tr> <td>Phosphorus export</td> <td>Unknown</td> </tr> <tr> <td>Waterlogging</td> <td>H2: &gt;70% moderate to very high risk</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Subsurface acidification</td> <td>Unknown</td> </tr> <tr> <td>Acid sulfate soils</td> <td>High to moderate risk</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td>Flooding</td> <td>Inundated by flooding</td> </tr> <tr> <td>Floodplains</td> <td>Yes</td> </tr> </tbody> </table>		Littoral System		Wind erosion	H1: 50-70% high to extreme risk	Water erosion	H1: 50-70% high to extreme risk	Salinity risk	M2: 30-50% high to extreme wind erosion risk	Phosphorus export	Unknown	Waterlogging	H2: >70% moderate to very high risk			Subsurface acidification	Unknown	Acid sulfate soils	High to moderate risk			Flooding	Inundated by flooding	Floodplains	Yes									
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Waterbodies	<p>The desktop assessment indicate that the application area is bordering on the intertidal zone of Shark Bay East and approximately 2.90 kilometres south of the Gascoyne Rivers estuary mouth.</p>																																		
Hydrogeography	<table border="1"> <tbody> <tr> <td>Hydrological Zone</td> <td colspan="2">Gascoyne River</td> </tr> <tr> <td>Basin</td> <td colspan="2">Gascoyne River (704)</td> </tr> <tr> <td>Hydrographic Catchment</td> <td colspan="2">Gascoyne River</td> </tr> <tr> <td colspan="3"> </td> </tr> <tr> <td>RIWI Act Surface Water and Irrigation District</td> <td>Yes</td> <td>Gascoyne River and Tributaries</td> </tr> <tr> <td>RIWI Act Rivers</td> <td>No</td> <td></td> </tr> <tr> <td>RIWI Act Groundwater Areas</td> <td>Yes</td> <td>Gascoyne</td> </tr> <tr> <td>CAWS Act Clearing Control Catchment</td> <td>No</td> <td></td> </tr> <tr> <td>Public Drinking Water Source Areas</td> <td>No</td> <td></td> </tr> <tr> <td>Wellhead Protection Zone</td> <td>No</td> <td></td> </tr> <tr> <td>Reservoir Protection Zone</td> <td>No</td> <td></td> </tr> </tbody> </table>		Hydrological Zone	Gascoyne River		Basin	Gascoyne River (704)		Hydrographic Catchment	Gascoyne River					RIWI Act Surface Water and Irrigation District	Yes	Gascoyne River and Tributaries	RIWI Act Rivers	No		RIWI Act Groundwater Areas	Yes	Gascoyne	CAWS Act Clearing Control Catchment	No		Public Drinking Water Source Areas	No		Wellhead Protection Zone	No		Reservoir Protection Zone	No	
Hydrological Zone	Gascoyne River																																		
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RIWI Act Groundwater Areas	Yes	Gascoyne																																	
CAWS Act Clearing Control Catchment	No																																		
Public Drinking Water Source Areas	No																																		
Wellhead Protection Zone	No																																		
Reservoir Protection Zone	No																																		
Flora	<p>According to available databases, 14 conservation significant flora species have been recovered within the local area (50-kilometre buffer). Comprising three Priority 2, six Priority 2, and five Priority 3 flora taxa. None of these records occurs over the application area. The closest record is two kilometres from the application area, <i>Swainsona ecallosa</i> and <i>Sporobolus blakei</i>.</p>																																		

Characteristic	Details
	The native species within the application area are a mix of <i>Atriplex bunburyana</i> and <i>Atriplex spp.</i> Priority flora are not likely to be recorded within the application area. Representative photos are available in (Appendix F).
Ecological communities	There is only one Threatened Ecological Community (TEC) within 10 kilometres of the application area. This is the Subtropical and Temperate Coastal Saltmarsh, listed as Vulnerable under the EPBC Act and a priority three (3) Priority Ecological Community (PEC) by the DBCA. The TEC is located approximately 3.43 kilometres north from the application area and is unlikely to be affected by the proposed clearing. The application area does not resemble an occurrence of this TEC/PEC.
Fauna	<p>According to available database, 68 conservation significant fauna species have been recorded within the local area comprising one Priority 3, three Priority 4, five Endangered, four critically endangered, 11 vulnerable, 40 migratory, two specially protected species (OS), and two specially protected species (Conservation dependent) fauna taxa. Four fauna are associated with only marine, estuarine or freshwater habitats that do not occur within the application area.</p> <p>Of the 64 terrestrial fauna species, seven are non-avian. The closest are the <i>Lagostrophus fasciatus fasciatus</i> (banded hare-wallaby, mernine) and <i>Idiosoma incomptum</i> (Carnarvon shield-backed trapdoor spider) located approximately 2.16 and 4.45 kilometres away, respectively.</p> <p>Of the 57 avian species the closest are the <i>Thalasseus bergii</i> (Crested tern) that has been recorded within the application area. Twenty-one avian species have been recorded 0.16 hectares from the application area (Appendix C.4)</p> <p>Noting the habitat requirements, the distribution of the recorded species, the mapped vegetation types, and the condition of the vegetation within the application area, the application area is likely to comprise suitable habitat for 26 avian species.</p>

## C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Carnarvon (CAR)	8,382,890.35	8,360,801.46	99.74	1,020,434.08	12.20
Shire of Carnarvon	4,637,447.90	4,613,554.78	99.48	356,933.01	7.96
Gascoyne Marches (308)	445,099.12	441,534.57	99.20	3,874.35	0.87
Local area					
10km radius	15,357.08	13,853.70	90.21	-	-

\*Government of Western Australia (2019a)

\*\*Government of Western Australia (2019b)

## C.3. Flora analysis table

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

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Abutilon</i> sp. Pritzelianum (S. van Leeuwen 5095)	P3	N	N	N	22.05	4	N
<i>Abutilon</i> sp. Quobba (H. Demarz 3858)	P2	NA	NA	Y	5.72	6	N
<i>Acacia ryaniana</i>	P2	N	N	N	2.16	7	N
<i>Atriplex spinulosa</i>	P1	N	N	N	9.75	1	N
<i>Carpobrotus</i> sp. Thevenard Island (M. White 050)	P3	N	Y	Y	20.58	22	N
<i>Chthonocephalus tomentellus</i>	P2	Maybe	Na	Y	8.12	12	N
<i>Lepidium biplicatum</i>	P3	Na	Na	Y	38.41	1	N
<i>Lepidium scandens</i>	P3	Na	Na	N	35.91	1	N
<i>Rumex crystallinus</i>	P2	N	N	Y	10.01	5	N
<i>Schoenia filifolia</i> subsp. <i>arenicola</i>	P1	Na	Na	Y	5.94	12	N
<i>Scholtzia</i> sp. Folly Hill (M.E. Trudgen 12097)	P2	N	N	N	34.98	10	N
<i>Sondottia glabrata</i>	P2	Na	Na	N	20.58	2	N
<i>Sporobolus blakei</i>	P3	N	Y	Y	2.00	1	N
<i>Swainsona ecallosa</i>	P1	Na	Na	Y	2.00	2	N

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

#### C.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<b>Birds</b>						
<i>Actitis hypoleucos</i> (Common Sandpiper)	MI	Y	Y	0.16	400	N
<i>Amytornis textilis textilis</i> (Western grasswren, thick-billed grasswren (western))	P4	N	N	27.84	3	N
<i>Anous stolidus</i> (common noddy)	MI	N	N	49.72	1	N
<i>Apus pacificus</i> (Fork-tailed swift)	MI	N	Y	2.16	7	N
<i>Ardenna carneipes</i> (flesh-footed shearwater, fleshy-footed shearwater)	VU	N	N	46.62	1	N
<i>Ardenna pacifica</i> (Wedge-tailed Shearwater)	MI	N	N	46.62	1	N
<i>Arenaria interpres</i> (Ruddy turnstone)	MI	N	Y	0.16	74	N
<i>Botaurus poiciloptilus</i> (Australasian bittern)	EN	N	N	46.62	1	N
<i>Calidris acuminata</i> (Sharp-tailed sandpiper)	MI	Y	Y	0.16	145	N

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Calidris alba</i> (sanderling)	MI	Y	Y	0.16	107	N
<i>Calidris canutus</i> (Red knot)	EN	Y	Y	0.16	128	N
<i>Calidris ferruginea</i> (curlew sandpiper)	CR	Y	Y	0.16	209	N
<i>Calidris melanotos</i> (pectoral sandpiper)	MI	Y	Y	0.73	5	N
<i>Calidris ruficollis</i> (Red-necked stint)	MI	Y	Y	0.16	347	N
<i>Calidris subminuta</i> (Long-toed Stint)	MI	Y	Y	2.43	52	N
<i>Calidris tenuirostris</i> (Great knot)	CR	Y	Y	0.16	167	N
<i>Charadrius dubius</i> (Little Ringed Plover)	MI	N	N	4.43	7	N
<i>Charadrius leschenaultii</i> (Greater sand plover, large sand plover)	VU	Y	Y	0.16	271	N
<i>Charadrius mongolus</i> (Lesser Sand Plover)	EN	Y	Y	0.16	69	N
<i>Charadrius veredus</i> (Oriental Plover)	MI	Y	Y	7.63	8	N
<i>Chlidonias leucopterus</i> (White-winged black tern, white-winged tern)	MI	N	N	2.47	11	N
<i>Falco hypoleucos</i> (Grey falcon)	VU	N	N	6.34	5	N
<i>Falco peregrinus</i> (Peregrine falcon)	OS	N	N	2.36	15	N
<i>Fregata ariel</i> (Lesser frigatebird)	MI	N	N	20.00	2	N
<i>Gelochelidon nilotica</i> (Gull-billed tern)	MI	N	Y	0.16	85	N
<i>Glareola maldivarum</i> (Oriental pratincole)	MI	N	N	3.73	12	N
<i>Hirundo rustica</i> (Barn swallow)	MI	N	N	7.63	1	N
<i>Hydroprogne caspia</i> (Caspian Tern)	MI	N	Y	0.16	304	N
<i>Leipoa ocellata</i> (malleefowl)	VU	N	N	27.78	3	N
<i>Limicola falcinellus</i> (Broad-billed sandpiper)	MI	Y	Y	0.16	6	N
<i>Limnodromus semipalmatus</i> (Asian dowitcher)	MI	Y	Y	0.16	8	N
<i>Limosa lapponica</i> (Bar-tailed godwit)	MI	Y	Y	0.16	344	N
<i>Limosa lapponica menzbieri</i> (Bar-tailed godwit (northern Siberian))	CR	Y	Y	2.22	3	N
<i>Limosa limosa</i> (Black-tailed godwit)	MI	Y	Y	0.16	30	N
<i>Macronectes giganteus</i> (Southern giant petrel)	MI	N	N	3.86	2	N
<i>Numenius madagascariensis</i> (Eastern curlew)	CR	Y	Y	0.16	217	N
<i>Numenius minutus</i> (Little curlew, little whimbrel).	MI	N	N	2.35	19	N
<i>Numenius phaeopus</i> (Whimbrel)	MI	Y	Y	0.16	221	N
<i>Oceanites oceanicus</i> (Wilson's storm-petrel)	MI	N	N	46.62	5	N
<i>Pandion cristatus</i> (Osprey, eastern osprey)	MI	N	N	0.16	85	N

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Phaethon rubricauda</i> (Red-tailed tropicbird)	P4	N	N	46.62	1	N
<i>Philomachus pugnax</i> (Ruff (reeve))	MI	N	Y	0.74	9	N
<i>Plegadis falcinellus</i> (Glossy ibis)	MI	N	N	2.62	90	N
<i>Pluvialis fulva</i> (Pacific golden plover)	MI	Y	N	0.5	45	N
<i>Pluvialis squatarola</i> (Grey plover)	MI	Y	Y	0.16	189	N
<i>Rostratula australis</i> (Australian painted snipe)	EN	N	N	2.22	29	N
<i>Sterna dougallii</i> (Roseate tern)	MI	N	N	0.73	10	N
<i>Sterna hirundo</i> (Common tern)	MI	Y	N	0.16	22	N
<i>Sternula albifrons</i> (Little tern)	MI	Y	Y	0.16	11	N
<i>Thalassarche chlororhynchos</i> (Atlantic yellow-nosed albatross)	VU	N	N	46.62	2	N
<i>Thalasseus bergii</i> (Crested tern)	MI	Y	Y	0	290	N
<i>Tringa brevipes</i> (Grey-tailed tattler)	P4	Y	Y	0.16	291	N
<i>Tringa glareola</i> (Wood sandpiper)	MI	N	N	1.56	227	N
<i>Tringa nebularia</i> (Common greenshank, greenshank)	MI	Y	Y	0.16	414	N
<i>Tringa stagnatilis</i> (Marsh sandpiper, little greenshank)	MI	Y	Y	0.16	34	N
<i>Tringa totanus</i> (Common redshank, redshank)	MI	Y	Y	0.16	7	N
<i>Xenus cinereus</i> (Terek sandpiper)	MI	Y	Y	0.16	70	N
<b>Mammals</b>						
<i>Bettongia lesueur lesueur</i> (Boodie (Shark Bay), Shark Bay burrowing bettong)	CD	N	N	48.93	3	N
<i>Dugong dugon</i> (Dugong)	OS	N	N	2.24	9	N
<i>Lagorchestes hirsutus bernieri</i> (Shark Bay rufous hare-wallaby, rufous hare-wallaby (Bernier and Dorre Islands))	VU	N	N	48.93	6	N
<i>Lagostrophus fasciatus fasciatus</i> (banded hare-wallaby, mernine)	VU	N	N	2.16	23	N
<i>Megaptera novaeangliae</i> (Humpback whale)	CD	N	N	2.16	3	N
<i>Perameles bougainville</i> (Western barred bandicoot, little marl, Shark Bay bandicoot)	VU	N	N	49.8	1	N
<i>Pseudomys fieldi</i> (Shark Bay mouse, djoongari)	VU	N	N	49.8	1	N
<b>Reptiles</b>						
<i>Caretta caretta</i> (loggerhead turtle)	EN	N	N	2.16	5	N
<i>Chelonia mydas</i> (Green turtle)	VU	N	N	2.16	4	N
<i>Egernia stokesii badia</i> (Western spiny-tailed skink)	VU	N	N	42.2	3	N

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<b>Invertebrates</b>						
<i>Idiosoma incomptum</i> (Carnarvon shield-backed trapdoor spider)	P3	N	N	4.45	2	N

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

### C.5. Ecological community analysis table

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Subtropical and Temperate Coastal Saltmarsh	P3	N	N	N	3.43	1	N

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

## Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u> The area proposed to be cleared does not contain locally / regionally significant flora habitats, or assemblages of plants. The application area does contain significant habitat for fauna species.</p> <p>The proposed clearing includes 5.55 hectares of vegetation in a good to completely degraded condition. The site has been used for dredging and historically cleared in 2014. It is unlikely that the proposed clearing will impact any significant biodiversity in the application area.</p>	Not likely to be at variance	No
<p><u>Principle (b):</u> "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."</p> <p><u>Assessment:</u> The area proposed to be cleared may contain habitat for conservation significant fauna.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</p> <p><u>Assessment:</u> The area proposed to be cleared is unlikely to contain habitat for threatened flora.</p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (d)</u>: <i>“Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</i></p> <p><u>Assessment</u>: The area proposed to be cleared does not contain species that can indicate a threatened ecological community (TEC).</p>	Not at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e)</u>: <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment</u>: The extent of the mapped vegetation type and native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p>	Not at variance	No
<p><u>Principle (h)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment</u>: Give the Wooramel Seagrass Bank, listed on the former Register of National Estate is located approximately 0.27 kilometres south of the application area, the proposed clearing may impact the Seagrass Bank.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f)</u>: <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment</u>: The area under application is adjacent to an estuary, near the mouth of the Gascoyne River. A small part of the application area is within the intertidal zone. The application area is growing in an environment associated with a watercourse or wetland.</p>	At variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (g)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment</u>: The mapped soils are highly susceptible to wind/water erosion and salinity risk. Noting the location of the application area, the proposed clearing may have an appreciable impact on land degradation.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (i)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment</u>: Given the application areas proximity to Shark Bay east, the proposed clearing may impact surface water quality.</p> <p>The majority of the vegetation within the application area under is shallow rooted. Therefore, the proposed clearing is unlikely to affect groundwater quality.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<p><u>Principle (j)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment</u>: The area proposed to be cleared is adjacent to an estuary and slopes downwards to sea level. According to available databases, the area is likely to flood in the event of a rise in sea level, however the proposed clearing is unlikely to cause or exacerbate this.</p>	Not at variance	No

## Appendix E. Vegetation condition rating scale

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

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

Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

### Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

## Appendix F. Photographs of the vegetation (Department of Transport, 2023; 2014).





Figure 3: Areal site photo of the application area. South-eastern direction. Photo taken (19/10/2022).



Figure 4: Areal site photo of application area. Southern direction. Photo taken (19/10/2022).



Figure 5: Areal map showing the location of where the site photos have been taken.



Figure 6: Site location at point E. Vegetation types representative of the Carnvon boat harbour, Harourd road reclamation area.



Figure A: low lying shrubs in a good vegetation condition



Figure B: tall shrubs, with bare sand and low lying shrubs.



Figure C.1: Sparse low-lying shrub vegetation, in a poor condition.



Figure C.2: *Atriplex* sp.

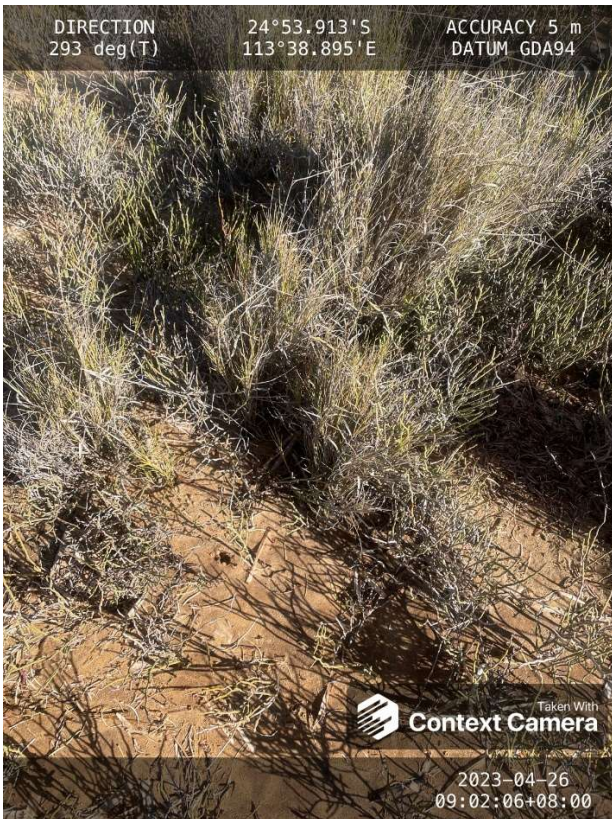


Figure C.3: *Cyperaceae* sp., *Echinochloa* sp.

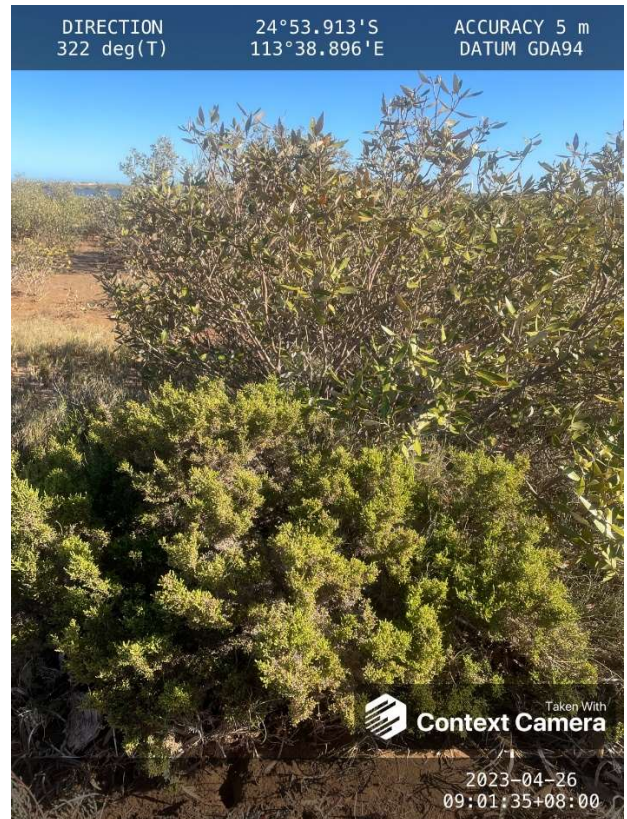


Figure C.4: low-lying shrub vegetation.



Figure D.2: *Carpobrotus* sp.



Figure D.3: Poaceae sp.



Figure D.5: *Acacia* sp.



Figure D.6: Poaceae sp.



Figure D.7: *Atriplex* sp.



Point E.1: Poaceae sp., *Atriplex* sp.



Figure E.2 Regrowth vegetation.



Figure E.3: Regrowth vegetation.



Figure E.4: Poaceae sp.



Figure E.5: Chenopodiaceae sp.



Figure E.6: Chenopodiaceae sp.

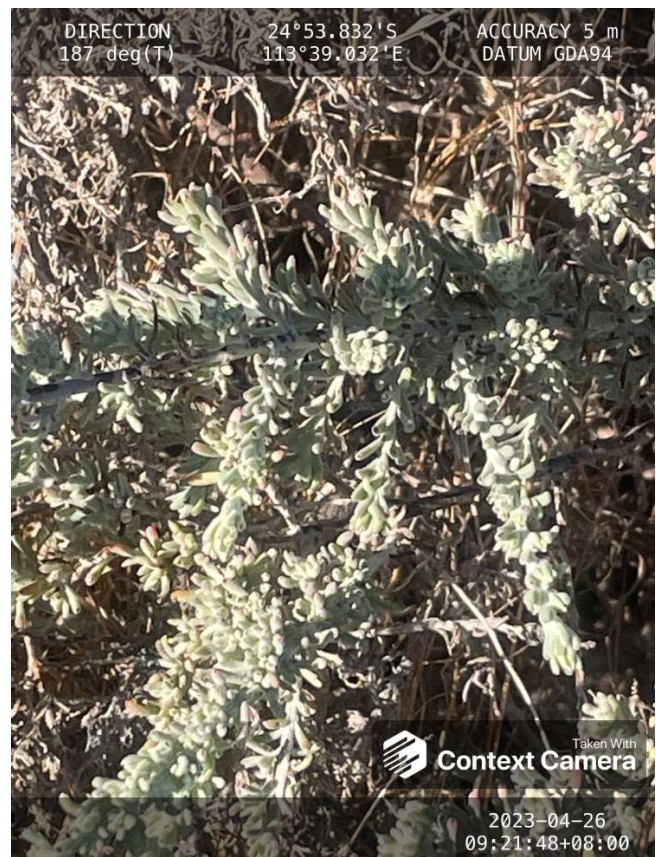


Figure F.1: Chenopodiaceae sp.



Figure F.2: *Acacia* sp.

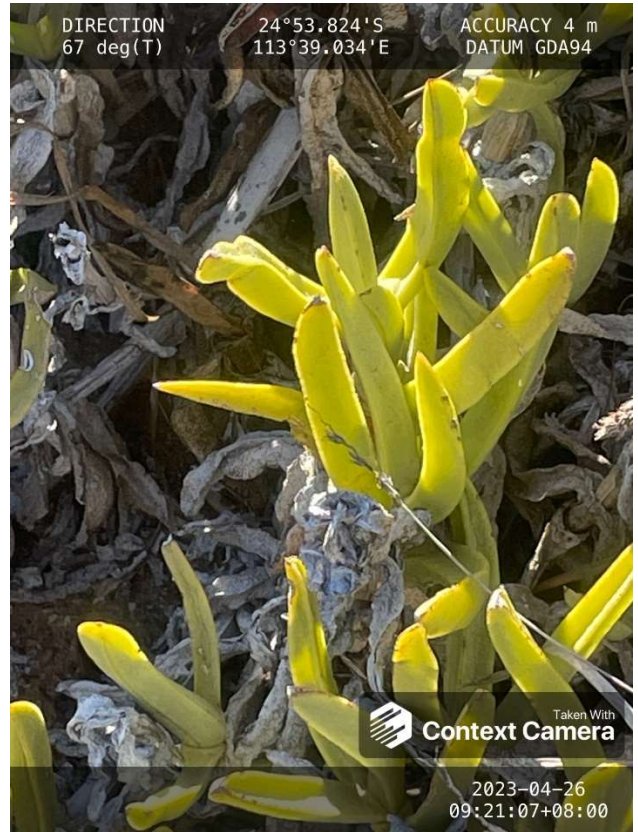


Figure F.5: *Carpobrotus* sp.

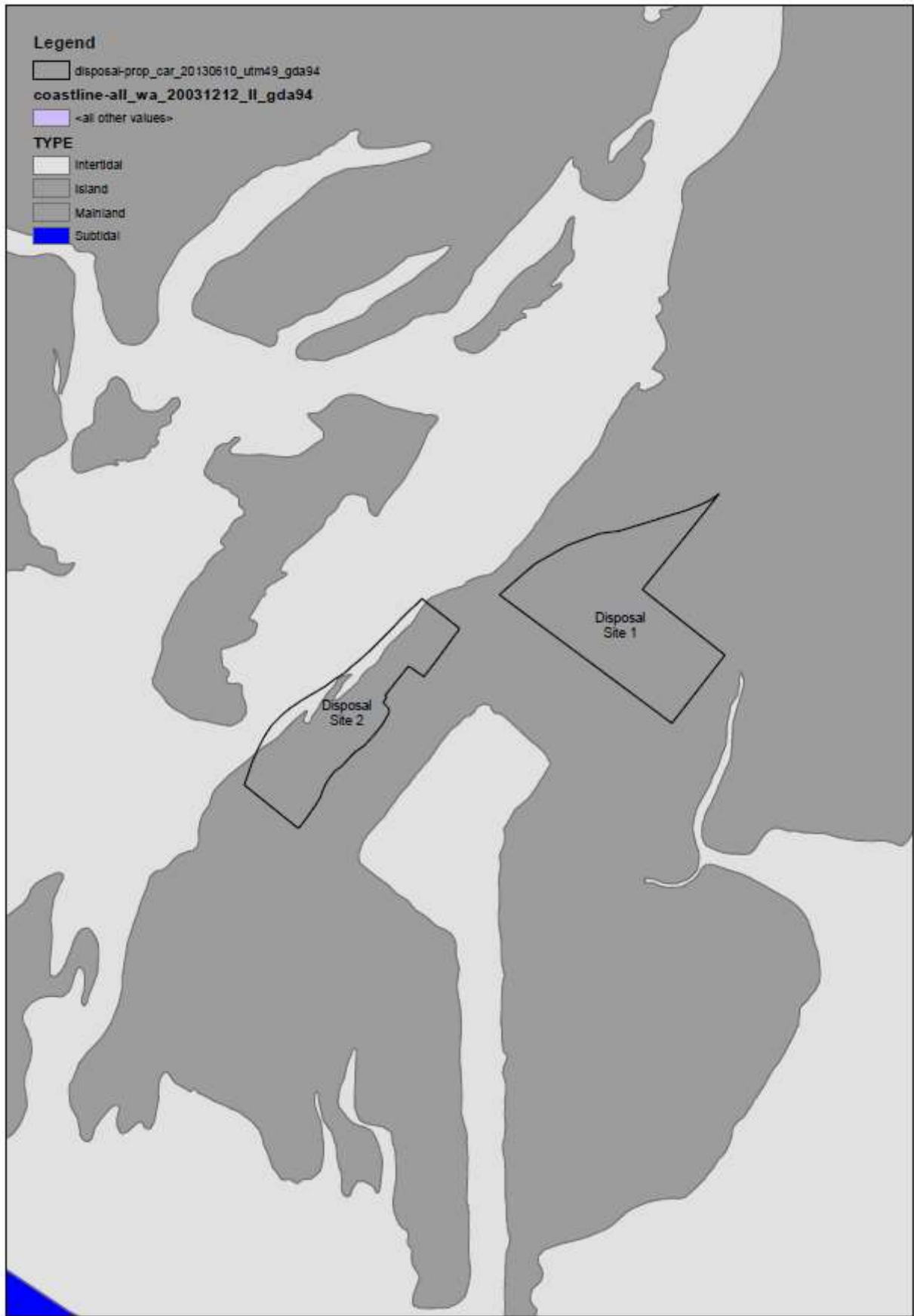


Figure 7: Application area areal map and intertidal zone mapping.





Figure 8: Map of the proposed application area and area to be dredged.

# Plan 5631/2



**LEGEND**

- Clearing Instruments
- Areas Approved to Clear
- Road Centrelines
- Local Government Authorities
- Cadastre for labelling
- Camarvon 1:4m Orthomosaic - Landgate 2002

Scale 1:3000  
 (Approximate when reproduced at A4)  
 Geocentric Datum Australia 1994  
 Note: the date in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.  
 Date \_\_\_\_\_  
 J Clantson  
 Officer with delegated authority under Section 20 of the Environmental Protection Act 1986  
 Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.  
  
 Government of Western Australia  
 Department of Environment Regulation  
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\*Project Data is denoted by asterisk. This data has not been quality assured. Please contact map author for details.

Figure 9: Map of the application area CPS 5631/2.

## Appendix G. Sources of information

### G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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