

## Appendix A

### Preliminary Environmental Risk Review

# WA Offshore Windfarm

## Environmental Risk Assessment Framework and Review

Final | 1 April 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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# ARUP

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# 1 Introduction

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## 1.1 Background

To ensure a consistent, robust and transparent approach is applied to the assessment of potential risks and impacts on the environment as a result of the proposed Western Australian (WA) Offshore Windfarm Project ('the Project'), this environment risk assessment framework has been developed. The framework contains a specific set of descriptors and criteria to help describe and evaluate risks.

## 1.2 Methodology

This Environmental Risk Assessment Framework has been developed based on widely adopted best practice and industry standards associated with environmental impact assessments.

The consequence criteria in **Section 2.6** and **Attachment A** has been developed has been developed by technical specialists and experienced environmental practitioners, and in consideration of relevant WA EPA environmental factor impact guidelines.

# 2 Impact assessment framework

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## 2.1 Overview

The risk assessment approach for the Project comprises evaluation of anticipated impacts with standard mitigation (e.g. statutory compliance), followed by determination of residual impacts, taking into consideration any additional mitigation measures to reduce the likelihood and/or consequence of the impact and hence the overall risk level.

**Figure 1** illustrates the proposed approach to environmental risk assessment, incorporating an assessment of the 'standard mitigation' scenario, as well as the 'additional recommended mitigation' scenario.

Impacts are to be assessed for the following Project phases:

- Pre-construction and construction (including establishment and decommissioning of the construction sites)
- Operation and maintenance (including initial testing and commissioning)
- Decommissioning (including potential rehabilitation work).

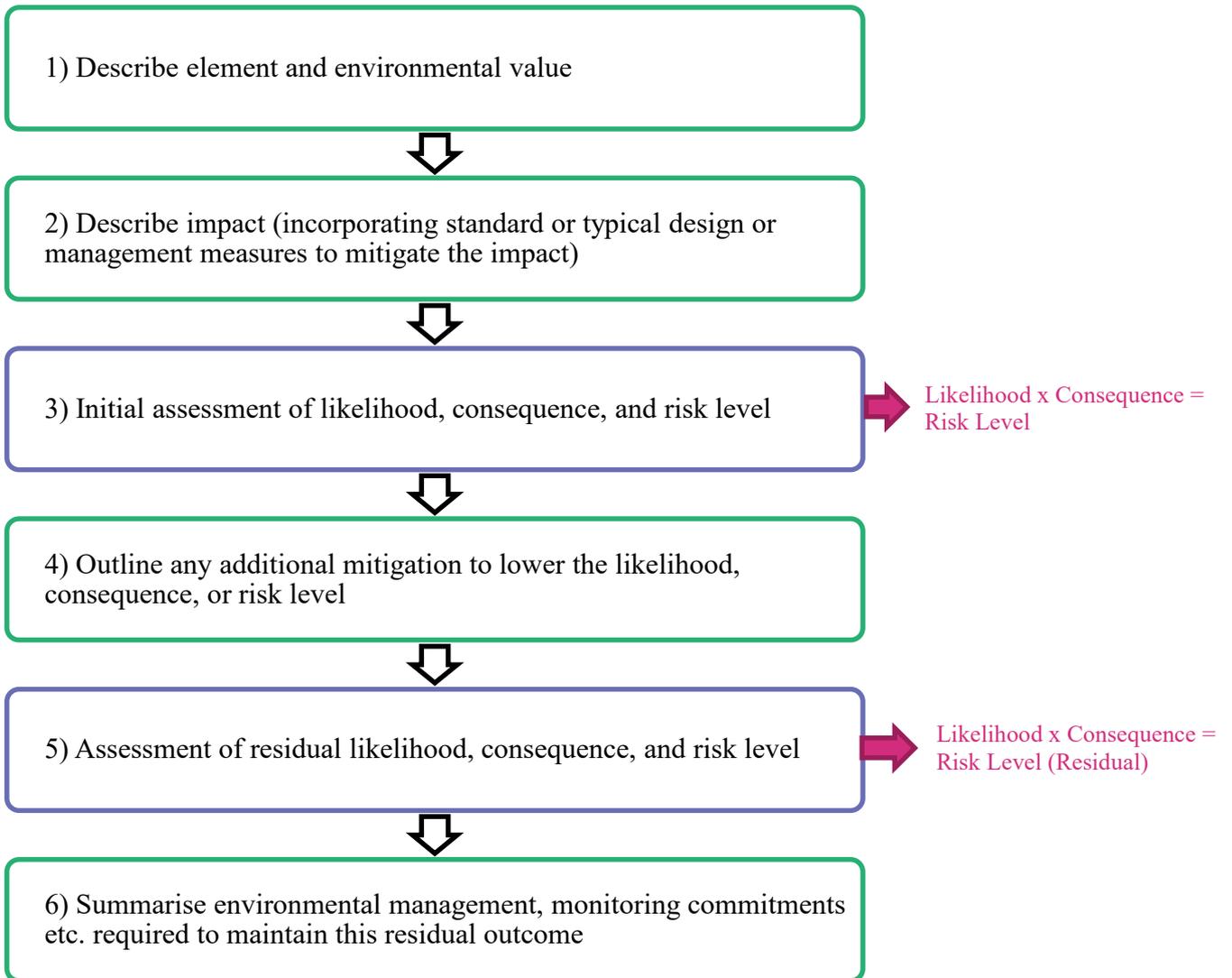


Figure 1 – Environmental impact assessment process

## 2.2 Risk identification

Potential Project risks have been predicted (see Table 5) by considering individual components and processes of the Project. Consideration has also been given to how different components and processes of the Project may interact with different components of the environment. When identifying potential environmental risks associated with the Project, both onsite and offsite and direct and indirect impacts have been considered.

## 2.3 Duration

**Table 1** outlines the general approach to classifying timeframes. Duration has been embedded into the consequence criteria.

**Table 1 - Duration**

Relative duration of environmental impacts	Description
Temporary	Days to months
Short term	Up to 1 year
Medium term	From 1 to 5 Years
Long term	From 5 to 50 Years
Permanent / irreversible	In Excess of 50 Years

## 2.4 Likelihood of impact

**Table 2** has been adopted for classifying the likelihood of an identified impact arising as a result of the Project.

**Table 2 - Likelihood of Impact**

Likelihood of impacts	Risk probability categories
<b>Highly unlikely / rare</b>	May occur only in exceptional circumstances - can be assumed not to occur during period of the Project (Probability <10%)
<b>Unlikely</b>	Event is unlikely to occur, but it is possible during period of the Project (Probability 10-30%)
<b>Possible</b>	Event could occur during period of the Project (Probability 30-70%)
<b>Likely</b>	Event likely to occur once or more during period of the Project (Probability 70-90%)
<b>Almost certain</b>	Very likely to occur as a result of the proposed Project construction and/or operations; could occur multiple times during relevant impacting period (Probability > 90%)

## 2.5 Consequence criteria

Consequence criteria has been developed for each environmental discipline (**Attachment A**). Where possible, duration has been incorporated into the criteria. **Table 3** below provides the general consequence criteria to be applied in the absence of aspect specific criteria.

**Table 3 - Example significance criteria**

Consequence	Criteria
<b>Major Adverse</b>	Impacts considered critical to the decision making process. They tend to be permanent, or irreversible, or otherwise long term, and/or can occur over large scale areas. Environmental receptors are extremely sensitive, and/or the impacts are of <b>national</b> significance. Typically mitigation measures are unlikely to remove such effects.
<b>High Adverse</b>	Impacts likely to be of importance in the decision making process. They tend to be permanent, or otherwise long to medium term, and/or can occur

	over large or medium scale areas. Environmental receptors are high to moderately sensitive, and/or the impacts are of <b>State</b> significance.
<b>Moderate Adverse</b>	Impacts relevant to decision making, particularly for determination of environmental management requirements. These impacts tend to range from long to short term, and/or occur over medium scale areas or are focused within a localised area. Environmental receptors are moderately sensitive, and/or the impacts are of <b>regional or local</b> significance.
<b>Minor Adverse</b>	Impacts recognisable, but acceptable within the decision making process. They are still important in the determination of environmental management requirements. These impacts tend to be short term, or temporary and at the <b>local</b> scale.
<b>Negligible</b>	Minimal change to the existing situation. This could include for example be impacts which are beneath levels of detection, impacts that are within the normal bounds of variation or impacts that are within the margin of forecasting error.
<b>Beneficial</b>	The Project results in an improvement in the baseline situation.

## 2.6 Risk evaluation

As shown in **Figure 1**, the risk level is a product of the likelihood of occurrence and consequence. The risk matrix in **Table 4** has been adopted for this Project.

**Table 4 - Risk Matrix**

		Consequence				
		Negligible	Minor	Moderate	High	Major
Likelihood	Highly unlikely	Very low	Very low	Low	Low	Medium
	Unlikely	Very low	Low	Low	Medium	Medium
	Possible	Low	Low	Medium	Medium	High
	Likely	Low	Medium	Medium	High	Very High
	Almost certain	Low	Medium	High	High	Very High

## 2.7 Mitigation

Mitigation measures have been identified with consideration of the following hierarchy:

1. Avoided where possible through appropriate location of Project infrastructure and planning of Project activities
2. 'Designed-out' where practicable, thereby minimising significant impacts to environmental values
3. Mitigated through implementation of environmental management plans to measure and minimise any impacts to the greatest practicable extent
4. Compensated for where impacts cannot be adequately mitigated and residual effects predominate.

As illustrated in **Figure 1**, mitigation is addressed in two ways in the impact assessment framework.

The first assessment considers what would be the 'standard mitigation' approach to implementing the Project, i.e. taking account of standard practice and statutory obligations. For example the implementation of erosion and sediment control would be a standard mitigation requirement that could reasonably be assumed to be in place for the construction

phase. The initial description and assessment of impacts is to include a description of these standard measures.

The second assessment of mitigation is ‘additional mitigation’ which is aimed at reducing the likelihood, consequence, or risk of an identified impact occurring. Additional mitigation may not be necessary for all impacts but would be relevant to impacts identified as high or very high risk. For example additional mitigation may include a species specific management plan to minimise impact during construction.

## 2.8 Risk table

Table 5 below contains a summary of the potential impacts and risks identified for the Project.

## WA Offshore Windfarm Preliminary Environmental Risk Review

ID	Aspect	Impact description	Project phase	Initial Risk			Significance rating		Justification for initial risk and significance rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
<b>Construction (incl. pre-construction)</b>													
1	Aboriginal heritage (Social surroundings)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during pre-construction and construction works potentially impacting on heritage values	Construction (incl. pre-construction)	Likely	Moderate	Medium	Yes	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the study area. The Noongar people also have a native title claim over land covering the offshore Study area.  It is likely that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the construction footprint. While project infrastructure would be located to avoid impacts as much as practicable (by utilising previously disturbed land and existing infrastructure easements and corridors where possible), some disturbance to Aboriginal cultural heritage sites could be required. This will be further examined and determined as the project progresses, with the avoid, minimise, mitigate, offset hierarchy applied during design development.	Engagement and site walkovers with Native Title claimants and local Aboriginal groups will be carried out to confirm cultural heritage values within the construction footprint and project areas. An Aboriginal Heritage Management Plan (AHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project, and would include an unexpected finds procedure. Mitigation, such as salvage prior to works on-site, may be carried out for impact to areas containing large artefact scatters.	Possible	Moderate	Medium
2	Aboriginal heritage (Social surroundings)	Impact to culturally sensitive landforms (Dreaming sites) during pre-construction and construction works resulting in long-term loss of connection to land	Construction (incl. pre-construction)	Likely	Moderate	Medium	Yes	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the study area. The Noongar people also have a native title claim over land covering the offshore Study area. Desktop assessments have not been able to identify culturally sensitive sites and consultation with Aboriginal representatives is required. If present, there is a risk that construction activities could temporarily restrict access to some culturally sensitive sites and song lines.  Possible exclusion zones (500m) to offshore areas during construction may impact on intangible Aboriginal culture as it will limit access to the ocean.	Engagement with Native Title claimants and local Aboriginal groups will be carried out to confirm intangible cultural heritage values in the study area. Design would avoid sites / minimise impacts to sites of cultural significance where practicable. An Aboriginal Heritage Management Plan (AHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project.	Possible	Moderate	Medium
3	Air quality (Air quality & GHGs)	Generation of air emissions and dust from pre-construction and construction works impacting on sensitive receptors and local air quality	Construction (incl. pre-construction)	Likely	Minor	Medium	No	N/A	Proposed pre-construction and construction works are expected to generate some air emissions (e.g. dust and grit through land disturbance and exhaust fumes etc from construction vessels and vehicles), however this would be localised and of limited duration. A preliminary land use assessment indicates there are limited sensitive receptors within the study area. Given the temporary and low magnitude nature of the air quality impacts and the limited sensitive receptors in the area, likely impacts are not considered significant under WA EPA significance criteria.	A future air quality assessment would inform the requirements for a Construction Environmental Management Plan (CEMP). Dust monitoring programmes and equipment (if required) could be used to determine when activities need to be altered to reduce dust emissions. Actions such as watercarts on haul roads and main construction sites could be used to generate less dust. Standard measures to limit the generation of dust and other air emissions (such as most efficient use of construction equipment and planning to reduce vessel and vehicle use and movements) would also be included in the CEMP.	Possible	Minor	Low
4	Air quality (Air quality & GHGs)	Generation of GHGs from pre-construction and construction work	Construction (incl. pre-construction)	Possible	Negligible	Very Low	No	N/A	The Project would generate minor GHGs for a short period of time, associated with manufacturing of offshore equipment (turbines, substations and cables) and onshore connection (cables, towers, substations) and other construction activities (shipping, land clearing) etc.  The Project is expected to produce approximately 40,000tGHW over 30 years which equates to 11,826t/year for 9 gCO2eq/kWh (Scope 1, 2 & 3 combined). Given the negligible impact of GHGs to the WA State Emissions Inventory is not significant under the WA EPA significance criteria.	A future greenhouse gas assessment would inform requirements for a Construction Environmental Management Plan (CEMP) if necessary. GHGs monitoring programmes could be used to determine high emitting construction activities and these would be limited where feasible. The intent of the Project is to provide clean, renewable energy to the State and reduce reliance on fossil fuels that emit large volumes of GHGs.	Possible	Negligible	Low
5	Aviation and radar (incl. EMI)	Interference to civil and military radar during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/rare	Negligible	Very Low	N/A	N/A	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Busselton Margaret River Airport (approx. 100km away). Interference to aircraft radar during pre-construction and construction works is considered low due to the anticipated construction methodologies.	A future radar impact assessment would inform of any requirements to minimise impacts during construction.	Highly unlikely/rare	Negligible	Very Low
6	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Negligible	Very Low	N/A	N/A	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Busselton Margaret River Airport (approx. 100km away). However, scenic flights over the coast of Myalup and Binningup form part of the local tourism industry. Scenic flights depart from various private airstrips located around the project area including Bunbury, Busselton and the closest being Blair Field Airstrip around 7km north of the Project area. Obstruction to scenic flight paths could be possible during construction of the Wind Turbine Generators (WTGs) and would be further investigated and determined. As scenic flights are expected to be largely carried out during day-light hours, impact from any night-lighting utilised during pre-construction or construction is anticipated to be low. This would be localised and of limited duration.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during construction. Future studies would also identify any TV or radio transmission sites and consultation with relevant stakeholders would take place.	Unlikely	Negligible	Very Low
7	Ecology (Benthic communities and habitat)	Potential impact on Western Australian listed, threatened or non- threatened benthic communities, or their habitat	Construction (incl. pre-construction)	Likely	High	High	Yes	N/A	Extensive benthic habitat mapping studies have been completed at Binningup. Benthic communities at Binningup are known to comprise of sponges, ascidians, bryozoa, hydroids, hard corals, macroalgae and seagrasses. However there is generally low diversity and abundance of benthic flora due to a high level of wind driven natural disturbance. Macroalgal assemblages in the region consist of Ecklonia, Sargassum, Caulerpa, Scytothalia, Epiphytes and Codium spp. Sparse seagrass beds occur approximately 1 km offshore, comprised primarily of Posidonia angustifolia, with P. coriacea and Amphibolis spp. present in lower abundance. Studies show that P. angustifolia is tolerant to low light and P.angustifolia and P. coriacea can survive long periods  Potential risks to benthic communities include seabed reomval turbidity, spills, marine pests. In regards to seabed disturbance, as cabling will be buried, benthic habitats will recover slowly over time. Given the extent of habitat loss is relatively small, it is unlikely that construction activities from the Project will physically fragment habitats to the extent that major flow-on impacts to benthic communities (and the values they support) will occur.  Due to likely occurrence of benthic communities, a precautionary risk rating has been given. Due to the conservative preliminary impact assessment and without field studies, impact to Benthic communities and habitat is considered significant under WA EPA significance criteria.	Further marine studies are required to collect baseline data and characterise existing conditions. This will be used to inform future stages of design and management measures applied in the CEMP. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and burying cables. To understand presence of benthic communities satellite and field ground-truthing is required. Further design development may involve avoiding benthic communities where possible.	Possible	Moderate	Medium

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				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
8	Ecology (Marine fauna)	Potential impact on Western Australian threatened and non-threatened marine species and communities, or their habitat	Construction (incl. pre-construction)	Likely	Major	Very High	Yes	N/A	<p>There are a number of state protected (endangered, critically endangered, priority 4) marine fauna that are likely to occur in the Study area. These include birds, mammals (sea-lion, whales and dolphin), reptiles (turtles), fish, sharks and crustaceans. The Project area is also a key habitat area for Western rock lobster.</p> <p>Potential risks to marine fauna during construction include pile driving (intense pulses of noise that can cause injury and behavioural changes, including Western rock lobster and other high value fisheries), habitat loss that may fragment seagrass (reduce foraging capacity), turbidity and disturbance of acidic soils from seabed disturbance when laying cables (resulting in decreased water quality), vessel strike (especially to slow moving fauna like whales), marine pests, spills, underwater noise generated by vessels and artificial light from construction.</p> <p>Therefore the unmitigated risk is high and impact to Marine fauna is considered significant under WA EPA significance criteria.</p>	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts include seasonal construction windows (vary depending on species), avoidance of whale migration period, safety zones/lookout, pingers, buried cables to allow habitat to recover, minimising lighting (or uses red lights)	Unlikely	High	Medium
9	Marine geology, oceanography and physical processes (Coastal processes)	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Minor	Low	No	N/A	<p>The region is classified as microtidal with a tidal range of 1.4 m from lowest to highest astronomical tide. Tides are predominantly diurnal, with a single tide cycle on most days. Prevailing swell is south to southwest, varying seasonally with storm activity during winter, and high wave conditions occur during periods of strong onshore winds. Moderate-high swell wave energy from the southwest drives net northward sediment transport, although occasional reversals of sediment transport occur during winter (BMT 2021). Construction equipment is unlikely to change coastal geomorphological processes because of their temporary nature, however more work is required to assess this risk and a precautionary risk rating has been given as a result.</p> <p>Given that construction is to take place over a short period, and is not expected to alter coastal processes, the impact to Coastal processes is not considered significance under WA EPA significance criteria.</p>		Possible	Minor	Low
10	Marine water quality and sediment quality (Marine environmental quality)	Potential impacts to marine water and sediment quality during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	No	N/A	<p><b>Water quality</b> - Water quality sampling has been carried out for previous projects in the area (e.g. Desalination Plant) and shows higher concentration of nutrients and chlorophyll in winter compared to summer, and concentrations of petroleum and metals below limits of reporting. Construction activities are likely to increase these levels.</p> <p><b>Turbidity/sediments</b> - Modelling will be required to assess turbidity generated by construction activities. Pile driving or dredging to install cabling in clean sands is expected to generate a short-term, low intensity sediment plume. It is likely that the plume would dissipate rapidly and would be unlikely to impact on adjacent light sensitive habitats or impede fauna vision.</p> <p><b>Spills</b> - vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants and other chemicals. These substances can have lethal and sub-lethal effects to organisms (Yuewen and Adzighli 2018) and can persist in the environment for long periods of time. An uncontrolled release could occur from (for example) vessel collision, equipment failure, leaks etc</p> <p>Impact to marine environmental quality is not considered significant under WA EPA significance criteria. Any impacts to marine environmental quality would be localised and would not cause significant changes to water, sediment and biota. Localised impacts can be managed with standard measures.</p>	A marine water quality and pollution risk assessment will be undertaken to inform the development of management strategies for the CEMP. Standard chemical storage, handling and maintenance procedures will be required.	Unlikely	Moderate	Low
11	Ecology (Flora and vegetation)	Potential impact on Western Australian listed or threatened flora and vegetation	Construction (incl. pre-construction)	Possible	High	Medium	Yes	N/A	<p>The Project area covers areas of flora and vegetation, including potential habitat for threatened and priority 1-4 flora species. The scale of direct flora and vegetation habitat is proposed to be limited due to the area being previously disturbed and cleared for existing infrastructure (e.g. Binningup Desalination Plant, transmission lines connecting to Kemerton sub-station, Forrest Hwy). Any clearing of vegetation outside these areas that contains supporting habitat for threatened and priority species will need to be surveyed and assessed for presence of threatened flora</p> <p>Besides direct disturbance, spread of weeds and disease and introduction of pest/non-native species during early works also has the potential to impact on listed threatened species and communities.</p> <p>Landside construction could potentially require clearing of threatened or priority species, locally endemic habitat, new and/or usual species and those that are of revictual status (taxonomic groups that are no longer occurring in the wider landscape). For this reason, impact to flora and vegetation is considered significant under WA EPA significance criteria.</p>	<p>Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the Construction Environmental Management Plan.</p> <p>During future project phases, native vegetation communities are to be mapped and ground-truthed.</p> <p>Where possible design refinement should avoid areas of native vegetation and supporting habitat for threatened and priority flora species.</p>	Possible	Minor	Low

ID	Aspect	Impact description	Project phase	Initial Risk			Significance rating		Justification for initial risk and significance rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
12	Ecology (Subterranean fauna)	Potential impact on Western Australian subterranean fauna	Construction (incl. pre-construction)	Possible	Major	High	Yes	N/A	<p>The risk is high due to the highly unique nature of potentially present subterranean fauna within the Project area. Species are unique compared to other communities because they've been isolated in underground perched aquifers and caves. Groundwater and perched aquifers along the WA coast are likely to provide habitat for Subterranean fauna and without further desktop and field work assessments the risk remains possible.</p> <p>This risk rating is precautionary until further assessment of local groundwater systems is carried out and construction methods are further developed. Given the unknown occurrence of subterranean fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.</p>	<p>If further desktop assessments confirms likelihood of occurrence, field work would be required to understand assemblage of species. The Project would be designed to avoid deep excavation in areas where subterranean species occur.</p>	Possible	Moderate	Medium
13	Ecology (Terrestrial fauna)	Potential impact on Western Australian listed or threatened terrestrial fauna	Construction (incl. pre-construction)	Possible	High	Medium	Yes	N/A	<p>The Project would impact areas mapped with critically endangered, endangered and vulnerable fauna species, as well as Priority 1-4 fauna species. Desktop mapping indicates there are smaller areas within the Project area that contain more habitat that may support threatened fauna, including areas of native vegetation cover around the foreshore and the existing substation</p> <p>The scale of direct fauna habitat is likely limited due to the area being previously disturbed (e.g. Binningup Desalination Plant, transmission lines connecting to Kemerton sub-station, Forrest Hwy).</p> <p>This risk rating is precautionary until further assessment of terrestrial fauna is carried out and construction methods are further developed. Given the unknown occurrence of threatened fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.</p>	<p>Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.</p>	Possible	Moderate	Medium
14	Ecology (Terrestrial fauna)	Potential impact on Western Australian on migratory birds	Construction (incl. pre-construction)	Almost Certain	High	High	Yes	N/A	<p>The Project would impact areas mapped as specially protected for migratory birds onshore, as well as marine migratory birds. Further assessment is required to understand occurrence and abundance of species, and whether the project area provides breeding/roosting habitat.</p> <p>Lake Preston is part of the Peel-Yalgorup Ramsar wetland areas and is likely to support migratory shorebirds and wetland birds. Additional understanding of the populations of migratory birds that utilise Lake Preston will be required to better understand any potential impacts. This will include assessment of flightpaths and flyways, as well as the diversity and abundance of migratory birds using Lake Preston and surrounds.</p> <p>This risk rating is precautionary until further assessment of terrestrial fauna, including migratory birds, is carried out and construction methods are further developed. Given the unknown occurrence of threatened fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria. Due to the proximity of the study area to the Peel-Yalgorup Ramsar wetland, the site has been consider</p>	<p>Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.</p> <p>Bird surveys for migratory wetland and shorebird species will be required to assess if a significant proportion of a population of a species, or a suitable diversity of species occur on the site and in the adjacent Ramsar wetland. Collision Risk Modelling is likely to be required to understand the potential impacts associated with blade strike</p>	Possible	Moderate	Medium
15	Ecology - EPBC listed threatened species and ecological communities	Potential impact on Commonwealth listed threatened species and communities, or their habitat (terrestrial and marine)	Construction (incl. pre-construction)	Likely	High	High	N/A	Yes	<p><b>TECS:</b> Three Commonwealth listed Critically Endangered Threatened Ecological Communities (TEC) are likely to occur in the area. Mapping shows extensive areas of TEC mapped within the Study area. (See report for full list of TEC species). There are no mapped TECs within the marine offshore area.</p> <p><b>EPBC flora species:</b> Based on desktop assessment of available mapping and aerial photographs, the vegetation within the Study area consists of a mosaic of native vegetation communities in a modified landscape. Native vegetation is predominantly mapped as occurring along the foreshore and dune systems, and then to the east of Old Coast Road. There is a strip of land adjacent to Old Coast Road that has been historically cleared. (See report for full list of flora species)</p> <p><b>EPBC fauna species:</b> The Study area is mapped with critically endangered, endangered and vulnerable fauna species. The Project also contains areas mapped as specially protected for migratory shorebirds associated with Lake Preston (apart of the Peel-Yalgorup Ramsar wetland area, as well as marine migratory birds. (See report for full list of fauna species). In regards to threatened marine species, the Study area could contain critically endangered birds, mammals (whales, sea-lion, dolphin) reptiles (turtles), fish, sharks and crustaceans.</p> <p><b>Potential risks for terrestrial species:</b> potential clearing of habitat for transmission cables and onshore infrastructure, including through dune systems and shrubland/woodland habitats east of Old Coast Road. Indirect impacts from noise and lighting for construction.</p> <p><b>Potential risks for marine species:</b> pile driving (generates intense noise and drive behavioural changes), habitat loss (seabed disturbance from WTGs and cabling), turbidity, disturbance of acidic and/or contaminated soils, vessel strike, marine nests, snails and vessel</p>	<p>Further ecological desktop and field assessments are required to refine the known or likely presence of threatened ecological communities and species within the study area.</p> <p>Pre-clearance flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the Construction Environmental Management Plan. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.</p> <p>Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables.</p>	Possible	Moderate	Medium
16	Ecology - EPBC migratory species (terrestrial)	Potential impact on marine Commonwealth listed migratory birds, or their habitat	Construction (incl. pre-construction)	Possible	Moderate	Medium	N/A	Yes	<p>The nearby Peel-Yalgorup Ramsar wetland is listed as it regularly supports more than 20,000 waterbirds, including 32 migratory shorebird species (Hale and Butcher, 2007). It is reported as supporting more than 1% of the known population of 11 waterbirds. Clearing for transmission lines during construction may indirectly impact shorebirds through removal of habitat associated with the Peel- Yalgorup Ramsar wetland.</p> <p>Given the limited desktop data available to assess presence of species and unknown migraotry patterns of species, a precautionary approach has been applied and as a result, activities from the Project could have a potentially significant impact on migratory species under the EPBC significance criteria.</p>	<p>Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of migratory patterns and the likelihood of disrupting this process.</p> <p>Specific measures in the CEMP for the management of fauna would include -Identification of any seasonal constraints, such as breeding or migration seasons and development of measures to avoid disruption to fauna during these times. Pre-clearing and clearing phase surveys to identify areas of animal breeding habitats</p>	Possible	Minor	Low

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	Ecology - EPBC migratory species (marine)	Potential impact of terrestrial Commonwealth listed migratory marine fauna, or their habitat	Construction (incl. pre-construction)	Possible	High	Medium	N/A	Yes	<p>The Study area is nominated to be a Biologically Important Area under the EPBC Act for marine migratory species such as whales, seabirds, sharks and turtles. (See report for full list of marine migratory species). Potential impacts during construction include underwater noise and artificial light (leading to avoidance behaviour), loss of foraging habitat (from seabed disturbance for WTG platforms and cabling) and vessel strikes (particularly for large slow moving fauna like whales).</p> <p>Given the likelihood that some EPBC protected marine migratory species exist within the study area, and the limited construction methodology or indicative placement for offshore infrastructure, a precautionary approach has been applied. As a result, activities from the Project could have a potentially significant impact on migratory species under the EPBC significance criteria.</p>	<p>Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of migratory patterns and the likelihood of disrupting this process.</p> <p>Specific measures in the CEMP for the management of fauna would include -identification of any seasonal constraints, such as breeding or migration seasons and development of measures to avoid disruption to fauna during these times. Pre-disturbance phase surveys to identify areas of animal breeding habitats</p>	Possible	Minor	Low
17	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Construction (incl. pre-construction)	Possible	High	Medium	N/A	No	<p>Although works do not take place in Commonwealth waters, there is still potential for indirect impacts to waters, as a result of spills, cable laying (or removal), piling activity the introduction of pest species or changes to hydrodynamics. With appropriate controls in place, these impacts are considered to be a low risk, which is localised. They are unlikely to have a 'substantial' or 'persistent' adverse impact on the Commonwealth marine environment. Impacts to Commonwealth Marine Areas is expected to be Not Significant.</p>	<p>Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given water quality monitoring and sediment quality of Cth marine environment.</p>	Likely	Moderate	Medium
18	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during pre-construction and construction works	Construction (incl. pre-construction)	Almost Certain	Moderate	High	N/A	N/A	<p>The Project will require interface with a range of other significant infrastructure during pre-construction and construction, such as ports, roads, electricity networks and other services and utilities. Pro-active planning, early engagement and the implementation of a governance structure with third-parties would help identify risks and associated risk management strategies.</p> <p>Unexpected infrastructure interfaces would be identified during design development and construction planning through DBYD searches and ground surveys. Hard interfaces will be identified early for pro-active management and engagement with third-parties. Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.</p>	<p>Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during pre-construction and construction.</p>	Possible	Minor	Low
19	Ground conditions and contamination (Terrestrial environmental quality)	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during pre-construction and construction works leading to potential risks to public health and the environment	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/A	N/A	<p>Construction of the Project will require excavation and stockpiling of soils to lay transmission lines and cables, with potential of soil contamination. However, the Project area is mapped with a mix of extremely low probability of Acid Sulfate Soils (ASS) occurrence, with some pockets of low probability and high probability on the eastern side of the Forrest Hwy. Agriculture and other previous disturbance within the Project area have potentially resulted in soil contamination. The potential for Acid Sulfate Soils and contaminated land within the construction footprint would be ascertained through on-site assessment during design development and pre-construction stages.</p>	<p>A contamination assessment would establish baseline indicators of material at site, which would be used to inform the Construction Environmental Management Plan, particularly in relation to management and disposal of spoil. Spoil from earthworks would be reused on-site where possible or disposed of in accordance with EPA requirements.</p>	Unlikely	Minor	Low
20	Ground conditions and contamination (Terrestrial environmental quality)	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during pre-construction and construction works impacting soil and water quality	Construction (incl. pre-construction)	Almost Certain	Minor	Medium	No	N/A	<p>Construction will require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality. The impacts to soils and ground conditions is not considered 'significant' under the Terrestrial Environmental Quality guideline because land use practices anticipated during construction will not significantly increase exposure and vulnerability of soils to salinisation due to vegetation clearing.</p> <p>Refer to 'Hydrology, flooding and water quality' for potential impacts to freshwater receiving environments.</p>	<p>Vegetation and dense land cover clearance would be minimised as much as practicable during design development. Areas containing significant drainage patterns or heavy water flows would be avoided. A CEMP would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. A Erosion and Sediment Control Plan would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. This would include measures such as runoff, diversion and drainage points, scour protection, stabilising disturbed areas with fencing and swales and arrangements for high-risk weather events. A site-specific emergency spill response procedure will be developed to minimise risk of spills and reduce impacts of exposure.</p>	Possible	Minor	Low
21	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to hydrology and flooding during pre-construction and construction works	Construction (incl. pre-construction)	Possible	High	Medium	No	N/A	<p>Activities such as earthworks and land cover and vegetation clearing could potentially impact on nearby waterways (i.e. changes to hydrological regime) and there is a risk of potential increase in flooding during construction. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and construction methods are further developed.</p>	<p>Further investigations will be carried out to understand the surface water environments in the area and to inform appropriate management measures to be applied. Standard construction management measures in accordance with the WA EPA requirements and implementation of a CEMP will reduce the risk of altered surface water flow regimes and flooding. Construction during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments.</p>	Unlikely	Moderate	Low
22	Hydrology, flooding, water quality, groundwater (Inland waters)	Potential impacts to surface water quality during pre-construction and construction works	Construction (incl. pre-construction)	Likely	High	High	Yes	N/A	<p>Lake Preston is just outside of the Project area and around 5.5 km from the nearest WTG. Lake Preston is a part of the Peel-Yalgorup System, which is a Ramsar protected wetland. The Bengier Swamp Nature Reserve is located inland and adjacent to the South Western Highway, around 4.5km outside of the Project area boundary. It is mapped under Directory of Important Wetlands of WA. The Project area includes Lake Josephine, a small lake at the southern end of nearby Lake Preston, with a drain and watercourse associated with the lake. The lake is not a part of the Ramsar protected Peel-Yalgorup System.</p> <p>Pre-construction and construction activities such as earthworks and vegetation clearing could potentially impact on nearby waterways (i.e. increased nutrients entering waterways). There is also the potential for leaks and spills during construction, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. Considering the highly sensitive environments of nearby wetlands and the limited understanding of local wetland and surface water systems, this risk rating is precautionary until further studies are carried out.</p> <p>The risk of impact to Inland Waters is significant under WA EPA significance criteria because although the Project area avoids important water sources, construction activities may have an indirect impact on sensitive water sources and ultimately affect water quality. Further assessment is required but in the absence of detailed data, a precautionary approach is justified.</p>	<p>Further investigations will be carried out to understand the value of surface water environments in the area and to inform appropriate management measures to be applied. Design development would look to minimise impacts through siting of infrastructure and construction methodology. Early installation of drainage controls and erosion and sedimentation monitoring during pre-construction and construction works would assist in managing and mitigating impacts to land processes. Standard construction management measures in accordance with the WA EPA requirements, such as bunding around earthworks and chemical storages and implementation of a CEMP, would reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Construction during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.</p>	Possible	Moderate	Medium

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23	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to ground water quality and/or flow during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	Yes	N/A	<p>The Project site is within a <i>Waterways Conservation Act 1976</i> declared management area, Leschenault Inlet Management Area, and within the South West Coastal Proclaimed Groundwater Area. The Department of Primary Industries and Regional Development mapping of groundwater and salinity shows that the Project area is located on a coastal plain with low risk of salinity and mostly stable groundwater trend.</p> <p>Local ground water quality may deteriorate through turbidity, salinity, colour, odour, temperature, nutrients or pollutants such as chemicals and materials required during construction. Some excavation for landfill site may extend below regional groundwater level. Local dewatering may be necessary to manage groundwater inflows to excavation. It is considered unlikely that lowering the water tables temporarily would have a long-term impact on groundwater flows however, a precautionary risk rating has been given.</p>	Further assessment of groundwater sources within the Project Area will be carried out. Early installation of drainage controls and erosion and sedimentation monitoring during site establishment and earthworks (if required) would assist in managing and mitigating impacts. Establishing appropriate procedures for handling, transporting and using potentially contaminating substances including diesel, petrol, oils, greases, cement and other construction chemicals in the Construction Environmental Management Plan.	Unlikely	Minor	Low
24	Human health, hazards and risks (Human health)	Human exposure to unsafe levels of Electro-magnetic fields (EMF) during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/rare	Moderate	Low	No	N/A	<p>Electro-magnetic fields are produced wherever electricity is used or transmitted. Therefore, the electricity supply to support work at the site is expected to be a source of Electro-magnetic fields. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.</p> <p>The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.</p>	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	Moderate	Low
25	Human health, hazards and risks (Human health)	Potential for fire and increased bushfire risk during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Moderate	Low	N/A	N/A	<p>The Project is located in a designated Bush Fire Prone Area. However, the Western Australian My Fire Watch mapping shows bushfires have occurred in the last two years within the wider region, but well outside the Project area. Recent fires occurred in Lane Pool Reserve (2019, 2020) and Hoffman (2020). Construction works may increase risk of fire and bushfire from accidental ignition from construction equipment, fuels and chemicals.</p>	Standard construction management measures such as management plans addressing these issues would be included in the CEMP and would reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/rare	Moderate	Low
26	Human health, hazards and risks (Human health)	Vulnerability of the project to natural hazards, extreme weather and climate change during pre-construction and construction works	Construction (incl. pre-construction)	Unlikely	Moderate	Low	N/A	N/A	<p>Climate induced risks include increased dust generation during drier weather, increased construction delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for construction workers to experience heatstroke as a result of extreme heat and hot weather events.</p>	Standard management measures such as management plans addressing these issues would be included in the CEMP and would reduce the impact on the Project, including adequate training and PPE being provided to construction workers.	Highly unlikely/rare	Moderate	Low
27	Human health, hazards and risks (Human health)	Exposure of construction personnel or the public to unsafe conditions as a result of pre-construction and construction works and on-site practices	Construction (incl. pre-construction)	Possible	Major	High	No	N/A	<p>Offshore wind project presents unique risks to construction workers because of the nature of offshore construction (i.e. working at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of construction personnel. The wider community is not expected to be impacted as access to construction sites on and offshore will be restricted.</p> <p>The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.</p>	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during construction on and offshore. Standard construction management measures would also reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers.	Unlikely	Major	Medium
28	Historic heritage (Social surroundings)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/rare	Moderate	Low	No	N/A	<p>There are no Commonwealth or State listed heritage places in the Project area. However, there are two recorded shipwrecks off the coastline, approximately 7km north off the coast of Preston Beach and 20km south near Bunbury. Project infrastructure would not interfere with the shipwrecks.</p> <p>Given that the Project area avoids any direct impact of historic heritage sites, the impacts are considered not significant under the WA EPA significance criteria for Social Surroundings.</p>	Project infrastructure would be located to avoid impacts to shipwrecks and local historic heritage assets. Management measures would be included in the CEMP (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/rare	Moderate	Low
29	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during pre-construction and construction works	Construction (incl. pre-construction)	Almost Certain	Moderate	High	N/A	N/A	<p>The onshore section of the Project area covers approximately 29,200ha and intersects various land uses zoned by the Shire of Harvey. Around half of the onshore project area is zoned for Conservation/Protection, currently used for general farming and regional open space. Construction of the Project (namely ancillary sites) would be significantly inconsistent with these planning zones, however would be temporary in nature. The other half of the Project area, east of the Forrest Hwy, is zoned as industrial or strategic industrial. Some sections are zoned for public utilities (e.g. Kemerton sub-station). The northern and southern extents of the Project area impact on residential areas. Impact to these residential areas will be temporary and limited to potential disruption to access but would not result in permanent acquisition.</p> <p>This is a precautionary risk rating. As the design of the Project progresses the Project area will be further refined and may exclude/avoid residential areas.</p>	Further assessment will identify specific impacts and in particular, any property acquisition required. Further design development will aim to reduce land use impacts by refining the Project area and construction boundary to avoid sensitive land uses. Consultation with the Shire of Harvey council will take place during detailed design, to ensure impacts are managed and appropriate consideration is given to future developments planned in the area. Management measures will be included in the CEMP, including ancillary sites to be rehabilitated to their pre-construction condition.	Likely	Minor	Medium

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30	Land use	Property acquisition or tenure of land or waters during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Moderate	Medium	N/A	N/A	<p>The offshore section of the Project area covers approximately 26,000ha. The assets would be located within the 3 nautical mile limit of Western Australia and key construction activities would be carried out within State waters, including the transport of monopile foundations by supply vessels, piling works, and seabed excavation for installation of offshore cables.</p> <p>For onshore construction, temporary use or acquisition of freehold land is unknown at this stage. This is a precautionary risk rating. As the design of the Project progresses the Project area will be further refined and would exclude/avoid residential areas.</p>	<p>Consultation will be undertaken with the Department of Planning, Lands and Heritage (DPLH) to determine the requirements for tenure in State waters.</p> <p>The Project will be developed in accordance with The Coastal and Lakelands Planning Strategy: Dawesville and Binningup, that applies to the Project area.</p>	Unlikely	Minor	Low
31	Landscape character & visual (Social surroundings)	Potential adverse impacts during pre-construction and construction works on visual and/or landscape values experienced from public open space (coast) or residential areas	Construction (incl. pre-construction)	Almost Certain	High	High	Yes	No	<p>Offshore construction equipment (eg. jack up barges, construction vessels) and WTGs themselves will impact on the landscape character and visual amenity of Myalup. The natural landscape of Myalup, being an important recreational and tourism node, is likely to be highly valued by the local, regional and state community. The WTGs and construction equipment will likely form a noticeable feature on the landscape that is currently untouched oceans views.</p> <p>However, the site itself was selected being of the lower population density of the area, to reduce impacts as much as possible. The WTG have been indicatively placed as far off the coast as possible to reduce visual impacts. The additional construction equipment will only impact visual amenity for a short-term period before being removed.</p> <p>The landscape character of the surrounding area holds ecological, scientific and social significance to the community. Accordingly, impacts to social surroundings is something that will need to be further tested with the community. This is considered to be potentially significant under the WA EPA significance criteria.</p>	<p>Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity at various viewpoints along the coastline and residential areas. Landscaping and revegetation would be used to minimise onshore impacts.</p>	Almost Certain	High	High
32	Noise and vibration	Noise and/or vibration from pre-construction and construction activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors	Construction (incl. pre-construction)	Possible	Minor	Low	N/A	N/A	<p>Construction of the onshore substation, landfill site and underground cables may cause some noise and vibration impacts to nearby sensitive receptors. Some minor noise may also be generated by heavy vehicles using haulage routes. Sensitive receptors within the Project area may be sensitive to noise particularly as it is likely the ambient noise level will be low given the remoteness of the coastal area. Site selection was determined due to lower sensitive receptors in the area, and accordingly the Project area directly impacts only the northern section of the Binningup town but noise impacts may be experienced further afield and by the wider Binningup community. Construction would be temporary and for limited duration.</p>	<p>Further noise modelling and monitoring would identify areas where construction noise and vibration may exceed acceptable levels for sensitive receptors. Potential impacts shall be assessed against Statutory and guideline noise and vibration targets for construction noise and vibration. Mitigations strategies include use of noise suppression devices, noise barriers where appropriate and limiting time frames for noisy works.</p>	Possible	Minor	Low
33	Noise and vibration	Underwater noise and/or vibration from pre-construction and construction activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species	Construction (incl. pre-construction)	Almost Certain	High	High	N/A	N/A	<p>Recent vessel traffic data (AMSA, 2021) shows that vessel traffic is quite low, indicating that background noise levels are likely to also be low. However, compared to other potential sites the Project area receives a higher level of shipping traffic, due to its proximity to the port of Bunbury.</p> <p>Piling works and trenching during construction may generate noises and vibrations that could elicit a behavioural (or startle) response in marine species up to several kilometres away (in extreme circumstances of continuous piling).</p> <p>However piling would be intermittent, taking place over a short period only. Noises from construction vessels are far lower and would not cause a startle response.</p>	<p>Further underwater noise monitoring would identify risks and potential impacts to marine species. Stop work distance will be implemented in accordance with the Underwater Piling Noise Guidelines (Government of South Australia, 2012). Mitigation measures would be incorporated into the CEMP including engaging a marine species-spotter to check there were no sensitive species in the work zone before construction work starts. Any recreational groups or tourism operators would be notified about the piling works before they start.</p>	Likely	Moderate	Medium
34	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Construction (incl. pre-construction)	Likely	High	High	N/A	N/A	<p>Existing port facilities will be used to support the transport and marshalling of equipment and Project components from globally distributed supply chains, as well as construction and maintenance vessels and activities. The nearest port is Bunbury Port, about 20km south of the Project area. Other ports in the area include the Port of Mandurah (60km north) and Port of Fremantle (125km north). A suitable port or harbour would be chosen depending on proximity to the Project, water depths, tidal conditions, dedicated or shared berthing facilities, and potential opportunity to provide local employment opportunities. The size of the WTGs and plant and equipment required for construction may require ports to alter berthing facilities and change existing operations to accommodate an increased amount and frequency of vessels.</p>	<p>A future study of nearby harbour and ports will identify risks and limitations. Future stages of the project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.</p>	Likely	Moderate	Medium
35	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during pre-construction and construction works	Construction (incl. pre-construction)	Possible	Minor	Low	N/A	N/A	<p>Risk to shipping and navigation is expected to low due to the short term nature and minor change in shipping routes expected during construction. Desktop assessment indicates that</p>	<p>A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during construction.</p>	Highly unlikely/rare	Negligible	Very Low
36	Social, economic and amenity (Social surroundings)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during pre-construction and construction works	Construction (incl. pre-construction)	Highly unlikely/rare	Negligible	Very Low	No	N/A	<p>Construction is not expected to have an impact on regional or state economic development. There could be employment opportunities for the wider region which would benefit the regional economy. This is a positive risk rating.</p>	<p>The intent of the Project is to maximise benefits to the State and regional economy. Opportunities for this would be further explored throughout the planning and development process.</p>	Highly unlikely/rare	Negligible	Very Low
37	Social, economic and amenity (Social surroundings)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	Yes	N/A	<p>Although residential displacement and access to community facilities is unlikely to be impacted, the community's access to recreational and open space will be restricted during construction. However, construction would be over a very limited duration and therefore these impacts will be short term and can be tested through consultation with key stakeholders.</p> <p>Given the potential impacts to accessing recreational activities and open spaces, the risk to social surroundings is considered significant under the WA EPA significance criteria.</p>	<p>A Stakeholder Engagement Plan will be developed to manage the construction phases of the project. Consultation would occur with the community regarding construction activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project Construction Environmental Management Plan. Further stages of design will consider staging construction to avoid the peak fishing season (e.g. Nov-June) where feasible. Where usual accesses are impeded, an alternate access route will be provided if it is safe to do so.</p>	Likely	Minor	Medium

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38	Social, economic and amenity (Social surroundings)	Disruption or impact to local or regional businesses through direct or indirect impacts during pre-construction and construction works	Construction (incl. pre-construction)	Likely	Moderate	Medium	Yes	N/A	Tourism operators could experience decreased trade during construction if certain recreational activities are restricted including camping, four-wheel driving, swimming, surfing, boating and fishing. Even if there is no actual decrease in access or amenity for recreational activities the community may still perceive negative construction stage impacts and decide not to travel to the Myalup and Preston Beach area, resulting in indirect impacts for local hotels, restaurants, cafes and retail outlets. However, construction would be over a very limited duration and therefore these impacts to the local and regional businesses will be short term and can be tested through consultation with key stakeholders. There may be some localised benefits to businesses from an increase in construction workers living and visiting in the area. This may result in increased expenditure at hospitality and retail outlets.  Given the potential risk of impacting local businesses, and the unknown socio-economic demographics of the area, potential impacts to Social Surroundings is considered significant under the WA EPA significance criteria.	A Stakeholder Engagement Plan will be developed to manage the construction phases of the project. Consultation would occur with coastal business owners regarding construction activities that may cause impacts e.g. business access, traffic controls. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project Construction Environmental Management Plan. Where usual accesses are impeded, an alternate access route will be provided.	Likely	Minor	Medium
39	Social, economic and amenity (Social surroundings)	Disruption to local community's culture, way of life and usual behaviours due to loss of amenity and inhibited ability to enjoy surroundings	Construction (incl. pre-construction)	Almost Certain	Moderate	High	N/A	N/A	During construction the local community's usual patterns of behaviour may be disrupted due to road network changes for construction haulage routes, restricted access to recreational activities and decreased amenity in public open spaces due to noise, vibration, odour and dust from construction works. However, construction would be over a limited duration and therefore these impacts to the community's way of life will be short term and manageable.	Engagement and consultation with local community groups will be carried out to communicate any direct or indirect impacts that may occur within the construction footprint and project areas. A Stakeholder Engagement Plan will be prepared to outline measures for the management and protection of existing community culture and amenity through all stages of the Project. Amenity impacts would be mitigated through appropriate separation distances between construction works and sensitive receptors. Stockpiles and ancillary facilities would be located as far as possible from sensitive areas.	Possible	Minor	Low
40	Traffic and transport	Change to the road network during pre-construction and construction works including increased traffic, change to transport network connectivity (including impacts to pedestrians and cyclists), and change to road pavement conditions	Construction (incl. pre-construction)	Likely	Moderate	Medium	N/A	N/A	The traffic generated during site establishment and construction may cause delay due to insufficient road capacity, particularly the delivery of large plant and equipment. The road links and intersections within the study area should be assessed to determine whether they can accommodate the additional traffic generated during construction (including heavy vehicles, haulage vehicles and staff access). There may be an increased risk of road accidents due to a higher level of traffic (including slow moving vehicles) on the road. Given limited detail of construction schedule and timing, a precautionary initial risk rating was given.	A Traffic Management Plan is likely to be required to mitigate impacts to the road transport network. Use of designated roads and areas, including for deliveries, waste collection and car park and use of major roads where possible (not tracks or private access roads) would be adhered to. Disruption to general traffic during the movement of oversized loads along the delivery path is manageable. The Traffic Management Plan would be prepared in consultation with local road managers, Council and business and property owners.	Possible	Minor	Low
41	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Construction (incl. pre-construction)	Possible	Minor	Low	N/A	N/A	Early works activities will require the use of energy and water and there will be some waste products (including general waste) generated. Given the limited construction details, such as resource and waste management during works, means a precautionary initial risk rating was given. There would be limited wastewater produced during early works activities.	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into early works practices to maximise resource efficiency. This could be outlined in the Construction Environmental Management Plan. Provisions to optimise the efficient use of water and energy during site establishment and maximise reuse and recycling i.e. use of on-site potable water tank during site establishment and sediment pond water (non-potable) for dust suppression purposes on site. All waste will be managed and disposed/recycled in accordance with applicable Western Australian regulations. Any hazardous liquid waste (e.g. oily water) will be captured and removed from site using a licensed waste contractor. There will be appropriate waste storage areas at the site during early works (as	Unlikely	Minor	Low
Operation and maintenance (incl. testing and commissioning)													
42	Aboriginal heritage (Social surroundings)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during operation and maintenance potentially impacting on heritage values	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	Yes	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the study area. The Noongar people also have a native title claim over land covering the offshore Study area.  It is possible that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the Project area. However, it is not likely Aboriginal sites and objects would be affected during operation and maintenance as all ground disturbance activities would occur during site establishment and construction work.	An Aboriginal Heritage Management Plan would be prepared to outline measures for management and protection of Aboriginal heritage sites, and would include an unexpected finds procedure.	Unlikely	Moderate	Low
43	Aboriginal heritage (Social surroundings)	Impact to culturally sensitive landforms (Dreaming sites) during operation and maintenance works resulting in long-term loss of connection to land	Operation and maintenance (incl. testing and commissioning)	Possible	High	Medium	Yes	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the Study area. The Noongar people also have a native title claim over land covering the offshore Study area.  Desktop assessments have not been able to identify culturally sensitive sites and consultation with Aboriginal representatives is required. This is a precautionary risk rating due to the unknown existing environment and the potential long-term impact the Project could have if culturally sensitive landforms and songlines are identified within the Project area.  Possible exclusion zones (50m) around each WTG during operation may impact on intangible Aboriginal culture as it will limit access to the ocean.  Due to the possibility and high consequence of impacting Aboriginal heritage, the impact to social surroundings is considered significant under WA EPA significance criteria.	Engagement with Native Title claimants and local Aboriginal groups will be carried out to confirm intangible cultural heritage values in the study area. Design would avoid sites / minimise impacts to sites of cultural significance where practicable. An Aboriginal Heritage Management Plan (AHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project.	Possible	Moderate	Medium
44	Air quality (Air quality & GHGs)	Generation of air emissions and dust from operation and maintenance impacting on sensitive receptors and local air quality	Operation and maintenance (incl. testing and commissioning)	Unlikely	Negligible	Very Low	No	N/A	Operation of the project is not expected to generate air emissions. Any dust or odour emissions in relation to maintenance of the Project would be localised, negligible and below levels of detection. Given the low magnitude of the air quality impacts and the limited sensitive receptors in the area, impacts air quality are not considered significant under WA EPA significance criteria.	Operation will need to comply with EPA performance requirements, and any standards and licences for air emissions. Air quality monitoring programmes and equipment could be used to determine when activities need to be altered to reduce emissions.	Highly unlikely/rare	Minor	Very Low
45	Air quality (Air quality & GHGs)	Generation of GHGs from operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Minor	Very Low	No	N/A	The Project would generate very minor GHGs emissions during operation and maintenance. GHGs emissions would be limited to maintenance vehicles and vessels which would be consistent with other utilities in the area. Given the negligible impact of GHGs to the WA State Emissions Inventory, impact to GHGs is not significant under the WA EPA significance criteria.	The intent of the Project is to provide clean, renewable energy to the State and reduce reliance on fossil fuels that emit large volumes of GHGs.	Highly unlikely/rare	Minor	Very Low

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				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
46	Aviation and radar (incl. EMI)	Interference to civil and military radar during operation	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Negligible	Very Low	N/A	N/A	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Busseton Margaret River Airport (approx. 100km away). The Project is not likely to interfere with civil or military radar during the operation of the project.	Consultation with stakeholders to determine any potential permanent changes to aviation and radar and mitigation required, if any.	Highly unlikely/rare	Negligible	Very Low
47	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/A	N/A	There are no commercial airports or military bases in proximity to the Project (proposed turbine locations), with the closest commercial airport being Busseton Margaret River Airport (approx. 100km away). There are various private airstrips located around the project area including Bunbury, Busseton and the closest being Blair Field Airstrip around 7km north of the Project area. Once constructed there is unlikely to be any obstruction of the OLS during operation.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during operation.	Unlikely	Minor	Low
48	Ecology (Benthic communities and habitat)	Potential impact on Western Australian listed, threatened or non-threatened benthic or marine species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	Yes	N/A	<p>Potential risks to benthic communities during operation include continued habitat loss turbidity, spills, marine pests. In regards to habitat (seagrass and reefs), as cabling will be buried, benthic habitats will recover slowly over time. Given the extent of habitat loss is relatively small, it is unlikely that construction activities from the Project will physically fragment habitats to the extent that major flow-on impacts to benthic communities (and the values they support) will occur.</p> <p>Maintenance vessels may introduce marine pests to area and turbines provide a surface for fouling pest species. The environmental impacts of introduced species on benthic communities can be significant as marine pests can eradicate unique benthic communities and contaminate fisheries.</p> <p>Due to unknown occurrence of benthic communities, a precautionary risk rating has been given. Similarly, due to the conservative preliminary impact assessment and without field studies, impact to Benthic communities and habitat is considered significant under WA EPA significance criteria.</p>	<p>Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables. To understand presence of benthic communities satellite and field ground-truthing is required. Further design development may involve avoiding benthic communities where possible.</p> <p>To avoid introduction of exotic marine species management measures will be employed, including vessel hull inspections and local sourcing of vessels.</p>	Possible	Moderate	Medium
49	Ecology (Marine fauna)	Potential impact on Western Australian non-threatened marine species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	Moderate	Medium	Yes	N/A	<p>There are a number of state protected (endangered, critically endangered, priority 4) marine fauna that are likely to occur in the Study area. These include birds, mammals (sea-lion, whales and dolphin), reptiles (turtles), fish, sharks and crustaceans. The Project area is also a key habitat area for Western rock lobster.</p> <p>Potential risks during operation of the Project include continued habitat loss, vessel strikes from maintenance vessels, marine pests, spills, noise generated from WTGs (less than pile driving and unlikely to cause acute impacts), noise generated by maintenance vessels (less frequent than construction), EMF (impacts to navigation from magnetic fields) hydrodynamic impacts from structures altering hydro processes, bird strike and avoidance of rotor blades, artificial light pollution.</p> <p>Therefore the unmitigated risk is high and impact to Marine fauna is considered significant under WA EPA significance criteria.</p>	<p>Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts include seasonal maintenance windows (vary depending on species), avoidance of whale migration period, safety zones/lookout, pingers, buried cables to allow habitat to recover and avoid EMF, minimising lighting (or uses red lights), height of WTG towers for bird strikes,</p>	Possible	Moderate	Medium
49	Ecology (Marine fauna)	Potential impact on Western Australian non-threatened marine species and communities, or their habitat	Operation and maintenance (incl. testing and commissioning)	Likely	Negligible	Low	Yes	N/A	<p>The WTG towers could create a beneficial artificial reef as it would provide a hard substrate for a diverse range of benthic flora and fauna species, as well as aggregation devices for fish. A fish 'sanctuary' could be created if fishing activities are prohibited around the structures. This may attract predators to the area and lead to localised changes to marine communities.</p>	For an artificial reef to establish, exclusion zones around the WTGs to avoid fishing would be required.	Possible	Negligible	Low

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50	Marine geology, oceanography and physical processes (Coastal processes)	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	No	N/A	The marine structures will alter local hydrodynamic and coastal processes. This may result in localised changes to sedimentary processes (i.e. scour and sediment deposition).	Modelling will be required to assess hydrodynamic impacts to seafloor habitats and coastal geomorphological processes.	Possible	Minor	Low
51	Marine water quality and sediment quality (Marine environmental quality)	Potential impacts to marine water and sediment quality during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	Yes	N/A	<b>Water quality</b> - Water quality sampling has been carried out for previous projects in the area (e.g. Desalination Plant) and shows higher concentration of nutrients and chlorophyll in winter compared to summer, and concentrations of petroleum and metals below limits of reporting. <b>Spills</b> - vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants and other chemicals. These substances can have lethal and sub-lethal effects to organisms (Yuewen and Adzibli 2018) and can persist in the environment for long periods of time. An uncontrolled release could occur from (for example) vessel collision, equipment failure, leaks etc Impact to marine environmental quality is considered significant under WA EPA significance criteria.	A marine water quality and pollution risk assessment will be undertaken to inform the development of management strategies during operation and maintenance. Standard chemical storage, handling and maintenance procedures will be required.	Possible	Minor	Low
52	Ecology (Flora and vegetation)	Potential impact on Western Australian listed or threatened flora and vegetation	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	No	N/A	Any clearing required for the project would take place during construction phases, as a result there are no additional risks of impact to Flora and vegetation during operation.	Pre-clearance flora and fauna surveys carried out during construction will confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site. These studies will inform Flora and Fauna Management Plans and any requirements for revegetation or further monitoring required during operation phases.	Unlikely	Minor	Low
53	Ecology (Subterranean fauna)	Potential impact on Western Australian subterranean fauna	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	No	N/A	Any risk of impact to subterranean fauna is likely to take place during construction for works involving interaction with groundwater systems. As a result, there are minor additional risks of impacting Subterranean fauna during operation. This risk rating is precautionary until further assessment of local groundwater systems is carried out and operation & maintenance methods are further developed. Given the unknown occurrence of subterranean fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.	Further desktop top and field work studies would inform Fauna Management Plans which would also include requirements for Subterranean fauna and the protection of groundwater levels and water quality.	Unlikely	Minor	Low
54	Ecology (Terrestrial fauna)	Potential impact on Western Australian listed or threatened terrestrial fauna	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	No	N/A	Any risk of impact to terrestrial fauna is likely to take place during construction for works involving clearing of habitat. As a result, there are minor additional risks of impacting terrestrial fauna during operation. This risk rating is precautionary until further assessment of terrestrial fauna is carried out and operation & maintenance methods are further developed. Given the unknown occurrence of threatened fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.	Pre-clearance flora and fauna surveys carried out during construction will confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site. These studies will inform Flora and Fauna Management Plans and any requirements for revegetation or further monitoring required during operation phases.	Unlikely	Minor	Low
55	Ecology (Terrestrial fauna)	Potential impact on Western Australian on shorebirds and migratory birds	Operation and maintenance (incl. testing and commissioning)	Almost Certain	High	High	Yes	N/A	Rotor blade strikes may impact bird species. Birds may avoid areas near rotors, resulting in habitat displacement and altered movement patterns. Shorebirds may pass through offshore waters when moving to and from other sites. In the case of migrants, flights once underway tend to be at high altitude, well above turbine height, to maximise flight and energy efficiency. Birds wait for suitable conditions before embarking on migration, but may be forced to lower their flight altitude if they encounter bad weather during migration and collide with turbines during takeoff and decent. This risk rating is precautionary until further assessment of terrestrial fauna, including migratory birds, is carried out and operation & maintenance methods are further developed. Given the unknown occurrence of threatened fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.	Further assessment is required to understand flight paths of shorebirds and migratory birds likely to use the Project area. Consideration of design refinements include turbine tower height and location to relative important bird areas and critical habitat.	Possible	Moderate	Medium
56	Ecology - EPBC listed threatened species and ecological communities	Potential impact on Commonwealth listed threatened species and communities, or their habitat (terrestrial and marine)	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	N/A	Yes	<b>Potential risks for terrestrial species:</b> potential rotor blade strikes, some shorebirds, although considered terrestrial species and based onshore, may fly into the path of WTG blades. <b>Potential risks for marine species:</b> sustained habitat loss through operation (seabed disturbance permanent structures), vessel strike, marine pests, spills and noise from turbine, noise from maintenance vessels, EMF, hydrodynamic changes, bird strike and avoidance of rotors (injury, death or changes in migratory pattern), light pollution. This risk rating is precautionary until further assessment is carried out and operation & maintenance methods are further developed. Given the unknown occurrence of threatened	Pre-clearance flora and fauna surveys carried out during construction will confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site. These studies will inform Flora and Fauna Management Plans and any requirements for revegetation or further monitoring required during operation phases.	Likely	Moderate	Medium

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57	Ecology - EPBC migratory species (terrestrial)	Potential impact on Commonwealth listed migratory birds, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	Major	High	N/A	Yes	Although the WTGs will be located offshore, migratory shorebirds may still be impacted by rotor blade strikes. Birds may avoid areas near rotors, resulting in habitat displacement and altered movement patterns. Shorebirds may pass through offshore waters when moving to and from other sites. In the case of migrants, flights once underway tend to be at high altitude, well above turbine height, to maximise flight and energy efficiency. Birds wait for suitable conditions before embarking on migration, but may be forced to lower their flight altitude if they encounter bad weather during migration and collide with turbines during takeoff and descent.	Additional survey effort is required to confirm the species present likely on site and with the regions of known habitat. Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to WTG tower height and flight paths of critically endangered or threatened birds and their relative movement patterns.	Unlikely	Major	Medium
	Ecology - EPBC migratory species (marine)	Potential impact of terrestrial Commonwealth listed migratory marine fauna, or their habitat	Operation and maintenance (incl. testing and commissioning)	Possible	Major	High	N/A	Yes	The Project area potentially intersects with marine species habitat and migration routes. The turbine structures may impact migration patterns and feeding grounds, resulting in habitat displacement and altered movement patterns. Potential impacts during operation include underwater noise from WTGs and maintenance vessels and artificial light (leading to avoidance behaviour), loss of foraging habitat (from permanent offshore structures) and vessel strikes (particularly for large slow moving fauna like whales). For marine birds, rotor blade strikes are a potential risk. At most risk are large pelagic seabirds, which feed in offshore waters and, being slow fliers, may be unable to evade the moving rotors.	Possible mitigation measures to avoid impacts to marine species include consideration of tower heights, seasonable operation and maintenance windows, 'go slow' measures, noise controls, megafauna spotters, hull inspections and local sourcing of vessels from pest free areas, burying cables to avoid EMF.	Possible	High	Medium
58	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	N/A	No	Although works do not take place in Commonwealth waters, there is still potential for indirect impacts to waters, as a result of spills, cable laying (or removal), piling activity the introduction of pest species or changes to hydrodynamics. With appropriate controls in place, these impacts are considered to be a low risk, which is localised. They are unlikely to have a 'substantial' or 'persistent' adverse impact on the Commonwealth marine environment. Impacts to Commonwealth Marine Areas is expected to be Not Significant	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of seabed disturbance, including locations of turbine platforms and cables.	Unlikely	Minor	Low
59	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	Moderate	Medium	N/A	N/A	The Project will require interface with a range of other significant infrastructure during operation and maintenance, such as ports, roads, electricity networks and other services and utilities.  Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during operation and maintenance.	Possible	Minor	Low
60	Ground conditions and contamination (Terrestrial environmental quality)	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during operation and maintenance leading to potential risks to public health and the environment	Operation and maintenance (incl. testing and commissioning)	Unlikely	Negligible	Very Low	N/A	N/A	Operation of the project is not expected to change ground conditions or generate risks related to contamination. However, the Project area is mapped with a mix of extremely low probability of Acid Sulfate Soils (ASS) occurrence, with some pockets of low probability and high probability on the eastern side of the Forrest Hwy. There is no anticipated risk of impacting public health or environment.	A contamination assessment would establish baseline indicators of material at site, which would be used to inform management and disposal of spoil. Spoil from any maintenance earthworks would be reused on-site where possible or disposed of in accordance with EPA requirements.	Unlikely	Minor	Low
61	Ground conditions and contamination (Terrestrial environmental quality)	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during operation and maintenance impacting soil and water quality	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	No	N/A	Any erosion and alternation of water courses and drainage patterns would occur during construction and therefore it is unlikely to be any risk of impact during operation. Operation of the project has the potential to result in unlikely contamination of soils due to any spills and leaks of fuel, oils and other hazardous materials from routine traffic. The potential for contamination as a result of general maintenance activities is considered to be low, based on the number of vehicles and equipment which would likely be used during maintenance.	A site-specific emergency spill response procedure will be developed to minimise risk of spills and reduce impacts of exposure.	Unlikely	Minor	Low
62	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to hydrology and flooding during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	No	N/A	Risk of impacts to hydrology and flooding during operation is unlikely as changes to surface water regimes is not anticipated. This risk rating is precautionary until further understanding of local and regional flooding and surface water systems is carried out and construction methods are further developed.	Further investigations will be carried out to understand the surface water environments in the area and to inform appropriate management measures to be applied.	Unlikely	Moderate	Low

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63	Hydrology, flooding, water quality, groundwater (Inland waters)	Potential impacts to surface water quality during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	Yes	N/A	There is a minor risk for leaks and spills during operation and maintenance, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and construction methods are further developed.	Standard operation and maintenance management measures in accordance with the WA EPA requirements, such as bunding around earthworks and chemical storages, would reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Maintenance during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	Minor	Low
64	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to ground water quality and/or flow during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	Yes	N/A	The Project site is within a <i>Waterways Conservation Act 1976</i> declared management area, Leschenault Inlet Management Area, and within the South West Coastal Proclaimed Groundwater Area. The Department of Primary Industries and Regional Development mapping of groundwater and salinity shows that the Project area is located on a coastal plain with low risk of salinity and mostly stable groundwater trend.  Local ground water quality may deteriorate through turbidity, salinity, colour, odour, temperature, nutrients or pollutants such as chemicals and materials required during maintenance. However deep excavation extending below regional groundwater level is unlikely to occur during operation and therefore risks of impact is low.	Early installation of drainage controls and erosion and sedimentation monitoring during earlier stages of the Project would assist in managing and mitigating impacts throughout operation. Establishing appropriate procedures for handling, transporting and using potentially contaminating substances including diesel, petrol, oils, greases, cement and other construction chemicals in the Environmental Management Plan.	Possible	Minor	Low
65	Human health, hazards and risks (Human health)	Human exposure to unsafe levels of Electro-magnetic fields (EMF) during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Moderate	Low	No	N/A	Electro-magnetic fields are produced wherever electricity is used or transmitted. Therefore, the electricity supply to support work at the site is expected to be a source of Electro-magnetic fields. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.  The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	High	Low
66	Human health, hazards and risks (Human health)	Potential for fire and increased bushfire risk during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	N/A	N/A	The Project is located in a designated Bush Fire Prone Area. However, the Western Australian My Fire Watch mapping shows bushfire have occurred in the last two years within the wider region, but well outside the Project area. Recent fires occurred in Lane Pool Reserve (2019, 2020) and Hoffman (2020). Operation and maintenance works may increase risk of fire and bushfire from accidental ignition from equipment, fuels and chemicals.	A Bushfire Management Plan addressing existing issues would be developed to reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/rare	Moderate	Low
67	Human health, hazards and risks (Human health)	Vulnerability of the project to natural hazards, extreme weather and climate change during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Moderate	Low	N/A	N/A	Climate induced risks include increased dust generation during drier weather, increased maintenance delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for maintenance workers to experience heatstroke as a result of extreme heat and hot weather events.	Standard management measures include seasonal work and 'stop work' procedures during extreme weather, OHS plans, adequate training and PPE for construction workers.	Highly unlikely/rare	Moderate	Low
68	Human health, hazards and risks (Human health)	Exposure of construction personnel or the public to unsafe conditions as a result of during operation and maintenance and on-site practices	Operation and maintenance (incl. testing and commissioning)	Possible	Major	High	No	N/A	Offshore wind project presents unique risks to workers because of the nature of offshore maintenance (i.e., working at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of construction personnel. The wider community is not expected to be impacted as access on and offshore will be restricted.  The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during construction on and offshore. Standard maintenance management measures would also reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers.	Unlikely	Major	Medium
69	Historic heritage (Social surroundings)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Moderate	Low	No	N/A	There are no Commonwealth or State listed heritage places in the Project area. However, there are two recorded shipwrecks off the coastline, approximately 7km north off the coast of Preston Beach and 20km south near Bunbury. Project infrastructure would not interfere with the shipwrecks.  Given that the Project area avoids any direct impact of historic heritage sites, the impacts are considered not significant under the WA EPA significance criteria for Social Surroundings.	Project infrastructure would be located to avoid impacts to shipwrecks and local historic heritage assets. Management measures would included in a Cultural Heritage Management Plan (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/rare	Moderate	Low

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70	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Negligible	Very Low	N/A	N/A	The onshore section of the Project area covers approximately 3,300ha and intersects various land uses zoned by the Shire of Harvey. Around half of the onshore project area is zoned for Conservation/Protection, currently used for general farming and regional open space. Changes to land use would occur during construction, and as such there would be no further land use impacts during operation.	Further assessment will identify specific impacts and in particular, any property acquisition required. Further design development will aim to reduce land use impacts by refining the Project area and construction boundary to avoid sensitive land uses. Consultation with Shire of Harvey and local council will take place during detailed design, to ensure impacts are managed and appropriate consideration is given to future developments planned in the area.	Unlikely	Negligible	Very Low
71	Land use	Property acquisition or tenure of land or waters during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Unlikely	Negligible	Very Low	No	N/A	The assets would be located within the 3 nautical mile limit of Western Australia and key construction activities would be carried out within state waters. Any acquisition or tenure agreements would occur prior to construction, and as such there would be no further changes during operation.	N/A	Unlikely	Negligible	Very Low
72	Landscape character & visual (Social surroundings)	Potential adverse impacts during operation and maintenance on visual and/or landscape values experienced from public open space (coast) or residential areas	Operation and maintenance (incl. testing and commissioning)	Almost Certain	High	High	Yes	N/A	Although onshore infrastructure is adjacent to some existing infrastructure the offshore WTGs will create permanent change to the landscape character and visual amenity of Myalup. The natural landscape of Myalup, being a major recreational and tourism node, is likely to be highly valued by the local, regional and state community. The WTGs and construction equipment will likely form a noticeable feature on the landscape that is currently untouched oceans views. The site itself was selected being of the lower population density of the area, to reduce impacts as much as possible. The WTG have been indicatively placed as far off the coast as possible to reduce visual impacts. The landscape character of the surrounding area holds ecological, scientific and social significance to the community. Accordingly, impacts to landform is something that will need to be further tested with the community. This is considered to be potentially significant under the WA EPA significance criteria	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity at various viewpoints along the coastline and residential areas. Landscaping and revegetation would be used to minimise onshore impacts.	Almost Certain	High	High
73	Noise and vibration	Noise and/or vibration during operation and maintenance activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/A	N/A	The indicative positioning of the WTGs 5km from the shoreline will limit noise impacts for sensitive receptors onshore. Noise from onshore infrastructure will be negligible. Maintenance and operation of the landfall site and sub-station will be in consistent with the existing noise in the area.	Further noise modelling and monitoring would identify areas where operational noise and vibration may exceed acceptable levels for sensitive receptors. Potential impacts shall be assessed against Statutory and guideline noise and vibration targets and mitigation strategies would be developed accordingly.	Unlikely	Minor	Low
74	Noise and vibration	Underwater noise and/or vibration during operation and maintenance activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	N/A	N/A	Operation of the WTGs is likely to generate some underwater noise from maintenance vessels and operation of turbines. but it would be low enough (much lower than piling) and unlikely to cause acute impacts to marine fauna. However the noise and vibration would be more continuous than noise throughout construction and could cause changes to behaviour of fauna. The scale of impact is dependent on the size and cumulative noise impact of the WTG array. Given that the Project area contains important marine species and likely has low background noise levels, the precautionary risk of underwater noise impacts is high until further studies are undertaken.	Further underwater noise monitoring would identify risks and potential impacts to marine species. Mitigation measures would be incorporated into Environmental Management Plans including engaging a marine species-spotter, avoiding maintenance during whale migration period and vessel amendments to reduce noise emissions. Any recreational groups or tourism operators would be notified about the piling works before they start.	Possible	Moderate	Medium
75	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Operation and maintenance (incl. testing and commissioning)	Unlikely	Minor	Low	N/A	N/A	Existing port facilities will be used to support the transport material and equipment needed to maintain the WTGs. The nearest port is Bunbury Port, about 20km south of the Project area. Other ports in the area include the Port of Mandurah (60km north) and Port of Freemantle (125km north). A suitable port or harbour would be chosen depending on proximity to the Project, water depths, tidal conditions, dedicated or shared berthing facilities, and potential opportunity to provide local employment opportunities. Post construction, ports will be well placed to accommodate requirements of large WTGs, maintenance vessels, plant and equipment. Accordingly, no further impacts are expected to ports during operation.	A future study of nearby harbour and ports will identify risks and limitations. Future stages of the project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.	Unlikely	Minor	Low
76	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/A	N/A	Risk to shipping and navigation are expected to low during operation due to the infrequent need for maintenance vessels to interfere with existing shipping vessels. Desktop assessment indicates that no existing shipping channels that interfere with the Project area, however there are some cargo ships using the surrounding study area to travel to either Bunbury port (20km south), Port of Mandurah (60km north) or Port of Freemantle (125km north) . Changes to navigation and shipping routes would be acceptable and vessel would easily adapt with minimal impact.	A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during operation and maintenance.	Unlikely	Minor	Low
77	Social, economic and amenity (Social surroundings)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Highly unlikely/rare	Negligible	Very Low	No	N/A	Operation is expected to have a beneficial impact on regional or state economic development. There would be employment opportunities for the wider region which would benefit the regional economy. This is a positive risk rating.	The intent of the Project is to maximise benefits to the State and regional economy. Opportunities for this would be further explored throughout the planning and development process.	Highly unlikely/rare	Negligible	Very Low

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78	Social, economic and amenity (Social surroundings)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Possible	Moderate	Medium	Yes	N/A	There will be no residential displacement during operation and maintenance. There may be some disruption to access for locals and tourism during maintenance works. Although these maintenance impacts would occur over a short limited duration, it has the potential to impact on recreational and commercial fisheries.  Given the potential impacts and risks to recreational uses and open space, the risk to Social Surroundings is considered significant under the WA EPA significance criteria.	A Stakeholder Engagement Plan will be developed to manage the operation phases of the project. Consultation would occur with the community regarding operation & maintenance activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project Environmental Management Plan.	Possible	Minor	Low
79	Social, economic and amenity (Social surroundings)	Disruption or impact to local or regional businesses through direct or indirect impacts during operation and maintenance	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	Yes	N/A	Tourism operators could experience decreased trade if there are any long-term impacts to recreation, amenity or tourism in the area. Although a navigational safety zone (50m) around the WTGs would restrict some recreational activities, such as boating and fishing close to the WTGs, all other recreational activities will be restored with limited amenity impacts. Fishing activities may also be impacted depending on whether fish species leave the area due to noise, or are attracted to the area due to added artificial reef habitat provided by the WTGs. Even if there is no actual decrease in access or amenity for recreational activities the community may still perceive negative operational stage impacts.  Given the unknown direct and indirect impacts to local businesses, the risk to social surroundings is considered significant under the WA EPA significance criteria.	A Stakeholder Engagement Plan will be developed to manage the operation phases of the project. Consultation would occur with the community regarding operation & maintenance activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project Environmental Management Plan.	Likely	Minor	Medium
80	Social, economic and amenity (Social surroundings)	Disruption to local community's culture, way of life and usual behaviours due to loss of amenity and inhibited ability to enjoy surroundings	Operation and maintenance (incl. testing and commissioning)	Likely	High	High	N/A	N/A	In addition to impacts to recreation, the general loss of amenity due to visual impact could result in an inhibited ability to enjoy the open space and surroundings. Considering the recreational assets and visual amenity of the Project area are highly valued by the community this could cause frustration and angst among the local residents, and lead to a disruption in community culture. The local community's usual patterns of behaviour will be disrupted due to reduce amenity and perceived ability to enjoy beach and recreational activities. As the community adapts, usual patterns of behaviour may return.  Given the community's attitudes towards the Project is unknown, impacts to community 'way of life' is difficult to assess. As a result, a precautionary approach has been applied and the risk to Social Surroundings is considered significant under the WA EPA significance criteria.	Engagement and consultation with local community groups will be carried out to communicate any direct or indirect impacts that may occur during operation and maintenance. A Stakeholder Engagement Plan will be prepared to outline measures for the management and protection of existing community culture and amenity through all stages of the Project. Amenity impacts would be mitigated through appropriate separation distances between maintenance works and sensitive receptors.	Possible	Minor	Low
81	Traffic and transport	Change to the road network during operation and maintenance including increased traffic, change to transport network connectivity (including impacts to peds and cyclists), and change to road pavement conditions	Operation and maintenance (incl. testing and commissioning)	Unlikely	Negligible	Very Low	N/A	N/A	Operation and maintenance will generate negligible operational traffic. Existing road networks will accommodate any additional traffic generated.	A Traffic Management Plan would be prepared to manage any potential impacts to the local road network during operation.	Unlikely	Negligible	Very Low
82	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Operation and maintenance (incl. testing and commissioning)	Possible	Minor	Low	N/A	N/A	Operation will require the use of energy and water and there will be some waste products (including general waste) generated. Given the limited operation details, such as resource and waste management during works, a precautionary initial risk rating has been given.	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into operational practices to maximise resource efficiency. All waste will be managed and disposed/recycled in accordance with applicable Western Australian regulations. Any hazardous liquid waste (e.g. oily water) will be captured and removed from site using a licensed waste contractor. There will be appropriate waste storage area's at the site during operation and maintenance (as required). There will be no waste disposed onsite or offshore.	Highly unlikely/rare	Minor	Very Low
Decommissioning													
83	Aboriginal heritage (Social surroundings)	Disturbance of known or previously unrecorded Aboriginal cultural heritage sites during decommissioning potentially impacting on heritage values	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	No	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the study area. The Noongar people also have a native title claim over land covering the offshore Study area  It is possible that known or previously unrecorded Aboriginal cultural heritage sites could be encountered within the Project area. However, it is not likely Aboriginal sites and objects would be affected during decommissioning as all ground disturbance activities would occur during site establishment and construction work.	An Aboriginal Heritage Management Plan (AHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project, and would include an unexpected finds procedure. Mitigation, such as salvage prior to works on-site, may be carried out for impact to areas containing large artefact scatters.	Unlikely	Moderate	Low
84	Aboriginal heritage (Social surroundings)	Impact to culturally sensitive landforms (Dreaming sites) during decommissioning resulting in long-term loss of connection to land	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	N/A	N/A	The Project is within an area with a registered Native Title claim by the Gnaala Karla Booja (WC1998/058), covering all land within the study area. The Noongar people also have a native title claim over land covering the offshore Study area. Desktop assessments have not been able to identify culturally sensitive sites and consultation with Aboriginal representatives is required. If present, there is a risk that decommissioning activities could temporarily restrict access to some culturally sensitive sites and songlines.  Possible exclusion zones (500m) during decommissioning may have impacts on intangible Aboriginal culture as it will limit access to the ocean.	Engagement with Native Title claimants and local Aboriginal groups will be carried out to confirm intangible cultural heritage values in the study area. Design would avoid sites / minimise impacts to sites of cultural significance where practicable. An Aboriginal Heritage Management Plan (AHMP) will be prepared to outline measures for the management and protection of Aboriginal heritage sites through all stages of the Project.	Possible	Minor	Low
85	Air quality (Air quality & GHGs)	Generation of air emissions and dust from decommissioning impacting on sensitive receptors and local air quality	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	No	N/A	Proposed decommissioning works are expected to generate some air emissions (e.g. dust and grit through land disturbance, exhaust fumes etc from construction vessels and vehicles), however this would be localised and of limited duration. A preliminary land use assessment indicates there are limited sensitive receptors within the study area. Given the temporary and low magnitude nature of the air quality impacts and the limited sensitive receptors in the area, likely impacts are not considered significant under WA EPA significance criteria.	A future air quality assessment would inform the requirements for a Decommissioning Environmental Management Plan (DEMP). Dust monitoring programmes and equipment (if required) could be used to determine when activities need to be altered to reduce dust emissions. Actions such as watercarts on haul roads and main construction sites could be used to generate less dust. Standard measures to limit the generation of dust and other air emissions (such as most efficient use of construction equipment and planning to reduce vessel and vehicle use and movements) would also be included in the DEMP.	Possible	Minor	Low

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86	Air quality (Air quality & GHGs)	Generation of GHGs from decommissioning	Decommissioning (and site rehabilitation)	Possible	Negligible	Low	No	N/A	The Project would generate minor GHGs for a short period of time, associated with the equipment used during decommissioning. Given the negligible impact of GHGs to the WA State Emissions Inventory is not significant under the WA EPA significance criteria.	A future greenhouse gas assessment would inform requirements for a Construction Environmental Management Plan (CEMP) if necessary. GHGs monitoring programmes could be used to determine high emitting construction activities and these would be limited where feasible. The intent of the Project is to provide clean, renewable energy to the State and reduce reliance on fossil fuels that emit large volumes of GHGs.	Possible	Negligible	Low
87	Aviation and radar (incl. EMI)	Interference to civil and military radar during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Negligible	Very Low	N/A	N/A	Interference with aircrafts of radars during decommissioning is not expected. If necessary, changes to flight routes would have already taken place for construction and operation of the Project.	A future radar impact assessment would inform of any requirements to minimise impacts during decommissioning	Unlikely	Negligible	Very Low
88	Aviation and radar (incl. EMI)	Impact to aviation and aircraft from obstruction of obstacle limitation surfaces (OLS) and night lighting during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Negligible	Very Low	N/A	N/A	Obstruction to scenic flight paths could be possible during decommissioning of the WTGs and would be further investigated and determined. As scenic flights are expected to be largely carried out during day-light hours, impact from any night-lighting utilised during decommissioning is anticipated to be low. This would be localised and of limited duration.	A future study of scenic flight routes and OLS, including engagement with local flight operators, would inform of any requirements to minimise impacts during construction.	Unlikely	Negligible	Very Low
89	Ecology (Benthic communities and habitat)	Potential impact on Western Australian listed, threatened or non-threatened benthic or marine species and communities, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	Potential risks to benthic communities during construction include turbidity and disturbance of acidic soils from seabed disturbance when removing cables (resulting in decreased water quality), marine pests and spills. Due to unknown occurrence of benthic communities, a precautionary risk rating has been given. Similarly, due to the conservative preliminary impact assessment and without field studies, impact to Benthic communities and habitat is considered significant under WA EPA significance criteria.	Further marine studies are required to collect baseline data and characterise existing conditions. This will be used to inform future stages of design and management measures applied in the DEMP.	Possible	Minor	Low
90	Ecology (Marine fauna)	Potential impact on Western Australian non-threatened marine species and communities, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	There are a number of state protected (endangered, critically endangered, priority 4) marine fauna that are likely to occur in the Study area. These include birds, mammals (sea-lion, whales and dolphin), reptiles (turtles), fish, sharks and crustaceans. The Project area is also a key habitat area for Western rock lobster. Potential risks to marine fauna during decommissioning include turbidity and disturbance of acidic soils from seabed disturbance when removing cables (resulting in decreased water quality), vessel strike (especially to slow moving fauna like whales), marine pests, spills, underwater noise generated by vessels and artificial light pollution.	Further marine studies are required to collect baseline data and characterise existing conditions. Mitigation measures to reduce impacts include seasonal work windows (vary depending on species), avoidance of whale migration period, safety zones/lookout, pingers, minimising lighting (or uses red lights)	Possible	Minor	Low
91	Marine geology, oceanography and physical processes (Coastal processes)	Changes to coastal and marine processes (such as tides, currents, water flow and wave patterns) potentially impacting on coastal land and assets, and the marine environment during operation and maintenance	Decommissioning (and site rehabilitation)	Unlikely	Negligible	Very Low	No	N/A	The region is classified as microtidal with a tidal range of 1.4 m from lowest to highest astronomical tide. Tides are predominantly diurnal, with a single tide cycle on most days. Prevailing swell is south to southwest, varying seasonally with storm activity during winter, and high wave conditions occur during periods of strong onshore winds. Moderate-high swell wave energy from the southwest drives net northward sediment transport, although occasional reversals of sediment transport occur during winter (BMT 2021). Construction/decommissioning equipment is unlikely to change coastal geomorphological processes because of their temporary nature, however more work is required to assess this risk and a precautionary risk rating has been given as a result. Given that decommissioning is to take place over a short period, and is not expected to alter coastal processes, the impact to Coastal processes is not considered significance under WA EPA significance criteria.		Unlikely	Negligible	Very Low
92	Marine water quality and sediment quality (Marine environmental quality)	Potential impacts to marine water and sediment quality during decommissioning	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	<b>Water quality</b> - Water quality sampling has been carried out for previous projects in the area (e.g. Desalination Plant) and shows higher concentration of nutrients and chlorophyll in winter compared to summer, and concentrations of petroleum and metals below limits of reporting. Decommissioning activities are likely to increase these levels. <b>Turbidity/sediments</b> - Modelling will be required to assess turbidity generated by decommissioning activities. Removal of the turbine piles may generate a short-term, low intensity sediment plume. It is likely that the plume would dissipate rapidly and would be unlikely to impact on adjacent light sensitive habitats or impede fauna vision. <b>Spills</b> - vessels, turbines and facilities utilise use and store a variety of fuels, oils, lubricants and other chemicals. These substances can have lethal and sub-lethal effects to organisms (Yuewen and Adzibli 2018) and can persist in the environment for long periods of time. An uncontrolled release could occur from (for example) vessel collision, equipment failure, leaks etc Impact to marine environmental quality is considered significant under WA EPA significance criteria.	A marine water quality and pollution risk assessment will be undertaken to inform the development of management strategies for the DEMP. Standard chemical storage, handling and maintenance procedures will be required.	Possible	Minor	Low

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93	Ecology (Flora and vegetation)	Potential impact on Western Australian listed or threatened flora and vegetation	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	Given the limited information available, landside decommissioning could potentially require clearing of habitat that supports threatened or priority species, locally endemic habitat, new and/or usual species and those that are of revictual status (taxonomic groups that are no longer occurring in the wider landscape). For this reason, impact to flora and vegetation is considered significant under WA EPA significance criteria.	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. Surveys will be in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low
94	Ecology (Subterranean fauna)	Potential impact on Western Australian subterranean fauna	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	Decommissioning works are not expected to impact on groundwater or perched aquifers where subterranean fauna occurs. This risk rating is precautionary until further assessment of local groundwater systems is carried out and decommissioning methods are further developed.	If further desktop assessments confirm likelihood of occurrence, field work would be required to understand assemblage of species. The Project would be designed to avoid deep excavation in areas where subterranean species occur.	Possible	Minor	Low
95	Ecology (Terrestrial fauna)	Potential impact on Western Australian listed or threatened terrestrial fauna	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	Given the limited information available, landside decommissioning could potentially require clearing of habitat that supports threatened or priority species, locally endemic habitat, new and/or usual species and those that are of revictual status (taxonomic groups that are no longer occurring in the wider landscape). For this reason, impact to terrestrial fauna is considered significant under WA EPA significance criteria.	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. Surveys will be in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels.	Possible	Minor	Low
96	Ecology (Terrestrial fauna)	Potential impact on Western Australian on migratory birds	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	Yes	N/A	Further assessment at the time of decommissioning is required to understand occurrence and abundance of migratory species, and whether the Project itself provided breeding/roosting habitat.  This risk rating is precautionary until further assessment of terrestrial fauna, including migratory birds, is carried out and construction methods are further developed. Given the unknown occurrence of threatened fauna within the Project area, and the high consequence to species if impacted, the impact has been considered significant under WA EPA significance criteria.	Pre-clearance flora and fauna surveys will be carried out to confirm if any threatened species and/or habitat has re-established since construction clearing for the Project. Surveys will be in for the Decommissioning Environmental Management Plan. This DEMP will identify rehabilitation requirements, including revegetating the area as much as possible to pre-construction levels to establish roosting habitat for migratory birds.	Possible	Minor	Low
97	Ecology - EPBC listed threatened species and ecological communities	Potential impact on Commonwealth listed threatened species and communities, or their habitat (terrestrial and marine)	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/A	Yes	<b>Potential risks for terrestrial species:</b> potential clearing of habitat for removal of transmission cables and onshore infrastructure, including through dune systems and shrubland/woodland habitats east of Old Coast Road. Indirect impacts from noise and lighting for decommissioning works  <b>Potential risks for marine species:</b> habitat loss (seabed disturbance from removal of cables and infrastructure), turbidity, disturbance of acidic and/or contaminated soils, vessel strike,	Pre-work flora and fauna surveys will be carried out to confirm the presence of any threatened species and/or habitat that may support listed communities or species at the site prior to works, and will inform management measures to be applied in the DEMP. If smaller areas within the Project area are found to contain habitat for terrestrial fauna, these areas may be avoided.	Possible	Minor	Low
98	Ecology - EPBC migratory species	Potential impact on Commonwealth listed migratory birds, or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/A	Yes	The nearby Peel-Yalgorup Ramsar wetland is listed as it regularly supports more than 20,000 waterbirds, including 32 migratory shorebird species (Hale and Butcher, 2007). It is reported as supporting more than 1% of the known population of 11 waterbirds. Clearing for transmission lines during construction may indirectly impact shorebirds through removal of habitat associated with the Peel- Yalgorup Ramsar wetland.  Given the limited desktop data available to assess presence of species and unknown migratory patterns of species, a precautionary approach has been applied and as a result, activities from the Project could have a potentially significant impact on migratory species under the EPBC significance criteria.	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of migratory patterns and the likelihood of disrupting this process.  Specific measures in the CEMP for the management of fauna would include -identification of any seasonal constraints, such as breeding or migration seasons and development of measures to avoid disruption to fauna during these times. Pre-clearing and clearing phase surveys to identify areas of animal breeding habitats	Possible	Minor	Low
	Ecology - EPBC migratory species	Potential impact on Commonwealth listed migratory marine fauna or their habitat	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/A	Yes	The Study area is nominated to be a Biologically Important Area under the EPBC Act for marine migratory species such as whales, seabirds, sharks and turtles. (See report for full list of marine migratory species). Potential impacts during construction include underwater noise and artificial light (leading to avoidance behaviour), loss of foraging habitat (from seabed disturbance for WTG platforms and cabling) and vessel strikes (particularly for large slow moving fauna like whales).  Given the likelihood that some EPBC protected marine migratory species exist within the study area, and the limited construction methodology or indicative placement for offshore infrastructure, a precautionary approach has been applied. As a result, activities from the Project could have a potentially significant impact on migratory species under the EPBC significance criteria.	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given to areas of migratory patterns and the likelihood of disrupting this process.  Specific measures in the CEMP for the management of fauna would include -identification of any seasonal constraints, such as breeding or migration seasons and development of measures to avoid disruption to fauna during these times. Pre-disturbance phase surveys to identify areas of animal breeding habitats	Possible	Minor	Low
99	Ecology - EPBC Cth marine environment	Potential direct or non-direct impacts to Commonwealth Marine Areas	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/A	No	Although works do not take place in Commonwealth waters, there is still potential for indirect impacts to waters, as a result of spills, cable removal, the introduction of pest species or changes to hydrodynamics. With appropriate controls in place, these impacts are considered to be a low risk, which is localised. They are unlikely to have a 'substantial' or 'persistent' adverse impact on the Commonwealth marine environment. Impacts to Commonwealth Marine Areas is expected to be Not Significant.	Further marine studies are required to collect baseline data and characterise existing conditions. Particular focus will be given water quality monitoring and sediment quality of Cth marine environment.	Unlikely	Minor	Low

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100	Existing infrastructure	Potential impact to existing local, regional or state significant infrastructure during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	N/A	N/A	The Project will require interface with a range of other significant infrastructure during decommissioning, such as ports, roads, electricity networks and other services and utilities. Pro-active planning, early engagement and the implementation of a governance structure with third-parties would help identify risks and associated risk management strategies.  Refer to 'Ports and harbours' for risk of potential impacts to existing port assets.	Future studies and engagement with third-parties during design development would inform of any requirements to minimise impacts to other infrastructure during decommissioning.	Possible	Minor	Low
101	Ground conditions and contamination (Terrestrial environmental quality)	Land excavation, stockpiling, transport or disposal of contaminated material (including or acid sulfate soils) produced during decommissioning leading to potential risks to public health and the environment	Decommissioning (and site rehabilitation)	Possible	Minor	Low	No	N/A	Decommissioning of the Project will require some excavation and stockpiling of soils to with potential of soil contamination. However, the Project area is largely mapped as extremely low probability of Acid Sulfate Soils (ASS) occurrence, with some pockets of low probability and high probability on the eastern side of the Forrest Hwy. Agriculture and other previous disturbance within the Project area have potentially resulted in soil contamination. The potential for Acid Sulfate Soils and contaminated land within the construction footprint would be ascertained through on-site assessment during design development and pre-construction stages.  Due to the low probability of ASS in the area, the impact to terrestrial environmental quality is not considered significant under the WA EPA significance criteria.	A contamination assessment would establish baseline indicators of material at site, which would be used to inform the DEMP, particularly in relation to management and disposal of spoil. Spoil from earthworks would be reused on-site where possible or disposed of in accordance with EPA requirements.	Unlikely	Minor	Low
102	Ground conditions and contamination (Terrestrial environmental quality)	Land disturbance, erosion, alteration of water courses and drainage patterns, vegetation removal, land clearing or modification during decommissioning impacting soil and water quality	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	No	N/A	Decommissioning could require excavation and some land cover and vegetation clearance, having the potential to impact on soils, drainage patterns and surface water quality. The impacts to soils and ground conditions is not considered 'significant' under the Terrestrial Environmental Quality guideline because land use practices anticipated during construction will not significantly increase exposure and vulnerability of soils to salinisation due to vegetation clearing.  Refer to 'Hydrology, flooding and water quality' for potential impacts to freshwater receiving environments.	A DEMP would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. A Erosion and Sediment Control Plan would establish management measures for cleared areas to ensure impacts to soil and water quality are reduced. This would include measures such as runoff, diversion and drainage points, scour protection, stabilising disturbed areas with fencing and swales and arrangements for high-risk weather events. A site-specific emergency spill response procedure will be developed to minimise risk of spills and reduce impacts of exposure.	Possible	Minor	Low
103	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to hydrology and flooding during decommissioning	Decommissioning (and site rehabilitation)	Possible	High	Medium	No	N/A	Activities such as earthworks and land cover and vegetation clearing could potentially impact on nearby waterways (i.e. changes to hydrological regime) and there is a risk of potential increase in flooding during decommissioning. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and construction methods are further developed.  The impact to Inland Waters, with particular respect to flooding, is considered not significant under WA EPA significance criteria because the Project area avoid important water sources and would not alter the water regime or existing flooding in the area.	Further investigations will be carried out to understand the surface water environments in the area and to inform appropriate management measures to be applied. Standard construction management measures in accordance with the SA EPA requirements and implementation of a CEMP will reduce the risk of altered surface water flow regimes and flooding. Construction during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments.	Unlikely	Moderate	Low
104	Hydrology, flooding, water quality, groundwater (Inland waters)	Potential impacts to surface water quality during decommissioning	Decommissioning (and site rehabilitation)	Possible	Minor	Low	Yes	N/A	Decommissioning activities such as earthworks and vegetation clearing could potentially impact on nearby waterways and Lake Preston (Peel-Yaragorup System - Ramsar wetland) (i.e. increased nutrients entering waterways, turbidity etc). There is also the potential for leaks and spills during decommissioning, which could potentially impact on surface water quality as a result of pollutants reaching waterways. Impacts to surface water quality may also have indirect impacts on potential threatened species which may be supported by these environments. This risk rating is precautionary until further understanding of local wetland and surface water systems is carried out and decommissioning methods are further developed.  The risk of impact to Inland Waters is considered significant under WA EPA significance criteria because while the Project area avoids important water sources and it could have indirect impact to the highly sensitive and protected, Lake Preston (Peel-Yaragorup System - Ramsar wetland)	Further investigations will be carried out to understand the value of surface water environments in the area and to inform appropriate management measures to be applied. Design development would look to minimise impacts through siting of infrastructure and decommissioning methodology. Standard management measures in accordance with the WA EPA requirements, such as bunding around earthworks and chemical storages and implementation of a DEMP, would reduce the risk of increased nutrient runoff or accidental spills and the potential impact on any waterways. Works during dryer periods would also avoid runoff impacts to receiving freshwater and marine environments from degradation of water quality.	Unlikely	Minor	Low
105	Hydrology, flooding, water quality, groundwater (Inland waters)	Impacts to ground water quality and/or flow during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	Yes	N/A	The Project site is within a Waterways Conservation Act 1976 declared management area, Leschenault Inlet Management Area, and within the South West Coastal Proclaimed Groundwater Area. The Department of Primary Industries and Regional Development mapping of groundwater and salinity shows that the Project area is located on a coastal plain with low risk of salinity and mostly stable groundwater trend.  Local ground water quality may deteriorate through turbidity, salinity, colour, odour, temperature, nutrients or pollutants such as chemicals and materials required during construction. Deep excavation for transmission cables may extend below regional groundwater level. Local dewatering may be necessary to manage groundwater inflows to excavation. It is considered unlikely that lowering the water tables temporarily would have a long-term impact on groundwater flows however, a precautionary risk rating has been given.	Drainage controls and erosion and sedimentation monitoring during decommissioning and earthworks (if required) would assist in managing and mitigating impacts. Establishing appropriate procedures for handling, transporting and using potentially contaminating substances including diesel, petrol, oils, greases, cement and other construction chemicals in the decommissioning Environmental Management Plan.	Possible	Minor	Low
106	Human health, hazards and risks (Human health)	Human exposure to unsafe levels of Electro-magnetic fields (EMF) during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/rare	Moderate	Low	No	N/A	Electro-magnetic fields are produced wherever electricity is used or transmitted. Therefore, the electricity supply to support work at the site is expected to be a source of Electro-magnetic fields. While there is no established evidence that exposure to Electro-magnetic fields from power lines, substations, transformers or other electrical sources, regardless of proximity, causes any health effects, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) still refers to guidelines that recommend the limiting of exposure to Electro-magnetic fields so that the threshold at which the interactions between the human body and external electric and magnetic fields that causes adverse effects within the body cannot be reached. It is expected that there would be a low risk of exceeding the levels recommended by ARPANSA. Exposure time would also be limited.  The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.	Site OHS plans would manage the risk of exposure to Electro-magnetic fields.	Highly unlikely/rare	High	Low
107	Human health, hazards and risks (Human health)	Potential for fire and increased bushfire risk during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	N/A	N/A	The Project is located in a designated Bush Fire Prone Area. However, the Western Australian My Fire Watch mapping shows bushfire have occurred in the last two years within the wider region, but well outside the Project area. Recent fires occurred in Lane Pool Reserve (2019, 2020) and Hoffman (2020). Construction works may increase risk of fire and bushfire from accidental ignition from construction equipment, fuels and chemicals.	Standard management plans addressing these issues would be included in the DEMP and would reduce the risk of the Project increasing fires and bushfires in the local region.	Highly unlikely/rare	Moderate	Low

ID	Aspect	Impact description	Project phase	Initial Risk			Significance rating		Justification for initial risk and significance rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
108	Human health, hazards and risks (Human health)	Vulnerability of the project to natural hazards, extreme weather and climate change during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Moderate	Low	N/A	N/A	Climate induced risks include increased dust generation during drier weather, increased construction delays due to wet weather, increased rainfall resulting in increased flow events in watercourses, temporary flooding and risk of failure of erosion and sediment controls and potential for construction workers to experience heatstroke as a result of extreme heat and hot weather events. Extreme weather offshore may impact decommissioning works and increase safety risks for construction workers.	Standard management plans addressing these issues would be included in the DEMP and would reduce the impact on the Project, including adequate training and PPE being provided to construction workers.	Unlikely	Moderate	Low
109	Human health, hazards and risks (Human health)	Exposure of construction personnel or the public to unsafe conditions as a result of during decommissioning	Decommissioning (and site rehabilitation)	Possible	Major	High	No	N/A	Offshore wind project presents unique risks to workers because of the nature of offshore decommissioning (at height and offshore, falls, electrical risks, subsea works and extreme weather experience in vast open spaces off the coast). In extreme circumstances this may result in death or serious injury of construction personnel. The wider community is not expected to be impacted as access to decommissioning sites on and offshore will be restricted.  The project is not expected to emit radiation. Therefore, impacts to human health under the WA EPA significance criteria is considered not significant.	Stringent site OHS plans would be developed and implemented to manage the risk of death or serious injury during construction on and offshore. Standard management measures would also reduce the likelihood of occurrence, including compulsory training and PPE provided to construction workers.	Unlikely	Major	Medium
110	Historic heritage (Social surroundings)	Impact to listed and non-listed heritage places and/or objects (maritime and terrestrial) during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/rare	Moderate	Low	No	N/A	There are no Commonwealth or State listed heritage places in the Project area. However, there are two recorded shipwrecks off the coastline, approximately 7km north off the coast of Preston Beach and 20km south near Bunbury. Project infrastructure would not interfere with the shipwrecks.  Given that the Project area avoids any direct impact of historic heritage sites, the impacts are considered not significant under the WA EPA significance criteria for Social Surroundings.	Project infrastructure for decommissioning would be located to avoid impacts to shipwrecks and local historic heritage assets. Management measures would be included in the dams (as required) to minimise any indirect impacts to mapped heritage places and sites.	Highly unlikely/rare	Moderate	Low
111	Land use	Potential impact or major change to existing and planned future residential, recreational, commercial and industrial land uses during decommissioning	Decommissioning (and site rehabilitation)	Unlikely	Minor	Low	N/A	N/A	Decommissioning of the project would not generate any additional impacts other than those already identified during the construction phase. As such, changes to land zoning would have already taken place for the construction and operation of the project. Land could be returned to open space and general farming, or utilised for other industrial purposes.	Further assessment will identify specific impacts and in particular, any property acquisition required. Further design development will aim to reduce land use impacts by refining the Project area and construction boundary to avoid sensitive land uses. Consultation with Shire of Harvey and local council will take place during detailed design, to ensure impacts are managed and appropriate consideration is given to future developments planned in the area. Management measures will be included in the CEMP, including ancillary sites to be rehabilitated to their pre-construction condition.	Highly unlikely/rare	Minor	Very Low
112	Land use	Property acquisition or tenure of land or waters during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/rare	Negligible	Very Low	N/A	N/A	Issues relating to land acquisition and tenure will have been addressed during earlier stages of the Project. Decommissioning activities are unlikely to have an impact.	Consultation with Council and State government bodies will resume prior to commencement of decommissioning.	Highly unlikely/rare	Negligible	Very Low
113	Landscape character & visual (Landforms)	Potential adverse impacts during decommissioning on visual and/or landscape values experienced from public open space (coast) or residential areas	Decommissioning (and site rehabilitation)	Possible	Moderate	Medium	N/A	N/A	Decommissioning of the project would cause similar impacts as those identified for the construction phase. Additional vessels and decommissioning equipment (cargo ships, cranes etc) would reduce the visual amenity. However, the WTGs would be removed entirely and the visual amenity of the area would be established to pre-construction landscape character and amenity.	Further visual assessments will be carried out to understand the magnitude of change for landscape character and impact to visual amenity once the Project is decommissioned. Landscaping and revegetation would be used to rehabilitate onshore areas.	Possible	Minor	Low
114	Noise and vibration	Noise and/or vibration during decommissioning activities exceeding thresholds/limits potentially impacting residential or other sensitive receptors	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/A	N/A	Decommissioning of the onshore substation, landfill site and underground cables may cause noise and vibration impacts to nearby sensitive receptors. Some minor noise may also be generated by heavy vehicles using haulage routes. Receptors within the Project area may be sensitive to noise particularly as it is likely the ambient noise level will be low given the remoteness of the coastal area. Site selection was determined due to lower sensitive receptors in the area, and accordingly the Project area directly impacts only the northern section of the Binningup town but noise impacts may be experienced further afield and by the wider Binningup community. Decommissioning would be temporary and for limited duration.	Further noise modelling and monitoring would identify areas where construction noise and vibration may exceed acceptable levels for sensitive receptors. Potential impacts shall be assessed against Statutory and guideline noise and vibration targets for construction noise and vibration. Mitigation strategies include use of noise suppression devices, noise barriers where appropriate and limiting time frames for noisy works.	Possible	Minor	Low
115	Noise and vibration	Underwater noise and/or vibration during decommissioning activities exceeding thresholds/limits potentially impacting sensitive marine receptors and species	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	N/A	N/A	Decommissioning may generate noises and vibrations that could elicit a behavioural (or startle) response in marine species up to several kilometres away. However impacts are not expected to be as severe as construction due to the activities anticipated during decommissioning. This would be very limited in duration.	Further underwater noise monitoring would identify risks and potential impacts to marine species. Stop work distance will be implemented in accordance with the Underwater Piling Noise Guidelines (Government of South Australia, 2012). Mitigation measures would be incorporated into the DEMP including engaging a marine species-spotter to check there were no sensitive species in the work zone before construction work starts. Any recreational groups or tourism operators would be notified about the piling works before they start.	Unlikely	Minor	Low
116	Ports and harbours	Modification of existing ports and harbours causing disruption to existing operations	Decommissioning (and site rehabilitation)	Unlikely	Minor	Low	N/A	N/A	Existing port facilities will be used to support the transport and marshalling of equipment for decommissioning vessels and activities. The size of the WTGs and plant and equipment required for previous stages will mean that ports and harbours will be able to accommodate decommissioning operations. Impacts to existing port operations will not be as severe as construction.	A future study of nearby harbour and ports will identify risks and limitations. Future stages of the project would involve engaging with local port operators and implementing mitigation measures to reduce impact to existing port operations as much as possible.	Unlikely	Negligible	Very Low
117	Shipping and navigation	Impact to shipping lanes, navigational setting or port approaches during operation and maintenance	Decommissioning (and site rehabilitation)	Possible	Minor	Low	N/A	N/A	Risk to shipping and navigation are expected to low due to the short term nature and minor change in shipping routes expected during decommissioning. Desktop assessment indicates that no existing formal shipping channels that interfere with the Project area, however there are some cargo ships using the surrounding study area to travel to either Bunbury port (20km south), Port of Mandurah (60km north) or Port of Freemantle (125km north). The broader study area is heavily used for recreational and commercial fishing, including lobster fishing. Decommissioning works may restrict certain areas from fishing and may impact abundance of fish in the area.	A future study of shipping and navigation routes, including engagement with local fisheries and port operators, would inform of any requirements to minimise impacts during construction/decommissioning.	Unlikely	Minor	Low
118	Social, economic and amenity (Social surroundings)	Potential impact (or benefit) to local, regional or state economic development and/or economic value of land and water during decommissioning	Decommissioning (and site rehabilitation)	Highly unlikely/rare	Negligible	Very Low	No	N/A	Decommissioning works are not expected to have an impact on regional or state economic development. There could be employment opportunities for the wider region which would benefit the regional economy. This is a positive risk rating.	The intent of the Project is to maximise benefits to the State and regional economy. Opportunities for the decommissioning phase would be explored throughout the planning and development process.	Highly unlikely/rare	Negligible	Very Low
119	Social, economic and amenity (Social surroundings)	Residential displacement, access restrictions and/or impact to community facilities, places of work, recreational uses or public open space during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	Yes	N/A	The community's access to recreational and open space will be restricted during decommissioning. However, this would be over a very limited duration and therefore these impacts will be short term and can be tested through consultation with key stakeholders.  Given the potential impacts to accessing recreational activities and open spaces, the risk to social surroundings is considered significant under the WA EPA significance criteria.	A Stakeholder Engagement Plan will be developed to manage the decommissioning phases of the project. Consultation would occur with the community regarding decommissioning activities that may cause impacts to access to community facilities, residential areas, recreational activities and public open space. The environmental assessment would further identify and address community perception of the project and determine the predicted impacts based on existing conditions. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a project DEMP. Further stages of design will consider staging works to avoid the peak fishing season where feasible. Where usual accesses are impeded, an alternate access route will be provided if it is safe to do so.	Possible	Minor	Low

ID	Aspect	Impact description	Project phase	Initial Risk			Significance rating		Justification for initial risk and significance rating	Possible mitigation measures	Residual Risk		
				Likelihood	Consequence	Inherent Risk Rating	WA Significance rating	EPBC Significance rating			Likelihood	Consequence	Residual Risk Rating
120	Social, economic and amenity (Social surroundings)	Disruption or impact to local or regional businesses through direct or indirect impacts during decommissioning	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	Yes	N/A	<p>Tourism operators could experience decreased trade during decommissioning if certain recreational activities are restricted including swimming, surfing kitesurfing, boating and fishing. Even if there is no actual decrease in access or amenity for recreational activities the wider community may still perceive negative impacts and decide not to travel to the Myalup area, resulting in indirect impacts for local hotels, restaurants, cafes and retail outlets. Some fishing activities may also be restricted resulting in lower income for professional fishing businesses. However, decommissioning would be over a very limited duration and therefore these impacts to the local and regional businesses will be short term and can be tested through consultation with key stakeholders.</p> <p>Given the potential impacts to local businesses, the risk to social surroundings is considered significant under the WA EPA significance criteria.</p>	A Stakeholder Engagement Plan will be developed to manage the construction phases of the project. Consultation would occur with coastal business owners regarding decommissioning activities that may cause impacts e.g. business access, traffic controls. Where potential impacts are identified, methods to avoid, manage or mitigate these impacts would be incorporated into a Decommissioning environmental Management Plan. Where usual accesses are impeded, an alternate access route will be provided.	Likely	Minor	Medium
121	Social, economic and amenity (Social surroundings)	Disruption to local community's culture, way of life and usual behaviours due to loss of amenity and inhibited ability to enjoy surroundings	Decommissioning (and site rehabilitation)	Likely	Minor	Medium	Yes	N/A	<p>During decommissioning the local community's usual patterns of behaviour may be disrupted due to road network changes, restricted access to recreational activities and decreased amenity in public open spaces. However, decommissioning would be over a limited duration and therefore these impacts to the community's way of life will be short term and manageable.</p>	Engagement and consultation with local community groups will be carried out to communicate any direct or indirect impacts that may occur during decommissioning. A Stakeholder Engagement Plan will be prepared to outline measures for the management and protection of existing community culture and amenity through all stages of the Project. Amenity impacts would be mitigated through appropriate separation distances between decommissioning activities and sensitive receptors.	Possible	Minor	Low
122	Traffic and transport	Change to the road network during decommissioning including increased traffic, change to transport network connectivity (including impacts to peds and cyclists), and change to road pavement conditions	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	N/A	N/A	<p>Traffic impacts would be similar to the construction phase. The road links and intersections within the study area should be assessed to determine whether they can accommodate the additional traffic generated during decommissioning (including heavy vehicles, haulage vehicles and staff access). Given limited detail and timing at this stage, a precautionary initial risk rating was given.</p>	A Traffic Management Plan is likely to be required to mitigate impacts to the road transport network. Disruption to general traffic during the movement of oversized loads along the delivery path is manageable. The Traffic Management Plan would be prepared in consultation with local road managers, Council and business and property owners.	Possible	Minor	Low
123	Waste and resources	High water and energy use, potential impacts of wastewater or wastewater removal and generation of waste	Decommissioning (and site rehabilitation)	Likely	Moderate	Medium	N/A	N/A	<p>Large amounts of waste would be generated if decommissioning results in the dismantling of WTGs. Dismantling would include decommissioned waste such as WTGs themselves, foundations, sub-sea cables, meteorological masts, offshore and onshore substations and any scour materials. However, if decommissioning involve the repowering or refurbishment of the WTGs this would extend the life of offshore windfarm and reuse resources already established. Decommissioning will require the use of energy and water and there will be some waste products (including general waste) generated.</p>	There are opportunities to minimise the generation of waste and the resources/materials sent to landfill by imbedding the waste hierarchy into overarching project planning to maximise resource efficiency. As far as possible, project resources would be utilised and reused in other parts of the Project. Provisions to optimise the efficient use of water and energy during decommissioning and maximise reuse and recycling i.e. use of on-site potable water tank during site establishment and sediment pond water (non-potable) for dust suppression purposes on site. All waste will be managed and disposed/recycled in accordance with applicable Western Australian regulations.	Possible	Minor	Low

## Attachment A

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### Consequence criteria

Levels of Consequence					
Discipline	Negligible	Minor	Moderate	High	Major
Aboriginal Heritage (Social surroundings)	Nil impact to Aboriginal archaeological objects or sites. No impact to intangible cultural heritage values such as contemporary sites or Dreaming Places.	Partial disturbance or removal of Aboriginal archaeological objects from one archaeological site. Intrusion on one of the following values of an intangible site – aesthetic, social, religious, historic or cultural.	Complete removal of one or more Aboriginal archaeological sites or removal of numerous objects at a number of site locations. Intrusion to more than two of the following values of an intangible site – aesthetic, social, religious, historic or cultural.	Complete removal of one of a large number of Aboriginal objects or complete removal of Aboriginal sites at many locations. Disturbance/ removal of an Aboriginal archaeological/ burial site(s) of high significance to the Aboriginal community or of high scientific significance. Intrusion to multiple values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.	Widespread removal of Aboriginal archaeological objects and/or sites/burials across all locations. Complete destruction of numerous sites or objects of high Aboriginal significance or high scientific significance. Complete destruction of all values (e.g. aesthetic, social, religious, historic or cultural) of more than one intangible site.
Air Quality (Air quality & GHGs)	No, or insignificant, impact to existing air quality. Local residents unlikely to notice a change in local air quality and there is unlikely to be adverse effects on human health or the environment. The Project will generate negligible amounts of GHGs emissions that are below detectable levels. .	Local, short term and minor exceedance of the nominated air quality criteria. Some local residents may notice a short term minor decrease in air quality, although no adverse effects on human health or the environment are predicted. The Project will generate detectable amounts of greenhouse emissions for a short timeframe. The GHGs emitted will contribute in a minor way to the regional and state GHGs annual inventories.	Local, long-term minor exceedance of the nominated air quality criteria OR local, short term major exceedance of the nominated air quality criteria. Local residents will notice a decrease in air quality and there may be adverse effects on the environment. Toxic or adverse effects on human health are unlikely, however some sensitive individuals may raise complaints. The Project will generate moderate amounts of GHGs emissions that will contribute in a moderate way to regional and state GHGs annual inventories.	Local short term and major exceedance of the nominated air quality criteria. Without mitigation, regional and local residents will experience a short term decrease in air quality and there may be toxic or adverse effects on human health or the environment. Regulator intervention is likely and sensitive individuals are likely to raise complaints. The Project will generate high levels of GHGs emissions that will contribute in a considerable way to regional, state and national GHGs annual inventories.	Local long-term and major predicted exceedance of the nominated air quality criteria. Without mitigation, regional and local residents will have their existing air quality significantly decreased, and there will be toxic or adverse effects on human health or the environment. Regulator intervention is very likely and sensitive individuals are likely to raise complaints. The Project will generate high and sustained levels of GHGs emissions for the life of the Project. The GHGs emitted will contribute in a considerable way to regional, state and national GHGs annual inventories.

Aviation and radar	No change to baseline aviation routes or impact to aviation radars.	Short term or minor change from baseline aviation and navigational settings, with changes deemed acceptable and minimal.	Permanent impacts with small to medium scale changes. Moderate short -term disruption to existing aviation operations and flight paths. Impacts relevant to decision making process.	Permanent impacts with large scale changes. Considerable or long-term disruption to existing aviation operations, flight paths and/or navigational radars. Impacts of importance to decision making process.	Permanent impacts with large scale changes. Permanent and unacceptable disruption to existing aviation operations, flight paths and/or navigational radars. Impacts of critical to decision making process.
Ecology	Minimal change to existing populations, species and communities, possibly a temporary effect within the bounds of natural variability.  No measurable impacts on the extent of remnant vegetation and/or habitat.	Short term (up to one year) decrease in a population or subpopulation of a threatened species or community with no effect on the viability of the population or community.  Minor loss of suitable habitat for a threatened species. Local short term decrease in some non-threatened or ecologically important species resulting in a change in local species composition and/or reduction in local biological diversity, however impact only expected to be temporary with no long term reduction in viability of the species, community or its habitat. Unlikely to effect the viability of the species.	Medium-term decrease of an important population or subpopulation of a threatened species or community, however, impact only expected to be temporary with no long term reduction in viability of the population or community.  Moderate loss of suitable habitat for threatened species but not of the extent that it affects the viability of the population or community. Regional medium-decrease in a number of non-threatened or ecologically important species resulting in change in regional species composition and/or reduction in biological diversity.  Possible reduction in regional viability of some populations of threatened species.	Long-term decrease of an important population or subpopulation of a threatened species or community resulting in a possible reduction in viability of the population or community.  Adverse impacts to habitat critical to the survival of the threatened species by fragmenting, modifying, destroying, removing or isolating or decreasing the availability or quality of habitat to the extent that the biological diversity of the species or community may possibly decline.  Regional long-term decrease in a number of non-threatened or ecologically important species resulting in significant change in regional species composition and/or reduction in biological diversity. Reduction in regional viability of some species.	Permanent decrease of an important population or subpopulation of a threatened species or community resulting in significant reduction in viability of the population or community.  Adverse impacts to habitat critical to the survival of threatened species by fragmenting, modifying, destroying, removing or isolating or decreasing the availability or quality of habitat to the extent that the biological diversity of the species or community is likely to decline.  Regional permanent decrease in numerous non-threatened or ecologically important species resulting in severe change in regional species composition and/or reduction in biological diversity.  Reduction in regional viability of numerous species populations.

<p>Ground conditions and contamination (Terrestrial environmental quality)</p>	<p>Potential impacts are not important to the decision making process. No risks to human health and/or the environment. Contamination levels may be marginally above expected background levels. Minimal to no disturbance of contaminated soils/groundwater and/or acid sulfate soils. Soils at no risk of flooding, rapid run-off and/or fragile landscapes. Limited cut and fill earthworks.</p>	<p>Potential impacts are unlikely to be of importance in the decision-making process and tend to be short term, or temporary and at a local scale. Impacts would not present a risk to human health and/or the environment. The cause would be limited to potential disturbance of minor volumes of contaminated soil/groundwater and/or disturbance to minor volumes of acid sulfate soils, that are able to be contained and treated on-site with an EPA approved Environmental Management Plan, or disposed of as prescribed waste. Contamination levels may exceed site specific risk-based environmental and/or health based investigation levels developed in accordance with National Environment Protection Measures or other relevant guidelines, however associated impacts are easily managed. Soils are likely to be at minimal risk of erosion due to flooding, rapid run-off and/or fragile landscapes, limited vegetation clearance. Cut and fill earthworks would be minimal and are unlikely to impact the ability the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are relevant to the decision-making process and tend to range from long term to short term and occur over medium scale or localised areas. Impacts would be limited to within the Project boundary but manageable risks to human health and/or the environment. The cause would include potential disturbance to moderate volumes of contaminated soil/groundwater and/or disturbance to moderate volumes of acid sulfate soils that are able to be treated on-site with an EPA approved Environmental Management Plan, or disposed as prescribed waste. Contamination levels are likely to exceed site specific risk-based investigation levels developed in accordance with National Environment Protection Measures or other relevant guidelines. Soils are likely to be at moderate risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Moderate scale cut and fill earthworks are likely to impact the ability of the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are likely to be of importance to the decision-making process and tend to be permanent, or otherwise long to medium term and occur over medium scale areas. Impacts could potentially significant widespread (outside the Project boundary) risks to human health (resulting in permanent adverse health impacts) and/or the environment. The cause would include potential disturbance to large volumes of contaminated soil/groundwater and/or large volumes of acid sulfate soils. Soils are likely to be at high risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Large scale cut and fill earthworks would impact the ability of the Project to manage the environment in a sustainable manner.</p>	<p>Potential impacts are considered critical to the decision-making process and tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Impacts would include potentially widespread (outside the Project boundary) irreversible risks to human health (potentially life-threatening) and/or environment (such as acute toxicity to receptors as defined in the National Environment Protection Measures). The cause would include potential disturbance to large volumes of contaminated soil/groundwater and disturbance to large volumes of acid sulfate soils. Soils are likely to be at very high risk of erosion and sedimentation impacts due to flooding, run-off and/or fragile landscapes and excessive vegetation clearance. Large scale cut and fill earthworks are likely to significantly change the geology and soil profile of the wider area.</p>
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Human health, hazard and risk (Human health)	No injury to the public are expected. Injury to workers requiring on-site treatment may be experienced, however unlikely to result in lost time. No fines or prosecutions expected. Unlikely risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards.	Moderate level of injury requiring offsite medical treatment and short term, however can be easily managed (i.e. spill and leaks can be easily isolated). Fines or prosecutions possible. Minor risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards. Risks can be easily mitigated.	Injury requiring hospitalisation or resulting in a temporary disability are likely and may result in investigations being conducted with some short time loss. Fines or prosecutions possible. Large risk of electromagnetic interference experienced by nearby sensitive receivers, fire or other hazards. Risks can be mitigated.	Member of the public or site workers suffer irreversible disability or serious injuries requiring long term hospitalisation. Fines and prosecutions likely. Large risk of electromagnetic interference experienced by sensitive receivers, fire or other hazards.	Death or serious injury to the public or site workers and the wider community. Fines and/or prosecutions incurred or expected. Significant risk of electromagnetic interference, fire or other hazards experienced by the wider region.
Historical heritage (Social surroundings)	No or negligible impacts to heritage values.	Impacts to local heritage, but are acceptable.	Heritage values at a national or state level may be partially impacted, but not sufficient enough to remove heritage values.	Heritage values at a national or state level may be significantly impacted, but not sufficient enough to remove heritage values.	Heritage values of a site on the national, state or local heritage register will be removed.
Hydrology, flooding, water quality, groundwater (Inland waters)	No or negligible change to shoreline, intertidal and/ or benthic profiles. No or negligible change to hydrological regimes, flooding, water quality, groundwater quality and/or flow and regional productivity.	Short term or temporary change to shoreline, intertidal and/or benthic profiles including, localised short term or temporary change to hydrological regimes, flooding, water quality, groundwater and regional productivity. Impacts tend to be minor, short term or temporary changes to groundwater quality and/or flow and occur at local scale. Impacts can be easily mitigated.	Short to medium term moderate change to shoreline, intertidal and/or benthic profiles including, localised short to medium term moderate change to hydrological regimes, flooding, water quality, groundwater and regional productivity. For groundwater specifically, it is unusable for its purpose without treatment and regularly exceeds water quality criteria or changes in groundwater levels and flow have an impact on groundwater users or groundwater dependant environmental receptors.	Medium to long term significant change to shoreline, intertidal and/or benthic profiles including, medium to long term significant change to hydrological regimes, flooding, water quality, groundwater and regional productivity. For groundwater specifically, it is unusable for its purpose without significant treatment and regularly exceeds water quality criteria. It has significant impact on groundwater users or groundwater dependent environmental receptors.	Long term irreversible change to shoreline, intertidal and/or benthic profiles including, long term irreversible change to hydrological regimes, flooding, water quality and wider productivity. For groundwater specifically, the impact is long-term and causes, irreversible change to groundwater or aquifer quality and water levels to the extent that it is unusable for the purpose it has been protected.

Land use	No impact on existing land uses and does not require any property acquisition. The Project element complies with all relevant legislative requirements and is consistent with government strategic planning studies.	Potential short term disruption to existing land use. Temporary limited access to properties but properties still able to be used for existing purpose. Minimal property acquisition that results in no land use changes. The Project element has minor inconsistencies with local planning policies.	Land use changes that would result in some inconsistencies with local planning policies. Moderate property acquisition that results in minimal land use changes. Temporary disruption of access to properties resulting in land use changes.	Land use changes that would result in significant inconsistencies with local planning policies. Major property acquisition required that results in some land use changes. Permanent disruption of access to properties resulting in some land use changes.	The Project cannot comply with all relevant legislative requirements and land use changes result in extensive conflict with state and local planning policies. Extensive property acquisition that results in significant land use changes. Permanent disruption of access to properties resulting in complete land use changes.
Landscape character and visual (Social Surroundings)	Minimal change to the existing integrity of the landscape character and visual amenity of the area. Landforms and views tend to be of lower significance and area lower ecological, scientific and social importance. Visual amenity is not a key feature or important to the viewer. Project would form only a small part of the view and would barely be noticeable.	Impacts are noticeable and tend to be short term, or temporary and at a local scale. Landforms and views are of high quality, and landscape features have ecological, scientific, or social significance for the local community. A noticeable reduction in the visual amenity of the view and/or landscape character value is experienced by local receptors and recreational users of the coastline. Project is noticeable but would not alter the overall balance of elements that comprise the existing landform. Impacts are still important in determining appropriate environmental management measures.	Impacts tend to range from long term to short term and occur over medium scale or localised areas. Landforms and views are of high quality, and ecological, scientific and social significance to the regional or localised community. A noticeable reduction of the visual amenity and change in landscape character value is experienced. Impacts are particularly important in determining appropriate environmental management measures.	Impacts tend to be permanent, or otherwise long to medium term and occur over medium scale areas. Landforms and views are of high quality and holds ecological, scientific and social significance to the local, regional and state community. The Project would likely form a noticeable feature or element of the view which is readily apparent to the receptor.	Impacts tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Landforms and views are of high quality and holds ecological, scientific and social significance for the local, regional, state and national community. The Project would form a substantial part of the view and /or landscape character value is altered permanently.

<p>Marine geology, oceanography and physical processes (Coastal processes)</p>	<p>No or negligible change to baseline marine geology, oceanography and physical processes. No detectable impact following disturbance.</p>	<p>Short term or temporary change to marine environment and physical processes. Temporary impact and natural recovery following disturbance.</p>	<p>Short to medium term change to marine environment and physical processes. Recovery in 1 to 2 years following disturbance.</p>	<p>Medium to long term change to marine environment and physical processes. Recovery in 3 to 10 years following disturbance.</p>	<p>Long term and possibly irreversible change to marine environment and physical processes. Potential recovery greater than 10 years following disturbance.</p>
<p>Marine water quality and sediment quality (Marine environmental quality)</p>	<p>No or negligible change to marine water quality and/or sediment quality. No oil leaks or spills from vessel.</p>	<p>Short term or temporary change to marine water quality and/or sediment quality including localised short-term changes. No oil leaks or spills from vessel.</p>	<p>Short term to medium term change to marine water quality and/or sediment quality including localised short-term changes. Changes can be reversed promptly.</p>	<p>Medium to long term change to marine water quality and/or sediment quality. Increased sedimentation and/or change to sediment movement, wave patterns current and water quality due to dredging. Medium to long-term change to water quality as a result of oil leaks and spillage. Remediation required. Risk of prosecution and/or fine.</p>	<p>Long term change to marine water quality and/or sediment quality. Increased concentration of sediments and turbidity in the Project area including port area. Significant changes to sedimentation of seafloor. Long term changes to wave patterns current and water quality. Irreversible damage to marine environment and potential risk to human health due to spillage. Remediation required. Risk of prosecution and/or fine.</p>

Noise and vibration	Minimal change to the existing situation and impacts are likely to be beneath levels of detection (at or below background). Noise and vibration from construction or operational activities are unlikely to result in impact and/or annoyance to sensitive receivers and/or local species.	Impacts are noticeable but acceptable and tend to be short term, or temporary (less than one week) and at a local scale and are relevant in determining standard environmental management measures. Noise levels are unlikely to exceed relevant guidelines and threshold criteria (at background + 5dB). Minor sensitivity of environmental receptors to impacts, with regular noise events that would cause minor annoyance. Noise and vibration from construction or operational activities which leads to a temporary (less than one week) disturbance of significant or non-significant species.	Impacts tend to range from long term to short term and occur over medium scale or localised areas and are important in the development of environmental management measures. Noise levels exceed relevant guidelines and threshold criteria (background + 10dB). Moderate sensitivity of environmental receptors to impacts, with regular noise events that would cause moderate annoyance and could be readily mitigated by the receptor (i.e. closing windows). Noise and vibration from construction or operational activities that result in temporary threshold shift or disruption to habitat, which leads to short term (less than five years) disappearance of non-significant species.	Impacts tend to be permanent, or otherwise long to medium term and occur over medium scale areas. High to moderate sensitivity of environmental receptors to impacts, with regular noise events that would cause significance annoyance / disturbance and could not be readily managed by the receptor (i.e. closing windows). Noise levels exceed relevant guidelines and threshold criteria (background + 20dB). Noise and vibration from construction or operational activities that result in mortality or permanent threshold shift (hearing damage) which leads to mortality or permanent disappearance of non-significant species or damage. Impacts may result in temporary threshold shift or disruption to habitat, leading to short term disappearance (less than five years) of nationally and state significant species or long term (greater than five years) disappearance of non-significant species.	Impacts tend to be permanent, or irreversible, or otherwise long term and occur over large scale areas. Very high sensitivity of environmental receptors to impacts, with regular noise events exceeding relevant guidelines and threshold criteria (background + 40 + 60 dB). Noise and vibration from construction or operational activities that leads to mortality and/or permanent or long-term (greater than five years) disappearance of nationally and state significant fauna.
Ports and harbours	Nil or minimal change to existing ports and harbours with impacts beneath levels of detection or within the normal bounds of variation.	Impacts are recognisable, but acceptable within the decision making process. Impacts tend to be short term, temporary or result in minor disturbance to existing operations.	Permanent impacts with small to medium scale changes. Moderate short -term disruption to existing operations. Impacts relevant to decision making process.	Permanent impacts with large scale changes. Considerable or long-term disruption to existing operations. Impacts of importance to decision making process.	Permanent impacts with large scale changes. Permanent and unacceptable disruption to existing operations. Impacts of critical to decision making process.

Shipping and navigation	No change to baseline shipping routes or navigational setting.	Short term or minor change from baseline shipping and navigational setting, with changes deemed acceptable and vessels able to adapt with minimal impact.	Long-term or moderate shift from baseline conditions leading to a partial loss or alteration to lower use navigable routes from baseline conditions i.e shipping routes and channels used by small and medium sized vessels using coastal routes.	Major alteration or loss of strategically important shipping lanes and navigational port approaches.	Total loss or very major alteration to internationally important shipping lanes.
Social, economic and amenity (Social Surroundings)	No change to the socio-economic environment. Impacts are likely to be beneath detection levels.	Impacts are noticeable but acceptable and tend to be short term, or temporary and at a local scale. The socio-economic environment is changed (i.e. decreased amenity and way of life) and people who live and work in the area (or its surrounds) may become annoyed by impacts associated with the project. It is expected that the community can/will adapt to changes over time and positive or negative economic impacts are easily managed or absorbed.	Impacts tend to range from long term to short term and occur over medium scale or localised areas. The socio-economic environment is changed (i.e. decreased amenity and way of life) and people who live and work in the area (or its surrounds) may be moderately annoyed by impacts associated with the project. It is expected that the community has some capacity to adapt and cope with change. Moderate or medium term impacts (positive or negative) to the economy may not be easily absorbed.	Impacts tend to be permanent, or otherwise long to medium term and occur over large or medium scale areas. The socio-economic environment is damaged and people no longer want to live and work in the area (or its surrounds). The community has limited capacity to adapt and cope with change. The negative public perception of the project is difficult to manage. Major or medium term impacts (positive or negative) to the economy may not be easily absorbed.	Impacts are permanent and occur over large scale areas. The socio-economic environment is damaged, and people no longer want to live and work in the area (or its surrounds). The community is highly sensitive to change and has limited capacity to adapt. The negative public perception of the project is difficult to manage. Major impacts (positive or negative) to the economy would not be easily absorbed.
Traffic and transport	No detectable change in a local transport operational setting.	Short term changes in a local transport operational setting. Impacts may cause initial annoyance to road users, but it is considered likely that they will adapt.	Long term but limited changes to transport operational setting that are able to be managed. Impacts likely to cause initial annoyance to road users but it is considered likely that they will adapt.	Long term, significant changes to the functioning of the transport network beyond the project area.	Long and short term changes resulting in significantly heightened road safety risk from road accidents and significant changes to the functioning of the transport network at a regional scale.

Waste and resources	No inefficiencies in resource use and waste generated by the project is negligible.	Inefficient use of resources that will impact local resource supply and generation of some waste for a short period.	Inefficient use of resources that will impact local resource supply for a short to medium period, with impacts present at either a local or wider level. Generation of some unnecessary waste for a short-medium period.	Very inefficient use of resources that will impact local resource supply for a long period. Generation of large amounts of unnecessary waste for a long period.	Very inefficient use of resources that will impact resources supply for life of the project. Generation of large amounts of unnecessary waste for the life of the project.
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## Attachment B

### EPBC Significance Criteria

Matter of National Environmental Significance	Significant impact criteria
<b>Listed threatened species and ecological communities</b>	
Extinct in the wild species	<p>An action is likely to have a significant impact on extinct in the wild species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• adversely affect a captive or propagated population or one recently introduced/reintroduced to the wild; or</li> <li>• interfere with the recovery of the species or its reintroduction into the wild.</li> </ul>
Critically endangered and endangered species	<p>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• lead to a long-term decrease in the size of a population</li> <li>• reduce the area of occupancy of the species</li> <li>• fragment an existing population into two or more populations</li> <li>• adversely affect habitat critical to the survival of a species</li> <li>• disrupt the breeding cycle of a population</li> <li>• modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</li> <li>• result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</li> <li>• introduce disease that may cause the species to decline; or</li> <li>• interfere with the recovery of the species</li> </ul>
Vulnerable species	<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• lead to a long-term decrease in the size of an important population of a species</li> <li>• reduce the area of occupancy of an important population</li> <li>• fragment an existing important population into two or more populations</li> <li>• adversely affect habitat critical to the survival of a species</li> </ul>

	<ul style="list-style-type: none"> <li>• disrupt the breeding cycle of an important population</li> <li>• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</li> <li>• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</li> <li>• introduce disease that may cause the species to decline; or</li> <li>• interfere substantially with the recovery of the species.</li> </ul>
<p>Critically endangered and endangered ecological communities</p>	<p>An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• reduce the extent of an ecological community</li> <li>• fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</li> <li>• adversely affect habitat critical to the survival of an ecological community</li> <li>• modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns</li> <li>• cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting</li> <li>• cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: <ul style="list-style-type: none"> <li>○ assisting invasive species, that are harmful to the listed ecological community, to become established; or</li> <li>○ causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community; or</li> </ul> </li> <li>• interfere with the recovery of an ecological community</li> </ul>
<p><b>Listed migratory species</b></p>	
	<p>An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:</p> <ul style="list-style-type: none"> <li>• substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species</li> </ul>

	<ul style="list-style-type: none"> <li>• result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or</li> <li>• seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</li> </ul>
<p><b>The Commonwealth marine environment</b></p>	
	<p>An action is likely to have a significant impact on the environment in a Commonwealth marine area if there is a real chance or possibility that the action will:</p> <ul style="list-style-type: none"> <li>• result in a known or potential pest species becoming established in the Commonwealth marine area</li> <li>• modify, destroy, fragment, isolate or disturb an important or substantial area of habitat such that an adverse impact on marine ecosystem functioning or integrity in a Commonwealth marine area results</li> <li>• have a substantial adverse effect on a population of a marine species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution</li> <li>• result in a substantial change in air quality<sup>4</sup> or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity; social amenity or human health</li> <li>• result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected; or</li> <li>• have a substantial adverse impact on heritage values of the Commonwealth marine area, including damage or destruction of an historic shipwreck.</li> </ul>

## Attachment C

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### WA Significance matters

The Statement of Environmental Principles, Factors and Objectives (DWER, 2020) outlines various matters that the EPA may have regard to when considering if an impact is a 'significant impact'.<sup>1</sup> These include the following:

- a) values, sensitivity and quality of the environment which is likely to be impacted
- b) extent (intensity, duration, magnitude and geographic footprint) of the likely impacts
- c) consequence of the likely impacts (or change)
- d) resilience of the environment to cope with the impacts or change
- e) cumulative impact with other existing or reasonably foreseeable activities, developments and land uses
- f) connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment
- g) level of confidence in the prediction of impacts and the success of proposed mitigation
- h) public interest about the likely effect of the proposal or scheme, if implemented, on the environment, and public information that informs the EPA's assessment.

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<sup>1</sup> Department of Water and Environmental Regulation, Western Australia Government, <https://www.epa.wa.gov.au/statement-environmental-principles-factors-and-objectives>, 2020.