



Environmental
Protection
Authority

Cambridge Gulf Marine Sand Proposal

Boskalis Australia Pty Limited

Report 1797

November 2025

This assessment report has been prepared by the Environmental Protection Authority (EPA) under s. 44 of the *Environmental Protection Act 1986* (WA). It describes the outcomes of the EPA's assessment of the Cambridge Gulf Marine Sand proposal by Boskalis Australia Pty Limited.

This assessment report is for the Western Australian Minister for Environment and sets out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment
- the EPA's recommendations as to whether or not the proposal may be implemented and, if it recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject
- other information, advice and recommendations as the EPA thinks fit.



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Chair

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17 November 2025

Contents

Summary	1
1 Proposal.....	6
2 Assessment of key environmental factors	11
2.1 Marine fauna.....	11
2.2 Coastal Processes.....	18
2.3 Social surroundings.....	24
3 Holistic assessment.....	30
4 Recommendations	32
5 Other advice	33

Figures

Figure 1: Project location and development envelope	10
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Tables

Table 1: Proposal content elements	6
Table 2: Assessment of marine fauna.....	12
Table 3: Assessment of coastal processes	19
Table 4: Assessment of social surroundings.....	25

Appendices

Appendix A: Recommended conditions.....	34
Appendix B: Decision-making authorities.....	52
Appendix C: Regulation under other statutory processes	53
Appendix D: Environmental Protection Act principles.....	54
Appendix E: Other environmental factors	57
Appendix F: List of submitters.....	61
Appendix G: Assessment timeline	62
Appendix H: Relevant policy, guidance, procedures and references.....	63

Summary

Proposal

The Cambridge Gulf Marine Sand Proposal is a proposal to develop a marine sand sourcing operation in the Cambridge Gulf for export to overseas construction projects. The proposal is located approximately 80 kilometres north of Wyndham, in the northeast region of Western Australia. The proponent for the proposal is Boskalis Australia Pty Limited.

The proposal includes a vessel-based operation, involving a single Sand Production Vessel (SPV), with proposal lifespan of up to 15 years. The proposal does not involve any construction of coastal or land-based infrastructure.

The development envelope, located in the central part of the main body of the Cambridge Gulf, covers an area of approximately 10,000 hectares (ha) in water depths averaging 25 meters (m). The SPV will operate in the development envelope over an area of up to 50 ha, for up to a two-day loading cycle every fortnight over the 15 year proposed project life. Each loading cycle will remove a layer of approximately 40 centimetres (cm) of sand from the seabed, with up to 70 million cubic meters (m³) of sand to be exported overseas for use in construction projects by the end of the proposed 15-year project life.

Context and environmental values

The proposal is located within the Cambridge Gulf within the Kimberley region of Western Australia. Its limited accessibility and low population density have contributed to the preservation of intact ecosystems and culturally significant landscapes, including extensive Indigenous heritage sites.

The coast/hinterland around the Cambridge Gulf are largely uninhabited, with no road access and no built facilities or infrastructure. The coast and hinterland on the western side of Cambridge Gulf are the Native Title lands of the Balanggarra People, and the coast and hinterland on the eastern side of Cambridge Gulf are the Native Title lands of the Mirriuwung-Gajerrong People. No Native Title exits over the marine waters of the Cambridge Gulf.

There are small numbers of commercial vessels that transit through the Cambridge Gulf, arriving and departing at the Port of Wyndham. The Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery occurs across the Cambridge Gulf, with fishing effort from commercial and recreational fishers predominately focused on the coast, rivers and inlets.

Several species listed as threatened and migratory under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) may occur or are likely to occur within the Cambridge Gulf. Australian snubfin dolphins (*Orcaella heinsohni*) and flatback turtles (*Natator depressus*) have biologically important areas that overlap the development envelope. Cape Domett 12 kilometres (km) east of the development envelope) is a globally important flatback turtle nesting site.

The State North Kimberley Marine Park is located at the seaward entrance of the Cambridge Gulf, to the 3 nautical miles (nm) limit of State coastal waters, with the Commonwealth Joseph Bonaparte Gulf Marine Park located seaward of the State Marine Park. The Ord River Floodplain Ramsar wetland contains the False Mouths of the Ord (mangroves and salt-and mud-flat habitat) on the eastern side of the Cambridge Gulf within the State Ord River Nature Reserve, approximately 6 km from the development envelope.

Consultation

The EPA published the proponent's referral information for the proposal on its website for seven days public comment and received six comments. Additional targeted consultation was sought from stakeholders (e.g. commercial fishers, industry groups, and non-government organisations), focussing on key issues raised during the 7-day public comment period. The EPA considered the comments received during the public consultation period and targeted consultation in its assessment.

Assessment of key environmental factors

The EPA has assessed the key environmental factors listed below for consistency with the EPA environmental factor objectives. The EPA assessed the residual impacts of the proposal on the environmental values and considered whether the environmental outcomes are likely to be consistent with the EPA environmental factor objectives.

Environmental factor: Marine fauna	
Residual impact on key value	Assessment finding/ environmental outcome (summary)
Behavioural or physiological responses associated with underwater noise.	The continuous operation of the SPV (24 hours a day) for up to 48 hours every two-week loading cycle for up to 15 years in the development envelope may overlap with the presence of conservation significant marine fauna including sawfish, sharks, Australian humpback dolphin and snubfin dolphin, marine turtle species, and saltwater crocodile. Commercially important fishery species (including prawns, mud crabs, barramundi and threadfin salmon) may transit through the development envelope and can be targeted by both commercial (Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery) and recreational fisheries. The EPA notes that the development envelope does not contain suitable habitat for conservation significant marine fauna. Individuals or small groups of marine fauna are expected to transit through the development envelope. The operation of the SPV has the potential to generate underwater noise that may result in physiological or behavioural responses to marine mammals, particularly cetaceans. The risk of vessel
Potential injury or death associated with vessel strike during operations.	
Potential injury, entrainment/entrapment or death associated with sand mining operations (interaction with the drag-head).	
Direct and indirect impacts to turtle nesting and hatchling emergence at nesting beaches associated with operational lighting.	

	strike associated with the presence of the SPV may impact marine fauna including dolphins, turtles and crocodiles. The EPA recognises that the likelihood of interactions with marine fauna is low based on the frequency of operations and low operational speed of the SPV (<5 knots). Cumulative impacts are considered to be low given the limited number of vessels (commercial/recreational fishing vessels and vessels transiting to/from the Port of Wyndham) expected to utilise the Cambridge Gulf. To ensure the proponent minimises the potential impact of underwater noise and vessel strike to marine fauna, the EPA has recommended conditions to ensure conservation significant marine fauna are not impacted by vessel strike, artificial light and underwater noise emissions, including requiring marine fauna observation and avoidance procedures/activities. The EPA has also recommended condition B4 that requires an environmental management plan to be implemented to demonstrate achievement of environmental outcomes. Subject to these recommended conditions, the environmental outcome is likely to be consistent with the EPA's objective for marine fauna.
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Environmental factor: Coastal processes	
Residual impact on key value	Assessment finding/ environmental outcome (summary)
Direct impacts to metocean and sediment transport from the removal of up to 70 million m³ of natural sediment supply from the development envelope. Indirect impacts to mangroves (erosion, alteration of species compositions and/or zonation of mangroves). Indirect impacts to turtle nesting beaches (erosion and alteration of physical composition).	The removal of up to 70 million m³ of sediment from the development envelope over the proposed 15-year operational life has the potential to alter hydrodynamic regimes and sediment transport processes. Impacts to coastal processes may include indirect impacts to: - surrounding mangrove communities of Cambridge Gulf, which form part of the Ord River Floodplain Ramsar Wetland and are located within the State Ord River Nature Reserve; and, - flatback turtle nesting sites at Cape Domett Seaward Beach and Small Beach, Turtle Bay on the NW side of Lacrosse Island, Turtle Beach West, west of Cape Dussejour and Barnett Point. Metocean and sediment dynamic modelling indicates that significant impacts to coastal processes from the proposal are not expected to occur. The EPA advises that residual impacts to coastal processes are not expected. The EPA recommends the implementation of recommended condition B2 to ensure coastal processes are maintained such that

	outcomes for key environmental values, such as turtle nesting beach geomorphology and mangrove community health are achieved. Condition B2 also requires the proponent demonstrate seafloor bathymetry at the end of operations remains consistent with that modelled by the proponent. The EPA has also recommended condition B4 that requires an environmental management plan to be implemented to demonstrate achievement of environmental outcomes. The recommended condition also requires revision of the plan after 5 years based on revised sediment dynamics modelling. Subject to the recommended conditions, the environmental outcome for coastal processes is likely to be consistent with the EPA's objective for this factor.
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Environmental factor: Social surroundings	
Residual impact on key value	Assessment finding/environmental outcome (summary)
Disruption of access to commercial fishing areas and interactions with other marine users. Impacts to marine fauna which have significant cultural value to Traditional Owners.	The SPV will be operating within the development envelope for up to 48 hours every two weeks over the proposed 15-year operational life. There are low numbers of commercial vessels transiting to/from the Port of Wyndham (average of 2.5 vessel movements per week). Recreational and commercial fishing activity in the broader Cambridge Gulf region is low, with potentially two active commercial fishing vessels operating primarily along coastal areas, rivers, and inlets. The EPA considers that given the low the likelihood of vessel interactions, low intensity and frequency of operations and the implementation of the proponent's proposed avoidance and minimisation measures, residual impacts to other marine users is unlikely. Underwater cultural heritage surveys of the Cambridge Gulf and the Aboriginal Cultural Heritage Inquiry System indicate no known Aboriginal cultural heritage sites within the development envelope. The proposal is not expected to impact any Aboriginal heritage sites. Marine fauna including turtles, crocodiles and marine mammals were identified as having significant cultural significance to the Mirriuwung-Gajerrong People, who have Native Title lands on the coast and hinterland of the Cambridge Gulf. Subject to the recommended conditions for marine fauna and coastal processes, cultural values are likely to be protected from significant impacts.

	The Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery occur over the Cambridge Gulf. Potentially two commercial fishers will be active in the Cambridge Gulf which may overlap with operations of the SPV. The EPA recommends a condition is included to ensure relevant stakeholders, including commercial fishers and Traditional Owners are informed in advance of anticipated activity in the development envelope to avoid interruption of ongoing access to areas used for commercial and recreational fishing, and for the proponent to conduct consultation with relevant stakeholders for the proposed operational life (condition B3). Subject to the recommended conditions, the environmental outcome for social surroundings is likely to be consistent with the EPA's objective for this factor.
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Holistic assessment

The EPA considered the connections and interactions between relevant environmental factors and values to inform a holistic view of impacts to the whole environment. The EPA formed the view that the holistic impacts would not alter the EPA's conclusions about consistency with the EPA factor objectives.

Conclusion and recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values which may be significantly affected by the proposal
- residual impacts and effects in relation to the key environmental factors, separately, holistically, and cumulatively
- likely environmental outcomes (taking into account the EPA's recommended conditions) and the consistency of these outcomes with the EPA objectives for the key environmental factors
- the EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the *Environmental Protection Act 1986*.

The EPA has recommended that the proposal may be implemented subject to conditions recommended in Appendix A.

1 Proposal

The Cambridge Gulf Marine Sand proposal relates to the development of a marine sand sourcing operation in the Cambridge Gulf for export to overseas construction projects. The proposal is located approximately 80 kilometres (km) north of Wyndham, in the northeast region of Western Australia (see Figure 1).

The proposal includes a vessel-based operation, involving a single Sand Production Vessel (SPV), with an operational lifespan of up to 15 years. The proposal does not involve any coastal or land-based development.

The development envelope, located in the central part of the main body of the Cambridge Gulf, covers an area of approximately 10,000 hectares (ha), in water depths averaging -25 m mean sea level (MSL). The SPV will operate in the development envelope over an area of approximately 50 hectares (ha), for a one-to two-day loading cycle every fortnight for up to 15 years from commencement of operations. Each loading cycle will remove a layer of approximately 40 centimetres (cm) of sand from the seabed and will target sand in different areas (approximately 50 ha) of the development envelope each loading cycle. Up to 70 million cubic metres (m³) of sand will be exported overseas during the proposed 15 year project life.

The proponent for the proposal is Boskalis Australia Pty Limited. The proponent referred the proposal to the Environmental Protection Authority (EPA) on 3 September 2024. The referral information was published on the EPA website for seven days public comment between 1 October to 7 October 2024. Additional information was requested from the proponent in October 2024, with the response being received in January 2025. On 7 April 2025 the EPA decided to assess the proposal at the level of Referral Information with additional information required.

The proponent has referred the proposal under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is being assessed separately (EPBC 2025/10106) by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The elements of the proposal which have been subject to the EPA's assessment are included in Table 1.

Table 1: Proposal content elements

Proposal element	Location	Maximum extent
Physical elements		
Development envelope	Figure 1	Up to 10,000 ha.
Sand production vessel (SPV)	NA	Length overall: up to 350 m Draft: up to 20 m Drag-head width: up to 6 m Sand capacity: up to 125 000 m ³

Operational elements		
Sand-loading and maneuvering.	Figure 1	The SPV will enter and depart the Cambridge Gulf via West Entrance in the designated shipping channel. Sand-loading to occur within the development envelope only. SPV drag-head in contact with approximately 50 ha of the seabed during one-sand loading cycle. Maneuvering area includes all navigable waters inside the Cambridge Gulf, including within and outside the development envelope.
Sand-loading and export	Within the development envelope	Sand-loading of up to 125,000 m³ each sand-loading cycle. Sand-loading of up to 70 million m³ over 15 years.
Sand-loading cycle	NA	No more than 48 hours every two weeks, up to a total of 52 days per year.
Timing elements		
Operational life	NA	Up to 15 years from the commencement of operations.

Units and abbreviations

ha – hectares

m³ – cubic meters

SPV – Sand Production Vessel

Proposal alternatives

The proposal targets marine sand deposits as opposed to conventional land-based sites. The proponent advised that marine-based sand deposits were determined as having preferred environmental outcomes over land-based sand deposit sites.

The proponent considered several marine sand deposit sites, including Admiralty Gulf, Vansittart Bay, Napier Broome Bay and Unsurveyed Bay, all located to the west of the Cambridge Gulf (refer to Figure 50 (BKA 2024c)). These sites were excluded because of the potential for adverse environmental outcomes based on lower suspended sediment regimes (naturally clearer waters) and presence of significant benthic habitats including coral and seagrass communities. Several tenements and sites located at King Shoals and Medusa Banks were also considered as possible alternative sites; however, were excluded because of their

location within the Commonwealth Joseph Bonaparte Gulf Marine Park, the State North Kimberley Marine Park, or proximity (immediately offshore) to the Cape Domett flatback turtle nesting beach.

The final development envelope location within Cambridge Gulf was the preferred option due to significant sand volumes available (BKA 2024e), naturally turbid conditions, lower potential for interactions with other marine users and lack of sensitive benthic ecological communities within the area sand will be sourced from.

The proponent has used baseline studies and investigations to inform the proposal design so that impacts to the environment can be mitigated. Alternative proposal locations are described in section 18 of the proponent's Referral Report No. 4 – Impact Assessment (BKA 2024c).

Proposal context

The proposal is situated within the Cambridge Gulf, along the tropical northeast coast of Western Australia, within State waters. This area lies within the broader Kimberley region, which is renowned for its exceptional biodiversity and ecological distinctiveness. The coastline and hinterland surrounding the main body of Cambridge Gulf are uninhabited, with no road access and no existing built infrastructure. This isolation has contributed to the preservation of largely undisturbed ecological systems. The closest town is Wyndham located approximately 80 km from the development envelope.

The coast and hinterland on the western side of Cambridge Gulf are Native Title lands of the Balanggarra peoples, and the coast and hinterland on the eastern side of Cambridge Gulf are Native Title lands of the Mirriuwung-Gajerrong peoples. No Native Title exists over marine waters within the Cambridge Gulf.

The Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery occur across the Cambridge Gulf, with fishing effort from commercial and recreational fishers mostly focused on the coast, rivers and inlets. On average approximately 2.5 commercial vessels transit through the Cambridge Gulf per week, arriving and departing at the Port of Wyndham.

There are several protected areas in the vicinity of the Cambridge Gulf. The State North Kimberley Marine Park is located at the seaward entrance of the Cambridge Gulf, to the 3 nm limit of State coastal waters, with the Commonwealth Joseph Bonaparte Gulf Marine Park located seaward of the State Marine Park. The Ord River Floodplain Ramsar wetland contains the False Mouths of the Ord (mangroves and salt-and mud-flat habitat) on the eastern side of the Cambridge Gulf within the State Ord River Nature Reserve, approximately 6 km from the development envelope.

The development envelope is located within two exploration tenements (E80/5655 and E80/6009) held by the proponent and the proposed activity is subject to the *Mining Act 1978* (WA Mining Act).

In August 2021, the Northern Territory (NT) Minister for Environment exercised section 38 of the *Environment Protection Act 2019* (NT EP Act) to formally declare

subsea mining a prohibited activity within NT coastal and intertidal waters. This decision, following a review by the NT Environment Protection Authority, was in part related to the absence of a comprehensive legal framework to manage such activities. In contrast, the regulatory framework in Western Australia (WA) includes, the *WA Mining Act 1978* which contains explicit provisions for the regulation of mining on the foreshore, seabed, and navigable waters within WA's internal waters (such as the Cambridge Gulf). Coupled with Part IV of the EP Act which establishes provisions for assessing and mitigating potential environmental impacts of significant proposals, this legislative framework enables the regulation of seabed mining activities in WA.



Figure 1: Project location and development envelope

2 Assessment of key environmental factors

This section reports on the EPA's assessment of the key environmental factors against its environmental objectives and recommendations on conditions that the proposal should be subject to if it is implemented. The EPA has considered the principles of the EP Act (see Appendix D) in assessing whether the residual impacts will be consistent with its environmental factor objectives. The EPA evaluated the impacts of the proposal on other environmental factors and concluded these were not key factors for the assessment. This evaluation is included in Appendix E.

2.1 Marine fauna

The EPA environmental objective for marine fauna is *to protect marine fauna so that biological diversity and ecological integrity are maintained* (EPA 2016b).

The proponent submitted the following investigations and surveys for the assessment:

- Analysis of ten years of turtle nesting data from Cape Domett, Cambridge Gulf, Western Australia – 2013 to 2022 inclusive (Annex 12 to Referral Report No 2. Setting and Existing Environment) (EcoStrategic 2024)
- Marine mega-fauna surveys images and locations (Annex 13 to Referral Report No 2. Setting and Existing Environment) (BKA 2024c)
- Environmental DNA (eDNA) assessment of native sawfish and riverine shark species in the Cambridge Gulf (Annex 14 to Referral Report No 2. Setting and Existing Environment) (NeRC 2024)
- Underwater noise modelling and impact assessment (Resonate 2025)
- Artificial light modelling and impact assessment (Nocterra 2025)
- Metocean Sediment Dynamics (refer to Coastal Processes in Section 2.2) (PCS 2024d)

Noise and light surveys undertaken were considered consistent with *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (NMFS 2024) and *National Light Pollution Guidelines* (DCCEEW 2023) respectively. The EPA considers that the proponent has completed relevant studies to appropriately inform the assessment.

Table 2: Assessment of marine fauna

Key environmental values and context
The marine waters surrounding the proposal area support a variety of fauna, several of which are protected under State and Commonwealth legislation. Conservation significant fauna species likely to occur or with the potential to occur, within the development envelope and surrounding area include the green sawfish (<i>Pristis zijsron</i>), freshwater sawfish (<i>Pristis pristis</i>), dwarf sawfish (<i>Pristis clavata</i>), narrow sawfish (<i>Anoxypristis cuspidate</i>), speartooth shark (<i>Glyphis glyphis</i>), northern river shark (<i>Glyphis garricki</i>) Australian humpback dolphin (<i>Sousa sahalensis</i>), Australian snubfin dolphin (<i>Orcaella heinsohni</i>), flatback turtle (<i>Natator depressus</i>), green turtle (<i>Chelonia mydas</i>) and olive ridley turtle (<i>Lepidochelys olivacea</i>) and saltwater crocodile (<i>Crocodylus porosus</i>). There are two Biologically Important Areas (BIAs) which coincide with the development envelope, namely: • An inter-nesting buffer BIA for flatback turtles associated with a globally important 2 km long nesting beach for flatback turtles on the seaward side of Cape Domett (12 km east of the development envelope), as well as turtle nesting beaches on a seaward beach west of Cape Dussejour, at Turtle Bay on Lacrosse Island and at Barnett Point inside the Cambridge Gulf. • A breeding, calving, foraging and resting BIA for Australian snubfin dolphin. Low numbers of these species were observed to be present within the development envelope (maximum 3 individuals sighted within the development envelope in surveys conducted by proponent (BKA 2024c). Sawfish and river shark species likely inhabit the mangrove lined coast of the Cambridge Gulf and the upstream rivers and inlets. While the development envelope does not contain suitable habitat for sawfish and river shark species, individuals may potentially transit through the development envelope. Several key fishery species, such as red legged banana prawns (<i>Penaeus indicus</i>), white banana prawns (<i>P. merguensis</i>), mud crabs (<i>Scylla spp.</i>), barramundi (<i>Lates calcarifer</i>) and threadfin salmon (<i>Eleutheronema tetradactylum</i>) are known to occur in the broader region. The development envelope does not provide suitable habitat for these species; however, they may potentially transit through the proposed development envelope and can be targeted by both commercial (Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery) and recreational fisherman. The mangrove-lined coast and inlets around Cambridge Gulf provide nursery areas and habitats for these species. No Threatened Ecological Communities (TECs) listed under the <i>Biodiversity Conservation Act 2016</i> WA (BC Act) were recorded within or proximal to the development envelope.

Impacts from the proposal	Assessment finding, environmental outcome and recommended conditions
Potential impacts The proposal has the potential to impact on marine fauna from: • behavioural or physiological responses associated with underwater noise • potential injury, entrainment/entrapment or death associated with sand mining operations (interaction with the drag-head) • potential injury or death associated with vessel strike during operations • introduction of invasive marine species from vessel movement • direct and indirect impacts to turtle nesting and hatchling emergence at nesting beaches associated with operational lighting • potential changes to beach morphology of turtle nesting beaches (addressed in section 2.2). Avoidance and minimisation measures • implementation of Marine Mega-fauna (MMF) observation and avoidance systems • incorporation of noise reduction measures for the SPV design as per the IMO 2023 Underwater Noise Guidelines (IMO 2023) • SPV fitted with lighting in accordance with the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023) to minimise artificial light at night • navigational area to avoid turtle nesting beaches • the drag-head will be fitted with marine fauna deterrent/deflector chains	Assessment finding and environmental outcomes The proposal involves continuous operation of the SPV (24 hours a day) for up to 48 hours every two-week loading cycle for up to 15 years which may overlap with the presence of conservation significant marine fauna species and key fishery species. <u>Interactions with marine fauna</u> The proposed activity will generate underwater noise during operation of the SPV, which may either have a physiological impact to an animal's hearing (which can be either permanent or temporary) or a behavioural response (such as fleeing or moving away). Marine mammals, particularly cetaceans, are susceptible to impacts from underwater noise. The presence of the SPV in the Cambridge Gulf during operations increases the risk of injury or death to marine fauna from vessel strike and entrapment/entrainment with the drag-head during sand-loading. Marine fauna in Cambridge Gulf susceptible to vessel strike include dolphins, turtles and crocodiles. Marine fauna such as sawfish, river sharks, resting female flatback turtles and transient species of fishery importance may occur on or near the seabed within the development envelope and may be susceptible to entrapment /entrainment by the SPV drag-head. In considering the proposal's likely impacts, the EPA recognises that the likelihood of interactions with marine fauna is reduced due to relatively low frequency of operations, and the low operational speed of the SPV (<5 knots). To minimise the impact of entrapment/entrainment of marine fauna with the drag-head during sand loading, the proponent has committed to implementing marine fauna deterrent/deflector chains to prevent marine fauna becoming trapped in the drag-head. The EPA notes that the seabed within the development envelope does not contain suitable habitat for marine fauna, and

implementing an Introduced Marine Pests – Monitoring, Detection and Response Plan. DMA regulation <u>Mining Act 1978</u> The proposal falls within the jurisdiction of the <i>Mining Act 1978</i> and will therefore be regulated by DPME. The proponent currently holds exploration licenses E80/5655 and E80/6009 over the proposal area. For the Cambridge Gulf Marine Sand Proposal to be implemented, appropriate tenure must be sought (Mining Lease) and environmental approval obtained (Mining Development and Closure Proposal (MDCPs)). <u>EPBC Act 1999</u> The proposed action is being assessed separately under the EPBC Act. Outcomes of the Commonwealth's assessment process administered under the EPBC Act may further manage and mitigate impacts to conservation significant marine fauna that are matters of national environmental significance. <u>Commonwealth Biosecurity Act 2015</u> The proposed activity will be subject to the <i>Commonwealth Biosecurity Act 2015</i> to mitigate and manage the risk of invasive marine species. Consultation During the 7-day public comment and targeted consultation period concerns were raised regarding the currency and adequacy of the supporting technical data and documentation, as well as the preliminary nature of the risk-based assessment for marine fauna. Concerns regarding the impact of light and noise impacts to marine fauna were raised during the 7-day public comment and targeted consultation	the likelihood of marine fauna resting on the seabed within the development envelope is low. The EPA considers that the implementation of the proponent's proposed controls, in addition to condition A1-1 and condition B1, restricting the sand-loading cycle to occur no more than 48 hours per event, the objective for marine fauna would be met. To minimise impacts from underwater noise and vessel strike to marine fauna, the proponent has committed to implementing marine megafauna (MMF) observation and avoidance systems and procedures in accordance with relevant guidelines (BKA 2024c). Consistent with other marine assessments, the EPA recommends the implementation of environmental outcomes (B1-1) and activities to be implemented during operations (B1-2) to ensure that no mortality, injury or disturbance to significant marine fauna occurs from vessel strike. The EPA considers that the observation and exclusion zone requirements in condition B1-2 will ensure that significant adverse impacts to marine fauna due to noise emissions are unlikely to occur. Additionally, the EPA considers that the implementation of condition A1-1, limiting the extent and frequency of the sand-loading cycle will ensure the EPA's environmental objective for marine fauna can be met. <u>Artificial light</u> Artificial light will be generated by the SPV when operating at night. Flatback turtles, as well as a small population of green turtles, are known to nest at beaches near the proposed development envelope, with the flatback turtle inter-nesting buffer biologically important area overlapping development envelope. Artificial light at night has the potential to impact the behaviour of turtle hatchlings and, to a lower degree, nesting adult females (Nocterra 2025). Emerging turtle hatchlings use light to orientate towards the ocean, and artificial light has the potential to cause misorientation and/or disorientation. The proponent commissioned an artificial light impact assessment, which determined that artificial light associated with the SPV is unlikely to cause significant impacts to turtle hatchlings or nesting adult females at any of the
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period. Additionally, concerns were raised regarding the impact of the proposal on commercially important species.	sandy beach habitats (Nocterra 2025). In accordance with recommendations from the artificial light impact assessment, the proponent has committed to implementing SPV lighting consistent with the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023). To further reduce potential impacts, the SPV will enter and exit Cambridge Gulf via the West Entrance, minimising light exposure to the globally significant turtle nesting beach at Cape Domett, located 12 km east of the development envelope. Other marine fauna within the development envelope are not expected to be significantly impacted by artificial light. In considering the proposal's likely impacts, the EPA recognises that the likelihood of light impacts is reduced due to the low intensity and frequency of operations. The EPA considers that implementation of light mitigation measures consistent with the <i>National Light Pollution Guidelines for Wildlife</i> (DCCEEW 2023), as outlined in recommended condition B1-2 (8), will ensure the EPA's objective for marine fauna would be met. <u>Potential changes to turtle nesting beach morphology and mangrove habitats</u> The removal of sand from the development envelope may have an indirect impact to turtle nesting beaches and mangrove communities within the Cambridge Gulf. As these receptors are likely to be impacted by coastal processes, they are discussed in section 2.2. The EPA has recommended condition B4 that requires the development and implementation of an environmental management plan (EMP) that must demonstrate how the outcome for marine fauna will be achieved, monitored and substantiated, with the EMP requiring approval prior to the commencement of the proposal. The EPA's recommended condition (B4) also requires the EMP to be reviewed and revised after a period of 5 yrs to ensure that the proposal applies adaptive management and continuous improvement strategies to contribute to the achievement of environmental outcomes consistent with the EPA's objectives.
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	Cumulative Impact The EPA considered the cumulative effects from the range of threats and pressures in the area of the proposal and whether the environment affected by the proposal has significant value. Cumulative impacts are not expected to be significant, noting low levels of recreational and commercial fishing activity, primarily outside the proposal area, and limited vessel traffic in the Cambridge Gulf, including an average of 2.5 transits per week to/from the Port of Wyndham. No other current or foreseeable activities are proposed within the Gulf. As such, cumulative impacts to marine fauna are not expected to significantly impact the predicted environmental outcomes of the proposal. As noted in section 1, the EPA acknowledges the unique cultural and environmental values of the Cambridge Gulf and the broader Kimberley region, along with the remoteness of the proposal area and the novel nature of the proposal. The EPA has considered these aspects and has recommended an independent audit condition (condition C5) that requires the proponent to commission an independent audit every 2 years to provide an independent audit and verification of the proposal's implementation consistent with the proponent's commitments and the requirements specified in the implementation conditions. The recommended condition complements standard implementation condition D6 and requires that the audit report be made publicly available, providing transparency and broader oversight over the implementation of the proposal. Recommended conditions to ensure consistency of environmental outcome with EPA objective Condition A1 A1-1 limits and extent on the proposal: limits and extent of sand-loading, including timing and frequency of operations.
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	Condition B1 Implement the proposal to meet the outcomes of: • no mortality, injury or disturbance from proposal related vessel strike. Implement the following activities: • not operating dredge pumps during transit, or until dredge cutterhead has been lowered to the seafloor • installation of overflow screen on the SPV to monitor for evidence of marine turtle entrainment • marine fauna observation and exclusion zones during operations • use of deterrent devices on the draghead implement best practice lighting design. Condition B4 Implementation and revision of an environmental management plan
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2.2 Coastal Processes

The EPA environmental objective for coastal processes is *to maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected* (EPA 2016a).

The proponent submitted the following investigations/surveys for the assessment:

- review of pre-existing studies and datasets (Refer to Annex 1 of Referral Report No. 4 Impact Assessments of Key Environmental Factors) (BKA 2024c)
- metocean and sediment dynamics (Referral Report No. 5 Metocean and Sediment Dynamics (PCS 2024a, 2024b, 2024c and 2024d)
- independent expert review of PCS 2024d (Buchan 2025).

The investigations were consistent with the requirements of the EPA's *Environmental Factor Guideline Coastal Processes* (EPA 2016a). The EPA considers that the proponent has completed relevant studies to appropriately inform the assessment.

The EPA notes that the modelling presented in PCS (2024d) had some limitations, such as a lack of seasonal variation in tidal constituents, wind forcing sourced from a hindcast model rather than measured wind datasets, and exclusion of current stratification from the model inputs. However, the model limitations are unlikely to change current understanding of the relative magnitude and scale of potential impacts and if certain locations outside the development will be affected more than others. The impacts on coastal processes are likely to be minor, temporary and localised to bathymetry of the development envelope.

The EPA determined it could proceed with its assessment given the model's limitations would not materially affect the environmental outcomes of the proposal and notes there is the opportunity to improve the current understanding of coastal processes and modelling through future revisions of the proponent's environmental management plan with an adaptive management component.

Table 3: Assessment of coastal processes

Key environmental values and context
The key factors influencing coastal processes in Cambridge Gulf include the underlying geology and geomorphology of the seabed, sediment input from surrounding catchment via rivers, prevailing meteorology and hydrodynamics. The Cambridge Gulf is a macrotidal environment with semi-diurnal tides with a spring tidal range of 8 m. Large tidal ranges and high tidal speeds result in a naturally turbid environment with high suspended sediment concentrations and is likely the dominant process driving the current form of the Cambridge Gulf. There is seasonal variability in the wind, wave and rainfall conditions within the Cambridge Gulf impacting coastal processes. The wind and wave conditions are typically from the northwest to north from December to April (wet season), from north to east between April and September (dry season) and from the northwest to northeast from September to December (transitional season). Approximately 7,530 ha of the 10,000 ha development envelope is estimated to comprise of sand with most sand present in a few large sand dunes which run south south-west to north north-east parallel to the current direction (BKA 2024a). There are five main rivers that discharge sediments into the upstream parts of Cambridge Gulf, upstream of Adolphus Island. These are the Durack, Forrest, King, Ord and Pentecost, along with a number of smaller tributaries. High, acute, short-term flows occur during the tropical wet season, depositing sediment (comprising of a combination of sand and fine-grained silt clay) into the Cambridge Gulf catchment. Strong tidal currents within the Cambridge Gulf results in the formation of intertidal and subtidal sandbanks. The value of coastal processes surrounding the proposed project area is linked to the environmental values they support, which may be impacted by the proposal, including: • mangrove communities around the coast of the Cambridge Gulf, and mangrove-lined tidal inlets and channels backed by extensive mud-and salt-flats (False Mouths of the Ord) on the eastern side of the Cambridge Gulf are part of the Ord River Floodplain Ramsar Wetland and are located within the State Ord River Nature Reserve • flatback turtle nesting sites at Cape Domett Seaward Beach and Small Beach, Turtle Bay on the NW side of Lacrosse Island, Turtle Beach West, west of Cape Dussejour and Barnett Point (refer to Figure 25 in Referral Report No. 4 Impact Assessment of Key Environmental Factors (BKA 2024c)). Coastal areas of the Cambridge Gulf that comprise of fixed, stable substrates such as rocky cliffs, rocky shores and intertidal rock platforms are not influenced by sediment transport and will not be impacted by the proposal.

Impacts from the proposal	Assessment finding, environmental outcome and recommended conditions
Potential impacts The proposal has the potential to impact on coastal processes from: • direct impacts to metocean and sediment transport from the removal of up to 70 million m³ of natural sediment supply from the development envelope • indirect impacts to mangroves (erosion, alteration of species compositions and/or zonation of mangroves) • indirect impacts to turtle nesting beaches (erosion and alteration of physical composition) Avoidance and minimisation measures No avoidance or minimisation measures in relation to this factor were proposed by the proponent. DMA regulation <u>Mining Act 1978 (WA Mining Act)</u> The proposed activity requires approval under the WA Mining Act regulated by the DMPE. The proponent is required to develop a MDCP to ensure environmental protection, risk mitigation, financial assurance, and regulatory compliance. <u>EPBC Act 1999</u> The proposed activity is being referred (separately) under the EPBC Act. Outcomes of the Commonwealth's assessment process administered under the EPBC Act may further manage and mitigate impacts to flatback turtle nesting beaches and/or mangrove communities.	Assessment finding and environmental outcomes The removal of sediment from has the potential to alter hydrodynamic regimes and sediment transport, resulting in erosion of surrounding areas over time. <u>Mangroves and turtle nesting beaches</u> The removal of sand from the development envelope over the projects operational life has the potential to result in indirect impacts to the surrounding coastal or beach habitats within the Cambridge Gulf. Key habitats that may be impacted by erosion include the mangroves lining the coast and inlets of the Cambridge Gulf and sandy beach habitats within the Cambridge Gulf used by nesting turtles. Mangrove communities lining the coast and inlets near the proposal area provide habitat for conservation significant marine fauna and key fishery species (identified in section 2.1 - marine fauna). Erosion, changes in zonation and species compositions of mangrove communities may result in impacts to marine fauna species, such as reducing available habitat. Sandy beach habitats within and near the Cambridge Gulf provide nesting habitats for populations of flatback turtles and some green turtles (section 2.1). Erosion of sandy beaches over time may reduce the available nesting habitat for these species. The proponent commissioned an assessment of metocean and sediment dynamics within the Cambridge Gulf to determine the proposals impacts to coastal processes (PCS 2024d). PCS (2024d) determined that changes to hydrodynamics and waves from the removal of sediment in the development envelopes were minor and provided no mechanisms whereby mangroves and turtle nesting beaches within the Cambridge Gulf would be impacted.

Consultation During the 7-day public comment and targeted consultation period, concerns were raised about the potential impacts from the removal of sand over a 15-year period on the disruption to natural sediment supply and changes to (turtle nesting) beach morphology.	The impacts to coastal processes from the proposal are likely to be minor, as a result of temporary changes to the bathymetry of the development envelope. Up to 70 million m³ of sand is proposed to be sourced from the development envelope over a 15-year period. At the end of this period, the average depth of the seabed within the development envelope is predicted to be less than 1 m greater (deeper) than the pre-project seabed. Sand from catchment sources is expected to naturally replenish the sand removed from the development envelope after the operational life of the project (PCS 2024d). The EPA notes that while significant impacts on coastal processes are unlikely to occur, there is a need for limits on the proposal to assure impacts are not greater than predicted. As such, the EPA recommends condition A1-1 to limit the maximum volume of sand removed, and condition B2 requiring the proponent to ensure that the mean seafloor bathymetry does not decrease by more than 1 m from baseline levels (i.e. increase in water depth). This is consistent with the basis for the modelled coastal process and the proponent's predicted outcomes. The EPA's recommended condition B4 requires the development and implementation of an environmental management plan (EMP) that demonstrates how the above-mentioned outcomes will be achieved, monitored and substantiated, with the EMP requiring approval prior to the commencement of the proposal. Noting the uncertainties with the sediment modelling, the EPA's recommended condition (B4) also requires the EMP to be reviewed and revised after a period of 5 yrs, and for the revised EMP to be based on revised metocean and sediment dynamics modelling that is subject to an independent review. The EPA considers that this 5 year review will ensure that the proposal applies adaptive management and continuous improvement strategies to contribute to the achievement of environmental outcomes consistent with the EPA's objectives.
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	The EPA considers that the recommended independent audit condition (C5) will provide further assurance relating to the achievement of acceptable environmental outcomes in relation to coastal processes. With the implementation of the recommended conditions, the EPA advises that the outcome of the proposal on coastal processes and associated environmental values of the Cambridge Gulf will be consistent with the EPA's objective for this factor. Cumulative impact The EPA considered the cumulative effects from the range of threats and pressures in the area of the proposal and whether the environment affected by the proposal has significant value. There is an existing interruption to the supply of sediment to the Cambridge Gulf from the building of two dams on the Ord River - one located near Kununurra, and one located near the Ord River Irrigation Scheme. Conversely, the construction of the dams has reduced the intensity of wet season flows resulting in an accumulation of sediments and a resultant increase in the extent of the mangroves in the Ord River estuary (Wolanski <i>et al.</i>, 2001 and 2004). There are no other activities within the Cambridge Gulf or proposed to occur within the Cambridge Gulf in the foreseeable future with the potential to impact on coastal processes. Cumulatively, the impacts to coastal processes are not to a level that alter the likely environmental outcomes of the Cambridge Gulf Marine Sand Proposal. Recommended conditions to ensure consistency of environmental outcome with EPA objective Condition A1 - A1-1 limits and extent on the proposal, including extent (e.g. total volume) and duration of sand extraction Condition B2 Implement the proposal to meet the outcomes of: - no change to beach geomorphology of key turtle nest beaches due to changes to sediment dynamics
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	• no change to the health or extent of the mangrove communities of the Cambridge Gulf due to changes to sediment dynamics • mean seafloor bathymetry across the development envelope decreases by no more than 1 metre at the end of operations. Condition B4 • Implementation and revision of an environmental management plan, including revision of the plan after a period of 5 years based on revised metocean and sediment dynamics modelling.
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2.3 Social surroundings

The EPA environmental objective for social surroundings is *to protect social surroundings from significant harm* (EPA 2016c).

The proponent submitted the following investigations/surveys for the assessment:

- Referral Report No. 6 Consultation Report (BKA 2024d)
- Referral Report No. 3 Traditional Owners, Native Title and Aboriginal Cultural Heritage (BKA 2024b).

The surveys and investigations presented in BKA 2024b were consistent with the *Interim Technical Guidance – Environmental impact assessment of social surroundings – Aboriginal cultural heritage* (EPA 2023). These documents have been used by the EPA as the basis for its assessment. The EPA considers that the proponent has completed the relevant studies to appropriately inform the assessment.

Table 4: Assessment of social surroundings

Key environmental values and context	
The coastline and hinterlands surrounding the Cambridge Gulf are uninhabited with no road access, and no built facilities or infrastructure. The closest town is Wyndham, 80 km from the development envelope. According to the Aboriginal Cultural Heritage System Inquiry (ACHIS) on the Department of Planning, Lands and Heritage (DLPH) website, and surveys of the Cambridge Gulf (BKA (2024b), the development envelope does not overlap with any known Aboriginal cultural heritage or Native Title. The coast and hinterland on the western side of the Cambridge Gulf are the Native Title lands of the Balanggara People, and the coast and hinterland on the eastern side of Cambridge Gulf are the Native Title lands of the Mirriuwung-Gajerrong People. There are two registered Aboriginal Cultural Heritage sites within the Cambridge Gulf located at Lacrosse Island and Cape Domett (Barrungu Site 12737 and Balu-Gunanjaar Site 12789, respectively). The eastern boundary of the Balanggarra Indigenous Protected Area (IPA) is approximately 10 km west of the development envelope. No underwater cultural heritage was identified within the broader region during surveys (BKA 2024b). Turtles, crocodiles and marine mammals that are likely to be present within the development envelope were identified to be marine species with indigenous cultural significance to the Mirriuwung-Gajerrong People. No other significant cultural heritage values have been identified within or near the development envelope. Low numbers of commercial vessels transit through the Cambridge Gulf to and from the Port of Wyndham (average of 2.5 transits per week). Commercial vessels generally transit through the western part of the gulf and do not transit through the development envelope. Recreational and commercial fishing vessels primarily operate along the coast, inlets, creeks and rivers within the Cambridge Gulf, associated with the Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery. Two commercial fishers may potentially be active within the Cambridge Gulf. No non-Aboriginal cultural heritage values were identified within the development envelope or broader region.	
Impacts from the proposal	Assessment finding, environmental outcome and recommended conditions
Potential impacts The proposal has the potential to impact on social surroundings from: - interactions with other marine users - impacts to marine fauna which have significant cultural value to Traditional Owners	Assessment finding and environmental outcomes <u>Interactions with other marine users</u> The SPV will be operating within the development envelope for up to 48 hours every two weeks over the proposed 15-year operational life.

• impacts to marine fauna which have significant fishery value (addressed in section 2.1) • disruption of access to commercial fishing areas. Avoidance and minimisation measures • low operational speed of the SPV (<5 knots) • SPV will maintain compliance with Australian Maritime Safety Authority requirements to avoid vessel collisions • relocate SPV within the development envelope when Automatic Identification System (AIS) tracking and port reporting indicate potential vessel overlap, to maintain separation and reduce interaction risk • Commitment to establish a Stakeholder Reference Group during operations. Consultation During the 7-day comment and targeted consultation periods concerns were raised about the potential impacts on commercial fishing operations because of displacement from fishing areas and impacts to commercially important species. Impacts to commercially important species is addressed in section 2.1 (marine fauna).	Commercial vessels transiting to/from the Port of Wyndham have the potential to interact with the SPV during operations. Low numbers of commercial vessels routinely transit through the Cambridge Gulf (average of 2.5 per week), predominantly occurring outside of the development envelope. Low numbers of vessels associated with recreational and commercial fishing may be present in the broader region of the Cambridge Gulf, along the coasts, rivers and inlets (potentially two active commercial fishing vessels). In considering the proposal's likely impacts, the EPA recognises that the likelihood of impacts from interactions with other marine users in the Cambridge Gulf is reduced due to the low intensity and frequency of operations in the development envelope. The proponent has committed to the implementation of a traffic control and separation scheme for commercial vessels arriving and departing the Port of Wyndham. Interactions with commercial vessels will be avoided using AIS tracking and advance port arrival and departure reporting, to identify potential overlap of commercial vessels with the SPV. If a potential overlap of the SPV with commercial vessels is identified, the SPV will relocate within the development envelope to avoid interaction. The EPA considers that given the low likelihood of impacts to other marine users within the development envelope, the avoidance and minimisation measures detailed in the proponent's referral, meets the EPA objective for this factor. <u>Aboriginal Cultural Heritage</u> The proposal is not expected to impact any Aboriginal heritage sites. Marine fauna including turtles, crocodiles and marine mammals were identified as having significant cultural significance to the Mirriuwung-Gajerrong People. The EPA considers that the proposal meets the EPA objectives for marine fauna and coastal processes, through the implementation of conditions outlined in section 2.1 and section 2.2. Significant impacts to marine fauna are not expected to occur from the proposal.
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	The proponent has engaged with the Balangarra and Mirriuwung-Gajerrong Traditional Owner groups in relation to potential impacts of the proposal on areas of cultural and heritage sensitivity and has committed to developing and implementing a joint Aboriginal Cultural Heritage Management Plan in consultation with the Balangarra Aboriginal Corporation (BAC) and the Yawoorroong Miriuwung Gajerrong Yirrgeb Noong Dawang Aboriginal Corporation (MC Corporation). Additionally, the proponent has committed to the development and implementation of a joint Aboriginal Cultural Heritage Management Plan to enhance the protection of land-based Aboriginal Cultural Heritage sites. The EPA notes that the proposal received letters of support from BAC and MC Corporation, noting that they wish to ensure the proposal does not negatively impact their interests (including Native Title, cultural heritage and marine species with indigenous cultural significance). The EPA recognises the broad cultural values of the Cambridge Gulf and in the Traditional Owners' interest in ensuring cultural and environmental values are protected. The EPA therefore recommends condition B3-1 requiring no interruption of ongoing access for Traditional Owners, and condition B3-2 requiring the proponent to conduct ongoing consultation with relevant stakeholders, including Traditional Owners on the achievement of the conditioned environmental outcomes. The EPA considers that with the management and mitigation protocols detailed in the proponent's referral and recommended conditions for marine fauna, coastal processes and social surroundings, the outcome for Aboriginal cultural heritage is likely to be consistent with the EPA objective for social surroundings. <u>Commercial fisheries</u> The Kimberley Gillnet/Barramundi Managed Fishery and Kimberley Crab Managed Fishery occur over the Cambridge Gulf. Potentially two commercial fishers will be conducting operations within the Cambridge Gulf, which may overlap with the SPV during sand-loading cycles. The EPA acknowledges that the proponent has taken reasonable steps to consult with relevant fishery stakeholders about the impacts associated with the
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	implementation of the proposal, and the EPA has used this information to inform its assessment. The EPA also notes that the proponent seeks to establish a Stakeholder Reference Group, including stakeholders with commercial fishing interests, and maintain this throughout operations. Key concerns were raised by fishery stakeholders relate to the potential disruption of access to fishing areas. Cambridge Gulf was highlighted a potentially critical area for sustaining commercial viability of fisheries. Subsequently, the EPA recommends condition B3-1 requiring no interruption of ongoing access for commercial fishers and Traditional Owners, and condition B3-2 requiring the proponent to conduct ongoing consultation with relevant stakeholders, including commercial fishers on the achievement of the conditioned environmental outcomes. The EPA considers that the recommended independent audit condition (C5) will also contribute to the achievement of acceptable environmental outcomes in relation to social surroundings. With the implementation of the recommended conditions, the EPA advises that the outcome of the proposal on social surroundings and associated environmental values of the Cambridge Gulf will be consistent with the EPA's objective for this factor. Cumulative impacts The EPA considered the cumulative threats and pressures in the proposal area and the environmental value of the affected surroundings. No other current or foreseeable activities in the Cambridge Gulf are likely to impact on social surroundings. As such, cumulative impacts are not expected to alter the environmental outcomes of the Cambridge Gulf Marine Sand Proposal.
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	Recommended conditions to ensure consistency of environmental outcome with EPA objective Condition B3 • no interruption of ongoing access to the development envelope by relevant stakeholders, including commercial fishers and Traditional Owners. • Ongoing consultation with relevant stakeholders.
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3 Holistic assessment

While the EPA assessed the impacts of the proposal against the key environmental factors and environmental values individually in the key factor assessments above, given the link between marine fauna, coastal processes and social surroundings, the EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole environment.

The following subsections present the connections and interactions between the key environmental factors and the relevant other environmental factors described in Appendix E, to inform the EPA's holistic assessment.

Coastal processes – benthic communities and habitats – marine fauna

There is a high level of connectivity between the environmental factors of coastal processes, marine environmental quality, benthic communities and habitats and marine fauna.

The maintenance of marine environmental quality supports healthy benthic communities and habitats. These benthic communities and habitats provide important habitat and resources for marine fauna including river sharks, crocodiles, sawfish, dolphins, marine turtles, as well as fish and crustacean species targeted by fisheries.

Coastal processes drive the formation of benthic communities and habitats in coastal, intertidal and subtidal areas that are comprised of mobile substrates. Within the development envelope there is highly mobile substrate, high tidal ranges and aphotic conditions which are not conducive to supporting significant benthic communities.

The removal of sediment from dredging activities has the potential to impact coastal processes which in turn may impact turtle nesting beaches and mangrove habitats within the Cambridge Gulf.

Through the proponent's application of appropriate avoidance and minimisation measures, having regard for the natural conditions within the proposal area, and the implementation of reasonable conditions, it is expected that potential impacts to these factors can be managed such that they continue to provide key environmental values. The inclusion of outcome-based conditions provides confidence that impacts to coastal processes and benthic communities and habitats will be managed appropriately to ensure that related ecological functions are not compromised and likely to be consistent with the EPA's environmental factor objectives.

Marine fauna – coastal processes - social surroundings

There is a high level of connectivity between the environmental factors marine fauna, coastal processes and social surroundings. There is a direct link between Aboriginal culture and the physical or biological aspects of the environment. Access to land, ability to carry out traditional Aboriginal customs and areas of cultural importance

may be impacted through impacts to environmental factors of marine fauna and marine environmental quality.

The maintenance of marine environmental quality supports marine fauna. Fish species within the Cambridge Gulf (such as barramundi and threadfin salmon), and crustaceans (such as red legged banana prawns, white banana prawns and mud crabs) are economically important because they are targeted by commercial and recreational fisheries. Key habitats for marine fauna formed by coastal processes, such as sandy beaches and mangrove habitats may be impacted by changes to coastal processes, such as declines in extent or changes to the physical composition of habitat. Impacts to habitats from changes to coastal processes can impact the availability of marine fauna that are important to commercial and recreational fisheries, and impact marine fauna with significant cultural values to Traditional Owners.

The EPA considers that the proposed mitigation and management measures, recommended conditions and management via other regulatory processes for impacts to marine fauna, marine environmental quality and coastal processes will also mean the interrelated impacts to the values of social surroundings will likely be consistent with the EPA environmental factor objectives.

Summary of holistic assessment

When the separate environmental factors and values affected by the proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the proposal would not alter the EPA's views about consistency with the EPA's factor objectives as assessed in section 2.

4 Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values which may be significantly affected by the proposal
- assessment of key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- likely environmental outcomes which can be achieved with the imposition of conditions
- consistency of environmental outcomes with the EPA's objectives for the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the EP Act.

The EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix A.

5 Other advice

The EPA may, if it sees fit, include other information, advice or recommendations relevant to the environment in its assessment reports, even if that information has not been taken into account by the EPA in its assessment of a proposal.

The EPA provides the following information for consideration by the Minister.

The EPA notes the Northern Territory (NT) Environment Protection Authority's 2020 review of seabed mining, which identified significant and long-term risks to NT benthic habitats, water quality, and ecosystem function. The review highlighted substantial knowledge gaps and limitations in mitigation and rehabilitation in the NT context, leading to the implementation of a moratorium on seabed mining in NT coastal waters. In light of this and considering Western Australia's regulatory framework under the Mining Act (and the *Offshore Minerals Act 2003*), along with environmental impact assessment under Part IV of the EP Act.

The EPA recommends that all significant seabed mining proposals, including marine sand extraction, be referred to the EPA for a decision on whether assessment is required under Part IV of the EP Act. This approach will ensure that decisions are grounded in robust baseline data and the latest knowledge about the potential effects of seabed mining proposals in Western Australia.

Appendix A: Recommended conditions

Section 44(2)(b) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This appendix contains the EPA's recommended conditions and procedures.

Recommended Environmental Conditions

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED **(*Environmental Protection Act 1986*)**

CAMBRIDGE GULF MARINE SAND PROPOSAL

Proposal: The proposal is to develop a marine sand sourcing operation in the Cambridge Gulf for export to overseas construction projects, approximately 80 kilometres north of Wyndham, in the northeast region of Western Australia. A single sand production vessel will remove approximately 70 million m³ sand over 15 years.

Proponent: Boskalis Australia Pty Ltd
Australian Company Number 099 738 333

Proponent address: Suite 1, Level 3, Havelock Street
WEST PERTH WA 6005

Assessment number: 2495

Report of the Environmental Protection Authority: 1797

Introduction: Pursuant to section 45 of the *Environmental Protection Act 1986*, it has been agreed that the proposal entitled Cambridge Gulf Marine Sand Proposal described in the 'Proposal Content Document' attachment of the referral of 3 October 2023, may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

Conditions and procedures

Part A: Proposal extent

Part B: Environmental outcomes, prescriptions and objectives

Part C: Environmental management plans and monitoring

Part D: Compliance and other conditions

PART A: PROPOSAL EXTENT

A1 Limitations and Extent of Proposal

A1-1 The proponent must ensure that the proposal is implemented in such a manner that the following limitations or maximum extents / capacities / ranges are not exceeded:

Proposal element	Location	Maximum extent
Physical elements		
Development envelope	Figure 1	No more than 10,000 hectares
Sand production vessel (SPV)	NA	Length overall: up to 350 m Draft: up to 20 m Drag-head width: up to 6 m Sand capacity: up to 125 000 m ³
Operational elements		
Sand-loading and manoeuvring.	Figure 1	The SPV will enter and depart the Cambridge Gulf via West Entrance in the designated shipping channel. Sand-loading not to occur outside the development envelope . Manoeuvring area includes all navigable waters inside the Cambridge Gulf, including within and outside the development envelope
Sand-loading	Within the development envelope	Sand-loading of no more than 125,000 m ³ each sand-loading cycle, and up to a total of 70 million m ³ over 15 years.
Timing elements		
Sand-loading cycle	N/A	No more than 48 hours every two weeks, up to a total of 52 days per year
Operational life	NA	Up to 15 years from the commencement of operations.

PART B – ENVIRONMENTAL OUTCOMES, PRESCRIPTIONS AND OBJECTIVES

B1 Marine Fauna

B1-1 The proponent shall implement the proposal to achieve the following environmental outcomes:

- (1) no mortality, injury or disturbance of **significant marine fauna** from proposal related vessel strikes.

B1-2 The proponent must undertake the following activities:

- (1) implement measures to minimise direct entrainment impacts to **significant marine fauna**, including not operating dredge pumps during transit and dredge cutterhead lowered to seafloor before commencement;
- (2) install an overflow screen on the **SPV** to visually assess for turtles and/or turtle remains that may have been entrained during dredging;
- (3) implement a **significant marine fauna** observation zone of at least one (1) kilometre radius from the **SPV** whereby an observer must undertake **significant marine fauna** observation for a minimum of thirty (30) minutes prior to the commencement of **sand-loading**;
- (4) implement an exclusion zone of at least five hundred (500) metres radius from the **SPV**, and within the exclusion zone:
 - (a) **sand-loading** must not commence if **significant marine fauna** are within the exclusion zone;
 - (b) **sand-loading** must cease if **significant marine fauna** enter the exclusion zone and must not recommence until the **significant marine fauna** is not within the exclusion zone as a result of:
 - (i) the **significant marine fauna** voluntarily moving from the area; or
 - (ii) manoeuvring of the **SPV** at a speed of now more than 5 knots to avoid the **significant marine fauna**; and
 - (c) excluding emergency operations, project related vessels, other than the **SPV**, must not enter the **significant marine fauna** the exclusion zone if a **significant marine fauna** is present.
- (5) engage a suitably trained, independent and experienced marine fauna observer who has a demonstrated knowledge of significant marine fauna

in the North-West region to undertake continuous observations in the observation zone required by condition B1-3(2) and exclusion zone required by condition B1-3(3);

- (6) maintain a log of recorded sightings, locations and behaviours indicative of stress or disturbance of cetaceans and submit these to National Marine Mammal Data Portal, and the **CEO**;
- (7) document and report to the **CEO**, **DCCEEW** and **DBCA** any incidents relating to significant marine fauna injury/mortality;
- (8) use marine fauna draghead deterrent or deflector chains, and
 - implement best practice lighting design for all artificial lighting as described in the **National Light Pollution Guidelines for Wildlife**, excluding where artificial lighting is required for maritime navigation

B2 Coastal Processes

B2-1 The proponent must implement the proposal to meeting the following environmental outcome:

- (1) no detectable change to the **beach geomorphology** of **key turtle nesting beaches** as a result of a proposal-related changes to sediment dynamics;
- (2) no detectable change to the health or extent of the **mangrove communities** of the Cambridge Gulf as a result of proposal-related changes to sediment dynamics; and
- (3) **Mean seafloor bathymetry** across the **development envelope** will not decrease by more than one metre, at the end of the **operational life** of the proposal in relation to baseline **mean seafloor bathymetry** measured prior to the commencement of **sand-loading**.

B3 Social Surroundings

B3-1 The proponent must ensure the implementation of the proposal achieves the following environmental outcomes:

- (1) subject to reasonable health and safety requirements, no interruption of ongoing access to the development envelope by **relevant stakeholders**.

B3-2 The proponent must take **reasonable steps to consult** with **relevant stakeholders** about the achievement of conditions B2-1(1), B2-1(2) and B3-1(1) prior to the commencement of **operations** and for the life of the proposal.

B4 Environmental Management Plan

- B4-1 The proponent must prepare an Environmental Management Plan that satisfies the requirements of conditions C4 and condition C5 and demonstrates how achievement of the environmental outcomes in condition B1-1 and B2-1 will be monitored and substantiated, and submit it to the **CEO**.
- B4-2 Within five (5) years of the **substantial commencement** of the proposal, or such other period of time agreed by the **CEO**, the proponent must review and revise the environmental management plan required by condition B4-1 and submit it to the **CEO**.
- B4-3 The revision to the environmental management plan required by condition B4-2 must include:
- (1) revised metocean and sediment dynamics numerical modelling that includes:
 - (a) bathymetry monitoring data for the development envelope captured since the commencement of sand-loading;
 - (b) contemporary metocean data;
 - (c) consideration of the timing, magnitude and impact of river discharge on suspended sediment concentrations and sedimentation; and
 - (d) analysis of the offshore and nearshore wave, including provision of swell wind rose diagrams and a Joint Frequency Table.
 - (2) a comparison of the modelling outcomes from condition B4-3(1) against the predicted outcomes in *Referral Report No. 8 - Boskalis Cambridge Gulf - Metocean & Sed Dynamics – Full Modelling Report (P076_R03v1.2)*;
 - (3) an independent review of the modelling required by condition B4-3(1) and the revised environmental management plan required by condition B4-2. The independent review must include:
 - (a) a critical analysis of the adequacy, accuracy, and appropriateness of the modelling approach, data inputs, assumptions, and outputs and comment on whether the model is scientifically robust and fit for its intended purpose; and
 - (b) recommendations, where applicable, for revision of the environmental management plan required by condition B4-2.
 - (4) revisions, where applicable, to trigger criteria, threshold criteria, monitoring and contingency measures that demonstrate how

achievement of the environmental outcomes in condition B1-1 and B2-1 will be monitored and substantiated; and

- (5) identification and inclusion of available **adaptive** management and continuous improvement strategies that contribute to the achievement of the environmental outcomes in condition B1-1 and B2-1.

B4-4 Where the **CEO** has requested further revision of the environmental management plan required by condition B4-2, the proponent must submit a revised environmental management plan addressing the **CEO's** requirements within two (2) months of the date of the request by the **CEO**, unless otherwise agreed by the **CEO**.

PART C – ENVIRONMENTAL MANAGEMENT PLANS AND MONITORING

C1 Environmental Management Plans: Conditions Related to Commencement of Implementation of the Proposal

C1-1 The proponent must not undertake:

- (1) Sand-loading until the **CEO** has confirmed in writing that the environmental management plan required by condition B4-1 meets the requirements of that condition and condition C4 or C5.

C2 Environmental Management Plans: Conditions Relating to Approval, Implementation, Review and Publication

C2-1 Upon being required to implement an environmental management plan under Part B, or after receiving notice in writing from the **CEO** under condition C1-1 that the environmental management plan(s) required in Part B satisfies the relevant requirements, the proponent must:

- (1) implement the most recent version of the **confirmed** environmental management plan; and
- (2) continue to implement the **confirmed** environmental management plan referred to in condition C2-1(1), other than for any period which the **CEO** confirms by notice in writing that it has been demonstrated that the relevant requirements for the environmental management plan have been met, or are able to be met under another statutory decision-making process, in which case the implementation of the environmental management plan is no longer required for that period.

C2-2 The proponent:

- (1) may review and revise a **confirmed** environmental management plan provided it meets the relevant requirements of that environmental

management plan, including any consultation that may be required when preparing the environmental management plan;

- (2) must review and revise a **confirmed** environmental management plan and ensure it meets the relevant requirements of that environmental management plan, including any consultation that may be required when preparing the environmental management plan, as and when directed by the **CEO**; and
- (3) must revise and submit to the **CEO** the **confirmed** Environmental Management Plan if there is a material risk that the outcomes or objectives it is required to achieve will not be complied with, including but not limited to as a result of a change to the proposal.

C2-3 Despite condition C2-1, but subject to conditions C2-4 and C2-5, the proponent may implement minor revisions to an environmental management plan if the revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-4 If the proponent is to implement minor revisions to an environmental management plan under condition C2-3, the proponent must provide the **CEO** with the following at least twenty (20) business days before it implements the revisions:

- (1) the revised environmental management plan clearly showing the minor revisions;
- (2) an explanation of and justification for the minor revisions; and
- (3) an explanation of why the minor revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-5 The proponent must cease to implement any revisions which the **CEO** notifies the proponent (at any time) in writing may not be implemented.

C2-6 **Confirmed** environmental management plans, and any revised environmental management plans under condition C2-4(1), must be published on the proponent's website and provided to the **CEO** in electronic form suitable for online publication by the Department of Water and Environmental Regulation within twenty (20) business days of being implemented, or being required to be implemented (whichever is earlier).

C3 Conditions Related to Monitoring

C3-1 The proponent must undertake monitoring capable of:

- (1) substantiating whether the proposal limitations and extents in Part A are exceeded; and
- (2) **detecting** and substantiating whether the environmental outcomes identified in Part B are achieved (excluding any environmental outcomes in Part B where an environmental management plan is expressly required to monitor achievement of that outcome).

C3-2 The proponent must maintain a log of operations, including:

- (1) time and duration of **sand-loading** operations within the **development envelope**; and
- (2) time, duration and cause of any **sand-loading** downtime whilst the **SPV** is within the **development envelope**.

C3-3 The proponent must submit as part of the Compliance Assessment Report required by condition D2, a compliance monitoring report that:

- (1) outlines the monitoring that was undertaken during the implementation of the proposal;
- (2) identifies why the monitoring was capable of substantiating whether the proposal limitation and extents in Part A are exceeded;
- (3) for any environmental outcomes to which condition C3-1(2) applies, identifies why the monitoring was scientifically robust and capable of **detecting** whether the environmental outcomes in Part B are met;
- (4) outlines the results of the monitoring;
- (5) reports whether the proposal limitations and extents in Part A were exceeded and (for any environmental outcomes to which condition C3-1 (2) applies) whether the environmental outcomes in Part B were achieved, based on analysis of the results of the monitoring; and
- (6) reports any actions taken by the proponent to remediate any potential non-compliance.

C4 Environmental Management Plans: Conditions Relating to Monitoring and Adaptive Management for Outcomes Based Conditions

C4-1 The environmental management plan required under condition B4-1 must contain provisions which enable the substantiation of whether the relevant outcomes of those conditions are met, and must include:

- (1) **threshold criteria** that provide a limit beyond which the environmental outcomes are not achieved;

- (2) **trigger criteria** that will provide an early warning that the environmental outcomes are not likely to be met;
 - (3) monitoring parameters, sites, control/reference sites, methodology, timing and frequencies which will be used to measure **threshold criteria** and **trigger criteria**. Include methodology for determining alternate monitoring sites as a contingency if proposed sites are not suitable in the future;
 - (4) baseline data;
 - (5) data collection and analysis methodologies;
 - (6) adaptive management methodology;
 - (7) **contingency measures** which will be implemented if **threshold criteria** or **trigger criteria** are not met; and
 - (8) reporting requirements.
- C4-2 Without limiting condition C3-1, failure to achieve an environmental outcome, or the exceedance of a **threshold criteria**, regardless of whether threshold **contingency measures** have been or are being implemented, represents a non-compliance with these conditions.

C5 Conditions Related to Independent Audits

- C5-1 The proponent must arrange for an independent audit of:
- (1) Compliance with the requirements of the conditions in Part A and Part B;
 - (2) Compliance with the **confirmed** environmental management plan required under condition B4-1; and
 - (3) Environmental performance of the proposal, including the effectiveness of the mitigation and management measures for the achievement of the environmental outcomes in condition B1-1 and B2-1.
- C5-2 The process for the appointment and publication of the independent audit must be consistent with condition D-6.
- C5-3 The scope, completion and reporting of the independent audit must have regard to the **Independent Audit and Audit Report Guidelines** and include evidence and data suitable to verify the audit findings, including in-person inspections of the proposal implementation and monitored environmental values.
- C5-4 Unless a different date or frequency is approved by the **CEO**, a report documenting the independent audit must be submitted within two (2) years of

the **substantial commencement** of the proposal, and then every two (2) years for the duration of the proposal, with every report documenting the audit of compliance and/ or environmental performance for the preceding two (2) year period.

PART D – COMPLIANCE, TIME LIMITS, AUDITS AND OTHER CONDITIONS

D1 Non-compliance Reporting

D1-1 If the proponent becomes aware of a potential non-compliance, the proponent must:

- (1) report this to the **CEO** within seven (7) days;
- (2) implement **contingency measures**;
- (3) investigate the cause;
- (4) investigate environmental impacts;
- (5) advise rectification measures to be implemented;
- (6) advise any other measures to be implemented to ensure no further impact;
- (7) advise timeframe in which contingency, rectification and other measures have and/or will be implemented; and
- (8) provide a report to the **CEO** within twenty-one (21) days of being aware of the potential non-compliance, detailing the measures required in conditions D1-1(1) to D1-1(7) above.

D1-2 Failure to comply with the requirements of a condition, or with the content of an environmental management plan required under a condition, constitutes a non-compliance with these conditions, regardless of whether the **contingency measures**, rectification or other measures in condition D1-1 above have been or are being implemented.

D2 Compliance Reporting

D2-1 The proponent must provide an annual Compliance Assessment Report to the **CEO** for the purpose of determining whether the implementation conditions are being complied with.

D2-2 Unless a different date or frequency is approved by the **CEO**, the first annual Compliance Assessment Report must be submitted within fifteen (15) months of the date of this Statement, and subsequent reports must be submitted annually from that date.

- D2-3 Each annual Compliance Assessment Report must be endorsed by the proponent's Chief Executive Officer, or a person approved by proponent's Chief Executive Officer to be delegated to sign on the Chief Executive Officer's behalf.
- D2-4 Each annual Compliance Assessment Report must:
- (1) state whether each condition of this Statement has been complied with, including:
 - (a) exceedance of any proposal limits and extents;
 - (b) achievement of environmental outcomes;
 - (c) achievement of environmental objectives;
 - (d) requirements to implement the content of environmental management plans;
 - (e) monitoring requirements;
 - (f) implement **contingency measures**;
 - (g) requirements to implement adaptive management; and
 - (h) reporting requirements;
 - (2) include the results of any monitoring (inclusive of any raw data) that has been required under Part C in order to demonstrate that the limits in Part A, and any outcomes or any objectives are being met;
 - (3) provide evidence to substantiate statements of compliance, or details of where there has been a non-compliance;
 - (4) include the corrective, remedial and preventative actions taken in response to any potential non-compliance;
 - (5) be provided in a form suitable for publication on the proponent's website and online by the Department of Water and Environmental Regulation; and
 - (6) be prepared and published consistent with the latest version of the Compliance Assessment Plan required by condition D2-5 which the **CEO** has confirmed by notice in writing satisfies the relevant requirements of Part C and Part D.
- D2-5 The proponent must prepare a Compliance Assessment Plan which is submitted to the **CEO** at least six (6) months prior to the first Compliance Assessment Report required by condition D2-2, or prior to implementation of the proposal, whichever is sooner.

D2-6 The Compliance Assessment Plan must include:

- (1) what, when and how information will be collected and recorded to assess compliance;
- (2) the methods which will be used to assess compliance;
- (3) the methods which will be used to validate the adequacy of the compliance assessment to determine whether the implementation conditions are being complied with;
- (4) the retention of compliance assessments;
- (5) the table of contents of Compliance Assessment Reports, including audit tables; and
- (6) how and when Compliance Assessment Reports will be made publicly available, including usually being published on the proponent's website within sixty (60) days of being provided to the **CEO**.

D3 Contact Details

- D3-1 The proponent must notify the **CEO** of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

D4 Time Limit for Proposal Implementation

- D4-1 The proposal must be **substantially commenced** within five (5) years from the date of this Statement.
- D4-2 The proponent must provide to the **CEO** documentary evidence demonstrating that they have complied with condition D4-1 no later than thirty (30) days after the **substantial commencement**.
- D4-3 If the proposal has not been substantially commenced within the period specified in condition D4-1, implementation of the proposal must not be commenced or continued after the expiration of that period.

D5 Public Availability of Data

- D5-1 Subject to condition D5-2, within a reasonable time period approved by the **CEO** upon the issue of this Statement and for the remainder of the life of the proposal, the proponent must make publicly available, in a manner approved by the **CEO**, all validated environmental data collected before and after the date of this Statement relevant to the proposal (including sampling design,

sampling methodologies and assumptions, monitoring and other empirical data (including hydrodynamic and sediment model inputs and setup characteristics, initial model conditions or model boundary data, model validation and calibration data) and derived information products (e.g. maps, hydrodynamic model domain characteristics and output data)), environmental management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

D5-2 If:

- (1) any data referred to in condition D5-1 contains trade secrets; or
- (2) any data referred to in condition D5-1 contains particulars of confidential information (other than trade secrets) that has commercial value to a person that would be, or could reasonably be expected to be, destroyed or diminished if the confidential information were published,

the proponent may submit a request for approval from the **CEO** to not make this data publicly available and the **CEO** may agree to such a request if the **CEO** is satisfied that the data meets the above criteria.

D5-3 In making such a request the proponent must provide the **CEO** with an explanation and reasons why the data should not be made publicly available.

D6 Independent Audit

D6-1 The proponent must arrange for an independent audit of compliance with the conditions of this statement, including achievement of the environmental outcomes and/or the environmental objectives and/ or environmental performance with the conditions of this statement, as and when directed by the **CEO**.

D6-2 The independent audit must be carried out by a person with appropriate qualifications who is nominated or approved by the **CEO** to undertake the audit under condition D6-1.

D6-3 The proponent must submit the independent audit report with the Compliance Assessment Report required by condition D2, or at any time as and when directed in writing by the **CEO**. The audit report is to be supported by credible evidence to substantiate its findings.

D6-4 The independent audit report required by condition D6-1 is to be made publicly available in the same timeframe, manner and form as a Compliance Assessment Report, or as otherwise directed by the **CEO**.

Table 1: Abbreviations and definitions

Acronym or abbreviation	Definition or term
Adaptive	Means having the ability or tendency to adapt in response to evidence in a manner which is most effective at achieving the specified outcomes.
Adverse impacts	Negative change that is neither trivial nor negligible that could result in a reduction in health, diversity or abundance of the receptor/s being impacted, or a reduction in environmental value. Adverse impacts can arise from direct or indirect impacts, or other impacts from the proposal.
Beach geomorphology	Beach geomorphology refers to the shape and physical characteristics of a beach, including but not limited its planform (overall layout), grain size distribution, and morphodynamics (the interaction between sediment movement and hydrodynamic forces). It encompasses key zones such as the foreshore—the beach face between high and low tide—and the backshore—the area above the high tide line, which includes features like berms and dunes.
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
Detecting/ Detectable	The smallest statistically discernible effect size that can be achieved with a monitoring strategy designed to achieve a statistical power value of at least 0.8 or an alternative value as determined by the CEO .
Development envelope	The maximum area within which the proposal will be located, and consistent with the Proposal Content Document for the proposal as referred to in the Introduction to this Statement; and depicted in Figure 1.
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or the CEO's delegate.
Confirmed	In relation to a plan required to be made and submitted to the CEO, means, at the relevant time, the plan that the CEO confirmed, by notice in writing, meets the requirements of the relevant condition. In relation to a plan required to be implemented without the need to be first submitted to the CEO, means that plan until it is revised, and then means, at the relevant time, the plan that the CEO confirmed, by notice in writing, meets the requirements of the relevant condition.

Acronym or abbreviation	Definition or term
Contingency measures	Planned actions for implementation if it is identified that an environmental outcome, environmental objective, threshold criteria, or management target are likely to be, or are being, exceeded. Contingency measures include changes to operations or reductions in disturbance or adverse impacts to reduce impacts and must be decisive actions that will quickly bring the impact to below any relevant threshold, management target and to ensure that the environmental outcome and/or objective can be met.
Independent Audit and Audit Report Guidelines	<i>Independent Audit and Audit Report Guidelines for controlled actions which have been approved under Chapter 4 of the Environment Protection and Biodiversity Conservation Act 1999</i> (Department of the Environment and Energy, 2019), or any subsequent revisions endorsed by the Commonwealth Government. EPBC Act Independent Audit and Audit Report Guidelines
m	Metre(s)
m³	Cubic metres.
Mean seafloor bathymetry	The arithmetic average of seafloor elevation values (relative to a specified vertical datum) measured across development envelope .
Mangrove Communities	The mangrove communities of Cambridge Gulf as described in <i>Referral Report No. 2 (August 2024), Proposal Setting and Existing Environment Descriptions, Boskalis Cambridge Gulf Marine Sand Proposal Western Australia, prepared for Boskalis Australia Pty Ltd by EcoStrategic Consultants</i> .
National Light Pollution Guidelines for Wildlife	<i>National Light Pollution Guidelines for Wildlife</i> (Department of Climate Change, Energy, the Environment and Water, 2023), or any subsequent revisions endorsed by the Commonwealth Government.
Operations	Operation of the SPV within the operational area depicted in Figure 1.
Reasonable steps to consult	Engaging in meaningful interaction such that there is a reasonable opportunity for relevant stakeholders to provide opinions and advice in relation to the achievement of relevant environmental outcomes and objectives . In relation to consultation with Native title party/ies this is as outlined in the EPA's <i>Technical Guidance Environmental impact assessment of Social Surroundings – Aboriginal cultural heritage</i> , as amended from time to time.
Relevant stakeholders	Any individual, group, organisation or agency that has a direct or indirect interest in the implementation of the proposal. Includes, but is not limited to: - Native title party/ies ; and

Acronym or abbreviation	Definition or term
	- recreational and commercial fishers and licence holders who operate within the Cambridge Gulf.
Native title party/ies	As defined in section 18(1AA) under the <i>Aboriginal Heritage Act 1972</i> .
Sand-loading	The mechanical extraction of sand from the sea floor by the suction pipe and drag-head of the SPV .
Sand-loading cycle	The period of time the SPV is within the development envelope and the suction pipe and drag-head is operating for the purpose of sand-loading .
Seafloor bathymetry	Refers to the physical contours, elevation, and structural features of the seafloor, including natural formations such as ridges, troughs, and sand waves, which influence benthic habitats and hydrodynamic processes.
Significant marine fauna	Threatened marine fauna species listed under the <i>Biodiversity Conservation Act 2016</i> and Priority fauna listed by the Department of Biodiversity, Conservation and Attractions.
SPV	Sand production vessel
Substantially commenced / substantial commencement	Substantial commencement is more than the preparatory works for a proposal and generally includes ground disturbance activities which are solely attributed to proposal elements described in the proposal content document, and a substantial portion of the total disturbance and infrastructure works physically commenced.
Threshold criteria	Indicators that have been selected for monitoring to provide a warning that, if exceeded, the environmental outcome may not be achieved. They are intended to forewarn of the approach of the threshold criteria and trigger response actions.
Trigger criteria	The indicators that have been selected to represent limits of impact beyond which the environmental outcome is not being met.
Turtle nesting beaches	Includes: Cape Domett large beach, Cape Domett small beach, Turtle Bay (Lacrosse Island), Turtle Beach West (west of Cape Dussejour) and Barnett Point.
West Entrance	Entrance/exit to the Cambridge Gulf west of Lacrosse Island depicted in Figure 2 as vessel route area.

Figures (attached)

Figure 1 Cambridge Gulf marine sand proposal location and development envelope

(Figure 1 is a representation of the co-ordinates referenced in Schedule 1)

Schedule 1

All co-ordinates are in metres, listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geocentric Datum of Australia 2020 (GDA2020).

Spatial data depicting the figures are held by the Department of Water and Environmental regulation. Record no. APP-0025643.

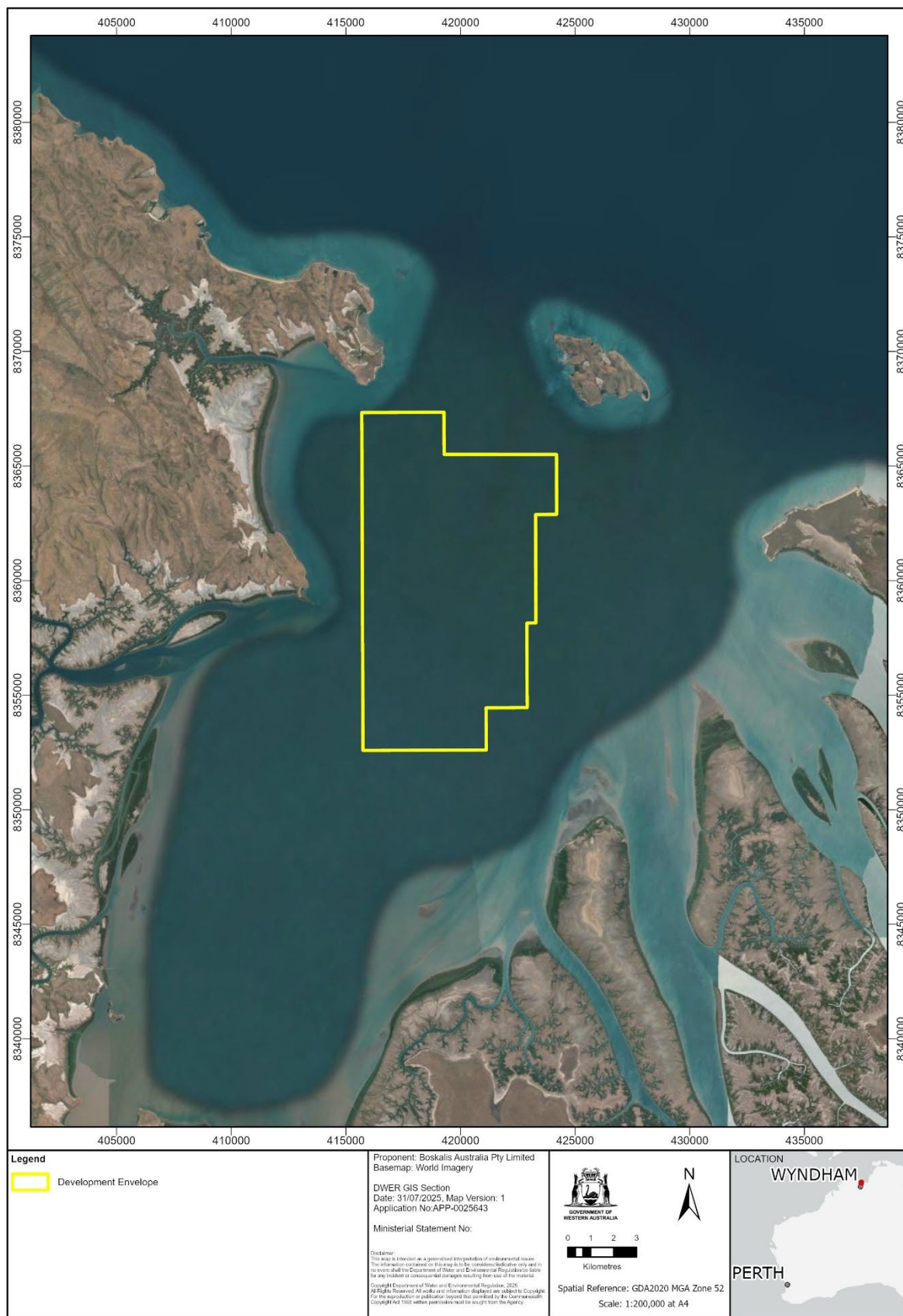


Figure 1 Cambridge Gulf marine sand proposal location and development envelope

Appendix B: Decision-making authorities

Table B1: Identified relevant decision-making authorities for the proposal

Decision-Making Authority	Legislation (and approval)
1. Minister for Environment	<i>Biodiversity Conservation Act 2016</i> - section 40 authority to take or disturb threatened species.
2. Minister for Mines and Petroleum	<i>Mining Act 1978</i> - granting of a mining lease / general purpose lease.
3. Chief Executive Officer, Department of Biodiversity, Conservation and Attractions	<i>Biodiversity Conservation Act 2016</i> - authority to take fauna (other than threatened species)
4. Director General, Department of Transport	<i>Navigation Act 2012</i> <i>Marine Navigational Aids Act 1973</i> <i>Shipping and Pilotage Act 1967</i> <i>Pollution of Waters by Oil & Noxious Substances Act (PWONS Act)</i>

Appendix C: Regulation under other statutory processes

Table C1: Identified relevant statutory decision-making processes applicable for the proposal

Statutory decision-making process	Environmental outcome
<i>Mining Act 1978</i>	Mining activities and mine closure will additionally be addressed in the Mine Development and Closure Plan under the Mining Act. The Department of Mining, Petroleum and Exploration may impose additional conditions under the Mining Act.
<i>Biodiversity Conservation Act 2016</i>	The taking of threatened marine fauna does not result in any species being listed under a higher conservation status.
<i>Commonwealth Biosecurity Act 2015</i>	No introduction of invasive marine species to the marine environment through vessel ballast water and/or biofouling of vessel hulls.
<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>	The EPA has recommended conditions in relation to impacts on listed threatened species and communities protected by the EPBC Act. The Department of Climate Change, Energy, the Environment and Water may impose additional conditions under the EPBC Act.

Appendix D: Environmental Protection Act principles

Table D1: Consideration of principles of the *Environmental Protection Act 1986*

EP Act principle	Consideration
1. The precautionary principle <i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i> <i>In application of this precautionary principle, decisions should be guided by –</i> (a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i> (b) <i>an assessment of the risk-weighted consequences of various options.</i>	The EPA has considered the precautionary principle in its assessment and has had particular regard to this principle in its assessment of marine fauna, coastal processes and social surroundings. The proponent has investigated the physical and biological environment to identify environmental values of the proposal area. The EPA considers consistency with this principle could be achieved with the implementation of its recommended conditions, in addition to the proposal's adoption of: - designing the location of development envelope away from significant benthic communities and habitats - low operational presence of the Sand Production Vessel (SPV) (one-to two-days every two weeks). The EPA has recommended conditions where there is uncertainty to prevent and avoid environmental impacts from occurring. The EPA has concluded that subject to the implementation of the recommended conditions, the proposal is unlikely to pose a threat of serious or irreversible harm.
2. The principle of intergenerational equity <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i>	The EPA has considered the principle of intergenerational equity in its assessment and has had particular regard to this principle in its assessment of marine fauna, coastal processes and social surroundings. The EPA notes that the proponent has identified measures to avoid and minimise impacts to the key environmental factors for marine fauna, coastal processes and social surroundings. The EPA has considered these measures during its assessment and has recommended conditions to ensure that appropriate measures are implemented. The EPA recommends that adverse impacts to relevant fishery stakeholders are minimised and that consultation with relevant fishery stakeholder groups should occur prior to the commencement of operations and for the life of the proposal.

EP Act principle	Consideration
	The EPA notes that if the proposal is approved, the proponent will implement a comprehensive environmental research and monitoring program in cooperation with Traditional Owners and relevant regulatory authorities (including the DWER, DBCA, DPIRD (Fisheries)). The proponent will develop and implement a joint Aboriginal Cultural Heritage Management Plan (ACHMP) with Traditional Owners as well as a Stakeholder Reference Group. Data collected will be used to inform, improve and enhance environmental protection within the Cambridge Gulf for the use of future generations. The EPA has concluded that the environmental values are likely to be protected and that the health, diversity and productivity of the environment will be maintained and enhanced for the benefit of future generations.
3. The principles of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i>	The EPA has considered the principle of conservation of biological diversity and ecological integrity in its assessment and has had particular regard to this principle in its assessment of marine fauna and coastal processes (flatback turtle nesting beaches at Cape Domett, Lacrosse Island, Cape Dussejour and Barnett Point and the mangrove communities in the State Ord River Nature Reserve). The EPA has considered to what extent the potential impacts from the proposal to marine fauna can be ameliorated to ensure consistency with the principle of conservation of biological diversity and ecological integrity. The EPA has concluded that the actions to avoid and minimise impact to marine fauna, which are also recommended as conditions, will likely conserve marine biological diversity and ecological integrity, so that environmental outcomes are achieved.
4. Principles relating to improved valuation, pricing and incentive mechanisms <i>(1) Environmental factors should be included in the valuation of assets and services.</i> <i>(2) The polluter pays principle — those who generate pollution and waste should bear the cost of containment, avoidance or abatement.</i> <i>(3) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the</i>	In considering this principle, the EPA notes that the proponent will bear the costs relating to implementing the proposal to achieve environmental outcomes, and management and monitoring of environmental impacts during the operation and decommissioning of the proposal. The EPA has had particular regard to this principle in considering marine fauna, coastal processes and social surroundings.

EP Act principle	Consideration
<i>use of natural resources and assets and the ultimate disposal of any wastes.</i> <i>(4) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.</i>	
5. The principle of waste minimisation <i>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</i>	The EPA has considered the principle of waste minimisation in its assessment and has had particular regard to this principle in its assessment of marine fauna, coastal processes and social surroundings. The EPA notes that proponent proposes to minimise the waste streams of domestic garbage and sewage generated from the SPV through the implementation of a Garbage Management Plan (as required by MARPOL Annex V and AMSA Marine Orders), and management of sewage as required by MARPOL Annex IV. The EPA notes the proponent is will not discharge garbage or sewage when in Australian waters to minimise the discharge of waste into the environment. No dredge spoil will be required to be discharged to the environment, minimising the requirement for material disposal.

Appendix E: Other environmental factors

Table E1: Evaluation of other environmental factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Water			
Marine environmental quality	Potential impacts to marine environmental quality due to sediment plumes and contamination spills from the SPV.	<u>Public comments</u> - concern over the impact to marine environmental quality associated with sediment plumes within the following protected areas: - North Kimberley Marine Park - Joseph Bonaparte Gulf Marine Park - King Shoals Sanctuary Zone - Ord River Nature Reserve <u>Agency comments</u> - DBCA commented on gaps in relation to sediment plume modelling (sediment transport and plume direction, seasonality) on marine environmental quality	The EPA did not consider marine environmental quality to be a preliminary key environmental factor when the EPA decided to assess the proposal. In considering the potential impacts to marine environmental quality, the EPA had regard to the following: - no discharges associated with the SPV (other than water from within the Cambridge Gulf) are proposed during operations - the Cambridge Gulf is a naturally turbid environment with high tidal movement and aphotic seabed conditions - modelling of sediment plumes by the proponent indicated temporary, localised changes to marine environmental quality - management measures proposed include fitting the SPV with turbidity reduction measures - the SPV will be operated in compliance with the requirements of the International Maritime Organisation (IMO) including the MARPOL Convention, as implemented in Australia through the Protection of the Sea (Prevention of Pollution from Ships) Act and supporting Marine Orders)) and the Australian Maritime Safety Authority (AMSA). This includes best practice measures to prevent discharges and respond to accidental discharges should they occur

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Additional regulation of marine environmental quality will occur under the <i>Mining Act</i> 1978 through the submission of a Mining Development and Closure Proposal, subject to approval by the Department of Mines, Petroleum and Exploration. It is not likely that the proposal will have a significant impact on marine environmental quality, and the proposal is likely to be consistent with the EPA factor objective. Accordingly, the EPA did not consider marine environmental quality to be a key environmental factor when the EPA decided to assess the proposal.
Benthic communities and habitats	Potential impacts to benthic communities and habitats from sediment plumes generated by the proposed activity and removal of sediment within the development envelope.	<u>Public comments</u> • concern over significant, irreversible damage to the seabed/habitat destruction • concern over potential impacts to fish habitat within the Cambridge Gulf • concern over cumulative impacts to benthic communities and their survival in the long term • concern over potential indirect impacts to benthic habitats and communities in the following protected areas: ○ North Kimberley Marine Park ○ Joseph Bonaparte Gulf Marine Park ○ King Shoals Sanctuary Zone ○ Ord River Nature Reserve	The EPA did not consider benthic communities and habitats to be a preliminary key environmental factor when the EPA decided to assess the proposal. In considering the potential impacts to benthic habitats and communities, the EPA had regard to the following: • there are no significant or sensitive BCH identified within the development envelope or greater Cambridge Gulf (except for mangroves lining the coast, rivers and inlets) • there are limiting environmental conditions within the develop envelope to support significant BCH • modelling of sediment plumes indicated no impacts will occur during operations to benthic habitats and communities within the Cambridge Gulf or outside of the Cambridge Gulf • implementation of EMP to monitor and mitigate impacts to benthic communities and habitats It is not likely that the proposal will have a significant impact on benthic communities and habitats, and the proposal is likely to be consistent with the EPA factor objective. Accordingly, the EPA did not consider marine

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			environmental quality to be a key environmental factor when the EPA decided to assess the proposal.
Air			
Air quality	Potential impacts to air quality due to emissions associated with emissions from the SPV and on-board machinery during operations.	No comments were received for this factor during consultation.	The EPA did not identify air quality as a preliminary key environmental factor when the EPA decided to assess the proposal. In considering the potential impacts to air quality, the EPA had regard to the following: • SPV will comply with Annex VI (Air Pollution) of the <i>International Convention for the Prevention of Pollution from ships</i> (MARPOL) and AMSA Marine Order 97 • management measures proposed including design of SPV for dual fuel use (alternative fuels such as methanol may be used) and potential fitting of Rotor Sails • separation distance between the proposal and inhabited areas (Wyndham, approximately 80 km downstream of the proposal) • low presence of the SPV within the development envelope (SPV will operate within the proposed operational area for up to two days every two weeks) No comments were received regarding this factor during consultation. Accordingly, the EPA did not consider air quality to be a key environmental factor at the conclusion of its assessment.
Greenhouse gas emissions	The proposal will generate greenhouse gas emissions that contribute to climate	No comments were received for this factor during consultation	The EPA did not identify greenhouse gas emissions as a preliminary key environmental factor when the EPA decided to assess the proposal.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
	change, impacting on Western Australia's environment. The proponent has estimated the proposal will result in scope 1 GHG emissions of approximately 13,000 tCO₂-e per annum during operations.		In considering the potential impacts to greenhouse gas emissions, the EPA had regard to the following: - the proponent's estimate of Scope 1 GHG emissions being well below the 100,000 tCO₂-e per annum threshold for consideration, as specified in <i>Environmental Factor Guideline: Greenhouse Gas Emissions</i> (EPA, 2023a) - the SPV will comply with Annex VI (Air Pollution) of the <i>International Convention for the Prevention of Pollution from ships</i> (MARPOL) and AMSA Marine Order 97 - management measures proposed including design of the SPV for dual fuel use (alternative fuels such as methanol may be used) and potential fitting of Rotor Sails. Accordingly, the EPA did not consider greenhouse gas emissions to be a key environmental factor at the conclusion of its assessment.

Appendix F: List of submitters

7-day comment on referral

Organisations and public

- Three private submitters
- Western Australian Fishing Industry Council
- Conservation Council of Western Australia

Government agencies

- Department of Primary Industries and Regional Development

Targeted Consultation

Organisations and public

- The Conservation Council of WA
- Western Australian Fishing Industry Council
- One commercial fishing operator

Government agencies

- Department of Primary Industries and Regional Development

Appendix G: Assessment timeline

Date	Progress stages	Time (weeks)
7 April 2025	EPA decided to assess – level of assessment set	
17 April 2025	EPA requested additional information	10 days
6 August 2025	EPA received final information for assessment	16
16 October 2025	EPA completed its assessment (s. 44(2b))	10
20 November 2025	EPA provided report to the Minister for Environment	6
25 November 2025	EPA report published	3 days
16 December 2025	Appeals period closed	3

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the EPA decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

Appendix H: Relevant policy, guidance, procedures and references

The EPA had particular regard to the references, policies, guidelines and procedures listed below in the assessment of the proposal:

BKA 2024a, Referral Report No. 2 – Proposal Setting and Existing Environment Descriptions.

BKA 2024b, Referral Report No. 3 Traditional Owners, Native Title and Aboriginal Cultural Heritage. Annexes include letters of support from 2 TO groups.

BKA 2024c, Referral Report No. 4 – Impact Assessment of Key Environmental Factors.

BKA 2024d, Referral Report No. 6 – Stakeholder Engagement and Consultation

BKA 2024e, Technical Note Soil Engineering – Cambridge Gulf Sand Search – Potential Sand Volume.

Buchan 2025, Independent Expert Review of PCS 2024d, prepared for Boskalis Australia Pty Limited by Steve Buchan.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023. Light Pollution Guidelines for Wildlife.

International Maritime Organisation (IMO) 2023, Revised guidelines for the reduction of underwater radiated noise from shipping to address adverse impacts to marine life.

EPA 2016a, *Environmental factor guideline – Coastal processes*, Environmental Protection Authority, Perth, WA.

EPA 2016b, *Environmental factor guideline – Marine fauna*, Environmental Protection Authority, Perth, WA.

EPA 2016c, *Environmental factor guideline – Social surroundings*, Environmental Protection Authority, Perth, WA.

EPA 2023, *Technical guidance – Environmental impact assessment of social surroundings - Aboriginal cultural heritage*, Environmental Protection Authority, Perth, WA.

National Marine Fisheries Service (NMFS) 2023, Summary of Marine Mammal Protection Act Acoustic Thresholds.

National Marine Fisheries Service (NMFS) 2024, Update to Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) – Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shift.

NeRC 2024, Environmental DNA Assessment of Native Sawfish and Riverine Shark

Species in the Cambridge Gulf, prepared for Boskalis Australia Pty Limited by National eDNA Reference Centre.

Nocterra 2025, Boskalis Cambridge Gulf: Sand Production Vessel Light Modelling and Impact Assessment, prepared for Boskalis Australia Pty Limited by Nocterra.

PCS 2024a, Metocean and Sediment Dynamics – System Understanding, Conceptual Model and Initial Modelling, prepared for Boskalis Australia Pty Limited by Port and Coastal Solutions.

PCS 2024b, Metocean and Sediment Dynamics – Supplementary Technical Note, prepared for Boskalis Australia Pty Limited by Port and Coastal Solutions.

PCS 2024c, Metocean and Sediment Dynamics – Factual Data Report, prepared for Boskalis Australia Pty Limited by Port and Coastal Solutions.

PCS 2024d, Metocean Sediment Dynamics – Data Analysis and Numerical Modelling Report, prepared for Boskalis Australia Pty Limited by Port and Coastal Solutions.

Ecostrategic 2024, Cape Domett turtle data report – prepared for Boskalis Australia Pty Limited by EcoStrategic.

Resonate 2025, Sand Production Vessel - Underwater Noise Assessment, prepared for Boskalis Australia Pty Limited by Resonate.

Wolanski, E., K. Moore, S. Spagnol, N. d'Adamo, and C. Pattiaratchi, 2004, Rapid, human-induced siltation of the macro-tidal Ord River Estuary, Western Australia. *Estuarine, Coastal & Shelf Science* 53(5): 717-732.

Wolanski, E., S. Spagnol and D. Williams 2004, The impact of damming the Ord River on the fine sediment budget in Cambridge Gulf, Northwestern Australia. *Journal of Coastal Research* 20(3): 801-807