NORTHERN TERRITORY GOVERNMENT
Department of
LANDS, PLANNING AND
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Our ref: DEPWS2024/0162

Ms Lisa Bradley
Department of Lands, Planning and Environment
PO Box 3675
DARWIN NT 0801

Dear Ms Bradley

Re: Invitation to Comment - Groote Holdings Aboriginal Corporation - Little Paradise Development

The Department of Lands, Planning and Environment (DLPE) has assessed the information submitted for the above Referral and provides the following comments:

Flora and Fauna Division

The Flora and Fauna Division has reviewed the Referral and have provided comments in **Attachment 1.**

The Flora and Fauna Division considers the Little Paradise Development to pose a low risk to regional populations of threatened species.

Risks to terrestrial ecosystems from the proposed development are considered to be low. Effective biosecurity management is essential to mitigate risks to some terrestrial threatened species and it is recommended that the Biosecurity Management Plan (BMP) is better integrated with other biosecurity management for the Groote Archipelago as a whole and includes a robust audit function.

Risks to most aspects of the marine environment are likely to be low, given the relatively small scale of the proposal. Nevertheless, the Referral does not contain adequate information to fully assess some risks, notably those associated with sediment transport, effluent discharge from the aquaculture facility, and potential biosecurity issues associated with the aquaculture facility. These issues are described in more detail in **Attachment** 1. It is also recommended that waste discharge from the aquaculture facility is managed through an Environment Protection Licence; and that a hydrocarbon and oil spill management plan is prepared for the proposal that fully assesses the risk from extreme weather events and measures to avoid and/respond to hydrocarbon spills.

Rangelands Division

Land Assessment Branch

The proponent has acknowledged that components of the project present an acid sulfate soil risk with appropriate controls to be included in site-specific Acid Sulfate Soil Management Plans for these discrete components. As such, consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate

Soils Guidance, further information is available online[1]. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines Version 5.1 (Dear et al. 2024)[2],[3] and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015.)[4]may also be referenced.

Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an acid sulfate soil management plan is required. Depending on the scale of the project, the acid sulfate soil management plan should include the following:

- exact location of the proposed disturbance;
- depth and volume of soil to be disturbed (m^3);
- clearly presented CRS results;
- acid base accounting results which clearly indicate an accurate liming rate;
- appropriately designed treatment pads; lime/soil mixing regimes; and
- an appropriate monitoring program.

Weed Management Branch

A desktop assessment of the Northern Territory (NT) Weeds Database for the sites, surrounding areas and adjoining roads revealed historic data records of the following declared species:

Common Name	Botanical Name	Declared
Bellyache bush	*Jatropha gossypiifolia*	Class A
Rubber vine	*Cryptostegia madagascariensis*	Class A
Neem	*Azadirachta indica*	Class B
Mission grass sp	*Cenchrus sp.*	Class B
Hyptis	*Hyptis suaveloens*	Class B
Senna - coffee	*Senna occidentalis*	Class B
Senna - candlebush	*Senna alata*	Class B
Senna - sicklepod	*Senna obtusifolia*	Class B
Sida - flannel weed	*Sida cordifolia*	Class B
Sida - spiny head	*Sida acuta*	Class B
Snake weed sp	*Stachytarpheta sp*	Class B
Caltrop	*Tribulus cistoides*	Class B
Mossman river grass	*Cenchrus echinatus*	Class B
Buffel grass	*Cenchrus ciliaris*	Class B
Lantana	*Lantana camara*	Class B

[1] https://www.waterquality.gov.au/issues/acid-sulfate-soils
[2] https://www.qld.gov.au/environment/land/management/soil/acid-sulfate/national-guidance
[3] https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/6d880993-4b80-45e3-9110-5c24fa7a7e75/soil-management-guidelines-version-5.1_14-may-2024_final.pdf?ETag=7b4f751ee0f047caf54dda1fc4d48bc7
[4] https://www.wa.gov.au/government/document-collections/acid-sulfate-soils-publications

All land in the NT is subject to the *Weeds Management Act 2001* (WM Act). The WM Act describes the legal requirements and responsibilities that apply to all persons, owners and occupiers of land regarding declared and potential weeds. General duties described in Division 1 of the WM Act include the requirement for owners or occupiers of land to take all reasonable measures to prevent land being infested with a declared weed and to prevent a declared weed from spreading.

There are four types of classifications for a declared or potential weed under the WM Act: Class A (to be eradicated); Class B (growth and spread to be controlled); Class C (not to be introduced into the Territory or part of the Territory); and Class D (prevent the growth and spread by actions of persons).

Bellyache bush and neem are subject to Statutory Weed Management Plans. All landholders and managers must adhere to management obligations outlined in these plans. Bellyache bush and rubber vine are Class A weeds.

The following issues are raised in relation to the Environmental Impact Assessment (EIA) and should be considered for addressing:

- Groote Island has a lower density of weeds compared to other parts of the NT and any proposed works should seek to ensure there is no introduction of new weeds and minimal spread of known weeds.
- The species *Andropogon gayanus*, *Cenchrus polystachios* and *Cenchrus pedicellatus* are identified as components of the Key Threatening Process 'Invasion of northern Australia by Gamba Grass and other introduced grasses' listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- There is a general obligation under the WM Act to control weeds on land, this would extend to reasonable steps to contain or control seed production and spread from infested areas around towns and communities into the site area.

The Weed Management Branch recommends that the EIA requires the proponent to address how they intend to ensure that any soil/sand or 'fill' or other construction elements brought in from elsewhere (i.e. the mainland) are free of weed seeds or plant parts.

'Preventing Weed Spread is Everybody's Business' is a document highlighting the areas of risk for all activities associated with weed spread. The document is available online[5] and details the pathways through which weeds are spread and provides actions to reduce weed spread. Proponents seeking to develop land for any purpose should address these actions.

Further information as to management requirements and the Weed Management Plan for gamba grass is available online[6] or alternatively contact the Weed Management Branch for further advice on (08) 8999 4567.

Water Resources Division

Groundwater

The recently drilled production bores are located over 500m away from the proposed development, minimising any contamination risks. As described in the Bartalumba Bay Road Water Bore Drilling Report by Territory Groundwater Services (TGS) there is a risk of saltwater intrusion resulting from groundwater extraction. The TGS recommendations for extraction should be adopted, most importantly, that

[5] https://denr.nt.gov.au/__data/assets/pdf_file/0011/257987/preventing-weed-spread.pdf
[6] ttp://www.nt.gov.au/environment/weeds

monitoring of groundwater levels and water quality must be undertaken and bore pumping rates should be kept low.

Surface water

There are no historical, current or envisaged surface water monitoring stations in the proposed development area. There are no issues of concern within the responsibilities of the Surface Water Assessment Team associated with the proposed development.

Licensing and Regulation

The proposed development is located outside of a water control district. A water licence is not required for the projected 3.65ML/year to support the proposed development, provided the water is extracted from low-rate bores (under 15L/s), which are listed as (RN042967, RN042968 and RN042969), or the total amount of water extracted from a single land parcel does not exceed 5 ML/year (noting that there are many bores in the area).

If new bores are drilled, a bore work permit would not be required, however, the drilling must be conducted by a licensed driller. Further information can be obtained from the DLPE website[7] and by contacting water.licensing@nt.gov.au or call 08 8999 4455.

Environment Division

The action may require an approval and/or licence under the *Waste Management and Pollution and Control Act 1998* (NT).

If the proponent will collect, transport, store, recycle or treat listed wastes on a commercial or fee for service basis as part of the development or operations of the activity, then an Environment Protection Approval or Licence will be required to authorise the activity under the *Waste Management and Pollution Control Act 1998* (NT).

The proponent should note that all persons are required to comply at all times with the General Environmental Duty under section 12 of the *Waste Management and Pollution Control Act 1998* (NT) (WMPC Act). To help satisfy the General Environmental Duty, the proponent is advised to take notice of the list of environmental considerations below. The list is not exhaustive, and the proponent is responsible for ensuring their activities do not result in non-compliance with NT laws.

A non-exhaustive list of environmental issues that should be considered to meet requirements under NT law are listed below:

1. **Dust**: The proposed activities have the potential to generate dust, particularly during the dry season. The proponent must ensure that nuisance dust and/or nuisance airborne particles are not discharged or emitted beyond the boundaries of the premises.
2. **Noise**: The proponent is to ensure that the noise levels from the proposed premises comply with the latest version of the NT EPA Northern Territory Noise Management Framework Guideline available online[8].
3. **Erosion and Sediment Control (ESC):** The proponent must ensure that pollution and/or environment harm do not result from soil erosion.

   ESC measures should be employed prior to and throughout the construction stage of the development. Larger projects should plan, install and maintain ESC measures in accordance with the current International Erosion and Sediment Control Association (IECA) Australia guidelines and specifications.

[7] https://nt.gov.au/environment/water
[8] https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/566356/noise_management_framework_guideline.pdf

Where sediment basins are required by the development, the NT EPA recommends the use of at least Type B basins, unless prevented by site specific topography or other physical constraints.

Basic advice for small development projects is provided by the NT EPA document: Guidelines to Prevent Pollution from Building Sites[9] and Keeping Our Stormwater Clean[10]

4. **Storage:** If an Environment Protection Approval or Environment Protection Licence is not required, the proponent should store liquids only in secure bunded areas in accordance with VIC EPA Publication 1698: Liquid storage and handling guidelines, June 2018, as amended. Where these guidelines are not relevant, the storage should be at least 110% of the total capacity of the largest vessel in the area.

   Where an Environment Protection Approval or Environment Protection Licence is required, the proponent must only accept, handle or store at the premises listed waste, including asbestos, as defined by the WMPC Act, in accordance with that authorisation.

5. **Site Contamination**: If the proposal relates to a change of land use or if the site is contaminated, including as a result from historical activities such as cyclones, a contaminated land assessment maybe required in accordance with the National Environment Protection (Assessment for Site Contamination) Measure (ASC NEPM). The proponent is encouraged to refer to the information provided on the NT EPA website[11], and the NT Contaminated Land Guidelines[12].

6. **Waste Management - Import and Export of Fill**: The proposed activities have the potential to generate fill and/or involve the importation of fill for use on-site. Untested fill material may already be present on the site. All fill imported or generated and exported as part of the activity must either be certified virgin excavated natural material (VENM) or be sampled and tested in line with the NSW EPA Guidelines[13]

   All imported fill material must be accompanied by details of its nature, origin, volume, testing and transportation details. All records must be retained and made available to authorised officers, upon request. The proponent should also consider the following NT EPA fact sheets: How to avoid the dangers of accepting illegal fill onto your land[14], and Illegal Dumping - What You Need to Know[15].

7. **Odour or Smoke:** The proposed activities may have the potential to create odours and/or smoke. The proponent must ensure that nuisance odours or smoke are not emitted beyond the boundaries of the premises.

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely

Maria Wauchope
Executive Director Rangelands

8 October 2024

[9] https://ntepa.nt.gov.au/__data/assets/pdf_file/0010/284680/guideline_prevent_pollution_building_sites.pdf
[10] https://ntepa.nt.gov.au/__data/assets/pdf_file/0006/284676/guideline_keeping_stormwater_clean_builders_guide.pdf
[11] https://ntepa.nt.gov.au/your-environment/contaminated-land
[12] https://ntepa.nt.gov.au/__data/assets/pdf_file/0020/434540/guideline_contaminated_land.pdf
[13] https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material
[14] https://ntepa.nt.gov.au/__data/assets/pdf_file/0005/285728/factsheet_avoid_danger_accepting_illegal_fill_to_your_land.pdf
[15] https://ntepa.nt.gov.au/__data/assets/pdf_file/0008/285740/factsheet_illegal_dumping_what_you_need_know.pdf

Submission on the referral

Groote Holdings Aboriginal Corporation - Little Paradise Development

This submission is made under regulation 53 of the Environment Protection Regulations 2020

Government authority: Department of Lands, Planning and Environment – Flora and Fauna Division

<table>
<tr><th>Section of Referral</th><th>Theme or issue</th><th>Comment</th></tr>
<tr><td>Main report
Section 6.3</td><td>Land – Terrestrial Ecosystems
Threatened species</td><td>Based on a search of DLPE databases within 10km of the boundary of the project area, fauna recorded during the terrestrial fauna and flora assessments for the proposed Little Paradise Development, expert knowledge of species' habitat requirements, and information about habitats occurring within the site, the following threatened terrestrial species have been recorded or may occur within or adjacent to the referral area (shorebirds are addressed in the marine ecosystem section).
<table>
<tr><th>Common Name</th><th>Scientific Name</th><th>TPWC Act</th><th>EPBC Act</th></tr>
<tr><td>Ghost Bat</td><td>Macroderma gigas</td><td>-</td><td>Vulnerable</td></tr>
<tr><td>Masked Owl</td><td>Tyto novaehollandiae</td><td>Vulnerable</td><td>Vulnerable</td></tr>
<tr><td>Mertens' Water Monitor</td><td>Varanus mertensi</td><td>Vulnerable</td><td>Endangered</td></tr>
<tr><td>Northern Blue-tongued Lizard</td><td>Tiliqu scincoides intermedia</td><td>-</td><td>Critically Endangered</td></tr>
<tr><td>Northern Quoll</td><td>Dasyurus hallucatus</td><td>Critically Endangered</td><td>Endangered</td></tr>
</table>
* Territory Parks and Wildlife Conservation Act 1976
** Environment Protection and Biodiversity Conservation Act 1999

Ghost Bat: Ghost Bats are widespread on Groote Eylandt and are known from several smaller satellite islands in the Groote Archipelago. Surveys detected Ghost Bats within the study area, however no roost sites were detected within the development area. Based on the known habitat preferences of this species and its distribution on Groote Eylandt, it is likely that Ghost Bats would forage across a variety of habitats in the area. Given the large areas of available foraging habitat in the region, the risk to Ghost Bats from the small area of disturbance associated with this proposal is considered to be low.

Masked Owl: This species is thought to depend upon tall eucalypt open forests for nesting sites, particularly those dominated by Eucalyptus tetrodonta, E. miniata and Corymbia nesophila even though home ranges are thought to be large and may include various habitats including rainforest margins. Field survey detected Masked Owl within the development footprint. It is considered unlikely that the development area supports nesting sites for the Masked Owl given the lack of suitable nesting</td></tr>
</table>

Section of Referral	Theme or issue	Comment
		habitat available on the site proposed for clearing. Additionally, the proponent has committed to protecting any roost and nest sites. The Flora and Fauna Division agrees that the likelihood of a significant impact upon local or regional populations of Masked Owl as a result of the proposed development is low. The area of native vegetation proposed to be removed as part of the development represents a very small proportion of habitat available on Groote Eylandt. Mertens' Water Monitor: Although this species has been recorded in proximity of the proposed development site, the habitats considered suitable for this species are not present within the site. The proposed works are also unlikely to exacerbate the known threat to the species (i.e. cane toads), provided the BMP is implemented. The Flora and Fauna Division considers it highly unlikely that the proposal would result in a significant impact upon population(s) of Mertens' Water Monitor on Groote Eylandt. Northern Blue-tongued Lizard: This species has a broad distribution across the monsoonal tropical regions of northern Australia. In the NT, it has been recorded across most of the Top End and the Gulf Region. The species occurs in a wide range of habitats and has been recorded in dissected sandstone plateaus and gorges, limestone ranges, granite, basalt and dolerite hills, glacial shale undulations, sand plains, sandy waterways, swamps, cracking clay floodplains and coastal flats. Surveys have located the Northern Blue-tongued Skink at numerous sites across Groote Eylandt and locally they were detected to the west of Lease 1 and 2 in an area associated with sandstone woodland. The Flora and Fauna Division agrees that the development is unlikely to cause a decline of the local or regional population of Northern Blue-tongued Skink. There are no identified critical habitats for the species within the project footprint. The primary risk is from the introduction of cane toads and the BMP provides mitigation of this risk. Northern Quoll: The Northern Quoll has suffered significant decline on mainland Australia but is widespread and abundant on Groote Eylandt and is known from several smaller satellite islands in the archipelago. It was recorded across the Little Paradise Development area, including at: all camera trap grids, in monsoon forest, mangroves, beach foreshore and sandstone escarpments, as well as crossing the access road. The Flora and Fauna Division agrees that the development is unlikely to cause a decline of the local or regional Northern Quoll population. There are no identified critical habitats for the species within the project footprint. The primary risk is from the introduction of cane toads and the BMP provides mitigation of this risk.
	Significant and/or Sensitive Vegetation	Interpretation of aerial imagery and DLPE mapping suggests that there is a dry Monsoon vine thicket on the coastal foreshore immediately east of the proposal area. The proposal appears to largely avoid clearing of the vegetation with the exception of Biosecurity Area 1, onshore parts of the marina and the aquaculture discharge point. Monsoon vine thicket is considered to be a

<table>
<tr><th>Section of Referral</th><th>Theme or issue</th><th>Comment</th></tr>
<tr><td></td><td></td><td>significant and/or sensitive vegetation type in the Northern Territory. Table 6-2 of the Referral identifies that 0.2ha of the vegetation community would be cleared and disturbed for the proposal.

It is noted that the Referral commits to avoid, mitigate and manage impacts to vegetation by ensuring all site preparation is undertaken in accordance with the NT Planning Scheme Land Clearing Guidelines (NTPS LCG). The NTPS LCG recommend that Monsoon vine thicket is not cleared, and an appropriate buffer of native vegetation is also retained based on the 'value' of the vegetation. If Monsoon vine thicket is proposed to be cleared, the Flora and Fauna Division recommends that the proponent provide an assessment of the importance of the vegetation being impacted within a local and regional context.</td></tr>
<tr><td>Appendix A – Biosecurity Management Plan</td><td>Land – Terrestrial Ecosystems

Threatened species</td><td>Incursion of pest and weed species associated with the Little Paradise Development poses a significant risk to threatened species and biodiversity. The Referral documents include a BMP to manage this risk. The Referral indicates that this plan will cover the construction and operation phases of the development. The BMP provides details on the biosecurity mitigation measures to be used.

The BMP needs to be integrated with the broader biosecurity plan for the Groote Archipelago to increase its effectiveness. In addition, regular auditing and compliance checks should be conducted to ensure the BMP is being implemented, however the BMP does not provide any details of this other than a regular internal review. The Flora and Fauna Division recommends that regular auditing of the BMP is conducted and reported, preferably by an independent organisation.</td></tr>
<tr><td>Appendix F – Threatened Species Management Plan</td><td>Sea – Marine ecosystems

Threatened species</td><td>Based on a search of DLPE databases within 10km of the boundary of the project area, expert knowledge of species' habitat requirements, and information about habitats occurring within the site, the following threatened marine or intertidal fauna species have been recorded or may occur within or adjacent to the Referral area.
<table>
<tr><th>Common Name</th><th>Scientific Name</th><th>TPWC Act*</th><th>EPBC Act**</th><th>Migratory</th></tr>
<tr><td>Greater Sand Plover</td><td>Charadrius leschenaultia</td><td>Vulnerable</td><td>Vulnerable</td><td>Migratory</td></tr>
<tr><td>Lesser Sand Plover</td><td>Charadrius mongolus</td><td>Vulnerable</td><td>Endangered</td><td>Migratory</td></tr>
<tr><td>Curlew Sandpiper</td><td>Calidris ferruginea</td><td>Vulnerable</td><td>Critically Endangered</td><td>Migratory</td></tr>
<tr><td>Far Eastern Curlew</td><td>Numenius madagascariensis</td><td>Vulnerable</td><td>Critically Endangered</td><td>Migratory</td></tr>
<tr><td>Greater Crested Tern</td><td>Thalasseus bergii</td><td>-</td><td>-</td><td>Migratory</td></tr>
<tr><td>Little Tern</td><td>Sternula albifrons</td><td>-</td><td>-</td><td>Migratory</td></tr>
<tr><td>Whimbrel</td><td>Numenius phaeopus</td><td>-</td><td>-</td><td>Migratory</td></tr>
</table></td></tr>
</table>

Section of Referral	Theme or issue	Comment

Green Turtle	*Chelonia mydas*	-	Vulnerable	Migratory
Flatback Turtle	*Natator depressus*	-	Vulnerable	Migratory
Hawksbill Turtle	*Eretmochelys imbricata*	Vulnerable	Vulnerable	Migratory
Spinner Dolphin	*Stenella longirostris*	-	-	Migratory
Indo-Pacific Bottlenose Dolphin	*Tursiops aduncus*	-	-	Migratory
Australian Snubfin Dolphin	*Orcaella heinsoni*	-	-	Migratory
Dugong	*Dugong dugon*	-	-	Migratory

* *Territory Parks and Wildlife Conservation Act 1976*
** *Environment Protection and Biodiversity Conservation Act 1999*

Migratory and Marine Megafauna: Marine megafauna is known to occur in Bartalumba Bay. Interactions with marine megafauna are possible during the extension of the marina, as well as from vessels operating from the facility. The main risk to marine biota is likely to be from impacts to habitat from the spillage of contaminants and hydrocarbons into the marine environment. These contaminants could potentially increase turbidity and thus reduce the light availability for seagrass and potentially smother biota living on the seafloor.

Extension of the existing rock ground and building of the marina is expected to alter the local hydrology along the eastern part of Little Paradise. This is expected to result in sediment deposition and changes to benthic habitats which likely provide foraging habitat for marine turtles and potentially dugongs, although the importance of this area to these species is currently unknown. While the proposal would result in a net loss of foraging habitat for marine turtles and Dugong, the Flora and Fauna Division notes that habitat for marine megafauna within Bartalumba Bay and the Groote Archipelago is extensive and largely intact. The area proposed to be impacted represents a very small component of the available habitat and is unlikely to support important nesting, foraging or aggregation areas for Migratory/Marine Megafauna.

Migratory shorebirds: Migratory shorebirds have been recorded foraging in salt flats and intertidal habitat around the Little Paradise shoreline. Recent surveys confirmed that the site is used by a relatively small numbers of Far Eastern Curlew, Lesser Sand Plover and Greater Sand Plover. Common Greenshank, Common Sandpiper, Greater Crested Tern, Whimbrel and Little Tern. There is no information to suggest that the Little Paradise site is used by internationally significant numbers of the Global flyway population. The site is also not known to provide important nesting or staging habitat for migratory shorebirds. Furthermore, intertidal habitat that is suitable foraging and roosting habitat for migratory shorebirds occurs extensively in Bartalumba Bay and the Groote Archipelago more broadly.

Section of Referral	Theme or issue	Comment
		The disturbance of a small area associated with the proposed development through changes in sediment deposition and the discharge of aquaculture effluent is expected to have a negligible impact on the local and regional availability of habitat for these species. Although extensive suitable habitat for these species exists throughout the region, the discharge of wastewater from the proposed aquaculture facility has the potential to impact migratory shorebirds by altering the natural structure of the saline flats and/or the diversity and availability of infaunal prey items. Therefore, the Flora and Fauna Division recommends the fate of wastewater should be modelled and the results used to assess the extent of potential impacts to migratory shorebirds. This should include a discussion on how excess nutrients, microalgae and other epiphytes will impact the trophic structure of infauna available in the saline flats and the erosion risk associated with a 1ML/day discharge rate.
		The management and mitigation measures in the Threatened Species Management Plan (TSMP) appear to be tailored to threatened terrestrial fauna with little to no information about threatened marine fauna. In particular, there is no specific assessment or mitigating actions relating to underwater noise, turbidity or marine water quality despite sensitive receptors (and listed threatened species) being in the general area. The Flora and Fauna Division recommends that the proponent provide further information on how the marine facilities would be constructed and what measures would be in place to mitigate impacts to sensitive receptors from the breakwater construction, pile driving and capital/maintenance dredging (if required).
		Management action 37 in the TSMP makes the following recommendation: "*Maintain the aquaculture facility to prevent discharges to the adjacent saline flats from impacting migratory and threatened shorebird habitat to the east of the Project Area*". The TSMP does not specifically define 'impact' or propose monitoring measures to detect changes to the habitat. Furthermore, it is also unclear whether a baseline condition of the discharge area has been assessed so that an impact can be detected. It is recommended that the proponent update the TSMP to clarify what is meant by an impact including thresholds of change (quantified change in condition) and appropriate reporting and intervention in the event that thresholds are exceeded, and an 'impact' is detected during monitoring.
Appendix I – Coastal Processes Report	Sea – Coastal processes and Marine	Impacts of the breakwall on natural sediment transport processes are modelled, however the assessment does not adequately consider the volume of sediment suspended or the fate of suspended sediments during the construction process as no plume modelling appears to have been undertaken. In Table 4-1 of Appendix I the proponent identifies,

Section of Referral	Theme or issue	Comment
	Environmental Quality	"*Sediment plumes developed in the vicinity of the structure through seabed disturbance. Extent of plumes will depend on construction methodology and vessel movements*". However, the construction methodology and specifics regarding vessel movement and use is not defined or addressed. In addition, construction and ongoing use of the facilities may lead to increased noise, Total Suspended Solids (TSS), turbidity, decreased light penetration and reduced water quality. Therefore, the Flora and Fauna Division recommends that suspended sediment and fate of plumes are modelled and discussed for both the construction and operation phases, considering the cumulative impacts of increased vessel use and concurrent construction activities in the area. There is also potential for reduced water quality through vessel use, refuelling activities and the frequent stir/turnover of sediments potentially re-releasing accumulated contaminants in sediments. These risks do not appear to have been discussed or assessed in the referral documentation and there is no consideration of the cumulative impacts associated with increased vessel activity from concurrent developments.
Appendix J – Benthic Habitat Survey	Sea – Marine ecosystems Benthic and intertidal habitats	The Flora and Fauna Division notes that while the species of coral and seagrass recorded are commonly found in intertidal and fringing reef habitats throughout Northern Australia and the Western Gulf, the importance and value of the 1.3ha of habitat is largely unknown as no site imagery or Benthic Communities and Habitat (BCH) mapping was provided with the Referral. The benthic survey does not appear to cover the full zone of impact, particularly for benthic and intertidal habitats. The sites selected and BCH map do not include Habitat Impact Zone 1 which is an area of 1.3ha that will be gradually smothered by sand accretion with a "High" degree of certainty. The likelihood of a significant impact is low given the small area of habitat likely to be impacted, but better survey and mapping of this habitat is required for a robust assessment.
		The proposal includes facilities for refuelling vessels within the proposed marina and potentially the barge landing. It is unclear what measures are in place to avoid hydrocarbon and oil spills from impacting on sensitive receptors in Bartalumba Bay. This is of particular concern given the frequency of cyclones in the Gulf and the risk to marine infrastructure during these events. It is recommended that the risk assessment is updated, and a hydrocarbon and an oil spill management plan is prepared for the proposal that assesses the risk from extreme weather events and measures to avoid and/respond to hydrocarbon spills.
Appendix J – Benthic habitat	Sea – Marine ecosystems Benthic and intertidal habitats	Benthic habitat has also not been surveyed at the wastewater discharge zone or downstream of the discharge location at the jetty. Effluent fate needs to be modelled and sites selected based on likely zones of impact in order to properly assess potential risks. Effluent from Stage 2 is being discharged onto saline flats landward of sensitive mangrove habitats and likely sensitive receptors on the remaining fringing rock platform, such as hard corals. Risks associated with discharge of effluent containing elevated nutrients, microscopic sessile or ephytic larvae, microalgae, etc. into coral habitats may adversely affect the existing coral community. The health of mangrove ecosystems and the benthic structure in this area has not been addressed.

Section of Referral	Theme or issue	Comment
		Additionally, wastewater discharge has the potential to have impacts on sediment infauna. The baseline infauna abundance and diversity in the saline flats receiving Stage 2 effluent has not been analysed and is a critical component of nutrient uptake, biogeochemical processes involved in maintaining water and sediment quality, and provides feeding habitat for threatened and migratory shorebirds. Additional sites need to be surveyed in predicted zones of impact, specifically on the rocky platform where sensitive coral habitats are subject to the utmost risk from development in order to assess risks and to define locations for ongoing monitoring efforts.
Main report – section 2.3.4	Sea – Marine environmental quality Aquaculture facility – Water collection and discharge	According to the Referral, wastewater from Stage 1 will be discharged off the wharf by truck. Stage 2 is planned to discharge into intertidal mangrove flats. Stage 3 is not within the scope of this Referral with the proponent proposing to apply for a waste discharge licence in the future. The Referral indicates that the positioning of the outlet will be refined after "*hydrodynamic analysis considering mixing and fate of the effluent*". The Flora and Fauna Division considers this to be a critical piece of information in order to assess the dilution and transport as well as the risk to sensitive receptors and the zone of impact. The Flora and Fauna Division notes that sensitive infauna in the saline flats, mangrove ecosystems and benthic communities to the east of the project area have not been analysed and are at risk of change to nutrient pathways and trophic structure. Information regarding the positioning of the wastewater pipeline and the transportation of effluent is required to refine benthic survey requirements, assess risks and define locations for ongoing monitoring effort.
		The ongoing discharge of wastewater into the saline flats may result in erosion and potentially form a channel, changing the structure of the natural environment. The Referral states that, *"Sheltering from the breakwater and deflection of currents would reduce the occurrence of suspended sediment within the water column. This has potential to reduce sedimentary exchange, which contributes to mangrove habitat development over longer time scales".* With the wharf limiting natural deposition of course sediment onto the platform, this may pose a long-term risk to the fringing mangrove habitat with limited suitable sediment depth for recruitment or sustainable growth. Therefore, the Flora and Fauna Division recommends that modelling of wastewater dilution, fate, mixing, sediment plumes and erosion at wastewater sites is required to assess risk to benthic communities, mangrove ecosystems and the fauna that occupy, forage and or breed at these locations.
		The Referral proposes to discharge wastewater from the hatchery into mangrove vegetation within Bartalumba Bay. The Flora and Fauna Division notes that the Referral does not provide any information around the quality or nutrient value of the wastewater proposed to be discharged into the mangroves and tidal flats.

Section of Referral	Theme or issue	Comment
		Without information on the nutrient load and speciation of the wastewater, the risk to the receiving environment which includes mangrove vegetation and tidal flats is unable to be assessed. Flora and Fauna Division notes that the facility would likely require an Environment Protection Licence (EPL) under the *Waste Management and Pollution Control Act 1998*. The regulation of discharges from the facility through an EPL is supported by the Flora and Fauna Division and future applications for an EPL should include a comprehensive Mangrove Monitoring Plan with measures for managing turbidity, nutrients and siltation. Where necessary, the Flora and Fauna Division may be able to provide advice on future EPL applications as well as suitability of trigger values, monitoring programs and contingency measures.
Main report – section 2.3.4	Sea – Marine environmental quality and Marine ecosystems Aquaculture facility	The Referral identifies three aquaculture species of interest and a further ~30 potential additional species that may be considered at later stages. The Flora and Fauna Division notes that these species have very different requirements in terms of culture systems, nutrients, filtration, wastewater, and risks associated with pathogens and diseases. Assessing the risk of cultivating each of these species requires an understanding of the likely diseases and pathogens, the reproductive behaviours and the feeding requirements of the species. This detail was not provided in the Referral and would likely alter the design and operation of the facility depending on the species being cultivated at the facility. The Flora and Fauna Division recommends that the proponent specify the main species of interest and compiles the necessary information to assess those species' cultivation requirements and any associated risks. Any additional species of interest could be considered at a later stage. The Flora and Fauna Division recommends that the proponent also provides details about the sourcing of brood stock. The map provided showing rock lobster trap locations is illegible in the Referral (Plate 2-2).
		It is unclear from the Referral whether other target species are to be sourced from the local environment. If this is the case, the Flora and Fauna Division recommends that abundance and distribution estimates are conducted and presented to understand available resources and sustainable catch limits. The proponent should also specify how harvesting will occur to assess the risk to surrounding marine biota. Should brood stock come from outside of the local environment, details regarding how this will occur (e.g. in-situ seawater) should be provided. This is important from a biosecurity and marine ecosystems perspective, the filtration of effluent into the marine environment and measures to prevent larvae from contributing to local gene flow will be necessary.
Main report – section 2.3.4	Sea – Marine environmental quality and Marine ecosystems	The Flora and Fauna Division supports the proponent's use of seaweed as a bioremediation step provided wastewater undergoes very fine mechanical filtration or UV sterilisation prior to discharge. The presence of mechanical filtration following bioremediation ponds is unclear in the flow chart provided (Figure 2-8). Tropical species of Ulva are extremely resilient and fast growing in effluent and reproduce by monthly break down and release of microscopic swarmers. The release of swarmers into the natural environment poses a threat to native corals and other seaweed species.

Section of Referral	Theme or issue	Comment
	Aquaculture facility	The Flora and Fauna Division notes that similar risks are associated with the aquaculture of Caulerpa. Exotic strains of *Caulerpa taxifolia* are considered to be aquatic pests in the NT and may be inappropriate for large-scale production even if present in the natural environment around Groote Eylandt. If Caulerpa is proposed to be kept, the Flora and Fauna Division recommends that the proponent clarify which species is proposed.
Appendix A – Biosecurity Management Plan	Sea –Marine ecosystems Aquaculture facility	The Flora and Fauna Division recommends that the BMP includes steps to monitor and manage the risk of bacteria, microalgae (including holoplankton listed as aquatic pests in the NT), larvae and other marine organisms cultivated in onshore aquaculture systems from being released into the natural environment via effluent or cross contamination. The Flora and Fauna Division notes that sand filtration and bioremediation is not effective for bacterial outbreaks which are generally common in onshore aquaculture facilities. The main Referral document states, *"Regular bacterial plating of intake, system and holding water prior to discharge will be done to assess presence and overall density of potentially pathogenic bacteria (e.g., Vibrio spp.). Prior to the discharge of any water from the facility back to the environment, water quality measurements and bacterial plating will have to return results within normal environmental range".* It is recommended that the BMP should be updated to detail the approach to treating water and stock should an outbreak occur, and should clearly identify the biosecurity risks associated with the collection, culture and discharge of each species of interest, relative to individual risks such as common diseases/pathogens and breeding behaviours for each species and the steps that will be taken to manage the risks associated with introduction of a species into the natural environment after captivity (e.g. gene flow and risks to natural population dynamics, etc.).