Department of **Biodiversity, Conservation and Attractions**

SWAN CANNING RIVERPARK

Swan and Canning Rivers Management Act 2006

PART 5

DETERMINATION OF DEVELOPMENT APPLICATION

FILE NUMBER	:	2021/2616
APPLICANT	:	The Nature Conservancy Limited
LANDOWNER	:	Swan River Trust
LAND DESCRIPTION	:	Swan River (Crown Reserve 48325), within Melville Water – two sites at Freshwater Bay, one site at Point Walter and Attadale (near-to the Swan Estuary Marine Park – Alfred Cove)
DEVELOPMENT	:	Swan-Canning Shellfish Reef Restoration Project – establishment of shellfish reefs in the lower Swan-Canning Estuary
VALID FORM 1 RECEIVED	:	19 October 2021
DETERMINATION	:	**APPROVAL WITH CONDITIONS**

The application to commence development in accordance with the information received on 19 October 2021 is APPROVED subject to the following conditions:

1. Approval to implement this decision is valid for two (2) years from the date of the approval. If substantial on-site works have not commenced within this period, a new approval will be required before commencing or completing the development.

2. Prior to the commencement of works the applicant shall notify the Department of Biodiversity, Conservation and Attractions in writing not less than three (3) days prior to the commencement of works (**Advice Note 1**).

3. Prior to the commencement of works the applicant shall enter into a Collaborative Arrangement with the Department of Biodiversity, Conservation and Attractions that confirms roles and responsibilities in relation to governance arrangements including monitoring and evaluation, maintenance, community engagement, capacity building and project technical guidance.

4. All works are to be undertaken in accordance with a Construction Environmental Management Plan approved by the Department of Biodiversity, Conservation and Attractions (**Advice Notes 2 and 3**).

5. All constructed reefs shall maintain minimum vertical separation of four metres at Lowest Astronomical Tide to minimise navigational safety risks.

6. The reefs are to be constructed a minimum of 10 metres from any seagrass beds.

7. Upon completion of the works, all waste materials, equipment and machinery shall be removed, and the site cleaned up to the satisfaction of the Department of Biodiversity, Conservation and Attractions.

8. Within one month following installation, the limestone reefs shall be surveyed using a multibeam survey method (or similar); the survey shall include the coordinates (in decimal degrees) of all reef locations. These surveys are to be repeated 12 months after the initial survey to the satisfaction of the Department of Biodiversity, Conservation and Attractions on the advice of the Department of Transport.

ADVICE NOTES

1. Notifications can be emailed to rivers.planning@dbca.wa.gov.au.

2. The Construction Environmental Management Plan required under **Condition 4** shall describe how the proposed works will be managed to minimise potential environmental impacts and shall address, but not be limited to:

   a. scope of works, including construction methodology;
   b. site access and management;
   c. management of machinery and equipment, including refuelling procedure and spill response (in that regard refuelling of vehicles or machinery is to be undertaken outside the Swan Canning Development Control Area or at a licensed refuelling facility);
   d. storage and bunding of materials, equipment, chemicals and fuel;
   e. protection of the river from inputs of debris, rubbish or other deleterious material;
   f. navigational safety;
   g. hours of operation and schedule of works;
   h. complaints and incident response procedures;
   i. that all contractors and personnel involved in the works will be familiar with the requirements of this approval;
   j. sediment and turbidity management (this should include stop work and contingency procedures clarifying when works are to cease including poor weather conditions, where a plume exceeds agreed trigger criteria); and
   k. provision of a site map showing the laydown area (if required), vehicle and barge entry/exit points and pedestrian management (if required).

   The Construction Environmental Management Plan must be approved by the Department of Biodiversity, Conservation and Attractions prior to works commencing.

3. The Construction Environmental Management Plan should in particular address the matters listed below:

   a. Appropriate communication and awareness raising for users of the river;
   b. The construction of the reefs will need to be undertaken at times which avoid impacts on fairy tern breeding, outside the seagrass growth period and on out-going neap tides to assist with the dispersion and reduce the amount of material settling in one place.
   c. Limestone substrate material should be regularly checked to ensure it is consistent with the required specification.
   d. Limestone substrate material will need to be screened to remove fines before placement. It is recommended that the physical movement/abrasion of limestone is reduced as much as possible. The limestone rocks should be dry when loaded on the barge and a rake bucket (or similar) used so that any fines drop out on the deck of the barge rather than sticking to the rock (if it were still wet). Any fine material left on the barge should be removed prior to the loading of new limestone substrate material.

e. It is recommended that the limestone substrate is deposited for each site separately, and any turbidity to be dissipated prior to the construction of the next reef.

f. Buoys should be placed at an agreed distance from the proposed reef sites to provide a visual marker that will be used to determine when mitigation measures to address plume spread will need to be implemented (distance and trigger criteria to be outlined in the CEMP). It is recommended that a drone be used to assist with monitoring for plumes relative to the buoy locations. Sediment traps should also be deployed in transects extending out from the reefs to record sediment deposition (intent being to learn from the approach). Sediment traps in control sites would provide a comparison.

4. The applicant shall ensure that no damage to the foreshore or waterway (including seagrass beds) occurs as a result of the approved works. If any inadvertent damage occurs, the applicant is required to notify the Department of Biodiversity, Conservation and Attractions within 48 hours of the damage occurring and rectify the damage at its expense.

5. In the case of pollution events or spills, the Department of Biodiversity, Conservation and Attractions' Duty Officer (Riverpark) can be contacted on 9278 0981 (24 hrs) or Pollution Response Officer (Marine) on 9480 9924 (24 hrs).

6. The applicant is to liaise with the Department of Primary Industries and Regional Development concerning the requirements for translocation and biosecurity approvals for the blue mussel (*Mytilus galloprovincialis)* to the Swan River.

7. The Department of Transport Maritime Safety (DoT) requires:

- A Temporary Notice to Mariners (TNTM) must be issued by DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement. The applicant or works contractor is to provide notification of the works to the DoT a minimum of 21 days prior to the works commencing to enable a TNTM to be published, by email to: navigational.safety@transport.wa.gov.au
- Notification of any request for an extension of the works period must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au prior to expiry of the scheduled works period
- Confirmation of completion of the works must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au once the works have been completed.
- As installed coordinates and clearance heights must be provided to navigational.safety@transport.wa.gov.au for charting purposes.

Hon Reece Whitby MLA
MINISTER FOR ENVIRONMENT

Date: 10/7/2022

FILE: 2021/2616

DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS REPORT

PROPOSAL	Swan-Canning Shellfish Reef Restoration Project – establishment of shellfish reefs in the lower Swan-Canning Estuary
LOCATION	Swan River (Crown Reserve 48325), within Melville Water – two sites at Freshwater Bay, one site at Point Walter and Attadale (near to the Swan Estuary Marine Park – Alfred Cove)
COST	Estimated $5 million
APPLICANT	The Nature Conservancy Limited
LANDOWNER	Swan River Trust
LOCAL GOVERNMENT	City of Melville, Shire of Peppermint Grove, Town of Claremont and Town of Mosman Park
MRS CLASSIFICATION	Waterways
DECISION TYPE	Part 5, *Swan and Canning Rivers Management Act 2006*, Ministerial Determination
ATTACHMENTS	1. Limestone reef locality map 2. Reef site plans: a. Attadale b. Freshwater Bay 1 c. Freshwater Bay 2 d. Point Walter 3. Bureau of Meteorology tidal information 4. Barrack Street predicted 2022 tide levels 5. Submissions: a. Town of Claremont b. City of Melville c. Department of Transport (Navigational and Maritime Safety) d. Department of Primary Industries and Regional Development e. Department of Planning, Lands and Heritage f. Yachting Western Australia/Yachting Western Australia (brief submission) g. Yachting Western Australia/Yachting Western Australia (detailed submission) h. Conservation Council of WA i. Member of the public j. Member of the public k. Combined yacht clubs comments 6. Submissions received on draft report 7. Pilot reef results summary 8. Risk assessment 9. TNC response to Swan River Trust queries
RECOMMENDATION	**APPROVAL WITH CONDITIONS**

1. INTRODUCTION

1.1. The Department of Biodiversity, Conservation and Attractions (DBCA) has received a development application from The Nature Conservancy Limited (TNC), proposing to (1) construct limestone reefs in the lower Swan-Canning Estuary (the estuary) at Attadale, Freshwater Bay (two sites) and Point Walter (see reef locations at Attachments 1 and 2a-d) and (2) introduce the blue mussel (*Mytilus galloprovincialis*, a shellfish native to the estuary) to these reefs.

1.2. This proposal is an extension of, and builds on, the results of 2020-2021 small-scale pilot reef studies constructed at these locations. Monitoring of the pilot reefs showed they were rapidly colonised by a wide variety of reef-dwelling life, including other shellfish such as scallops, many other filter feeding invertebrates (e.g. sponges, sea squirts), crabs and a high abundance of fish (including juvenile pink snapper). The diversity and abundance of this reef life was far greater than at comparable control sites.

1.3. The blue mussel is known for its ability to filter and remove nutrients from the water column, enhancing the long-term health and resilience of a river system. The proposed reefs and mussels will also create additional habitat and food source for other riverine fauna and thus provide a more diverse natural habitat feature within the Swan estuary.

1.4. The design of the proposed reefs and their boundary specifications are informed by an engineering assessment by The University of Western Australia, Coastal and Offshore Engineering Laboratory (UWA-COEL). The assessment looked at reef stability, potential reef impacts on the surrounding environment (for example water and sediment dynamics) and potential environmental impacts upon the reefs from external factors (for example water currents). A range of environmental, ecological, recreational, commercial, social, cultural, and logistical factors have been considered in the planning and selection of these sites.

1.5. The proposed reef locations also took into account tide levels and water depths. The proposal originally advised the reefs would be placed in water depths ranging from approximately three to eight metres at Lowest Astronomical Tide (LAT). LAT is predicted to occur under average meteorological conditions and under any combination of astronomical conditions. This is increasingly used as chart datum, for example, for all new Australian charts (source-Tidal Glossary, Australian Hydrographic Office Glossary, Australian Government, Department of Defence, https://www.hydro.gov.au/prodserv/data/tides/tidal-glossary.htm#l). A definition of the factors affecting the actual tide heights and times is provided at **Attachment 3**.

1.6. Public submissions were received (sections 2 and 3 below) from the yachting community. The community's main concerns are there may be inadequate keel clearance to allow safe navigation of sailing vessels through the chosen reef locations at low tide, and secondly the reefs would attract other rivers users, such as fishers, to the locations which could impede safe navigation during yachting events.

1.7. In response to the keel clearance concerns, TNC amended the reef design to increase the vertical separation of the reefs to the water surface from three to four metres at LAT.

1.8. The Department of Transport uses the Australian Bureau of Meteorology (BOM) data for its publication(s), including for the Barrack Street site - BOM's nearest tide measuring station to the mussel reef locations. The predicted times and heights of high and low waters at Barrack Street for 2022 are also provided at **Attachment 4**. This does not include all factors influencing water levels such as winds, wave action, pressure systems and seasonal changes such as *La Nina*, which are less predictable.

1.9. The Department of Transport advises that for maritime and navigational safety, a minimum vertical separation height of three metres must be achieved between the highest part of the reef structure (including any predation netting) and the water surface at LAT. TNC's revised minimum vertical separation clearance of four metres below LAT is considered by relevant stakeholders to be an acceptable height for the top of the reefs. The water levels on the Swan River have never been recorded at less than 0.25 metres below LAT. This leaves 0.25 metres 'freeboard' in the worst-case scenario.

1.10. The proposed development is to occur within waters entirely within the Swan Canning Development Control Area and therefore requires an approval from the Minister for Environment in accordance with Part 5 of the *Swan and Canning Rivers Management Act 2006* (SCRM Act).

1.11. DBCA's Rivers and Estuaries Science Program and River Systems Management Unit are members of the proposal's external Technical Advisory Group. TNC engaged this group to provided relevant, informed information to aid TNC's design and scope of the proposal, noting it is separate to the assessment of the proposal by DBCA's Statutory Assessment Unit.

1.12. The Director General of DBCA has prepared this report in accordance with section 76 of the SCRM Act.

2. CONSULTATION AND SUBMISSIONS

Town of Claremont

2.1. The Town of Claremont (the Town) supports the project and wishes to be kept informed of the project's progress and be notified of the project's success or otherwise. The Town has sought assurances that the project won't impact existing seagrass beds or cause any seagrass to be disturbed and wash-up onto the Town's foreshores. The Town was advised that the sites have been chosen to avoid any adverse impact on seagrass beds and therefore won't impact the foreshore.

2.2. The Town's full comments are provided in **Attachment 5a.**

City of Melville

2.3. The City of Melville (the City) supports the project unconditionally.

2.4. The City's full comments are provided in **Attachment 5b.**

Town of Mosman Park

2.5. The Town of Mosman Park did not comment on the proposal.

Shire of Peppermint Grove

2.6. The Shire of Peppermint Grove did not comment on the proposal.

Department of Transport (DoT) (Navigational Safety; Maritime Safety)

2.7. DoT Navigational Safety has considered the proposal from a navigational perspective and has no objection provided that:

- Current issues are resolved with Sailing Australia in relation to minimum keel clearance heights at some locations;
- A minimum vertical separation height of three metres is achieved between the highest part of the reef structure (including any predation netting) and the water surface at Lowest Astronomical Tide (LAT);
- A Temporary Notice to Mariners (TNTM) must be issued by DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement of works;
- Notification of any request for an extension of the works period must be made prior to expiry of the scheduled works period;
- Confirmation of completion of the works must be made; and
- As installed coordinates and clearance heights must be provided for charting purposes.

2.8. DoT's full comments are provided in **Attachment 5c.**

Department of Primary Industries and Regional Development (DPIRD)

2.9. DPIRD has considered the proposal from an aquatic pest biosecurity perspective given the blue mussel juvenile spat will be sourced from hatcheries located in Cockburn Sound, and has no objection noting that:

- There have been recent detections of invasive marine pest species in Cockburn Sound (and nearby HMAS Stirling, Garden Island). TNC will need to provide specific details regarding sourcing mussels from within Cockburn Sound when TNC applies for exemption and translocation permits from DPIRD.
- TNC should be aware of existing marine pest species in the estuary such as *Didemnum perlucidum* (white colonial sea squirt) and *Arcuatula senhousia* (Asian mussel or bag mussel). Aquatic biosecurity measures will need to be employed to prevent further spread of these species and other potential marine pest species. If temporary predator exclusion structures are used, when removed, they should be disposed of on land or decontaminated and dried to prevent translocation of potential marine pest species.

2.10. DPIRD's full comments are provided in **Attachment 5d.**

Department of Planning, Lands and Heritage (DPLH)

2.11. DPLH acknowledges the proposed reef locations occur within the registered Aboriginal Site ID3536 (Swan River) and therefore approvals under the *Aboriginal Heritage Act 1972* and/or *Aboriginal Heritage Regulations 1974* will be required. The applicant will be required to obtain approvals under Regulations 7 and 10 and engage with the traditional owners.

2.12. DPLH's full comments are provided in **Attachment 5e.**

Yachting Western Australia (Australian Sailing)

2.13. Yachting Western Australia (YWA) is the governing body that represents eleven river-based yachting clubs with 22,000 members. YWA supports the environmental benefits the reef proposal will bring to the river system, but does not support the chosen reef locations (with the exception of the Point Walter site). YWA (and other yachting clubs) is of the view that:

- there is inadequate keel clearance (depth) to allow safe navigation through the chosen locations (YWA has subsequently confirmed that the amended four metres clearance at LAT has largely resolved its concerns on this matter);
- the reef location(s) bisect, and will not allow for unfettered passage through the 'usual' racecourse lines, turning (tack or gybe) marks, and start and end points used during sailing competitions; and
- as one of the outcomes of the reef proposal is to attract marine fauna (including fisheries species such as pink snapper), there is a corresponding increased likelihood the proposed reefs will attract additional fishers to the area, further impacting safe passage of vessels during sailing competitions

2.14. YWA further explained that due to the nature of sailing, yachts do not stay on the rhumb line (straight line from the previous mark to the next turning mark). Boats are required to tack or gybe multiple times, based on the ever-changing wind conditions, performance, or strategy. Due to this, yachts will vary by up to plus or minus 60 degrees when heading towards a mark from the rhumb line. This can result in the turning marks (the positions of which are determined on the day of racing and influenced by wind conditions) being in the close vicinity of the proposed reef structures.

2.15. YWA did not provide any further clarification concerning how race events and/or courses are adjusted, or what sailing strategies sailboats employ during low tide events. YWA also explained the reefs could be damaged by the deployment of anchors if they are aligned with the start boat at the start/end lines.

2.16. YWA sought clarification as to whether the reefs could be relocated and were concerned that there was insufficient consultation with the yachting community.

2.17. YWA provided two submissions (refer **Attachments 5f** and **5g**).

Conservation Council of Western Australia (CCWA)

2.18. CCWA identified concerns related to the Point Walter reef location, stating:

- the reef is within the 'prey-field' area that supports the nearby fairy tern colony, quoting a recent Murdoch University PhD research paper - *Feeding ecology of a threatened coastal seabird across an inner shelf seascape*. The abundance of certain fishes, whose spawning periods overlap the fairy tern breeding season (October to February), is likely to be an important factor influencing the location of the fairy tern colony. The proposed reef location may alter foraging patterns positively or negatively and should be monitored;
- the reef structure may alter sediment erosion/accretion and change the shape of the sandbar. Fairy tern nesting/breeding habitat could be lost from the sandbar;
- the reef structure may provide habitat for invasive sessile species (for example *Sabella* sp., a marine polychaete worm);
- if recreational fishing is permitted on the reefs, it may increase pressures on large mobile target fish species and recommend the reefs be closed to fishing; and
- reef construction should not occur between October and February to avoid disturbance to the tern's foraging habits.

2.19. CCWA's full comments are provided in **Attachment 5h**.

Public submissions

2.20. Submissions were received from two members of the public.

2.21. The first submission supports the resultant increased biodiversity and habitat the reefs will attract but questions the robustness of the science behind the application. The submission queries whether the mussel should be considered as native to the river system, the mussel's long-term survivability and ability of the mussel to naturally recruit in-situ.

2.22. The second submission raises similar concerns to those expressed by YWA and the general sailing community. The submission expresses the view that the scientific modelling behind the reef design and chosen locations (for example) is flawed by the "...lack of any criteria that truly reflects the area used for sailing/boating..." and whether similar reef structures or the blue mussel previously existed at the localities chosen.

2.23. Redacted versions of these two submissions are provided in **Attachments 5i and 5j** respectively.

2.24. Submissions were also made from five yacht clubs:

- East Fremantle, Royal Freshwater Bay, Royal Perth and South Perth Yacht Clubs each reiterated YWA's concerns about insufficient keel clearances. Royal Freshwater Bay added concerns about the reef's potential influences upon wave characteristics (wave-state) that may impact how yachts

manoeuvre around course markers; East Fremantle added there may be potential influences on the incoming/outgoing tide at Tasker Point marker (Point Walter) that could cause scour of the sand pit and questioned whether limestone ever naturally occurred at some sites.

- Additionally, Claremont Yacht Club believed the additional reef habitat may increase the number of fishers to the area, and thus also increase potential environmental pressures.

2.25. The combined Clubs' full comments are provided in **Attachment 5k**.

3. PUBLIC CONSULTATION – DRAFT REPORT SUBMISSIONS

3.1. In accordance with the requirements of Part 5 of the SCRM Act, a copy of the draft report and proposed recommendation was provided to the applicant, relevant local government authorities and stakeholders who made a submission under section 74 of the SCRM Act.

3.2. Subsequently, pursuant to section 75(4) of the SCRM Act, a copy was published on the DBCA website for a period of 14 days between 27 May and 10 June 2022 with an invitation for submissions. The Department of Planning, Lands and Heritage (Aboriginal Heritage Conservation) advised that it had no further comments, noting the requirement for TNC to obtain a Regulation 7 and/or 10 approval(s) under the Aboriginal Heritage Regulations.

3.3. The submissions on the draft report are provided at **Attachment 6**.

3.4. A total of six submissions were received within the advertising period. These submissions are summarised below and discussed in Section 4 Consideration of issues identified from submissions.

3.5. Four submissions supporting the proposal were received within the advertising period.

- Recfishwest has worked with TNC on other shellfish reef projects in Western Australia and is a member of the Technical Advisory Group for this proposal. Recfishwest stated that increasing the volume and complexity of mussel habitat within the Swan-Canning estuary will provide long and short-term benefits for fish populations and abundances as well as providing broader societal benefits.
- OzFish has previously (and currently) partnered with TNC in habitat restoration projects across the country and particularly in Western Australia. In its dealings with the Perth TNC branch, OzFish has found TNC to be knowledgeable, trustworthy, and able to deliver project outcomes in a timely and professional manner. OzFish is confident TNC has the skills and resources to deliver the Blue Mussel Reef Construction Project successfully.
- Perth NRM states that the proposal represents a great opportunity to improve water quality through increased biofiltration and improve biodiversity and ecosystem resilience through increasing habitat availability

for a range of estuarine species. Perth NRM is also collaborating with TNC on black pygmy mussel restoration project also in the estuary.

- Members of the Underwater Explorers Club frequently dive in the river, and are of the view that the new reefs will provide a potential brilliant new area for photography.

3.6. The East Fremantle Yacht Club (the Club), which made a submission on 26 November 2021 in response to the advertising of TNC's application (refer to section 2.24 above) provided a further submission objecting to the proposal. The Club's reasons have not changed from that submission. The Club supported the objections raised by YWA and in addition, the Club suggested that:

- the reefs will impact the sailing race start/finish lines;
- the Point Walter location will impact the Club's racecourse turning markers (and the Tasker marker);
- the volume of limestone material to be deposited will impact the currents and river bank at Point Walter;
- the Club questions whether limestone ever occurred at the chosen locations and should not be introduced; and
- the revised minimum vertical separation (to the river's surface) of four metres at LAT only considers keel clearance, not mast clearances of their Centreboard class of vessels (with masts greater than 5 metres) if such vessels were to capsize over a reef. The submission doesn't elaborate on the frequency of capsizing events or why such events would be characteristic of the reef locations.
- DoT advises that there is a very low risk of vessels capsizing and masts being stuck within the reef systems.

3.7. TNC provided a submission addressing technical and ecological matters identified in the public submissions (refer **Attachment 6**).

3.8. TNC requested that Advice Note 2 be amended as the proposed works are intended to commence as soon as possible in the event that the application is approved. Advice Note 2 currently includes the following:

To allow sufficient time for the Department of Biodiversity, Conservation and Attractions to consider and approve the Construction and Environmental Management Plan, the document shall be submitted at least 42 days before the expected works commencement date.

To support efficient implementation of the approval, it is recommended that the above text is replaced with the following:

The Construction and Environmental Management Plan must be approved by the Department of Biodiversity, Conservation and Attractions prior to works commencing.

4. CONSIDERATION OF ISSUES IDENTIFIED IN SUBMISSIONS

This section discusses the issues identified in submissions received during assessment of this proposal.

4.1. Potential impact on fairy tern habitat

4.1.1. TNC and the CCWA subsequently discussed the proposal where both parties agreed:

- that indirect impacts on the fairy terns' prey-species are likely to be small and impact monitoring should be included in the project's ongoing monitoring regime;
- that reef construction should not occur when fairy terns are present at Point Walter (this is possible as reef construction is scheduled to occur outside the terns' breeding period);
- that fishers are likely to be attracted to the area, and an increase in recreational fishing from boats may occur, but not from the sand spit. Therefore, a significant increase in direct human and tern interaction is unlikely; and
- TNC is confident that engineering assessments provide sufficient evidence that reefs will have negligible impact on the shape of the sand spit at Point Walter (refer also to section 8.1 Reef design and riverbed site selection).

4.2. Potential impacts to other river users (safe navigation)

4.2.1. Concerns have been noted regarding navigational risk in terms of the risk of impact of keels with the reefs and potential entanglement or impact of masts on capsized vessels. It is considered that capsizing of vessels may occur in any section of the river and strike any underwater/riverbed obstruction or feature. Further, noting the keel clearance concerns raised by YWA, on 14 January 2022 TNC provided modified concept reef designs to DBCA to ensure a minimum vertical separation (to the river's surface) of four metres at LAT.

4.2.2. As part of the ongoing application referral and assessment procedures and following TNC's offer to increase the reefs' vertical separation to four metres LAT, DBCA facilitated a meeting between TNC, YWA and DoT on 28 January 2022. The parties were advised that it is DBCA's role to ensure that development within the Riverpark protects and enhances the Swan Canning River's amenity and ecological health, noting there is also a need to balance development and community activities amongst competing Riverpark users. Further, it is DBCA's role to prepare an informed and balanced assessment of the reef proposal for the Minister's determination.

4.2.3. YWA was supportive of the revised four metres vertical separation and considered that this clearance should significantly lessen potential keel impacts. YWA still has some concerns with the increased likelihood that the proposed reefs will attract additional fishers to and around the reefs and that the presence of additional fishing or recreational activity around the reefs may adversely impact safe navigation during race events (as

noted in section 2.13 above). These concerns were expressed in the context of the Freshwater Bay 1 and Attadale reef locations.

4.2.4. TNC indicated that, subject to support from DBCA, any modifications to reef design (or locations) could be considered subject to ensuring that modifications would not significantly detract from the environmental benefits of the project. TNC re-confirmed the four chosen sites were based on the results of the pilot reef studies, including the survivability/ecological requirements of the mussel, needing to avoid existing seagrass beds and from a logistical aspect, the ability to access the sites to construct and later monitor the reefs.

4.2.5. TNC further clarified there is available space within the four build envelopes for some reconfiguration of the reefs and specific reef unit positions. TNC reiterated that it would be eager to work with the yachting community during the final design to optimise reef locations. This will form part of TNC's final reef designs to be submitted for DBCA's review and approval prior to any in-river works commencing.

4.3. Queries relating to reef locations, mussel long term survivability and environmental impacts

4.3.1. There is general support for establishment of habitat to support improved biodiversity outcomes however, some concern was raised regarding the robustness of the science behind the application. In particular, concerns were raised regarding:

- whether the mussel should be considered to be native to the river system;
- the mussel's long-term survivability; and
- the ability of the mussel to naturally recruit in-situ.

4.3.2. It is acknowledged that blue mussels are a benthic species needing hard substrata to establish on. TNC surveyed the subtidal areas of the river and noted there were no blue mussel reefs where soft sediments exist. It is the aim of this project to mimic and introduce hard substrata to the riverbed in the form of limestone substrate.

4.3.3. It is noted that blue mussels do occur naturally in exposed sites in the lower Swan-Canning Rivers. The cage trials conducted by TNC were intended to validate the habitat suitability assessment.

4.3.4. In response to the concern that blue mussels are not native to the estuary, TNC advised of publications supporting a distinct southern genetic variant being native to temperate waters including the estuary (refer **Attachment 6).**

4.3.5. It is noted the pilot trial experienced significant crab predation after summer restocking with blue mussels – netting of the trial sites reduced predation. Initial stocking of the proposed reefs will occur outside peak crab season

to avoid this issue and enable time for densely stocked mussels to mat-up and establish.

4.3.6. While TNC's application did not demonstrate natural recruitment, further information provided in its submission on the draft report supports natural recruitment occurring in the Swan estuary (refer **Attachment 6**). It is noted that the focus of the trials was to establish where sub-adults would survive, as they would be the source of new stock directly within the reef zone. This project intends to increase stocking density to significantly improve the natural recruitment (currently low in the Swan) within the system.

4.3.7. The pilot reef trials also adequately demonstrated that other filter feeders populated the small-scale reefs including sponges, tunicates and scallops. If the blue mussel does not persist, other filter feeders will and the structure of the reefs would provide habitat for other species, that are not present in soft sediments. This will result in a significant opportunity for improved biodiversity within the system.

4.3.8. TNC mapped subtidal reef habitat and only one significant reef was found in the focus area. This reef did not contain significant blue mussel populations. The limited presence of blue mussels within the system is attributable to a range of factors including location of habitat within the optimal survivable range and currently low stocking density of mussels. The intention of this project is to provide optimal habitat for establishment of reef environments that would boost stock density in the river and improve opportunities for recruitment.

5. RELEVANT POLICIES AND PLANS

- State Planning Policy 2.10 – Swan-Canning River System (SPP 2.10)
- Corporate Policy Statement No. 42 – Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)
- Corporate Policy Statement No. 45 – Planning for Miscellaneous Structures and Facilities in the Swan Canning Development Control Area (Policy 45)

6. ENVIRONMENTAL AND PLANNING CONSIDERATIONS

- Environmental protection and benthic habitat protection
- Water quality
- Navigational safety
- Community consultation

7. BACKGROUND

7.1. The *Swan-Canning Shellfish Reef Restoration Project* will involve the construction of limestone reefs, seeded with blue mussel (shellfish), as a nature-based solution to help restore vital ecosystem functions to the estuary. Reefs provide important

habitat and contribute to the restoration of vital ecosystem functions such as water filtration and increased fish production, and provide an overall boost for estuarine biodiversity. With less than 10 per cent of natural shellfish reef ecosystems remaining in Australia, this proposal is part of TNC's National Reef Building Program to restore and protect 60 shellfish reef systems across southern Australia.

7.2. Native to the estuary, blue mussel juvenile spat (*Mytilus galloprovincialis*) will be used to seed the limestone substrate. The mussel is also common at other locations and is known to colonise existing man-made, in-river structures such as jetties and rock revetments. Blue mussel spats will be sourced at an aquaculture lease in Cockburn Sound and transported to the four reef locations following stringent health and biosecurity checks required by DPIRD.

7.3. The project is being supported by DBCA, Lotterywest, the Minderoo Foundation and philanthropists. DBCA is currently providing $250,000 of the total $5 million raised for the scientific investigation, planning, implementation and subsequent monitoring of the reefs. DBCA is also represented, along with DPIRD, Minderoo Foundation, Murdoch University, Harvest Road Oceans and Recfishwest, on a Technical Advisory Group that will continue to provide technical advice on the project. In order to maintain the impartiality required to prepare this report, DBCA staff that undertook the statutory assessment of the proposal did not participate in the Technical Advisory Group.

7.4. This proposal is an extension of, and builds on, the results of 2020-2021 small-scale pilot reef studies (using a combination of 16 rocky substrate reefs and eight coir mesh substrate beds) at Freshwater Bay, Point Walter, Attadale and Applecross. Those trials required the development of a Habitat Suitability Index (HSI) to determine the optimal river location(s) for the reefs based on the environmental suitability and potential conflict with other river users (e.g. sensitive habitats, jetty infrastructure and recreation/boating). Data collected from these pilot studies (e.g. mussel survival, recruitment, and growth) were used to validate the HSI model and to inform the current proposal. A range of environmental, ecological, recreational, commercial, social, cultural, and logistical factors were considered in the planning and selection of the four proposed reef sites (refer also to Section 7.10 below).

7.5. The State Government has committed an additional $2 million to understanding and further improving habitat within the estuary, which will augment and build on the learnings from this project and will complement other management and community actions currently being undertaken across the waterway and catchment that are aimed at protecting and enhancing estuary health.

7.6. This proposal involves a combined total area of two hectares of inert limestone rock installed over four riverbed sites (near the existing, previously constructed small-scale pilot reefs) at Attadale, Freshwater Bay (two sites) and Point Walter. The Applecross site was excluded as it did not return favourable results. All reefs will have minimum vertical separation of at least four metres to the river's surface at LAT.

7.7. It is proposed that the existing pilot reefs, used as proof of concept for this large-scale reef project, will be left in-situ, further adding to and benefitting the current

estuary habitat. Not actively removing the pilot reefs will also eliminate any disturbance to the surrounding benthic environment.

7.8. It is anticipated that natural ecological colonisation and development of the proposed reefs ('maturation' process) will occur over five to seven years to become a fully established and self-sustaining ecosystem.

7.9. Following establishment of the reefs TNC has estimated that annually, the mature reefs will filter a combined 50 gigalitres of river water, remove 2000kg of nutrients, produce 3,500kg of new fish mass and provide habitats for 100 aquatic species.

7.10. Monitoring during the 2020-2021 pilot reef trials undertaken by TNC demonstrated good mussel survival and overall increased species richness and composition at most sites when compared to the control sites (bare riverbed) and pilot reef sites prior to their construction. This is despite a challenging year for the mussels, due to the significant freshwater flows and resultant low dissolved oxygen conditions experienced in the lower estuary over the 2020-2021 winter period. In summary, the results demonstrated:

- Whilst the results of the pilot reef trials are encouraging, a 100 per cent survival rate of mussel spat or a water filtration rate of 50 gigalitres/year may not be achievable in the early stages of the project. However, such outcomes should increase over time as the reef habitat establishes;
- mussel survival and growth was excellent at Point Walter and Freshwater Bay, good at Attadale and poor at Applecross;
- mussels demonstrated substantial resilience, given water quality issues over the winter period;
- mussels had survived, grown and were more resilient with higher mussel survival experienced downstream (at Point Walter);
- the predator exclusion nets have proven to be very important to protect the mussels from predation during the initial stress caused by translocation when mussels are more susceptible to predation;
- even with the 2021 winter flooding, mussels survived through the harsh conditions with high freshwater and low oxygen;
- other aquatic fauna were using the reefs and settling on the rocky substrate, for example, fish, filtering organisms, native flat oysters, scallops and razor clams; and
- important fisheries species (for example pink snapper) were noted using the reefs, with multiple schools identified in May 2021.

7.11. DBCA's Rivers and Estuaries Science and Marine Science teams used a remote underwater vehicle to provide a current (March 2022) visual assessment of the existing pilot reefs. Control sites (those without reefs) were also included. Both deep and shallow reefs demonstrated a level of habitat complexity (with extensive ridges and crevices) that was not available at control sites. Although the pilot reefs varied, in general they showed a range of fish and invertebrate species that were noticeably more abundant than control areas. Invertebrates that were present included ascidians, sponges, tunicates, crabs, seastars, anemones and bivalve species,

including small clusters of blue mussels. Fish species included abundant gobbleguts, and common blowfish, as well as leatherjackets, blennies, butterfish, and flathead. All the reefs showed significant aggregation of a red turf algae.

7.12. An extract from TNC's development application summarising its observations of a similar assessment is provided at **Attachment 7.**

8. DISCISSION

8.1. Reef design and riverbed site selection

8.1.1. As noted in sections 1.4 and 8.1.2 the reef design and locations have been informed by an engineering assessment conducted by UWA-COEL that examined potential impacts of the reefs on the surrounding environment including:

- potential impacts of the reef structures on the surrounding estuarine environment, for example changes to water/sediment dynamics, erosion/deposition/scouring impacts around the reefs and/or nearby priority habitats;
- potential impacts of the estuarine environment on the reefs, for example displacement/dislodging of the reef structure, burial of any nearby seagrass beds;
- design of the reef units at each site to enhance ecological benefits for mussel restoration, minimise any negative impacts on the surrounding environment and maximise reef structural integrity; and
- recreational, commercial, social, cultural and logistical factors.

8.1.2. DBCA commissioned MP Rogers and Associates, an engineering consultancy specialising in coastal and port projects, to undertake a high level, independent peer review of the UWA-COEL report. The peer review concluded that overall, the modelling used to inform the reef proposal, and identify potential issues, was sufficiently described to indicate the planned reef array is unlikely to result in any significant, negative environmental impact.

8.1.3. Water depth at the four proposed reef sites varies from approximately 3.5 to 8 metres (during normal tide). Reef structures will be built to a maximum height of 1.9 metres, with one to four peaks per reef unit, where water depth allows, and where the required minimum vertical separation of four metres LAT over the reefs to the river's surface can be maintained.

8.1.4. The proposed individual reef units will be constructed from local, naturally occurring limestone rock with two size fractions proposed:

- Smaller diameter (150-300mm) limestone spalls to form a base layer for the reefs (extending ~0.5m above bed) extending over each reef footprint; and
- Larger diameter (600-1000mm) limestone rock to build elevation and size heterogeneity in the reef, including to build the elevated peaks in each reef.

8.1.5. The proposal states there will be one to four peaks on each individual reef unit (more likely to be three to four), with elevation variability for each peak

between 1.4 and 1.9 metres high. It is noted that the bathymetry of the riverbed is variable and that the installation of the limestone substrate is unlikely to be identical to the proposed indicative dimensions (refer to **Attachments 2a-d**). However, the maximum reef height and reef locations will be able to be accurately controlled.

8.1.6. As noted above, the overall footprint of the full-scale reefs will be two hectares within a combined riverbed area (the four locations) of 10 hectares and will comprise the following design parameters (refer to **Attachments 2a-d**):

- **Attadale** – will comprise four separate reef units, with a combined footprint of 0.6 hectares, within a riverbed envelope of three hectares. Highest reef peak will be 1.9 metres above the level of the riverbed with a minimum vertical separation to the surface of four metres at LAT.
- **Freshwater Bay 1** – will comprise up to 16 separate reef units, with a combined footprint of 0.6 hectares, within a riverbed envelope of three hectares. Highest reef peak will be 1.9 metres above the level of the riverbed with a minimum vertical separation to the surface of four metres at LAT;
- **Freshwater Bay 2** – will comprise four separate reef units, with a combined footprint of 0.2 hectares, within a riverbed envelope of one hectare. Highest reef peak will be 1.9 metres above the level of the riverbed with a minimum vertical separation to the surface of four metres at LAT; and
- **Point Walter** – will comprise four separate reef units, with a combined footprint of 0.6 hectares, within a riverbed envelope of three hectares. Highest reef peak will be 1.9 metres above the level of the riverbed with a minimum vertical separation to the surface of four metres at LAT.

Table 1 below provides a summary of the size of the pilot reefs and the proposed full-scale reefs.

	Pilot reef footprint hectares/reef units per site	**Full scale reef footprint (hectares)**	**Full scale reef units per site**	**Full scale build envelope (hectares)**
Freshwater Bay 1	0.0035/4	0.6	16	3
Freshwater Bay 2	0.0035/4	0.2	4	1
Point Walter	0.0035/4	0.6	4	3
Attadale	0.0035/4	0.6	4	3
TOTALS	**0.056/16**	**2.0**	**28**	**10**

Table 1: Summary of reef size in hectares

These locations are further described hereunder (refer to the locality map at **Attachment 1**):

8.1.7. *Attadale (proximal to the Swan Estuary Marine Park - Alfred Cove)*

The proposed three-hectare reef envelope for this site is situated between the moderately-deep and deeper pilot reefs and will comprise four larger individual reef units within the envelope with a combined 0.6-hectare footprint (surface area). This site has a large, gently sloped bank, making it ideal for building stable reef structures. It is located well south of the main navigational route through Melville Water. This area is located 200 metres (twice DBCA's buffer requirement) north of the marine park boundary, which comprises tidal flats and salt marsh areas that are significant habitats for birdlife. The water quality conditions at this site rank the lowest compared to the other sites, but are well within the tolerance of blue mussel; the trial pilot reef survival results were promising. The four pilot reefs are outside the proposed reef envelope and will remain in-situ.

Adjacent Foreshore

The closest foreshore is over 600 metres to the south, being the Attadale Reserve, a flat open grassland and recreational area with a golf practice area and dual-use path. The Alfred Cove Nature Reserve forms a narrow strip between the marine park and this recreational area. No impacts to the marine park, nature reserve or foreshore are anticipated as a result of the reef's placement.

The Perth Flying Squadron Yacht Club is approximately 1300 metres north-east of this site.

8.1.8. *Freshwater Bay* - sites 1 and 2

The two proposed Freshwater Bay sites are subject to year-round marine conditions at depth, making them ideal candidates for the reef structures. The shallow bank areas have been avoided because of their shallow (two metres) depth and because they comprise key seagrass habitat. The Freshwater Bay 1 site (FB1 – three-hectare reef envelope with a 0.6-hectare footprint comprising 16 reef units) is located on a large, gently sloping bank which is ideal for building larger reef units. The proposed reefs will partly intersect a gazetted water-skiing area, however the reef's depth will not impact use of the area. DoT has previously advised DBCA that a minimum water depth requirement of 1.5 metres is generally recommended within water ski areas in Western Australia. The two pilot reefs associated with FB1 will be integrated into the proposed reef envelope.

The Freshwater Bay 2 site (FB2 – one hectare reef envelope with a 0.2-hectare footprint comprising four reef units) is situated on a slightly steeper bank. The two pilot reefs associated with FB2 are outside the proposed reef envelope and will not be integrated, but will remain in-situ.

Adjacent Foreshores

The Freshwater Bay foreshore area is between 280 and 500 metres from the reef sites and characterised by the residential areas of Mosman Park, Claremont, and Dalkeith. The Claremont Yacht Club is approximately 400 metres from FB2 and the Royal Freshwater Bay Yacht Club is approximately 300 to 700 metres from FB1. Public foreshore access is

limited in places, although, there are several wide foreshore reserves which encourage recreational activities. In addition to water-skiing, other key user groups in the vicinity include the yachting and rowing communities, with two yacht clubs and several rowing sheds along the foreshore.

8.1.9. *Point Walter*

The proposed three-hectare reef envelope site remains largely in marine conditions at depth throughout the year, making it an ideal location for the proposed four larger individual reef units. This is reinforced by the fact that the highest mussel survival in all field trials was generally seen at this site. It is an area with a relatively gentle slope and the greatest current velocity of any site. The spatial arrangement of the four reef units (with a 0.6-hectare footprint) has been designed accordingly to maximise water flow (and hence food supply) across the reef units, and thereby amplify the expected ecological gains. Of the four pilot reefs at this location, two will be integrated into the proposed reef envelope, whilst the other two will remain in-situ.

Priority Habitats and Conservation Areas

There are no gazetted aquatic conservation areas in this precinct, although nearby Minim Cove is an important location of natural and scientific value, with fossiliferous shell beds representing one of four separate marine transgressions in the estuary. Significant seagrass beds are present in the shallows of the Point Walter region, which were considered during site selection. Reefs have been designed to alleviate any negative impact on seagrass communities.

Adjacent Foreshores

The closest foreshore is over 400 metres east of the site and is known for its high scenic, recreation and conservation value as part of the Blackwall Reach Reserve and Point Walter Reserve. There are no residential areas adjacent to the site.

The Royal Freshwater Bay Yacht Club is approximately 1200 metres from the Point Walter site.

8.2. Reef Construction

8.2.1. Based on the pilot reef methodologies, reef construction will involve the use of a barge-based excavator that will slowly lower the rocky (limestone) substrate onto the bare riverbed. The boundaries for each reef construction area will be established by a surveyor and the corner points marked with anchored surface buoys. The excavator will deploy the limestone substrate in a methodical manner over the reef-building footprint to the pre-defined boundary dimensions. Divers will need to assess the deposited substrate to ensure it meets design requirements and, if not, the substrate will be

manually adjusted. The methodology will be revised to ensure appropriate reef dimensions and tolerances are attained.

8.2.2. Deployment of the limestone substrate will create a short-term sediment plume due to the small particles (fines) within the substrate material. Surface buoys will be deployed to delineate an acceptable plume extent boundary, providing a basis to trigger (visually) a 'stop-work' event if the boundary is exceeded. Drone footage will also be collected to provide additional visual support for detecting whether environmental exceedances (and stop-work triggers) are reached.

8.2.3. Once all reef building has been completed, a surveyor will undertake a multi-beam bathymetric survey of all reefs to ensure they meet specifications and verify the geographic coordinates of each reef building area. In the event reefs do not meet specifications, they will be manually adjusted.

8.2.4. Once it is determined the reef structures meet specifications, 'seeding' of the limestone substrate with the juvenile spats will commence. The spats will attach to the limestone substrate.

8.3. Ecological considerations and risk assessment

8.3.1. TNC's development application / proposal primarily focuses on the introduction and establishment of blue mussels on limestone (reef) substrate. It is acknowledged that the reef structures will also provide greater ecological benefits and functions for the river system by creating additional habitat for other marine fauna and flora, including algae and seagrass and small bottom-dwelling invertebrates (such as crustaceans), which will provide additional and varied food sources for higher order consumers, such as fish (pink snapper for example). The reef units have been designed to create increased heterogeneity of elevation, cryptic spaces, and a natural, undulating reef aesthetic. Over a period of years the reefs will be naturally colonised with algae, other shellfish, and mobile invertebrates such as worms and crabs. It is likely an array of fish and larger fauna, such as dolphins, may also feed around the reefs.

8.3.2. It is intended the reef structures will have a positive impact on seagrass habitat by clarifying the water, thus increasing light availability and reducing high nutrient loads that encourage the growth of smothering macroalgae. Risks to seagrass beds have been mitigated via extensive consideration of seagrass extent and suitable buffer zones between reefs and seagrass beds.

8.3.3. Blue mussels are unlikely to be a significant dietary component of either dolphins or estuary-associated bird species. It is possible that a localised shift in prey communities from pelagic (water column) to demersal (bottom-associated) sources may alter feeding behaviour near (reef) structures. However, these impacts are not expected to be large or negative, given that 80 per cent of the fish species in the estuary are demersal.

8.3.4. TNC developed an Ecologically Sustainable Development (ESD) risk assessment matrix to evaluate the major environmental and ecological risks that may arise from the construction and development of the reefs. The ESD includes potential impacts to mobile and sessile benthic fauna, seagrass and macroalgae, fairy terns and riverbed scouring. It is based on a National ESD Reporting Framework developed initially for the fisheries and aquaculture sectors in Australia and is based on the Australia and New Zealand standard for risk management AS/NZS ISO 31000:2009 (refer to **Attachment 8**).

8.3.5. Overall, the risk rating and associated levels of management for various components of the reef proposal range from negligible to low to moderate. An action of moderate risk may require additional information to address the issue, or the issue may require monitoring. Or, where immediate management is required, the issue should be the subject of continuous improvement with the aim of achieving a low risk ranking in the future.

8.4. Governance arrangements

8.4.1. DBCA will take on responsibility and management of the reefs (which will become part of the River reserve) following provision and acceptance of the as constructed multibeam survey of the reef units from the proponent.

8.4.2. A recommended pre-construction condition of approval includes establishment of a Collaborative Arrangement between DBCA and TNC that confirms roles and responsibilities in relation to governance of the reefs. This will include monitoring and evaluation, maintenance, community engagement, capacity building and project technical guidance and responsibilities around restocking the reefs with mussels, if required.

8.5. Environmental protection

8.5.1. Sediment scour can occur at the front edge of such structures as the proposed reefs, along the sides and in the wake of elevated structures when currents are sufficient to move the predominant sediment type. Engineering analysis has shown that some scouring effects are possible under increasing current strength conditions, but these will occur close to the base of reef units. At sites where this is more likely to occur, reef positioning has been aligned with the dominant current direction to reduce any impacts. This will allow tidal movement and natural sediment movement processes (e.g. longshore drift) without compromising the reef structures. Coupled with the distance from the shoreline, reef design considerations and use of appropriate materials, this ensures that the risk of erosion has been minimised and is consequently considered low risk.

8.5.2. The Attadale site is most likely to have instances of scour under increasingly extreme conditions due to the silty nature of the estuary bed sediments. Freshwater Bay 1 and the Point Walter site are only expected to experience some scouring effects during 5 and 10-year return periods. It is not expected that any scouring effect will be seen at Freshwater Bay 2, except in the 100-year extreme conditions. Extreme conditions could be a combination of high tides, waves and strong currents.

8.5.3. Biosecurity risk from the spread of marine pests/invasive species, parasites and disease via translocated blue mussels from Cockburn Sound will be addressed as part of the required approvals from DPIRD. The mussels will require testing and clearance for disease and invasive species prior to transfer to the four sites. Given these measures, TNC believes biosecurity risks are low but monitoring for invasive species/pests will form part of TNC's ecologically sustainable development risk assessment program.

8.5.4. Policy 42 aims to ensure that land use and development on and adjacent to the river system maintains and enhances the quality and amenity of the river environment. The proposed development should be carefully undertaken to prevent detrimental impacts to the riverbed and nearby ecosystems (seagrass beds), water quality and foreshore area.

8.5.5. The foreshore areas closest to the Attadale, Freshwater Bay and Point Walter river locations are a combination of conservation areas (marine park and Blackwall Reach Reserve), public (picnic grounds) and community-based infrastructure (sailing and rowing clubs) and other wider foreshore reserves which encourage recreational activities. In addition, no residential areas are adjacent to the Point Walter location.

8.5.6. A Construction Environmental Management Plan (CEMP) will be required as a condition of approval and include details on how the proposed construction works will be managed to minimise potential environmental impacts.

8.6. Public access and safety

8.6.1. Based on advice from DoT, it is considered that the proposed depth of the reefs is adequate to ensure the safe movement of vessels over them.

8.6.2. As the reefs establish it is anticipated they will attract fishing activities to their locations. Measures will be explored in cooperation with DoT to maintain viable yachting activities on race days and during training.

8.6.3. On-water safety (for the water vessel community) is the only aspect this proposal will need to consider during the construction of each reef array. As noted in section 2.7 above DoT's Navigational Safety will require the contractor to ensure (1) a Temporary Notice to Mariners to be in place, (2) a notification of any request for an extension of the works period must be made, (3) a confirmation of completion of the works is provided and (4) as installed coordinates and clearance heights must be provided to DoT for charting purposes.

9. SWAN RIVER TRUST

9.1. In accordance with section 75(3A) of the SCRM Act, the Swan River Trust (the Trust) considered DBCA's draft report at its meeting on 22 March 2022 and resolved to advise the Director General of DBCA that while it has outstanding

concerns regarding the proposal, it supports formal advertising of the draft report and recommendation. The Trust also requested further information on the financial implications of a potential 12-month deferment of implementation of the project, to allow for further monitoring and evaluation of the pilot reefs, and further consideration of the proposed locations of the reefs, to minimise potential navigation impacts.

9.2. TNC subsequently advised DBCA that a 12-month deferment will have significant, detrimental implications for the financial viability of the project, funding from project sponsors (including State Government and philanthropists) and delivery of on-ground outcomes with the remaining budget. Regarding the reef locations, TNC reconfirmed the locations were chosen based on the environmental preference for mussel growth and survival, avoidance of existing seagrass beds, and mitigating navigational impacts. To reduce impact on navigational routes, reef locations were selected after consultation with key stakeholders, including DoT and the yachting community. TNC's full comments are provided at **Attachment 9.**

10. CONCLUSION

10.1. The *Swan-Canning Shellfish Reef Restoration Project* will involve the construction of limestone reef structures, and seeding with blue mussel, as a nature-based solution to help restore vital ecosystem functions to the lower Swan-Canning Estuary. The proposed reefs will also create additional habitat for other marine fauna and flora and will contribute to the restoration of vital ecosystem functions such as water filtration and fish production and provide an overall boost for estuarine biodiversity.

10.2. The project will encompass a network of individual but ecologically connected reef units over four sites, will be approximately two-hectares in area, in water depths ranging from 3.5-8 metres and will have a minimum vertical separation to the river's surface of four metres at LAT.

10.3. DBCA's Policy 42 aims to ensure that land use and development on and adjacent to the river system maintains and enhances the quality and amenity of the river environment. It is also DBCA's role to encourage a balanced approach for community activities and use, enjoyment, and development within the Swan Canning River system amongst competing Riverpark users.

10.4. Some boating and yachting stakeholders initially strongly opposed the four proposed reef locations on navigational safety grounds. However, following further consultation, these stakeholders recognise there will be adequate keel and mast clearance (should larger vessels capsize) to allow safe passage of sail boats. The stakeholders advise that only two sites, Freshwater Bay 1 and Attadale sites may require further consideration given the reefs will attract fishers to the sites that, in their opinion, will further impede sailing activities.

10.5. While these concerns are acknowledged, they can be managed through appropriate management strategies, including a requirement for the four reef locations to be adequately marked in DoT's marine charts.

For these reasons, the proposal is recommended for approval, subject to conditions and advice.

11. RECOMMENDATION – APPROVAL WITH CONDITIONS

That the Director General of DBCA advises the Minister for Environment that The Nature Conservancy's proposal to construct limestone substrate reefs, within the Swan River at Attadale, Freshwater Bay and Point Walter as described in the application received on 19 October 2021, be approved, subject to the following conditions and advice notes:

CONDITIONS

1. Approval to implement this decision is valid for two (2) years from the date of the approval. If substantial on-site works have not commenced within this period, a new approval will be required before commencing or completing the development.

2. Prior to the commencement of works the applicant shall notify the Department of Biodiversity, Conservation and Attractions in writing not less than three (3) days prior to the commencement of works (**Advice Note 1**).

3. Prior to the commencement of works the applicant shall enter into a Collaborative Arrangement with the Department of Biodiversity, Conservation and Attractions that confirms roles and responsibilities in relation to governance arrangements including monitoring and evaluation, maintenance, community engagement, capacity building and project technical guidance.

4. All works are to be undertaken in accordance with a Construction Environmental Management Plan approved by the Department of Biodiversity, Conservation and Attractions (**Advice Notes 2 and 3**).

5. All constructed reefs shall maintain minimum vertical separation of four metres at Lowest Astronomical Tide to minimise navigational safety risks.

6. The reefs are to be constructed a minimum of 10 metres from any seagrass beds.

7. Upon completion of the works, all waste materials, equipment and machinery shall be removed, and the site cleaned up to the satisfaction of the Department of Biodiversity, Conservation and Attractions.

8. Within one month following installation, the limestone reefs shall be surveyed using a multibeam survey method (or similar); the survey shall include the coordinates (in decimal degrees) of all reef locations. These surveys are to be repeated 12 months after the initial survey to the satisfaction of the Department of Biodiversity, Conservation and Attractions on the advice of the Department of Transport.

ADVICE NOTES

1. Notifications can be emailed to rivers.planning@dbca.wa.gov.au.

2. The Construction Environmental Management Plan required under Condition 4 shall describe how the proposed works will be managed to minimise potential environmental impacts and shall address, but not be limited to:
    a. scope of works, including construction methodology;
    b. site access and management;

c. management of machinery and equipment, including refueling procedure and spill response (in that regard refueling of vehicles or machinery is to be undertaken outside the Swan Canning Development Control Area or at a licensed refueling facility);
d. storage and bunding of materials, equipment, chemicals and fuel;
e. protection of the river from inputs of debris, rubbish or other deleterious material;
f. navigational safety;
g. hours of operation and schedule of works;
h. complaints and incident response procedures;
i. that all contractors and personnel involved in the works will be familiar with the requirements of this approval;
j. sediment and turbidity management (this should include stop work and contingency procedures clarifying when works are to cease including poor weather conditions, where a plume exceeds agreed trigger criteria); and
k. provision of a site map showing the laydown area (if required), vehicle and barge entry/exit points and pedestrian management (if required).

The Construction Environmental Management Plan must be approved by the Department of Biodiversity, Conservation and Attractions prior to works commencing.

3. The Construction Environmental Management Plan should in particular address the matters listed below:
   a. Appropriate communication and awareness raising for users of the river;
   b. The construction of the reefs will need to be undertaken at times which avoid impacts on fairy tern breeding, outside the seagrass growth period and on out-going neap tides to assist with the dispersion and reduce the amount of material settling in one place.
   c. Limestone substrate material should be regularly checked to ensure it is consistent with the required specification.
   d. Limestone substrate material will need to be screened to remove fines before placement. It is recommended that the physical movement/abrasion of limestone is reduced as much as possible. The limestone rocks should be dry when loaded on the barge and a rake bucket (or similar) used so that any fines drop out on the deck of the barge rather than sticking to the rock (if it were still wet). Any fine material left on the barge should be removed prior to the loading of new limestone substrate material.
   e. It is recommended that the limestone substrate is deposited for each site separately, and any turbidity to be dissipated prior to the construction of the next reef.
   f. Buoys should be placed at an agreed distance from the proposed reef sites to provide a visual marker that will be used to determine when mitigation measures to address plume spread will need to be implemented (distance and trigger criteria to be outlined in the CEMP). It is recommended that a drone be used to assist with monitoring for plumes relative to the buoy locations. Sediment traps should also be deployed in transects extending out from the reefs to record sediment deposition (intent being to learn from the approach). Sediment traps in control sites would provide a comparison.

4. The applicant shall ensure that no damage to the foreshore or waterway (including seagrass beds) occurs as a result of the approved works. If any inadvertent damage

occurs, the applicant is required to notify the Department of Biodiversity, Conservation and Attractions within 48 hours of the damage occurring and rectify the damage at its expense.

5. In the case of pollution events or spills, the Department of Biodiversity, Conservation and Attractions' Duty Officer (Riverpark) can be contacted on 9278 0981 (24 hrs) or Pollution Response Officer (Marine) on 9480 9924 (24 hrs).

6. The applicant is to liaise with the Department of Primary Industries and Regional Development concerning the requirements for translocation and biosecurity approvals for the blue mussel (*Mytilus galloprovincialis)* to the Swan River.

7. The Department of Transport Maritime Safety (DoT) requires:

    - A Temporary Notice to Mariners (TNTM) must be issued by DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement. The applicant or works contractor is to provide notification of the works to the DoT a minimum of 21 days prior to the works commencing to enable a TNTM to be published, by email to: navigational.safety@transport.wa.gov.au
    - Notification of any request for an extension of the works period must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au prior to expiry of the scheduled works period
    - Confirmation of completion of the works must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au once the works have been completed.
    - As installed coordinates and clearance heights must be provided to navigational.safety@transport.wa.gov.au for charting purposes.

FINAL REPORT ENDORSED

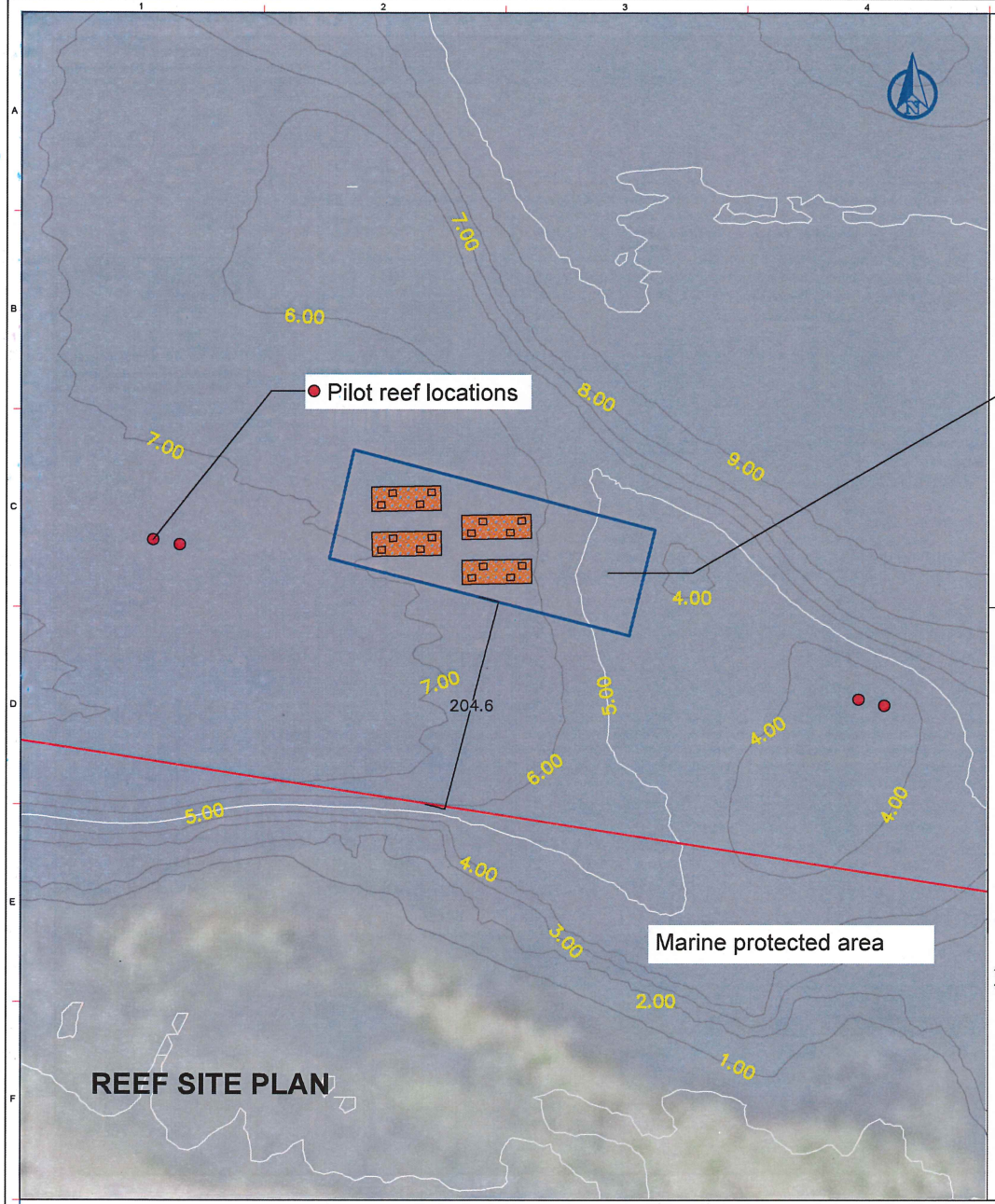
Signed: _____ Date: 17/12/

Mark Webb
Director General

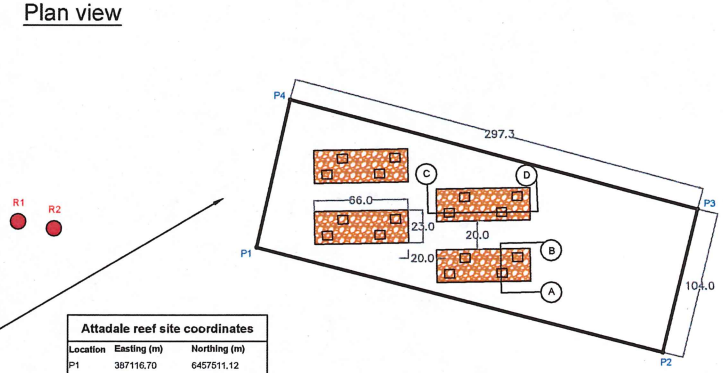
Blue mussel reef restoration site map for Swan-Canning Estuary, WA

The Nature Conservancy
Protecting nature. Preserving life.

Figure 1. Proposed build areas in relation to pilot reef locations and 7 of the 26 basket survival trial sites.



Plan view



Attadale reef site coordinates

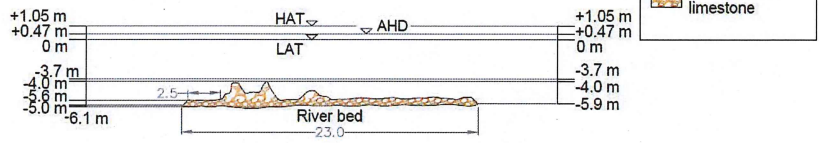
Location	Easting (m)	Northing (m)
P1	387116.70	6457511.12
P2	387403.13	6457437.40
P3	387427.45	6457538.47
P4	387140.11	6457614.92

Pilot reef site coordinates

Location	Easting (m)	Northing (m)
R1	386948.5	6457529.2
R2	386973.7	6457524.5
R3	387621.6	6457376.4
R4	387646.0	6457370.6

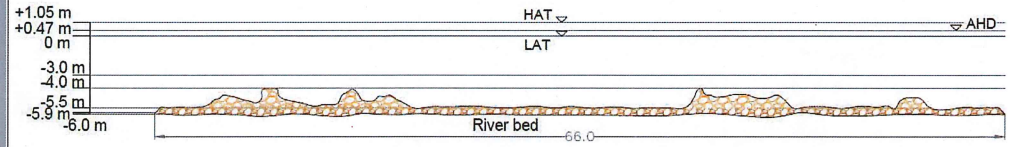
REEF ENLARGED PLAN

Section A-B



REEF UNIT CROSS SECTION

Section C-D



REEF UNIT CROSS SECTION

1:200

All dimensions are in 'm'

THE UNIVERSITY OF WESTERN AUSTRALIA

DATE: 14/10/2021

DRAWING No: ATDA1001

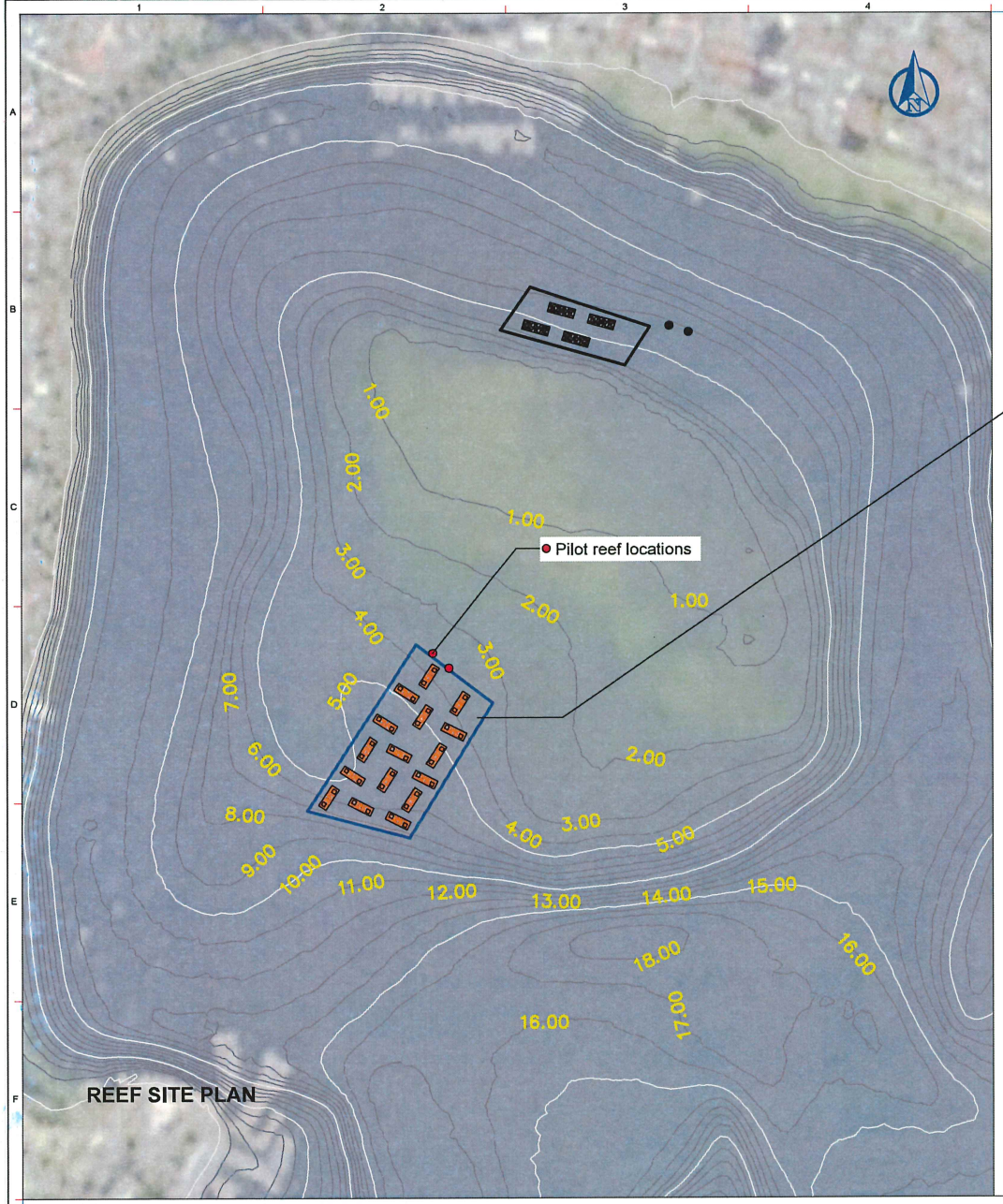
Rev:02

SWAN RIVER REEF CONSTRUCTION

The Nature Conservancy Australia

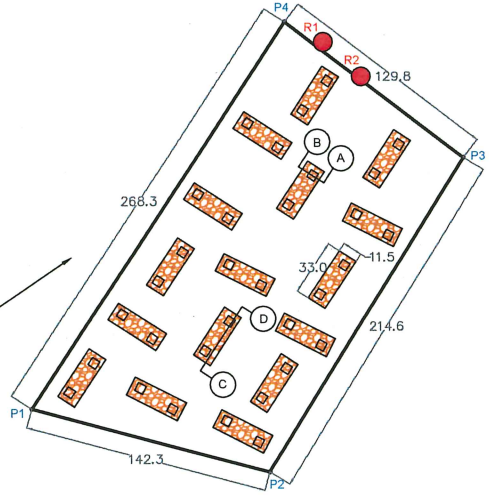
Attadale Reef site plan

Approved:



REEF SITE PLAN

Plan view



Limestone

Pilot reef sites (not to scale)

Freshwater Bay 1 reef site coordinates

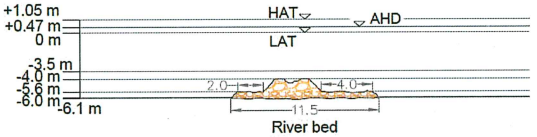
Location	Easting (m)	Northing (m)
P1	384388.5	6459135.1
P2	384526.0	6459098.4
P3	384638.2	6459281.4
P4	384534.9	6459360.0

Pilot reef site coordinates

Location	Easting (m)	Northing (m)
R1	384557.2	6459348.3
R2	384579.0	6459328.4

REEF ENLARGED PLAN

Section A-B

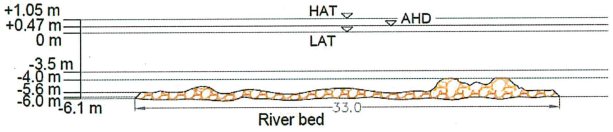


0.15 m to 1 m limestone

0.15 m to 0.3 m limestone

REEF UNIT CROSS SECTION

Section C-D



REEF UNIT CROSS SECTION

1:200

All dimensions are in 'm'

THE UNIVERSITY OF WESTERN AUSTRALIA

DATE: 14/10/2021

DRAWING No: FB1A1001

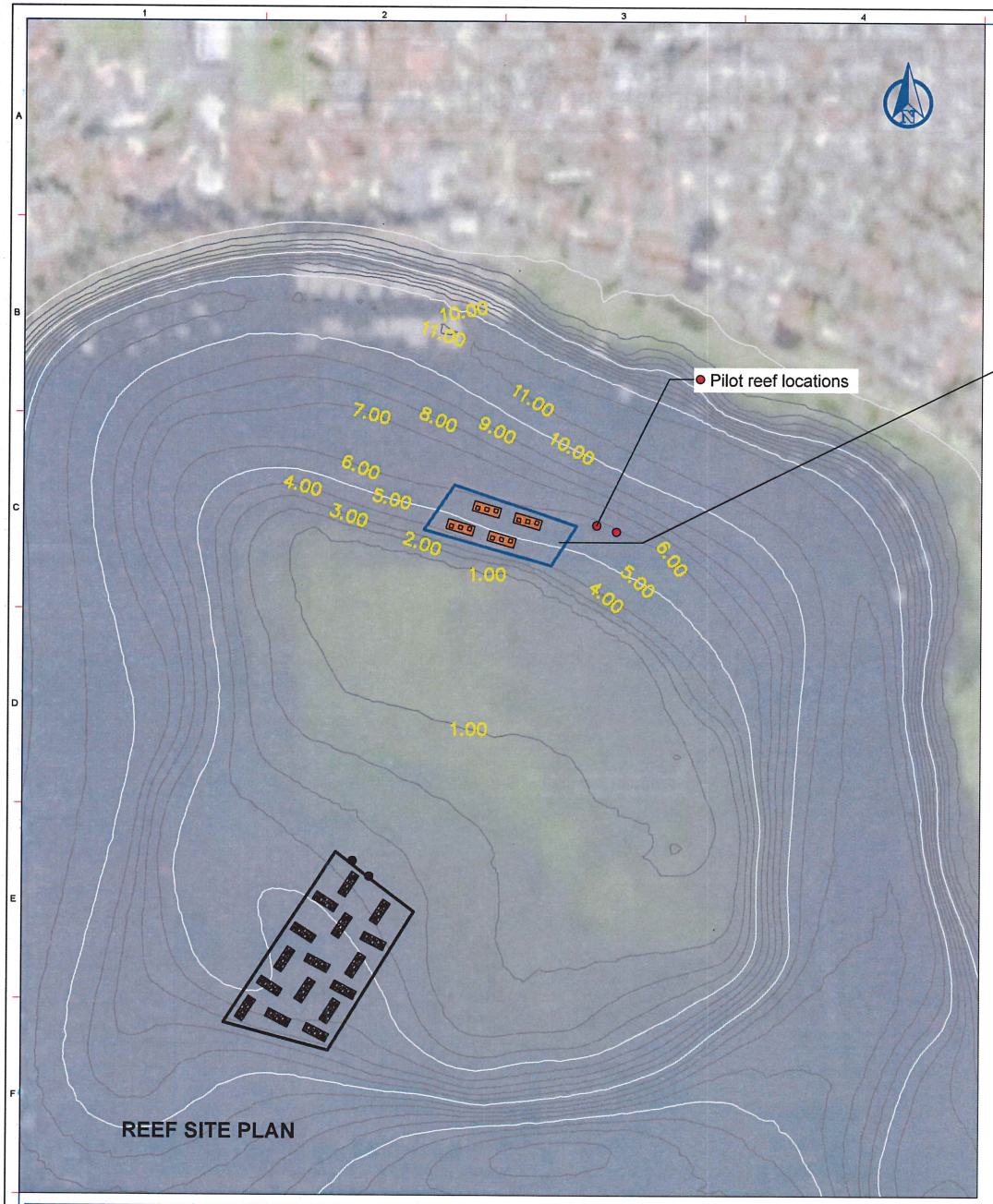
Rev: 02

SWAN RIVER REEF CONSTRUCTION

The Nature Conservancy Australia

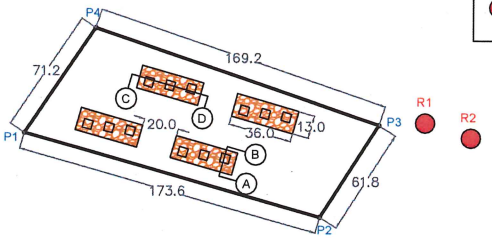
Freshwater Bay 1 Reef site plan

Approved:



REEF SITE PLAN

Plan view



Limestone

Pilot reef sites (not to scale)

Freshwater Bay 2 reef site coordinates

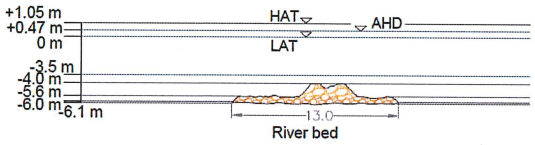
Location	Easting (m)	Northing (m)
P1	384649.1	6459785.0
P2	384816.1	6459737.8
P3	384849.5	6459789.8
P4	384689.2	6459843.8

Pilot reef site coordinates

Location	Easting (m)	Northing (m)
R1	384875.4	6459791.0
R2	384901.5	6459782.7

REEF ENLARGED PLAN

Section A-B

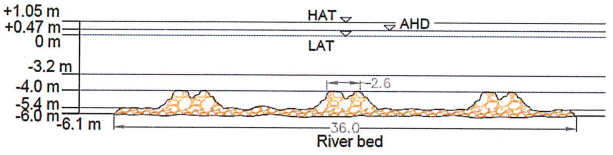


0.15 m to 1 m limestone

0.15 m to 0.3 m limestone

REEF UNIT CROSS SECTION

Section C-D



REEF UNIT CROSS SECTION

1:200

All dimensions are in 'm'

THE UNIVERSITY OF WESTERN AUSTRALIA

DATE:14/10/2021

DRAWING No:FB2A1001

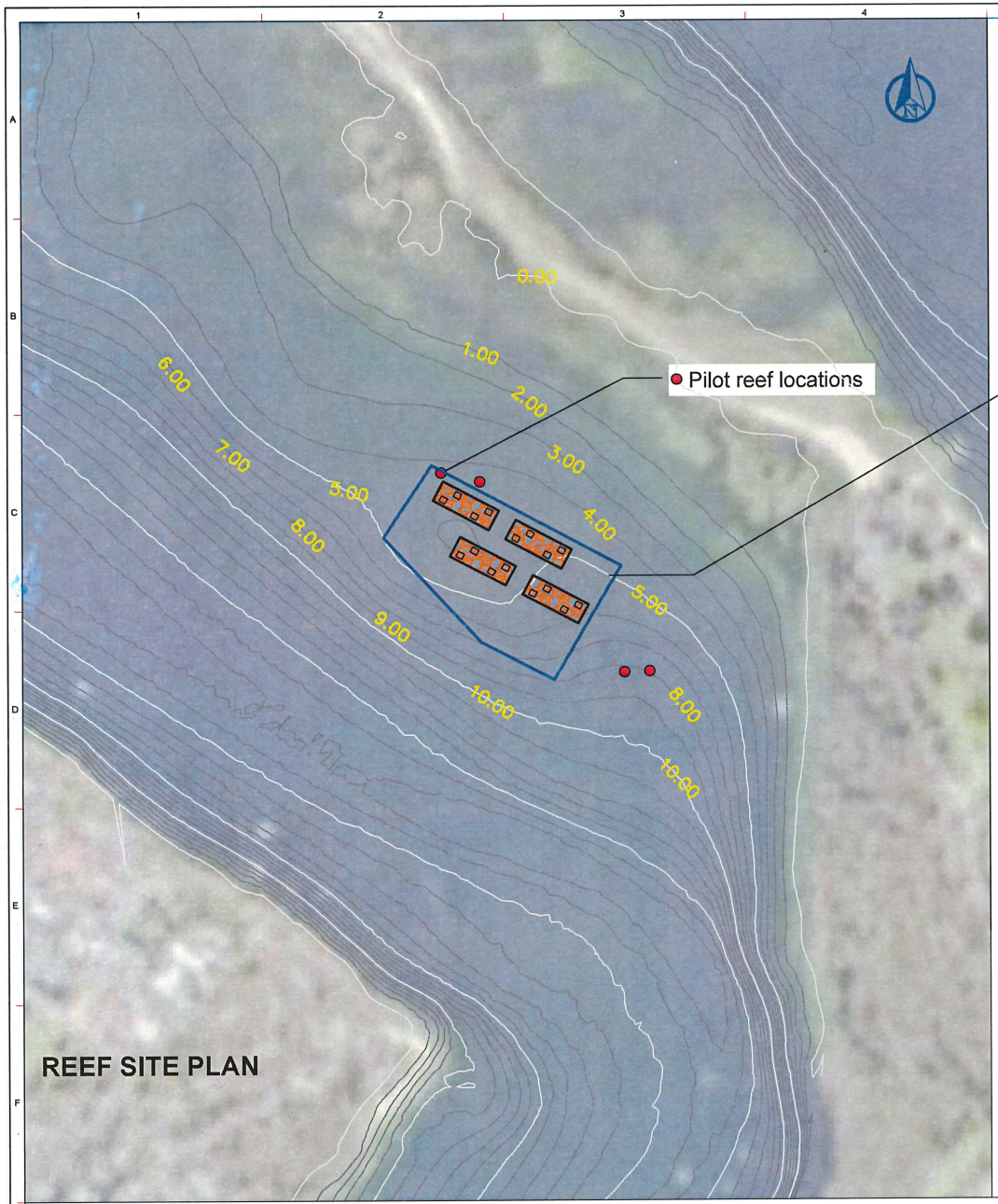
Rev: 02

SWAN RIVER REEF CONSTRUCTION

The Nature Conservancy Australia

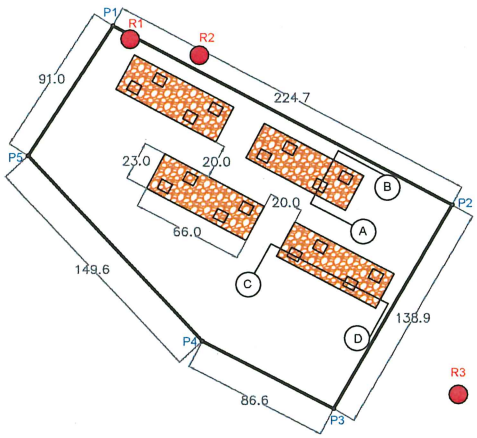
Freshwater Bay 2 Reef site plan

Approved:



REEF SITE PLAN

Plan view



Limestone

Pilot reef sites (not to scale)

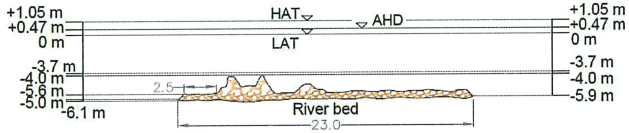
Point Walter reef site coordinates		
Location	Easting (m)	Northing (m)
P1	384941.7	6457689.0
P2	385139.8	6457583.0
P3	385069.8	6457463.0
P4	384993.0	6457503.0
P5	384891.6	6457613.0

R3 R4

Pilot reef site coordinates		
Location	Easting (m)	Northing (m)
R1	384951.55	6457681.05
R2	384992.07	6457671.67
R3	385142.93	6457470.97
R4	385169.12	6457471.69

REEF ENLARGED PLAN

Section A-B

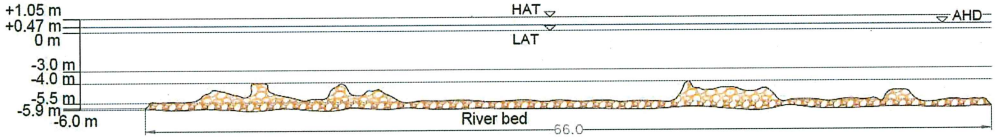


0.15 m to 1 m limestone

0.15 m to 0.3 m limestone

REEF UNIT CROSS SECTION

Section C-D



REEF UNIT CROSS SECTION

1:200

All dimensions are in 'm'

THE UNIVERSITY OF WESTERN AUSTRALIA

DATE: 14/10/2021

DRAWING No: PWA1001

Rev: 02

SWAN RIVER REEF CONSTRUCTION

The Nature Conservancy Australia

Point Walter Reef site plan

Approved:

Factors affecting the actual tide heights and times

The actual tide is affected by a number of factors including the barometric pressure, wind and unseasonal climate variations.

Differences between the predicted and the actual tide height and times are mainly caused by unusually high or low barometric pressure or by prolonged strong winds.

Meteorological Effects on Tides

Meteorological conditions which differ from the average will cause corresponding differences between the predicted and the actual tides. Variations from predicted heights are caused mainly by strong or prolonged winds, and by unusually high or low barometric pressure. Differences between predicted and actual times of high and low water are caused mainly by the wind.

Barometric pressure

Tidal predictions are computed for average barometric pressure. A difference of 10 hectopascals (hPa) from the average can cause a difference in sea level of about 0.1m. This depression of the water surface under high atmospheric pressure, and its elevation under low atmospheric pressure, is often described as the inverted barometer effect. The water level does not adjust itself immediately to a change of pressure and it responds moreover to the average change in pressure over a considerable area. The average barometric pressure and information, in some instances, concerning changes in level which can be expected under different conditions for certain places, is given in Sailing Directions. Changes in sea level due to barometric pressure seldom exceed 0.3m but their effect can be important as they are usually associated with those caused by wind set-up since winds are driven by the pressure gradient.

The effect of wind

The effect of wind stress on sea level and hence on tidal heights and times is very variable and depends largely on the topography of the area. In general, sea levels are raised in the direction of the wind, often called wind setup. A strong wind blowing onshore will pile up the water and cause high waters to be higher than predicted, while winds blowing off the land will have the reverse effect. In addition, winds blowing along a coast tend to set up long waves which travel along the coast, raising the sea level at the crest and lowering it in the trough.

Storm surges

The combination of wind setup and the inverted barometer effect associated with storms can create a pronounced increase in the sea level. This is often called a storm surge. An additional process in the form of a long surface wave travelling with the storm depression can further exaggerate this sea level increase. A negative surge is the opposite effect, generally associated with high pressure systems and offshore winds, and can create unusually shallow water. This effect is of great importance to very large vessels which may be navigating with small under-keel clearances.

Seasonal Changes in Mean Sea Level

Average seasonal sea level cycles are incorporated into the tide predictions. However, in extreme cases, such as during an El Nino or La Nina event, sea levels may differ by as much as 0.5m above or below and remain so for many months.

Source – Australian Bureau of Meteorology, http://www.bom.gov.au/australia/tides/about/index.shtml

AUSTRALIA, WEST COAST – PERTH (BARRACK STREET)

2022

LAT 31° 58' S LONG 115° 51' E

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

TIME ZONE –0800

JANUARY

	Time	m		Time	m		Time	m		Time	m
1 SA	0806	0.46	9 SU	0847	0.65	17 MO	0840	0.53	25 TU ◐	0818	0.65
	2153	1.20		2130	0.91		2239	1.15		1740	0.97
2 SU	0851	0.42	10 MO ◑	0815	0.63	18 TU ○	0904	0.53	26 WE	0736	0.63
	2239	1.21		1903	0.96		2313	1.14		1816	1.04
3 MO ●	0934	0.42	11 TU	0738	0.60	19 WE	0927	0.54	27 TH	0640	0.58
	2325	1.20		1912	1.01		2343	1.12		1905	1.10
4 TU	1014	0.44	12 WE	0720	0.58	20 TH	0943	0.55	28 FR	0648	0.52
				1934	1.06					2000	1.15
5 WE	0006	1.16	13 TH	0724	0.56	21 FR	0008	1.09	29 SA	0721	0.47
	1048	0.48		2006	1.10		0947	0.58		2055	1.19
6 TH	0037	1.09	14 FR	0735	0.55	22 SA	0028	1.04	30 SU	0800	0.45
	1115	0.54		2043	1.12		0933	0.61		2147	1.20
7 FR	0037	1.01	15 SA	0752	0.54	23 SU	0038	0.97	31 MO	0837	0.44
	1109	0.60		2122	1.14		0903	0.64		2237	1.20
	2352	0.95									
8 SA	1018	0.65	16 SU	0815	0.53	24 MO	0020	0.89			
	2249	0.91		2201	1.15		0839	0.65			
							1729	0.90			

FEBRUARY

	Time	m		Time	m		Time	m		Time	m
1 TU ●	0911	0.47	9 WE	0638	0.58	17 TH ○	0838	0.59	25 FR	0545	0.54
	2323	1.17		1728	1.04		2334	1.09		1815	1.12
2 WE	0937	0.51	10 TH	0638	0.57	18 FR	0834	0.63	26 SA	0616	0.51
				1822	1.06		1500	0.80		1940	1.15
							1629	0.79			
3 TH	0000	1.11	11 FR	0645	0.57	19 SA	0002	1.04	27 SU	0652	0.50
	0950	0.57		1922	1.09		0812	0.65		2048	1.17
							1445	0.83			
							1757	0.81			
4 FR	0023	1.03	12 SA	0658	0.56	20 SU	0026	0.96	28 MO	0726	0.51
	0937	0.62		2017	1.11		0746	0.67		2145	1.17
	2357	0.95					1447	0.89			
							1929	0.82			
5 SA	0856	0.66	13 SU	0718	0.55	21 MO	0029	0.88			
	1609	0.84		2107	1.13		0726	0.68			
	1802	0.84					1504	0.95			
	2309	0.89									
6 SU	0747	0.66	14 MO	0742	0.55	22 TU	0706	0.67			
	1612	0.90		2151	1.14		1530	1.01			
	1947	0.87									
	2131	0.87									
7 MO	0718	0.63	15 TU	0805	0.56	23 WE	0621	0.64			
	1623	0.95		2230	1.14		1608	1.06			
8 TU ◑	0655	0.61	16 WE	0826	0.57	24 TH ◐	0537	0.59			
	1648	1.00		2303	1.13		1700	1.09			

MARCH

	Time	m		Time	m		Time	m		Time	m
1 TU	0754	0.54	9 WE	0526	0.63	17 TH	0703	0.67	25 FR ◐	0358	0.58
	2235	1.15		1515	1.07		1315	0.85		1611	1.15
							1600	0.83			
							2257	1.08			
2 WE	0813	0.58	10 TH ◑	0523	0.62	18 FR ○	0652	0.70	26 SA	0443	0.56
	2319	1.10		1556	1.08		1300	0.88		1732	1.14
							1716	0.81			
							2337	1.02			
3 TH ●	0817	0.64	11 FR	0525	0.61	19 SA	0633	0.73	27 SU	0521	0.57
	1359	0.81		1656	1.08		1302	0.93		1922	1.13
	1612	0.80					1826	0.80			
	2354	1.03									
4 FR	0800	0.68	12 SA	0534	0.61	20 SU	0018	0.95	28 MO	0550	0.59
	1355	0.86		1824	1.08		0616	0.74		2040	1.12
	1741	0.81					1315	0.99			
							1955	0.79			
5 SA *	0010	0.94	13 SU	0553	0.60	21 MO	0103	0.86	29 TU	0611	0.63
	0717	0.71		1945	1.09		0600	0.75		2142	1.10
	1402	0.91					1335	1.05			
							2208	0.76			
6 SU	0633	0.71	14 MO	0616	0.61	22 TU	0155	0.77	30 WE	0620	0.68
	1411	0.96		2044	1.11		0536	0.73		1240	0.88
	2026	0.83					1401	1.10		1545	0.86
	2206	0.83								2234	1.06
7 MO	0608	0.68	15 TU	0638	0.62	23 WE	0148	0.69	31 TH	0615	0.73
	1424	1.01		2132	1.12		0308	0.69		1218	0.92
							0414	0.69		1702	0.84
							1434	1.13		2318	1.00
8 TU	0545	0.66	16 WE	0656	0.64	24 TH	0301	0.62			
	1445	1.05		2216	1.11		1515	1.15			

APRIL

	Time	m		Time	m		Time	m		Time	m
1 FR ●	0553	0.77	9 SA ◑	0340	0.67	17 SU ○	0000	0.95	25 MO	0408	0.67
	1223	0.97		1538	1.12		0437	0.83		1840	1.08
	1806	0.82					1157	1.12			
	2356	0.93					2000	0.77			
2 SA	0530	0.78	10 SU	0406	0.67	18 MO	0100	0.87	26 TU	0423	0.72
	1232	1.03		1653	1.10		0421	0.83		1238	0.97
	1919	0.81					1221	1.18		1345	0.97
							2130	0.73		2025	1.04
3 SU	0023	0.87	11 MO	0430	0.67	19 TU	0222	0.80	27 WE	0426	0.77
	0500	0.78		1841	1.09		0323	0.80		1114	0.99
	1244	1.07					1250	1.22		1620	0.92
	2100	0.80					2327	0.68		2141	1.00
4 MO	0020	0.81	12 TU	0448	0.69	20 WE	1324	1.24	28 TH	0415	0.81
	0443	0.76		2003	1.09					1055	1.05
	1259	1.11								1733	0.88
										2242	0.96
5 TU	0419	0.74	13 WE	0500	0.72	21 TH	0052	0.64	29 FR	0401	0.84
	1319	1.14		1226	0.94		1401	1.24		1100	1.10
				1444	0.93					1844	0.84
				2109	1.08					2332	0.92
6 WE	0349	0.71	14 TH	0503	0.75	22 FR	0200	0.62	30 SA	0340	0.85
	1344	1.15		1140	0.96		1445	1.22		1112	1.15
				1614	0.89					1951	0.82
				2208	1.05						
7 TH	0325	0.69	15 FR	0500	0.79	23 SA ◐	0256	0.61			
	1415	1.15		1130	1.00		1536	1.18			
				1722	0.85						
				2304	1.01						
8 FR	0320	0.68	16 SA	0451	0.82	24 SU	0339	0.63			
	1450	1.14		1139	1.06		1646	1.13			
				1834	0.81						

Datum of Predictions is Chart Datum

* Extra Tides

Moon Phase Symbols ● New Moon ◑ First Quarter ○ Full Moon ◐ Last Quarter

AUSTRALIA, WEST COAST – PERTH (BARRACK STREET)

LAT 31° 58' S LONG 115° 51' E

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

2022

TIME ZONE –0800

MAY

	Time	m		Time	m		Time	m		Time	m
1 SU ●	0019	0.87	9 MO ◑	0247	0.73	17 TU	1145	1.32	25 WE	0246	0.85
	0315	0.85		1532	1.14		2218	0.67		1011	1.07
	1127	1.19									
	2055	0.79									
2 MO	0108	0.84	10 TU	0308	0.76	18 WE	1223	1.33	26 TH	0212	0.88
	0302	0.83		1700	1.09		2324	0.64		0936	1.12
	1145	1.22								1907	0.89
	2153	0.77								2212	0.91
3 TU	1209	1.24	11 WE	0317	0.79	19 TH	1304	1.33	27 FR	0137	0.89
	2246	0.76		1130	1.03					0942	1.18
				1426	1.01					1935	0.84
				1854	1.05						
4 WE	1236	1.25	12 TH	0316	0.82	20 FR	0027	0.64	28 SA	0956	1.23
	2342	0.74		1017	1.05		1345	1.29		2011	0.81
				1604	0.95						
				2049	1.01						
5 TH	1305	1.24	13 FR	0312	0.86	21 SA	0123	0.65	29 SU	1014	1.26
				1008	1.11		1424	1.24		2045	0.79
				1715	0.89						
				2222	0.98						
6 FR	0040	0.73	14 SA	0302	0.89	22 SU	0210	0.68	30 MO ●	1038	1.29
	1336	1.23		1019	1.17		1457	1.18		2117	0.77
				1832	0.82						
				2339	0.93						
7 SA	0132	0.72	15 SU	0248	0.90	23 MO ◐	0243	0.74	31 TU	1107	1.30
	1407	1.20		1041	1.23		1451	1.10		2147	0.76
				1951	0.77						
8 SU	0215	0.72	16 MO ○	1110	1.28	24 TU	0257	0.79			
	1443	1.17		2106	0.71		1144	1.05			

JUNE

	Time	m		Time	m		Time	m		Time	m
1 WE	1139	1.30	9 TH	0053	0.87	17 FR	1256	1.33	25 SA	0838	1.22
	2216	0.75		0902	1.08					1954	0.78
2 TH	1212	1.29	10 FR	0045	0.90	18 SA	0001	0.66	26 SU	0903	1.26
	2250	0.75		0845	1.14		1335	1.27		2015	0.76
				1720	0.91						
				2124	0.92						
3 FR	1243	1.28	11 SA	0018	0.92	19 SU	0046	0.70	27 MO	0935	1.28
	2330	0.75		0900	1.21		1358	1.19		2040	0.75
				1830	0.83						
4 SA	1311	1.26	12 SU	0926	1.27	20 MO	0120	0.77	28 TU	1011	1.29
				1936	0.76		1306	1.11		2106	0.75
5 SU	0015	0.76	13 MO	1000	1.32	21 TU ◐	0130	0.83	29 WE ●	1048	1.30
	1337	1.23		2035	0.70		1154	1.06		2131	0.74
							2342	0.88			
6 MO	0056	0.77	14 TU ○	1041	1.36	22 WE	0950	1.07	30 TH	1124	1.29
	1402	1.19		2130	0.65		2123	0.87		2158	0.74
7 TU ◑	0118	0.80	15 WE	1125	1.37	23 TH	0815	1.12			
	1428	1.13		2222	0.63		1945	0.83			
8 WE	0112	0.84	16 TH	1212	1.37	24 FR	0821	1.18			
	1409	1.07		2313	0.63		1938	0.80			

JULY

	Time	m		Time	m		Time	m		Time	m
1 FR	1157	1.28	9 SA	0729	1.16	17 SU	1320	1.16	25 MO	0829	1.20
	2224	0.74		1845	0.80		2343	0.76		1950	0.71
2 SA	1226	1.26	10 SU	0805	1.23	18 MO	1256	1.07	26 TU	0915	1.22
	2247	0.75		1908	0.73		2245	0.82		2014	0.70
3 SU	1250	1.23	11 MO	0850	1.28	19 TU	1143	1.01	27 WE	0958	1.23
	2303	0.77		1953	0.67		2041	0.84		2038	0.70
4 MO	1312	1.18	12 TU	0939	1.32	20 WE ◐	0618	0.99	28 TH	1039	1.23
	2300	0.80		2040	0.62		0739	0.99		2102	0.70
							0953	1.00			
							1953	0.80			
5 TU	1330	1.12	13 WE	1029	1.34	21 TH	0611	1.05	29 FR ●	1115	1.22
	2228	0.83		2125	0.61		1913	0.76		2124	0.71
6 WE	1330	1.05	14 TH ○	1119	1.34	22 FR	0630	1.10	30 SA	1145	1.20
	2151	0.85		2208	0.61		1901	0.73		2139	0.72
7 TH ◑	0723	1.03	15 FR	1207	1.31	23 SA	0703	1.15	31 SU	1211	1.17
	2130	0.86		2248	0.64		1913	0.72		2142	0.75
8 FR	0706	1.09	16 SA	1250	1.25	24 SU	0745	1.18			
	2041	0.85		2323	0.70		1930	0.71			

AUGUST

	Time	m		Time	m		Time	m		Time	m
1 MO	1234	1.12	9 TU	0833	1.22	17 WE	0258	0.94	25 TH	0948	1.12
	2119	0.77		1938	0.59		0749	0.87		1945	0.66
							0944	0.88			
							1832	0.74			
2 TU	0354	0.87	10 WE	0932	1.25	18 TH	0316	0.99	26 FR	1030	1.12
	0513	0.87		2020	0.58		1759	0.70		2005	0.68
	1256	1.06									
	2038	0.79									
3 WE	0334	0.91	11 TH	1027	1.25	19 FR ◐	0347	1.03	27 SA ●	0136	0.79
	0655	0.90		2058	0.59		1754	0.67		0256	0.78
	1307	0.98								1104	1.11
	2015	0.79								2015	0.70
4 TH	0352	0.97	12 FR ○	1117	1.23	20 SA	0433	1.05	28 SU	0122	0.80
	1118	0.91		2130	0.63		1805	0.65		0402	0.78
	1225	0.91								1136	1.08
	1957	0.79								2006	0.73
5 FR ◑	0427	1.03	13 SA	1204	1.18	21 SU	0538	1.07	29 MO	0116	0.82
	1916	0.77		2151	0.68		1820	0.65		0502	0.77
										1206	1.03
										1930	0.75
6 SA	0515	1.08	14 SU	1244	1.09	22 MO	0657	1.08	30 TU	0118	0.86
	1812	0.72		2144	0.74		1837	0.65		0603	0.77
										1237	0.96
										1903	0.75
7 SU	0616	1.13	15 MO	0238	0.83	23 TU	0806	1.09	31 WE	0130	0.91
	1817	0.67		0500	0.81		1859	0.65		0714	0.78
				1303	0.99					1311	0.88
				2045	0.79					1848	0.75
8 MO	0728	1.18	16 TU	0246	0.89	24 WE	0901	1.11			
	1856	0.62		0623	0.85		1922	0.66			
				1141	0.91						
				1914	0.78						

Datum of Predictions is Chart Datum

Moon Phase Symbols ● New Moon ◑ First Quarter ○ Full Moon ◐ Last Quarter

AUSTRALIA, WEST COAST – PERTH (BARRACK STREET)

2022

LAT 31° 58' S LONG 115° 51' E

TIMES AND HEIGHTS OF HIGH AND LOW WATERS

TIME ZONE –0800

SEPTEMBER

	Time	m		Time	m		Time	m		Time	m
1 TH	0152	0.96	9 FR	1029	1.11	17 SA	0219	1.02	25 SU	0428	0.73
	0928	0.78		1949	0.63		1626	0.61		1101	0.97
	1338	0.80								1759	0.72
	1828	0.74								2348	0.85
2 FR	0222	1.00	10 SA ○	0059	0.75	18 SU ◐	0300	1.01	26 MO ●	0521	0.71
	1726	0.71		0315	0.74		1635	0.61		1144	0.92
				1120	1.06					1742	0.73
				1955	0.68					2356	0.90
3 SA	0302	1.04	11 SU	0042	0.79	19 MO	0401	0.99	27 TU	0618	0.69
	1606	0.65		0448	0.73		1652	0.61		1229	0.86
				1206	0.99					1725	0.74
				1930	0.74						
4 SU ◑	0359	1.06	12 MO	0050	0.85	20 TU	0548	0.98	28 WE	0010	0.95
	1645	0.60		0554	0.73		1715	0.61		0730	0.67
				1245	0.90					1320	0.80
				1833	0.76					1713	0.73
5 MO	0518	1.08	13 TU	0100	0.90	21 WE	0733	0.98	29 TH	0031	1.00
	1732	0.56		0657	0.74		1739	0.62		0913	0.65
				1312	0.81					1428	0.72
				1741	0.74					1639	0.71
6 TU	0706	1.09	14 WE	0112	0.95	22 TH	0842	1.00	30 FR	0059	1.03
	1815	0.55		0904	0.74		1800	0.64		1110	0.62
				1053	0.75						
				1704	0.71						
7 WE	0828	1.11	15 TH	0127	0.99	23 FR	0035	0.79			
	1854	0.56		1625	0.66		0202	0.79			
							0933	1.00			
							1814	0.66			
8 TH	0931	1.12	16 FR	0148	1.02	24 SA *	1019	0.99			
	1927	0.58		1618	0.63		1814	0.69			
							2348	0.82			

OCTOBER

	Time	m		Time	m		Time	m		Time	m
1 SA	0131	1.05	9 SU	0508	0.69	17 MO	0155	1.00	25 TU ●	0628	0.63
	1332	0.57		1132	0.88		1446	0.58		1218	0.79
				1709	0.73					1538	0.75
				2328	0.91					2301	1.02
2 SU	0213	1.05	10 MO ○	0613	0.66	18 TU ◐	0231	0.97	26 WE	0740	0.59
	1444	0.54		1222	0.82		1519	0.59		1333	0.74
				1639	0.74					1512	0.74
				2339	0.96					2326	1.06
3 MO ◑	0311	1.04	11 TU	0730	0.65	19 WE	0331	0.93	27 TH	0854	0.55
	1544	0.52		1312	0.75		1545	0.60		2355	1.09
				1554	0.73						
				2352	1.00						
4 TU	0435	1.01	12 WE	0853	0.63	20 TH	0601	0.90	28 FR	1013	0.52
	1630	0.53		1416	0.69		1603	0.63			
				1508	0.69		2339	0.84			
5 WE	0646	0.99	13 TH	0008	1.03	21 FR	0233	0.82	29 SA	0029	1.10
	1705	0.55		1043	0.62		0756	0.88		1141	0.50
							1613	0.66			
							2251	0.84			
6 TH	0823	0.98	14 FR	0029	1.05	22 SA	0339	0.77	30 SU	0105	1.09
	1729	0.59		1230	0.60		0915	0.88		1258	0.49
							1614	0.69			
							2232	0.87			
7 FR *	0935	0.97	15 SA	0055	1.04	23 SU	0430	0.72	31 MO	0145	1.06
	1739	0.64		1325	0.59		1020	0.86		1400	0.49
	2323	0.80					1607	0.72			
							2234	0.92			
8 SA	0402	0.72	16 SU	0123	1.03	24 MO	0525	0.67			
	1037	0.93		1409	0.59		1119	0.83			
	1732	0.69					1553	0.74			
	2318	0.85					2245	0.97			

NOVEMBER

	Time	m		Time	m		Time	m		Time	m
1 TU ◑	0234	1.01	9 WE	0845	0.57	17 TH	0135	0.93	25 FR	0937	0.46
	1450	0.52		2302	1.09		1404	0.63		2338	1.16
							2324	0.89			
2 WE	0345	0.95	10 TH	0931	0.56	18 FR	1406	0.67	26 SA	1034	0.44
	1524	0.56		2328	1.10		2201	0.89			
3 TH	0545	0.89	11 FR	1009	0.55	19 SA	1352	0.70	27 SU	0018	1.15
	1543	0.61		2355	1.09		2124	0.92		1131	0.45
	2302	0.84									
4 FR	0338	0.80	12 SA	1043	0.55	20 SU	0449	0.73	28 MO	0058	1.11
	0816	0.84					0913	0.76		1227	0.47
	1545	0.67					1339	0.73			
	2212	0.87					2122	0.98			
5 SA	0441	0.72	13 SU	0023	1.07	21 MO	0532	0.66	29 TU	0130	1.06
	0955	0.80		1120	0.56		1121	0.75		1315	0.52
	1527	0.71					1317	0.75			
	2205	0.93					2135	1.03			
6 SU	0543	0.66	14 MO	0050	1.05	22 TU	0631	0.60	30 WE ◑	0134	0.98
	1113	0.77		1207	0.57		2157	1.09		1350	0.57
	1501	0.74									
	2215	0.99									
7 MO	0647	0.62	15 TU	0114	1.01	23 WE	0736	0.55			
	1235	0.74		1300	0.58		2225	1.13			
	1353	0.74									
	2227	1.03									
8 TU ○	0750	0.59	16 WE ◐	0131	0.97	24 TH ●	0838	0.50			
	2243	1.07		1341	0.60		2259	1.16			

DECEMBER

	Time	m		Time	m		Time	m		Time	m
1 TH	0042	0.91	9 FR	0928	0.53	17 SA	1001	0.67	25 SU	1029	0.42
	1401	0.64		2308	1.13		2015	0.94			
	2227	0.89									
2 FR	1254	0.69	10 SA	0952	0.53	18 SU	0936	0.68	26 MO	0019	1.17
	2111	0.92		2340	1.12		2006	1.00		1109	0.46
3 SA	0721	0.70	11 SU	1015	0.53	19 MO	0718	0.66	27 TU	0056	1.10
	2055	0.98					2021	1.06		1145	0.51
4 SU	0659	0.63	12 MO	0007	1.09	20 TU	0646	0.59	28 WE	0108	1.02
	2103	1.04		1039	0.54		2048	1.12		1201	0.58
5 MO	0723	0.58	13 TU	0030	1.06	21 WE	0725	0.53	29 TH	0011	0.94
	2119	1.09		1103	0.56		2124	1.17		1106	0.65
										2215	0.90
6 TU	0757	0.55	14 WE	0045	1.02	22 TH	0813	0.47	30 FR ◑	0916	0.67
	2140	1.12		1119	0.59		2205	1.20		2005	0.92
7 WE	0830	0.53	15 TH	0052	0.98	23 FR ●	0900	0.43	31 SA	0819	0.64
	2205	1.14		1114	0.63		2250	1.21		1934	0.99
8 TH ○	0900	0.53	16 FR ◐	0021	0.93	24 SA	0945	0.42			
	2236	1.14		1033	0.65		2336	1.20			
				2153	0.90						

Datum of Predictions is Chart Datum

* Extra Tides

Moon Phase Symbols ● New Moon ◑ First Quarter ○ Full Moon ◐ Last Quarter

ATTACHMENT 5A

From:	Eugene Lee
To:	Rivers Planning
Cc:	Ahmed Yassin
Subject:	RE: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited
Date:	Tuesday, 26 October 2021 1:30:47 PM
Attachments:	image002.jpg image003.png

[External Email] This email was sent from outside the department – be cautious, particularly with links and attachments.
To: Department of Biodiversity, Conservation and Attractions

After careful consideration and review of the proposed "Blue Mussel Reef Construction"- the following comments:-

1. The Town will occasionally get complaints about the washed up seagrass (decomposing odours) on Claremont Foreshore between Jetty Road and Chester Road and we trust the proposed development will not be causing further damage to the seagrass or causing more of it to be washed up on the foreshore.
2. The Town notes the construction works will be undertaken during the permitted hours of 7am to 5pm Monday to Friday which is consistent with the *Environmental Protection (Noise) Regulations 1997.* However, can you please confirm who the Town is to contact should there be any complaints or concerns raised about the project – will this be the Department – Riverpark Manager or Construction Manager for the project? What is the best number or email to use?
3. It is noted that Dust, Spillage Controls and Waste Disposal have been considered for the project so these impacts will be controlled and mitigated by enlarge.
4. Similarly is it possible to ensure that the Town is provided with any copies of communications to the public about this project so that we can ensure our Communication Team & Executive Managers are kept updated on the project matters.

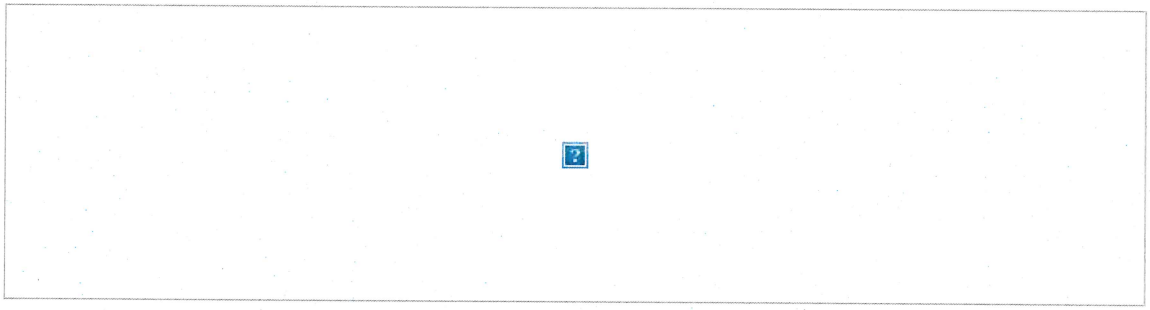
We hope the project goes well and will be keen to track its progress and the final assessment results on the success of the shell fish reef.

Thanks & Regards,

Eugene Lee
Manager Environmental Health
Town of Claremont

308 Stirling Highway, Claremont, WA 6010
PO Box 54, Claremont, WA, 6910
ph +61 8 9285 4300

www.claremont.wa.gov.au



City of Melville

26 October 2021
Enquiries: Michael Flanagan– 08 9364 0234
Our Ref: DA-2021-1183

Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
17 Dick Perry Avenue
Kensington WA 6151

Dear Sir/Madam

MRS Referral – Blue Mussel Reef Restoration (DBCA Ref: 2021/2616)

I refer to the abovementioned application received by the City of Melville on 26 October 2021.

The City has no objection to the proposed works and supports the application unconditionally.

If you require any further information or clarification regarding this matter, please do not hesitate to contact Michael Flanagan, on 08 9364 0234 or by email michael.flanagan@melville.wa.gov.au.

Yours sincerely

Ben Ashwood
Senior Planning Officer

Enc

From: Rivers Planning <rivers.planning@dbca.wa.gov.au>
Sent: Thursday, 21 October 2021 3:57 PM
To: Town of Claremont <toc@claremont.wa.gov.au>
Cc: John Riley <john.riley@dbca.wa.gov.au>
Subject: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited

Good afternoon,

PART 5 – SWAN RIVER – POINT WALTER, FRESHWATER BAY AND ATTADALE – BLUE MUSSEL REEF CONSTRUCTION PROJECT – THE NATURE CONSERVANCY LIMITED

The Department of Biodiversity, Conservation and Attractions (DBCA) has received an application for the above mentioned development. The application can also be downloaded from our website here https://www.dbca.wa.gov.au/node/473. You are invited to provide comments and recommendations considered relevant to this proposal.

Prior to the report being prepared, the application has been referred to relevant local government agencies for comments and advice. Accordingly, if you wish to, please provide a response to this office within **42 days** of receipt of this email.

In preparing your response, please be aware that it may be made available for viewing by the public, unless otherwise requested.

Please forward your response via email to rivers.planning@dbca.wa.gov.au. Should there be any queries regarding this matter, please contact John Riley, Environmental Officer, on 9278 0900. In all correspondence please quote the reference number 2021/2616.

Yours sincerely

Carolyn Pearce
Administration Officer
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
Phone: 08 9278 0921
17 Dick Perry Avenue, Kensington WA 6151
Email: carolyn.pearce@dbca.wa.gov.au Web: www.dbca.wa.gov.au

We acknowledge the Whadjuk people as the Traditional Owners of this land

ATTACHMENT 5C

From:	Davies, Kathryn
To:	Rivers Planning; Navigational Safety
Cc:	John Riley; Briant, Mark
Subject:	RE: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited
Date:	Wednesday, 24 November 2021 4:54:50 PM
Attachments:	image003.png image001.png Referral for Comment - Part 5 - 20212616 - Blue mussel reef construction project - Swan River - Point Walter Freshwater Bay and Attadale - The Nature Conservancy Limited.msg

[External Email] This email was sent from outside the department – be cautious, particularly with links and attachments.

Good afternoon

Re: Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited

Thank you for your email below dated 21 October 2021 requesting comment from the Department of Transport (DoT) in relation to the above mentioned proposal. DoT Navigational Safety has considered this proposal as outlined in the attached permit application from a navigational perspective and has no objection provided that:

- Current issues are resolved with Sailing Australia in relation to minimum clearance heights at some locations
- A minimum clearance height of 3m is achieved between the highest part of the structure (including predation netting) and the water surface at Lowest Astronomical Tide (LAT)
- A Temporary Notice to Mariners (TNTM) must be issued by the DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement. The applicant or works contractor is to provide notification of the works to the DoT a minimum of 21 days prior to the works commencing to enable a TNTM to be published, by email to: navigational.safety@transport.wa.gov.au
- Notification of any request for an extension of the works period must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au prior to expiry of the scheduled works period
- Confirmation of completion of the works must be made by the applicant or works contractor by email to: navigational.safety@transport.wa.gov.au once the works have been completed.
- As installed coordinates and clearance heights must be provided to navigational.safety@transport.wa.gov.au for charting purposes.

Please be advised that DoT hold some low-level concerns with potential future activities the reefs may introduce that conflict with existing use such as fishing, noting all areas are outside of main navigational routes and may be addressed by future Aquatic Use Review should any conflicts arise.

Please don't hesitate to contact me on the number below if you have any questions

Kathryn Davies
Team Leader Navigational Safety | Maritime | Department of Transport
Level 4, 5 Newman Court, Fremantle WA 6160
Tel: (08) 0436 664 789 | Mob: 0436 664 789
Email: Kathryn.Davies@transport.wa.gov.au | Web: www.transport.wa.gov.au

From: Rivers Planning <rivers.planning@dbca.wa.gov.au>
Sent: Thursday, 21 October 2021 3:43 PM
To: Navigational Safety <Navigational.Safety@transport.wa.gov.au>; Marine Safety <Marine.Safety@transport.wa.gov.au>
Cc: John Riley <john.riley@dbca.wa.gov.au>
Subject: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited

Good afternoon,

PART 5 – SWAN RIVER – POINT WALTER, FRESHWATER BAY AND ATTADALE – BLUE MUSSEL REEF CONSTRUCTION PROJECT – THE NATURE CONSERVANCY LIMITED

The Department of Biodiversity, Conservation and Attractions (DBCA) has received an application for the above mentioned development. The application can also be downloaded from our website here https://www.dbca.wa.gov.au/node/473. Your department is invited to provide comments and recommendations considered relevant to this proposal.

Prior to the report being prepared, the application has been referred to relevant agencies for comments and advice. Accordingly, please provide a response to this office within **42 days** of receipt of this email. Should you not be able to respond within this time, please notify the department as soon as possible, outlining the reasons for the delay and a date when a response may be available.

In preparing your response, please be aware that it may be made available for viewing by the public, unless otherwise requested.

Please forward your response via email to rivers.planning@dbca.wa.gov.au. Should there be any queries regarding this matter, please contact John Riley, Environmental Officer, on 9278 0900. In all correspondence please quote the reference number 2021/2616.

Yours sincerely

Carolyn Pearce
Administration Officer
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
Phone: 08 9278 0921
17 Dick Perry Avenue, Kensington WA 6151
Email: carolyn.pearce@dbca.wa.gov.au Web: www.dbca.wa.gov.au

We acknowledge the Whadjuk people as the Traditional Owners of this land

ATTACHMENT 5D

From: Claire Wellington
To: Rivers Planning; Aquatic Biosecurity; John Riley
Subject: RE: [EXT] - FW: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited
Date: Friday, 3 December 2021 2:46:15 PM
Attachments: image001.png

[External Email] This email was sent from outside the department – be cautious, particularly with links and attachments.

Hi Carolyn,

Below are some general comments and recommendations from Aquatic Pest Biosecurity in response to this project application:

There have been recent detections of invasive marine pest (IMP) species in Cockburn Sound and at HMAS Stirling, Garden Island. Consequently, there may be more rigorous requirements regarding aquatic pest biosecurity for translocation of mussels from these areas. Details of where mussels will be sourced from within Cockburn Sound – lat/long coordinate or mussel farm location should be specified when proponents are applying for exemption and translocation permits from DPIRD.

I couldn't access the original Scientific Report completed by Murdoch, but the applicants should be aware of existing marine pest species in the Swan-Canning estuary such as *Didemnum perlucidum* and *Arcuatula senhousia.* Aquatic biosecurity measures should be outlined and undertaken to prevent further spread of these species and other potential marine pest species by addressing aquatic biosecurity measures for vessels & equipment; maintain good vessel hygiene and decontaminate diving and sampling equipment used in water when moving to locations inside and outside of Swan-Canning estuary. When the Temporary Predator Exclusion Structures are removed, they should be disposed of on land or decontaminated and dried to prevent translocation of potential marine pest species.

Thanks for the opportunity to comment.

Kind regards,

Claire Wellington | Research Scientist
Aquatic Pest Biosecurity
Biosecurity Directorate, Sustainability And Biosecurity
Department of Primary Industries and Regional Development
w dpird.wa.gov.au

For general aquatic pest biosecurity enquiries, please email: aquatic.biosecurity@dpird.wa.gov.au
For vessel management enquiries, please email: vessel.management@dpird.wa.gov.au
https://www.vessel-check.com

From: Rivers Planning <rivers.planning@dbca.wa.gov.au>
Sent: Monday, 29 November 2021 11:19 AM
To: Aquatic Biosecurity <Aquatic.Biosecurity@dpird.wa.gov.au>
Subject: [EXT] - FW: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited

Good morning

Can you please advise if your department will be providing any comments or recommendations by the 3rd December.

Kind Regards

Carolyn Pearce
Administration Officer
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
Phone: 08 9278 0921
17 Dick Perry Avenue, Kensington WA 6151
Email: carolyn.pearce@dbca.wa.gov.au Web: www.dbca.wa.gov.au

We acknowledge the Whadjuk people as the Traditional Owners of this land

Department of Biodiversity, Conservation and Attractions
GOVERNMENT OF WESTERN AUSTRALIA
PARKS AND WILDLIFE SERVICE
We're working for Western Australia.

From: Rivers Planning
Sent: Thursday, 21 October 2021 3:54 PM
To: aquatic.biosecurity@dpird.wa.gov.au
Cc: John Riley <john.riley@dbca.wa.gov.au>
Subject: Referral for Comment - Part 5 - 2021/2616 - Blue mussel reef construction project - Swan River - Point Walter, Freshwater Bay and Attadale - The Nature Conservancy Limited

Good afternoon,

PART 5 – SWAN RIVER – POINT WALTER, FRESHWATER BAY AND ATTADALE – BLUE MUSSEL REEF CONSTRUCTION PROJECT – THE NATURE CONSERVANCY LIMITED

The Department of Biodiversity, Conservation and Attractions (DBCA) has received an application for the above mentioned development. The application can also be downloaded from our website here https://www.dbca.wa.gov.au/node/473. Your department is invited to provide comments and recommendations considered relevant to this proposal.

Prior to the report being prepared, the application has been referred to relevant agencies for comments and advice. Accordingly, please provide a response to this office within **42 days** of receipt of this email. Should you not be able to respond within this time, please notify the department as soon as possible, outlining the reasons for the delay and a date when a response may be available.

In preparing your response, please be aware that it may be made available for viewing by the public, unless otherwise requested.

Please forward your response via email to rivers.planning@dbca.wa.gov.au. Should there be any queries regarding this matter, please contact John Riley, Environmental Officer, on 9278 0900. In all correspondence please quote the reference number 2021/2616.

Yours sincerely

Carolyn Pearce

Administration Officer
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
Phone: 08 9278 0921
17 Dick Perry Avenue, Kensington WA 6151
Email: carolyn.pearce@dbca.wa.gov.au Web: www.dbca.wa.gov.au

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Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

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Dept of Primary Industries and Regional Development

DPIRD acknowledges the Traditional Owners of Country, the Aboriginal people of the many lands that we work on and their language groups throughout Western Australia and recognise their continuing connection to the land and waters.

We respect their continuing culture and the contribution they make to the life of our regions and we pay our respects to their Elders past, present and emerging.

Artwork: "Kangaroos going to the Waterhole" by Willarra Barker.

Western Australia's COVID-safe principles: Practise physical distancing where possible. Wash hands regularly. Stay home if unwell. Get tested if symptomatic. Download the COVIDSafe app.

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Planning, Lands and Heritage**

Your ref: 2021/2616
Our ref: PLH00014-2021
Enquiries: Melissa Davis (08) 6552 4080

Ms Carolyn Pearce
Rivers and Estuaries Branch
Department of Biodiversity, Conservation & Attractions

Via Email: rivers.planning@dbca.wa.gov.au

Dear Ms Pearce

REFERRAL FOR COMMENT – PART 5 – SWAN RIVER – BLUE MUSSEL REEF CONSTRUCTION PROJECT

Thank you for your email of 21 October 2021 seeking comments from the Department of Planning, Lands and Heritage (DPLH), Aboriginal Heritage Operations, regarding The Nature Conservancy Limited's proposed *Swan-Canning Shellfish Reef Restoration Project* (July 2019-June 2023).

We note the artificial reefs proposed are permanent and will be constructed offsite and lowered into the Swan-Canning Estuary. The reefs will be located at four locations ranging in water depths from 3.3 – 8 metres in Attadale, Freshwater Bay (2 sites) and Point Walter, and will improve the overall ecological health of the Estuary.

A review of the Aboriginal Heritage Register of Places and Objects, as well as the DPLH Aboriginal Heritage Database, concludes the proposed build areas, as per Figure 1 of the October 2021 Development Application, intersects with registered Aboriginal Site ID 3536 (Swan River). Therefore, approvals under the *Aboriginal Heritage Act 1972* or *Aboriginal Heritage Regulations 1974* will be required.

As referenced in Table 3 under 'Section 6 – Other Departmental Permits, Approval and Advice', the project has been discussed in detail with DPLH. Along with information regarding the requirements of applying for a Regulation 7 and 10 Permit, the knowledge holder family names for ID 3536 (Swan River) have been provided to the Applicant. An adequate briefing to this stakeholder group will be required prior to the application for a Regulation 7 and 10.

Should you have any queries regarding this advice please contact Melissa Davis at Melissa.Davis@dplh.wa.gov.au or on 6552 4080.

Yours sincerely

Melissa Davis
TEAM LEADER ABORIGINAL HERITAGE OPERATIONS

30 November 2021