Review of Environmental Factors

This 'Review of Environmental Factors' comprises the assessment of those matters affecting or likely to affect the environment by reason of the proposed activity, as required by
Part 5 of the *Environmental Planning and Assessment Act 1979*

PROJECT: **Tweed Sand Bypassing – Back-passing by Dredge**

SITE ADDRESS: **Tweed River entrance and waters adjacent to Fingal Beach and Dreamtime Beach**

PROPONENT: **NSW Department of Industry – Crown Lands**

DATE: **3 July 2019**

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Appendices

Executive Summary

This Review of Environmental Factors (REF) has been prepared by Ardill Payne & Partners (APP) on behalf of the Department of Industry – Crown Lands (DoI) who has responsibility for over-seeing the maintenance of the navigable depth of the Tweed River entrance. The REF relates to a project involving the back-passing of sand that will be dredged from the Tweed River entrance, so as to maintain a navigable channel of the Tweed River entrance and the near-shore deposition of the sand that will facilitate beach nourishment. The proposal involves the dredging and back-passing of a maximum of 50,000m^3 of material per annum (in perpetuity).

The DoI is the proponent and is also the determining authority for the project under Part 5 of the *Environmental Planning and Assessment Act 1979* (*EP & A Act*).

The proposed works are such that fall under the ambit of State Environmental Planning Policy (Infrastructure) 2007, particularly Division 13 – Port, Wharf or Boating Facilities. The purpose of this REF is to describe the proposed works, assess the likely impacts on the natural and man-made environment and provide ameliorative measures to be implemented to minimise/mitigate any environmental impacts.

This REF has been prepared having regard to Clause 228 of the *EP & A Regulation 2000* and other applicable environmental planning instruments and legislation.

This REF will assist DoI in satisfying the requirements of Section 5.5 of the *EP & A Act*, which requires a determining authority to *"..examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reasons of the activity."*

The findings of the REF will be considered when assessing whether the proposal is likely to have any significant impact on the environment and thus the necessity for an EIS under Section 5.7 of the *EP & A Act*.

The works form part of the Tweed River Entrance Sand Bypassing Project (TRESBP), which is now referred to as Tweed Sand Bypassing (TSB), which is a joint marine sand delivery project between the NSW and QLD State Governments.

The TSB project is legislated in both States under the *Tweed River Entrance Sand Bypassing Act 1995* which has the following purpose and objectives:

Purpose

- to enhance and maintain the attributes of the Gold Coast – Tweed Heads region and more specifically the Tweed River estuary and the southern Gold Coast beaches and to achieve the objectives of each State

Objective – NSW

- to establish and maintain a navigable depth of water of at least 3.5m below Indian Spring Low Water (ISLW) in the approach to and within the entrance channel to the Tweed River over a width of equal to that between the rubble mound breakwaters

Objective – QLD

- to achieve a continuing supply of sand to the Southern Gold Coast beaches at a rate that is consistent with the natural littoral drift rates up-drift and down-drift, together with the supply of such additional sand to the beaches as is required to restore the recreational amenity of the beaches and to maintain it

Intention

- to achieve the objectives in perpetuity

The TSB project is also legislated under the *Tweed River Entrance Sand Bypassing Project Agreement Act 1998* (QLD), the purpose of which is to provide for the carrying out of the agreements which *"… provide for a sand bypassing project to improve and continuously maintain –*

(a) the amenity of the southern Gold Coast beaches; and

(b) the navigability of the Tweed River entrance."

The existing sand bypassing system aims to meet the above objectives in perpetuity by the pumping of sand slurry via the jetty mounted pumping system at Letitia Spit and the dredging of the Tweed River entrance by floating dredge. The pumping and dredging works are not alternatives, but are complementary and fundamental components of the same system.

Based on the findings of the assessment contained in this REF, it is concluded that the proposed works will result in a number of positive outcomes including maintenance of a safe navigation channel within this heavily trafficked waterway and providing beach nourishment to local beaches. Although there is some potential for some minor negative impacts, the project will follow well established practices for minimising harm/adverse impacts to the coastal environment and this REF has concluded that there is unlikely to be a significant impact.

A Project Environmental Management Plan (PEMP) will be developed and implemented by the principal works contractor that complies with the NSW Government *Environmental Management System Guidelines*. The environmental controls and management measures detailed in **Section B** of this REF are required to be implemented and maintained (as a minimum) to ensure that the findings and conclusions of this REF are valid.

These environmental controls and measures are to be duly incorporated into the PEMP and are to be complied with at all times during the project works.

Project History

The following articulates the history of the Tweed Sand Bypassing (TSB) project which is considered to be of relevance to the proposed "back-passing by dredge" project which is the subject of this REF.

The TSB was developed in the 1990's and has been fully operational since 2001. The operational period can be divided into distinct halves with 2001-2008 being a period of sand over-supply, and as a corrective measure, the 2008-2016 was a period of intentional sand under-supply.

The NSW Minister for Urban Affairs and Planning (Hon Craig Nowles MP) granted conditional approval under Section 115B(2) of the *EP & A Act* to the Minister for Land and Water Conservation on the 20th July 1998 (Ref.: G94/00236) *"..to carry out the proposal as specified in the EIS and the Representations Report for the proposed Tweed River Entrance Sand Bypassing project – Permanent Bypassing System, dated June 1997 and December 1997 respectively."*

Since the commencement of operations, extensive monitoring has been carried out as well as technical investigations to try to determine the interaction between Tweed Sand Bypassing operations and local natural coastal processes.

The current sand extraction operations are being undertaken in accordance with an Environment Protection Licence (EPL) No. 10423 for Extractive Activities (Activity Type: Water-based extractive activity), held by the Tweed River Entrance Sand Bypassing Company Pty Ltd.

This REF does not provide any assessment or consideration of the existing operations in the context of the terms and conditions of the Minister's approval (and associated EIS) and the EPL. This REF considers the environmental impacts of the proposed sand back-passing, being the deposition of the sand in two deposition areas to the south, which will provide on-going beach nourishment.

The Department of the Environment and Energy (Queensland Assessments and Sea Dumping Section) by letter dated 12th September 2016 advised the TRESBP Project Manager inter alia that:

- the Department considers that a permit for the TRESBP under the *Environment Protection (Sea Dumping) Act 1981* is not required as there is sufficient information to demonstrate that the placing of the sand at nearby nearshore locations is for a purpose, specifically beach nourishment, and is not for the mere disposal thereof
- the Department also considers that sufficient information has been provided to demonstrate that the material would not pose risks to the marine environment or other users of the sea and therefore placement would not be contrary to the aims of the London Protocol to prevent marine pollution

This letter is not specifically applicable to the proposed back-passing by dredge project; however it demonstrates the Government's position in respect to comparable nearshore sand deposition in adjacent QLD waters.

Based on the above, it is considered that a permit is likely not required under the *Environment Protection (Sea Dumping) Act 1981* for the TRESBP back-passing/sand deposition in NSW waters proposed under this REF. Notwithstanding such, a copy of the REF is to be referred to the Department of the Environment and Energy for consultation and to ascertain if a permit is required for this proposal, prior to the commencement of the back-passing deposition works.

Community Consultation

The Tweed Sand Bypassing Advisory Committee has been formed and contains representatives from a number of local and community groups including representatives from:

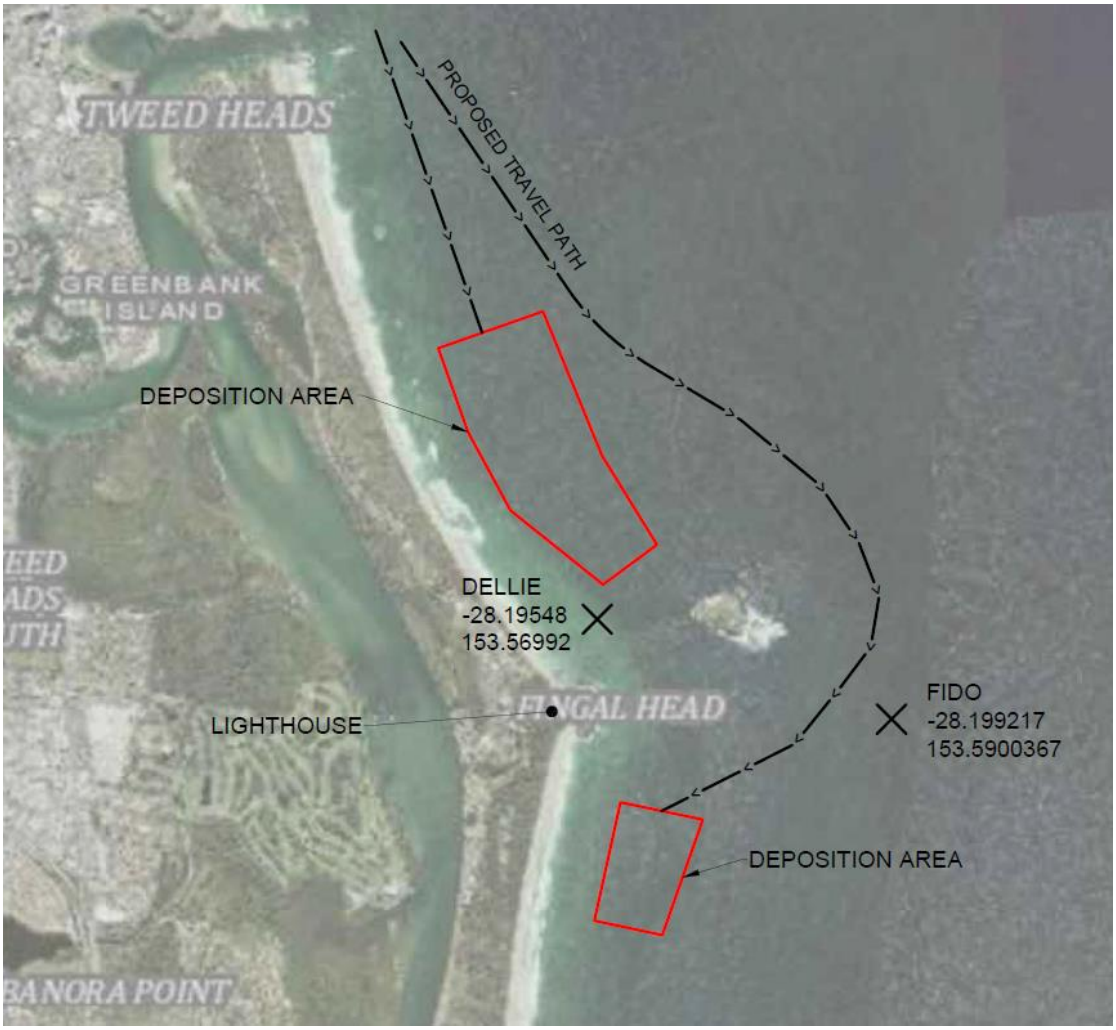
- NSW DoI
- TRESB Co
- QLD DES
- members of the public
- dive charters
- Fingal community members
- QLD community representatives
- Kirra Surfriders

There are regular scheduled advisory committee and community meetings which consider and discuss on issues with the TSB and sand movements. This back-passing by dredge proposal was discussed at the meeting on the 1st August 2018 amongst a range of other matters with the broader Tweed sand bypassing project.

Section A – Site identification

Address	The proposed works involve the deposition of dredged sand at two locations near Fingal Head (NSW Far North Coast) immediately south of Tweed Heads and the NSW/QLD border. The dredged sand will be extracted from the Tweed River entrance under existing approvals as per the on-going operation of the Tweed River Entrance Sand Bypassing Project. The sand deposition areas are located in waters adjacent to Fingal Beach (north of Fingal Head) and adjacent to Dreamtime Beach (south of Fingal Head) on the Tweed Coast, approx. between 3m -13m depth contours. The locations of the dredge and deposition areas are identified in photographs and plans at **Appendices A** and **B**.
Lot and DP Description	The dredge and deposition areas are situated below the MHWM and are Crown land that does not have a real property description (ie **no** Lot or DP number). The dredging areas are on the river entrance and the deposition areas are proximate to Lot 7322 DP 1128432 (reserved Crown Land).
Local Government Area	Tweed Shire
Land Status *(Reserve name/number if applicable.* *Nature of any tenure).*	The subject land is Crown land below the MHWM and comprises part of the South Pacific Ocean.
Any Native Title or Aboriginal land claims	No Native Title claims or Indigenous Land Use Agreements (ILUA's) were known to be in place within the project/works area as at 17th January 2019 (as per the National Native Title Tribunal map 'New South Wales, Australian Capital Territory & Jervis Bay Territory – Native Title Claimant Applications and Determination Areas' as per the Federal Court (30 September 2018)). Representatives from the Tweed Byron LALC Aboriginal Cultural Heritage Unit were consulted by DoI – Crown Lands and undertook a joint inspection with the Crown on the 22nd January 2018 in respect of the proposed deposition (and consequential beach nourishment). Provided at **Appendix J** is an Inspection Report from the Tweed Bryon LALC which provides comments on the proposal and the following recommendations: *"TBLALC recommends that a process of due diligence be followed as outlined in the OEH Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW. This process concludes that all ground disturbance activity should "proceed with caution" and a "stop work procedure" should be in place if any inadvertent discovery of cultural heritage objects is made.* *Note that this Inspection Report can form part of the documentation for proceeding in accordance with the OEH*

	Due Diligence Code. *TBLALC appreciates having been consulted and does not require a comprehensive heritage assessment in regard to the proposed program prior to the commencement of the work."* Provided at **Appendix H** are the results of an AHIMS search and an Extensive search.



Map showing deposition areas, indicative dredge travel paths, shipwrecks and lighthouse locations.

Section B – Description of the proposed activity

What is proposed? *(Include:* *(i) ancillary and ongoing components* *(ii) location on the site)*	The proposal involves the transport and deposition of sand sourced from the on-going extraction of the Tweed River entrance by a dredge/barge vessel so as to maintain a navigable channel. The sand will be dredged by and stored on the vessel, transported south and placed in one of two nominated deposition areas. In an effort to better meet the TRESBP objectives; further flexibility is required with regard to dredge placement. This flexibility will allow dredge campaigns to better respond to environmental, contractual and stakeholder considerations. This proposal is specifically for the back-passing of sand toward the "up-stream" direction of net coastal long-shore sediment transport in the region. This ensures that sand remains within the active coastal zone and is not lost from the total sediment budget. Back-passing will be an option that the project may consider as a stand-alone activity or as part of a wider dredging campaign. The areas to be nourished include the Fingal Beach deposition area north of Fingal Head and the Dreamtime Beach deposition area south of Fingal Head as detailed in **Appendix B**. The cross-shore boundaries of the deposition areas are approximately between 3m – 13m depth contours. The proposal is for a nominal annual placement of 50,000m^3 across both deposition areas and this is inclusive of a 20,000m^3 restriction at Dreamtime Beach. This annual volume is significantly less than the calculated maximum capacity of approximately 434,000m^3 and 166,870m^3 at Fingal Beach and Dreamtime Beach respectively. Therefore this proposal, which is limited to placement volumes of 50,000m^3 per year, aims to minimise the potential for continuous impacts. The maximum capacity is calculated as per the Design Fill Profile detailed in **Appendix B**. Prior to sand placement of up to 50,000m^3 per year, the existing bathymetry will be considered and compared with the Design Fill Profile. This will ensure that the placement volume can be accommodated. The rationale for the proposed placement areas in **Appendix B** are aligned with the design of the existing approved deposition areas 2A and 2B to the north of the proposal area (refer **Appendix D**). As such, the design profiles are consistent and within the envelope of historical surveyed cross-shore profiles. The proposed placement volume of 50,000m^3 per year in waters adjacent to Fingal Head is less than 10% of the long-term averaged (LTA) long-shore sediment transport (LST). The approximate LST at Fingal is 588,000m^3/annum averaged over the period 2001 to 2015 (BMT WBM, 2016). The relatively small proposed placement volume of 50,000m^3 in comparison with LST aims to minimise and manage potential impacts.

A sand transport pathway study for the TSB project area investigated the local coastal process and survey data to determine sand movements of locations inclusive of Fingal (refer **Appendix F**). Figure 3-8 – *Conceptual model of sediment transport patterns through Letitia Spit & Fingal Head compartment* identifies the sediment transport patterns. The following extracts from this report demonstrate their findings:

"Sand supply to Letitia Spit occurs past Fingal Head and tends to occur mostly as episodic 'slugs' of relatively large quantities of sand over a short period of time.

The sand transport pathway past the headland is expected to be exclusively located between Cook Island and Fingal Head.

The vast majority of the longshore transport occurs in water depths of less than 4m."

Considering the low volumes of sand to be placed at Dreamtime (~20,000m^3) and the sediment pathway between Fingal Head and Cook Island, the risk of cumulative effects of the activity is low. The Dreamtime placement will dissipate quickly long-shore and cross-shore with the majority of sediment moving south to north around Fingal Head through natural episodic sand 'slugs'.

The only plant and equipment involved in the back-passing is a floating dredge vessel. At this point in time, the proposal will involve the use of a vessel having a hopper capacity of 1800m^3.

However, due to the fact that the sand bypassing project is to continue in perpetuity, the sand back-passing is able to be undertaken with any comparable vessel that is approved by Crown Lands.

Details of a typical back-passing by dredge campaign, assuming the nominal proposed placement volumes, are as follows:

- dredge vessel likely have a hopper capacity of 1800m^3
- a placement rate of 3 trips per day, equating to 5400m^3 per day
- assume 57% stand-by days due to unfavourable weather conditions the actual operation time is therefore:
    - 10 days for 50,000m^3 + 6 days stand-by = 16 days in total year
    - the estimated 16 days will be split as 10 days total to Letitia and 6 days to Dreamtime per year inclusive of stand-by days

The dredge campaign commencement window is between June and September unless otherwise advised in writing by the Local NPWS Area Office; and is dependent on weather, presence of threatened flora and fauna, dredge availability and operational requirements.

	Due to the nature of the proposed works, there will not be any impacts on any public land, public roads or any public pedestrian footpaths/networks. The crossing of the Tweed entrance is over-seen and controlled by the Point Danger Marine Rescue NSW and thus any potential conflicts with the dredge/barge and boats entering/leaving the river will be managed by Marine Rescue. A RMS Notice to Mariners and Vessel Management Plan should be prepared and implemented prior to commencement of back-passing operations to minimise disruption to other vessels and to minimise strikes between dredge barge and mammals, cetaceans and turtles. Such plan is to be submitted to and approved by the RMS. All navigation hazards should also be clearly marked and appropriate navigation markers be used to direct boats and other water-craft safely around the deposition area(s) whilst deposition activities are being undertaken. Noise and vessel operation associated with the proposal also has potential to result in disturbance of cetaceans, turtles and birds, especially birds that are known to breed and occasionally turtles, nearby. Due to the nature of the works and the fact that they are not proximate to any sensitive receivers, it is submitted that there is no need to impose specific hours of operation.
What environmental protection measures are to be included?	All factors of the activity and associated impacts have been considered and detailed in this REF. Environmental protection measures have been proposed as part of this REF to minimise/mitigate potential environmental impacts arising from these activities. A Project Environmental Management Plan (PEMP) is required to be developed and implemented by the principal contractor that complies with the NSW Government's *Environmental Management System Guidelines*. The following environmental protection and safety management measures are to be implemented, maintained and complied with at all times to ensure that the findings of this REF are valid and are to be incorporated into the PEMP. <u>General</u> • If there are changes to the scope of work, the requirement to update this REF to include additional assessment requirements or to undertake a new environmental assessment process for the works should be determined in accordance with applicable legislation. Authorities provided notice during this REF process should be consulted in determining these requirements. Notwithstanding this requirement, any applicable management plans or procedures should be reviewed and updated as required, if there is any change to the scope of work. • The contractor is to prepare and implement a Project Environmental Management Plan (PEMP) for the proposed works to ensure all provisions and safeguards

identified in this REF, as well as other applicable legislative requirements are implemented and managed throughout the process.

- The PEMP shall comply with the NSW Government Environmental Management Systems Guidelines and take into account the National Assessment Guidelines for Dredging (DEWHA, 2009) and DPI Fisheries "Policy and Guidelines for Fish Habitat Conservation and Management (2013)".
- The PEMP must be developed and reviewed in consultation with the OEH and DPI-Fisheries.
- Back-passing operations are not to commence until such PEMP has been completed and submitted to DoI.
- DPI Fisheries and the organisation representing local commercial fishers are to be given notice prior to the commencement each back-passing deposition campaign.

<u>Dredging/Deposition Measures</u>

- Develop a deposition management plan or similar for the proposed work which includes the management of plumes, currents and other known variables associated with potential impacts from sediment during placement.
- Any dredge vessel is to comply with the relevant Marine Legislation for survey, registration and safety equipment.
- Vessels must exhibit lights and shapes in accordance with International Regulations for Preventing Collisions at Sea.
- Any ancillary equipment which presents as a potential hazard to people or vessels is to be appropriately marked, including the use of lights at night.
- Marking of objects is to be clarified with the RMS Boating Safety Officer prior to placement.
- A suitable Vessel Traffic Management Plan is to be prepared and implemented to minimise disruption to other vessels, which may include placement of additional navigation aids to warn/advise the boating public of potential hazards.
- Whilst dredging and deposition operations are underway, if navigation aids are required to be relocated or removed, such is to be undertaken in consultation with the local Boating Safety Officer and the RMS Navigation Aid Contractors, with such cost to be borne by the Dredging Operator.

<u>Air Quality</u>

- Ensure that all plant and equipment (including the dredge vessel) meets the required emission control compliance regulations.

<u>Noise</u>

- The proposed Dreamtime and Fingal placement locations are just two of a number of other approved placement locations for the TRESBP, spread across QLD and NSW, which may be considered for strategic placement during each dredging campaign. Placement locations will be carefully selected prior to each dredging campaign based on a number of factors including available capacity of compartments, environmental factors and stakeholder

and project requirements. Deposition of sediments will be spread over approved placement areas to avoid repeated deposition of spoil in one area and to minimise potential for continuous impacts.
- Deposition must be restricted to occur from June to September unless otherwise approved in writing by the local NPWS Area Office.

It should be noted that due to the small number of proposed deposition activities/days per annum, there will not be potential for significant adverse noise impacts on any fauna.

Water Quality
- Undertake an assessment of sediment contamination in accordance with the National Assessment and Guidelines for Dredging 2009 (DEWHA2009) if there are any changes to the dredge area or potential for/suspected change in sediment quality/attributes from the proposed dredge area.
- Turbidity should be periodically monitored within 50m down-current of the deposition area. Turbidity is to be below 25 NTU above ambient at all times.
- Water quality monitoring must be undertaken in accordance with conditions as prescribed under the Environment Protection Licence for the activity and any monitoring program developed for the proposed activity, with such monitoring to be undertaken by the appointed dredge contractor.

Pollution
- Fuel, lubricants and hydraulic fluids are to be kept in minimum volumes and in sealed containers.
- Implement emergency spill procedures including provision of a spill kit on the dredge vessel at all times during operations.
- All plant and equipment is to be kept in good working order and is to be operated in accordance with the manufacturer's specifications.
- Undertake regular inspection and maintenance of the dredge vessel and any other plant/equipment (including fuel holds, hydraulic lines etc).
- Should there be an incident that impacts the Tweed River or the ocean/beaches, Crown Land, DPI Fisheries, the EPA (EPA Environment Line 131 555), the RMS and Marine Rescue are to be notified immediately.
- There is to be no storage of any fuel or other liquids or materials other than in sealed bunded storage facilities locked and managed within the contractor compound.
- All petroleum products and chemicals are to be stored in appropriately constructed and bunded areas.
- There is to be no cleaning of any tools, plant or equipment within or proximate to the deposition areas.
- Suitable rubbish bins are to be provided on the dredge vessel with all waste being appropriately disposed of at approved waste receiver sites/facilities.

Benthic Habitats
- The proposed Dreamtime and Fingal placement locations are just two of a number of other approved placement

locations for the TRESBP, spread across QLD and NSW, which may be considered for strategic placement during each dredging campaign. Placement locations will be carefully selected prior to each dredging campaign based on a number of factors including available capacity of compartments, environmental factors and stakeholder and project requirements. Deposition of sediments will be spread over approved placement areas to avoid repeated deposition of spoil in one area and to minimise potential for continuous impacts.

- Consideration of the rotation of deposition areas to allow benthic bottom communities to recover post-deposition.
- A monitoring program must be developed in consultation with OEH and DPI-Fisheries to identify any real or potential short, medium and long-term impact from the activities. The monitoring program should include the following as a minimum and must be consistent with the conditions of the EPL for the activity:
  - Monitoring of turbidity and plumes during placement.
  - Monitoring of any impacts to Reef habitat within potential impact areas of Fingal Head and Cook Island Aquatic Reserve, inclusive of a mix of biotic and abiotic variables and collection of sufficient baselines data-set to account for temporal variability.
  - Adaptive management measures in relation to monitoring outcomes, as required.
  - Process for maintaining records of monitoring results. This should include the requirement for all records to be kept on the dredge vessel for inspection.
  - Records of monitoring results to be provided to the DoI upon request.
  - Reporting of monitoring results to key stakeholders.

  The Operator may choose to incorporate the monitoring program (and associated requirements) into an existing monitoring program associated with the Tweed Sand Bypass Project.

<u>Sediment and Water Quality</u>

- Assessment of sediment contamination in accordance with the National Assessment and Guidelines for Dredging 2009 (DEWHA2009) if there are any changes to the dredge area or potential for/suspected change in sediment quality/attributes from the proposed dredge area. Water quality monitoring must be undertaken in accordance with conditions as prescribed under the Environment Protection Licence for the activity and any monitoring program developed for the proposed activity, with such monitoring to be undertaken by the appointed dredge contractor.
- Deposition of sediments with contaminants or substantially different characteristics to those that naturally occur at the deposition site should be avoided.

<u>Waste, Spills, Debris and Introduced Noxious Species</u>

- Regular inspection and maintenance of equipment, fuel holds, hydraulic lines etc. of construction equipment and vessels.
- Spill kits to be on hand and all petroleum products and chemical products to be stored in a bunded area.

- Suitable rubbish bins to be provided for rubbish disposal on all vessels.
- No disposal of materials (other than sediment) overboard.
- Cleaning of all equipment before being taken into the proposal area.
- Inspection of all equipment that has been mobilised from states other than NSW/QLD for introduced and noxious species.
- All waste is to be disposed of ay approved waste receiver facilities.

<u>Flora and Fauna</u>

- Avoid deposition of spoil in areas where seabirds or shorebirds (in adjacent intertidal areas at low tide) are foraging.
- The local NPWS Area Office should be consulted prior to commencement of each operation, unless otherwise advised in writing by the NPWS.
- Maintaining a distance of 300m from any whales, dolphins or dugongs.
- Maintaining a distance of 80m from any sea lions or seals.
- Maintaining a distance of 300m from any breeding shorebirds and sea turtles *(Local NPWS should advise operators of such occurrences).*
- Maintaining a distance of 80m from any foraging shorebirds and sea turtles.
- The dredge campaign window of June – September has been selected to further minimise potential impacts on threatened or migratory species, including:
  - Marine turtle breeding season – October – May
  - Shorebird breeding season – September – April

<u>Non-indigenous Heritage</u>

- A minimum setback/clearance of 100m is to be provided and maintained between any deposition area and the ship wrecks “Dellie” and”Fido”.

<u>Indigenous Heritage</u>

- A process of due diligence is to be followed as outlined in the OEH’s *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* and ensure that all site/works personnel are conversant with the requirements of the Code in the case of an unexpected discovery of an item of Aboriginal heritage.
- All deposition works are to “proceed with caution” and a “stop work procedure” is to be in place should any inadvertent discover of cultural heritage objects be made, with the OEH, TBLALC and Tweed Council being notified immediately upon the discovery of such.

<u>Air Quality</u>

There will not be any dust generated due to the nature of the works (wet dredge and direct bulk deposition into the ocean).

There will be exhaust emissions from the dredge vessel which are required to meet emission control compliance regulations. There will not be any issues with fumes due to the off-shore

location of the haulage and deposition areas and the physical and spatial separation from any sensitive receivers (particularly dwelling houses).

Sediment Quality

Sediment quality includes physical characteristics and composition, nutrients, chemicals and potential contaminants. These characteristics all have potential to have direct impacts on fauna that occur in the study area, specifically infauna and fish, as well as transient fauna, mammals, birds and reptiles, and indirect impacts on the surrounding aquatic environment. Analysis of sediments to be dredged did not detect any concentrations of contaminants above the sediment quality guidelines. It was concluded that the sediments were considered non-toxic, and suitable for unconfined ocean disposal (DSITI 2016). Furthermore, the sediments were described as bare sands and likely similar to those in the deposition areas to the south of the Tweed River entrance. Based on this finding, the potential for impacts on aquatic flora and fauna from sediment quality will likely be minimal.

The following extract is from the Backpass Deposition Areas Sediment Particle Size Distribution report (Hydrosphere Consulting (May 2018) – refer Appendix K) that *"Sediment samples taken off-shore of both Fingal and Dreamtime Beaches consistently showed that the particle size distribution became finer with depth. Sediments taken off-shore of Fingal Beach, at similar depths to the entrance bar (ie -4 to -8m AHD) were shown to have very similar grain size characteristics to the entrance.*

The grain size distribution off-shore of Dreamtime Beach occupied a broader range with the best match to the entrance bar sediments occurring once again with the shallower (-4 to -8m AHD) samples with the exception of the most southerly in-shore sample at Dreamtime Beach which was noticeably coarser than all other samples."

Water Quality

As detailed in the Aquatic Ecological Assessment at **Appendix E**, changes in water quality have the potential for direct and indirect impacts. Assuming the sediments are clean sands and contaminant free, the changes in water quality will be confined to potential for elevated turbidity, and levels of suspended solids within the water column. This has potential to have direct impacts on fauna that live or utilise habitat within the deposition area, and indirect impacts on the surrounding habitat that may include reefs. Turbidity can limit the growth of primary producers, which require light, such as microalgae and phytoplankton, effect gaseous exchange in aquatic organisms, impact on foraging, and over time is expected to reduce biodiversity in aquatic systems. In coastal areas, turbidity is known to effect foraging success of visual foraging predators such as aerial seabirds, some fish, shark, ray, mammal, and reptile species (Lunt and Smee 2015).

Suspended solids also have pronounced impacts on aquatic systems as they settle out from the water column. They may directly impact the quality of and biodiversity amongst aquatic habitats. The Cook Island Aquatic Reserve is an extensive

	reef system, which includes an abundance of sessile reef taxa sensitive to sedimentation that include hard corals. In high energy areas, similar to those around Cook Island, sedimentation has been found to increase the rate of succession from hard coral to algal turf dominated habitats (Goatley and Bellwood 2013). Thus, given the proposal is in close proximity to the Cook Island Aquatic Reserve and potential reefs with hard coral cover, any elevated levels of suspended solids may impact on the habitat quality and biodiversity of nearby reefs including those within the Cook Island Aquatic Reserve, especially where hard corals are abundant. The visible sediment plume from this proposal will be influenced by deposition method and amount, ocean conditions (wind, waves and current) and sediment characteristics. Previous placement of dredge material in similar depths at Cronulla Beach resulted in a plume of less than 50m from the point of deposition (TEL 2011). It is likely that a similar sized plume will be experienced from the deposition of sediments adjacent to Fingal and Dreamtime Beaches. In order to avoid, minimise and manage impacts on sediment and water quality, water quality monitoring must be undertaken in accordance with conditions as prescribed under the Environment Protection Licence for the activity and any monitoring program developed for the proposed activity, with such monitoring to be undertaken by the appointed dredge contractor. <u>Traffic, Access and Parking</u> Due to the nature of the works, the method of haulage and the location of the deposition areas, there will not be any impacts on any local road or public footpath networks. There will not be any significant traffic generated at/by the works, other than movements that are already existing and are associated with staffing of the dredge vessel. There will not be any traffic, parking or access issues with the proposed back-passing. In respect of vessel traffic/navigation during deposition operations, the dredge vessel is to exhibit lights and shapes in accordance with International Regulations for Preventing Collisions at Sea (to display upon its mast 'Ball-Diamond-Ball' which indicates dredging activity with lower mast indicating 'Diamonds' safe side to pass and 'Balls' on obstruction side. A Vessel Traffic Management Plan is to be prepared and implemented. <u>Consultations with Local Community</u> The DoI is to continue to liaise and engage with interested members of the local and broader community and key agencies and is to maintain the operation of the Advisory Committee and community meetings. Details of the stakeholder consultation undertaken as part of the preparation of this REF are contained at **Appendix G**.
Is the proposal consistent	The dredge site and deposition areas are below the mean

with: (i) the Reserve purpose? (ii) any land assessment? (iii) any plan of management?	high water mark (Crown land), are not zoned under the TLEP 2014 and are not within the Tweed Coast Regional Crown Reserve (Coastal areas) or subject to any specific land assessment. The proposed works comprise an integral component of the Tweed River Entrance Sand Bypassing Project (TRESBP) which is legislated under the Tweed River Entrance Sand Bypassing Act 1995 (NSW) and has an approval under Section 115B(2) of the *EP & A Act 1979* (dated 20th July 1998, Ref.: G94/00236) *".. to carry out the proposal as specified in the EIS and the Representations Report for the proposed Tweed River Entrance Sand Bypassing project – Permanent Bypassing System, dated June 1997 and December 1997 respectively."* The dredge site and deposition areas are outside of the land subject to the Tweed Coast Regional Crown Reserve (Coastal areas) and will not have any adverse impacts on such reserve lands. Tweed Council adopted the Kingscliff – Dreamtime Coastal Zone Management Plan (K-DCZMP) on the 18th May 2017 and resolved to forward the adopted plan to the Minister for certification under the repealed *Coastal Management Act 1979*. The study area for the K-DCZMP extends to the southern side of Fingal Head and land adjacent to the Dreamtime Beach deposition area. The proposed deposition of sand (which will facilitate beach nourishment) is consistent with the primary and secondary objectives of the CZMP.

Section C – Reasons for the proposed activity and consideration of options

Reasons for activity	The primary goal of the project is to remove accumulated sand/sediment from the navigation channel of the Tweed River entrance to ensure safe boat passage. Additionally, the dredge material will be deposited such that the sand will facilitate beach nourishment.
Options	There are no alternatives to dredging if the primary goal is to be achieved (which is already the approved method of extraction). There is one alternative for the back-passing of the sand which would be via pipeline from the dredge to the deposition areas(s) which has significant problems/issues in regards to logistics, costs, reduced flexibility, increased impacts on the natural and man-made environment and the safe and efficient use of the river entrance by boats.

Reasons for adopting the preferred option	The logistical, cost, environmental implications and impediments to the river entrance access of a pipeline were considered with the most effective, efficient and practical means of sand transfer/back-passing being via the dredge vessel.

Section D – Planning controls & other approvals

What is the relevant Planning Instrument(s)? *(LEP, REP, SEPP)*	**State Environmental Planning Policy (Infrastructure) 2007** It was determined that Division 25 – Water or foreshore management activities of SEPP-I is applicable to the proposed sand back-passing (transport and placement of dredged material), as it pertains to beach nourishment. The dredge and deposition areas are situated in the South Pacific Ocean and are not zoned under any environmental planning instrument. Clause 128 defines *Water or foreshore management activities* as inclusive of 'beach nourishment'. Clause 129(1) provides that development for the purpose of waterway or foreshore management activities may be carried out by or on behalf of a public authority without consent on any land. Clause 129(2) provides that any reference to development for the purpose of waterway or foreshore management activities includes a reference to development for any of the following purposes if the development is in connection with waterway or foreshore management activities:: (a) construction works, (b) routine maintenance works, (c) emergency works, including works required as a result of flooding, storms or erosion, (d) environmental management works. The proposed works comprise back-passing of sand that has been sourced by maintenance dredging to ensure the on-going safety and efficiency of the existing river entrance to the wharf and boating facilities in Tweed Heads, with such works being carried out by/on behalf of DoI. Accordingly, the proposed works do not require consent under Part 4 of the *EP & A Act* and are considered to fall under the ambit of Part 5 of the *EP & A Act* (pursuant to SEPP-I). Clause 15A of SEPP-I applies to development on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land and provides that a public authority, or a person acting on behalf of public authority, must not carry out development unless the authority has: *(a) given written notice of the intention to carry out the development to the council for the local government area in which the land is located, and* *(b) taken into consideration any response to the notice that*

is received from the council within 21 days after the notice is given

At the time of preparing this REF, there was no "Coastal Vulnerability Area Map" under SEPP (Coastal Management) 2018.

SEPP (Coastal Management) 2018

SEPP-CM came into effect on the 3rd April 2018, with SEPP 71 – Coastal Protection being repealed that same day.

The land subject to the dredging/shifting/placement is not mapped on the:

- Coastal Wetlands and Littoral Rainforest Area Map and thus Part 2, Division 1 does not apply
- Coastal Vulnerability Map (NO map at this time) and thus Part 2, Division 2 does not apply
- Coastal Use Area Map and thus Part 2, Division 4 does not apply – the deposition areas are in excess of 200m from the MHWM and are thus outside the area mapped on the Coastal Use Area Map

The subject land is mapped on the Coastal Environment Area Map and thus Part 2, Division 3 applies. As per Clause 13, the proposed development:

- will not have any significant adverse impacts on the biophysical, hydrological (surface and groundwater) and ecological environment
- will not have any significant impacts on coastal environmental values or natural coastal processes
- will not significantly impact on or be significantly impacted by geological and geomorphological coastal processes and features
- will not have any significant adverse impacts on the water quality of marine estate
- will not have any significant adverse impacts on native vegetation and fauna and their habitats, undeveloped headlands and rock platforms
- will not significantly adversely impact Aboriginal cultural heritage and places
- will not have any impact on the use of the surf zone

Clause 19(2)(a) of SEPP-CM provides that development for the purpose of coastal protection works may be carried out on land to which the SEPP applies, by or on behalf of a public authority without development consent if the coastal protection works are "beach nourishment". The provisions of SEPP-CM are therefore considered not applicable to the proposed activity.

SEPP 55 – Remediation of Land

There are no contamination issues with the proposed dredging and shifting/placement of the sand and this SEPP does not apply.

	North Coast Regional Plan 2036 The proposed works areas are technically outside of the area to which the NCRP applies. The proposed works are not contrary to the goals and directions of the plan. **Tweed LEP 2014** The works areas are not within the area shown on the Land Application Map – Sheet LAP_001 and the project is therefore not subject to the provisions of the Tweed LEP 2014. **Tweed DCP 2008** The works area is not subject to the provisions of the Tweed DCP 2008. **Kingscliff - Dreamtime Beach Coastal Zone Management Plan (2017)** Tweed Council adopted the Kingscliff – Dreamtime Coastal Zone Management Plan (K-DCZMP) on the 18th May 2017 and resolved to forward the adopted plan to the Minister for certification under the repealed *Coastal Management Act 1979*. The study area for the K-DCZMP extends to the southern side of Fingal Head and land adjacent to the Dreamtime Beach deposition area. The proposed deposition of sand (which will facilitate beach nourishment) is consistent with the primary and secondary objectives of the K-DCZMP.
What is the land zoned?	The dredge and deposition areas are not within the area shown on the Land Application Map – Sheet LAP_001 and the project is therefore not subject to the provisions of the Tweed LEP 2014. The dredge and deposition areas are also not within the area to which the Tweed LEP 2000 applies. Provided at **Appendix C**, are land zoning maps that confirm that the land subject to the works is **not** zoned under the TLEP 2014 and that the deposition areas are adjacent to land zoned RE1 – Public Recreation (coastal foreshore) and E1 – National Parks and Nature Reserves (Cook Island).
Is the land subject to a planning overlay?	The land upon which the works are proposed is not subject to any specific planning overlay. The land is subject to the provisions of the NSW Coastal Policy 1997.
Are there any specific clauses relating to: (i) the proposal ? (ii) Part 5 assessments?	This REF has been prepared in accordance with the provisions of Part 5 and Section 5.5 of the *EP & A Act 1979*, which requires the proponent to take into account, to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity. SEPP (Coastal Management) 2018 is designed to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area by:

	(a) managing development in the coastal zone and protecting the environmental assets of the coast, and *(b) establishing a framework for land use planning to guide decision-making in the coastal zone, and* *(c) mapping the 4 coastal management areas that comprise the NSW coastal zone for the purposes of the definitions in the Coastal Management Act 2016*
Are any other approvals, permits, licences etc from other authorities required? (*If 'yes', list with their status*)	An Environment Protection Licence is required for any 'scheduled activity' as defined under the *Protection of the Environment Operations Act 1997*. A 'scheduled activity' includes extractive activities in relation to dredging. Tweed River Entrance Sand Bypassing Company Pty Ltd hold a current EPL (No. 10423) for Extractive Activities (Activity Type: Water-based extractive activity). The EPA by letter dated 20th June 2018 provided comments in respect of the prior draft REF for this project. The EPA advised *inter alia* that *"…the EPA believes that the activity of dredging of sand from the Tweed River mouth for the TRESMP, is part of the same activity encompassed by EPL 10432. On this basis, the EPA would require TRESBC to complete and submit a 'Licence variation application – premises' form for assessment of the proposed activity to be added to EPL 10432 prior to works commencing."* As detailed above, it is considered that there is no requirement for a permit under the *Environment Protection (Sea Dumping) Act 1981* or a licence under the *Fisheries Management Act 1994*. Notwithstanding such, it is submitted that prior to commencement of deposition, that it would be appropriate to consult with the Department of the Environment and Energy and DPI Fisheries to confirm such.
Does the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999* apply? (*If 'yes', nominate the specific matter(s) that require approval*)	Yes. Assessments of Significance under the *Biodiversity Conservation Act 2016* and Significant Assessment Criteria Assessment under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* were undertaken and are provided at **Appendix E**. It was concluded that subject to the implementation of recommended mitigation measures that: - the proposal is considered unlikely to have a significant impact on State and/or Commonwealth listed threatened biodiversity or MNES - referral to the Department of Environment under the *EPBC Act* is not required - the preparation of a species impact statement based on the provisions of the *BC Act* or *FM Act* is not required

Other relevant legislation	*Protection of the Environment Operations Act 1997* Tweed River Entrance Sand Bypassing Company Pty Ltd hold a current EPL (No. 10423) for Extractive Activities (Activity Type: Water-based extractive activity). The EPA by letter dated 20th June 2018, advised that *"..the EPA would require TRESBC to complete and submit a 'Licence variation application – premises' form for assessment of the proposed activity to be added to EPL 10432 prior to works commencing."* *National Parks and Wildlife Act 1974* The proposed deposition areas are separated from and will not impact any National Parks Estate (including the Cook Island Nature Reserve). The Aquatic Ecological Assessment (refer **Appendix E**) assessed the proposed development having regard to impacts on the Cook Island Nature Reserve and the Aquatic Reserve and provided a number of recommendations to mitigate any such impacts. The proposed back-passing deposition areas are physically and spatially removed/separated from the Ukerebagh Nature Reserve, by a distance of approx. 1km and the Fingal Spit, Fingal Beach, Tweed River, vegetated coastal fore-dunes (including Letitia Road) and the town of Fingal Head. There is no physical connection via land or water between the nature reserve and the deposition area and no "pathway" for the deposited material to impact the reserve. The proposed deposition will not have any impacts on the nature reserve. *Fisheries Management Act 1994* An assessment of the proposal under the *FM Act* was undertaken and is provided at **Appendix E** which concluded that the proposal is unlikely to have a significant impact on State and/or Commonwealth listed threatened biodiversity or matters of national environmental significance and that a species impact statement is not required. There are no approvals considered necessary under the *FM Act* as the proposed works do **not** involve: - aquaculture (i.e. cultivating fish or marine vegetation for sale or commercial purposes) – s144 - dredging or reclamation – s201 – NB: this REF does not relate to the dredging component as that is already approved under the TRESBP - harm *(cut, remove, damage, destroy etc)* to marine vegetation on public water land or aquaculture lease or the foreshore of such land – s205 - obstruction of free passage of fish – s219 Notwithstanding the advice in DPI-Fisheries letter dated 19th June 2018, including subsequent advice received from the Department by email dated 8 March 2019, written notice of the proposed work is required in accordance with s199 of the *FM Act*. Based on Fisheries' advice, a copy of this REF should be referred to Fisheries for further comment (and approved if and where required). *Marine Estate Management Act 2014 and Marine Estate Management Regulation 2017*

	The Cook Island Aquatic Reserve is located approx. 600m off-shore from Fingal Head and includes approx. 80ha of the NSW marine estate extending from the mean high water mark of Cook Island out to a 500m radius from the survey marker on Cook Island (refer **Appendix I**). DPI Fisheries by letter dated 19th June 2018 advised that the proposed deposition areas are proximate to the Cook Island Aquatic Reserve and that the proposed deposition works may impact the Reserve. As a consequence of such, Fisheries advised that a copy of the REF should be referred to them in accordance with the *MEM Act*. A range of mitigation measures have been proposed to ensure that there are no adverse impacts on the aquatic reserve (refer **Appendix E**). Fisheries also raised concern in respect to the Dreamtime Beach deposition area and the potential for adverse impacts on the reserve as a consequence of sand migrating northwards via long-shore drift. Provided at **Appendix F**, is a report that confirms that the long-shore drift pathways are not such that will impact the reserve, with comments on potential flora & fauna / ecological impacts being provided in **Appendix E**. *Biodiversity Conservation Act 2016* An assessment of the proposal under the *BC Act* was undertaken and is provided at **Appendix E** which concluded that the proposal is unlikely to have a significant impact on State and/or Commonwealth listed threatened biodiversity or matters of natural environment significance. Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 An assessment of the proposal under the *EPBC Act* was undertaken and is provided at **Appendix E** which concluded that the proposal is unlikely to have a significant impact on State and/or Commonwealth listed threatened biodiversity or matters of natural environment significance. *Heritage Act 1977* There are three maritime heritage items listed in the OEH's Maritime Heritage Register in the vicinity of the deposition areas being: - ship wreck – "Dellie" (Site ID 1563) – Maximum latitude -28.19548, Maximum longitude 153.56992 - ship wreck – "Fido" (Site ID 1443) – Maximum latitude - -28.199217, Maximum longitude 153.590367 - Fingal Head Lighthouse (Site ID 2010) The location of the above (including the Fingal Head Lighthouse) are shown on the above plan in Section A. The proposed deposition areas are removed from and will not impact or disturb any of these items. An AHIMS Search and an Extensive Search was undertaken for (+1000m buffer) refer **Appendix H** which confirmed that: - 33 Aboriginal sites are recorded in or near the above location

- 1 Aboriginal place has been declared in or near the above location

It appears from details contained in the Extensive Search that the 33 Aboriginal sites are all land-based "open sites" that are removed from the deposition areas and will not be impacted by the deposition works.

As detailed in the Tweed Byron LALC Aboriginal Cultural Heritage Unit inspection report at **Appendix J**, the proposed works *".. would not impact Aboriginal cultural heritage on land or offshore"*, subject to compliance with their recommendations.

Due to the nature and location of the deposition areas, there is not likely to be any disturbance to any items of Aboriginal heritage significance, however, as a precautionary measure, it would be prudent to further consult with the appropriate Local Aboriginal Land Council and the OEH prior to commencement of deposition.

Water Management Act 2000
The deposition areas are not on or proximate to "waterfront land" for the purposes of the *WM Act*. Notwithstanding such, a Controlled Activity Approval would not be required pursuant to Clause 38, Part 3, Division 2, Subdivision 4 of the *Water Management (General) Regulation 2011*.

Environment Protection (Sea Dumping) Act 1981
As was the case with the beach nourishment areas in QLD waters, it is considered that a permit under the *EP (SD) Act* is likely not required as sand back-passing at the proposed near-shore locations is intended to facilitate beach nourishment and is not for the mere disposal thereof. This situation should be confirmed with the Department of the Environment and Energy prior to the commencement of deposition.

Historic Shipwrecks Act 1976
The "Dellie" and "Fido" are listed in the Australian National Shipwreck Database (ID 489 and ID 682 respectively). There is no declared "protected zone" around either wreck site.

The proposed deposition areas are removed from and are clear of the wreck sites and the deposition will not disturb or have any adverse impacts on the wreck sites.

Due to the relatively small amount of material to be deposited (having regard to the quantum of sand being transported by and the "pathway" of the long-shore sediment transport – refer **Appendix F**) and the small number of days in any year for deposition, the proposed deposition should not have any adverse impacts on these shipwrecks.

Crown Land Management Act 2016
The land subject to the dredging and deposition is Crown land (below the mean high water mark). The REF and the works contained therein are being undertaken on behalf of the Crown and are consistent with the approved Tweed River Sand Bypassing Project (TSB) and the approval under s115B(2) of the *EP & A Act* dated 20th July 1998 (Ref.: G94/00236).

	The works are consistent with the provisions of the *CLM Act*. *Coastal Management Act 2016* The dredge and deposition areas are situated in coastal zone and are thus subject to the provisions of the *CM Act*. SEPP (Coastal Management) 2018 is the Environmental Planning Instrument (EPI) that gives effect to the objectives of the *CM Act*, by specifying how development proposals are to be assessed if they fall within the coastal zone. Clause 19(2)(a)(ii) provides that development for the purpose of coastal protection works (being beach nourishment) may be carried out by or on behalf of a public authority without consent. The proposed works are consistent with the provisions of the *CM Act*.

Section E – Site and locality description

Short site and locality description	The dredge area and operation is within/adjacent to the river entrance of the Tweed River and is subject of an existing approval under the *EP&A Act*. The deposition areas are in waters adjacent to Fingal Beach (north of Fingal Head) and adjacent to Dreamtime Beach (south of Fingal Head) on the Tweed Coast situated approximately between the 3m - 13m depth contours. The works are contained wholly below the MHWM of the South Pacific Ocean and there are no land-based works/activities associated with the back-passing operation.
Current use of the site	**Dredge areas:** The dredge areas comprise the Tweed River entrance and are currently used as boating navigation channels and are subject to routine dredging operations. They are also used for recreational fishing. **Deposition areas:** The deposition areas are off-shore and are currently used by residents, visitors and tourists for general boating and fishing (as well as for diving and snorkelling).
Uses on adjoining land	The deposition areas are surrounded by water/ocean. The land adjacent the deposition areas comprise ocean, sandy beaches, Fingal Headland and Cook Island.
Vegetation (*List vegetation type, condition, density; Advise the date of any previous clearing or fire. Note any threatened species from Section F, below).*	As detailed in the Aquatic Ecology Assessment (refer **Appendix E**): • the majority of the benthic habitat contained in and that will be impacted by the proposed deposition areas supports un-vegetated, sandy communities • the proposal is not expected to have any impacts on

	plants that occur above tidal limits of the shore-line (NB: the adjacent shore-line does not include any intertidal trees (eg mangroves) • the habitat in the proposal area and adjacent habitats is a high energy coastal area of open beach that is not suitable for the establishment of seagrasses • algal communities in the proposal area are restricted to microalgae that may grow amongst soft sediments – given that the sediments in the area are typically coarse (bare sands) and it is within a highly dynamic zone near the beach, the presence of any benthic microalgae will be minimal
Fauna *(List fauna known or likely to be on the site and habitat(s). Note any threatened species from Section F, below).*	A detailed Aquatic Ecology Assessment was undertaken and is provided at **Appendix E**. This assessment involved the following tasks: • review of relevant data, mapping and reports • desktop searches for threatened species, populations and communities listed under the FM, BC and EPBC Acts • identification and description of potential impacts from the proposal • consideration of the "avoid, mitigate and offset" principles • preparation of impact assessments under the EP& A Act and EPBC Act for threatened biodiversity deemed relevant to the proposal Searches of threatened species and ecological communities, including migratory species, identified one ecological community, 84 estuarine species of birds (including migratory species), 37 fish species, 20 marine mammal species (including migratory species), 8 species of reptiles, 9 shark and ray species, and 1 plant (refer Appendix 1 at **Appendix E**). Searches of the NSW Office of Environment and Heritage Bionet Atlas found records of 26 species within a 10km radius. Of all 84 species, 24 were considered further as part of the impact assessment as there was a moderate to high likelihood of occurrence or they are known to occur in the study area, being: • Beach-stone Curlew • Black-necked Stork • Crested Tern • Double-banded Plover • Eastern Curlew • Eastern Osprey • Flesh-footed Shearwater • Little Tern • Pied Oystercatcher

- Silver Gull
- Sooty Oystercatcher
- Ruddy Turnstone
- Whimbrel
- White-bellied Sea-eagle
- Wedge-tailed Shearwater
- Black Rockcod
- Grey Nurse Shark
- Great White Shark
- Humpback Whale
- Spotted Bottlenose Dolphin
- Bottlenose Dolphin
- Green Turtle
- Hawksbill Turtle
- Loggerhead Turtle

The following habitats were identified by the Aquatic Ecological Assessment (refer **Appendix E**):

Soft bottom communities

The majority of benthic habitat impacted by this proposal supports un-vegetated, sandy communities. There is potential for direct impacts on the infauna community. Impacts on this community type will likely result in some changes to the benthic infaunal assemblage. These changes will be dependent on existing species composition, depth of sand deposited on the seafloor, composition of sand, and frequency of deposition. The deposition of sand on sub-tidal areas will bury and selectively kill populations of benthic invertebrates, or indirectly alter assemblages by modifying sediment characteristics (Bishop et al 2006). Previous research has indicated that infauna associated with shallow sub-tidal areas of beaches typically recovers between six months and two years following nourishment works (Menn et al 2003). Continuous use of the deposition areas may potentially result in longer term changes to infauna communities in these areas, as they are unlikely to gain the opportunity to recover.

The existing coastal processes and sediment transfer patterns that occur at the deposition sites will also influence the impact of the sand on infauna. Previous research has found that constant deposition of sand in a dynamic sedimentary environment disperses the sand and mixes it with the ambient sediments (Roberts and Forest 1999). In the proposal area, there is potential that the dynamic nature of the environment may assist in minimising potential impacts on the infauna assemblage. This is supported by the conceptual sediment transport model, which describes the area as having very variable levels of sediment transport and deposition (Jacobs 2017). Furthermore, the proposal represents a sand volume of less than 10% per annum of the long term averaged (LTA) longshore sediment transport (LST) along the coast (Pers

Com: Matthew Harry, Senior Coastal Management Specialist - Tweed Sand Bypass, December 2018). Given that the proposal is only for small placement volumes in comparison to the natural transport rate, which will likely be dispersed quickly through the natural sediment transport pathways, and sediment deposition will be spread throughout the deposition areas, continuous and cumulative impacts on infauna will likely be minimal.

Analysis of sediments from the Tweed River entrance, (where the dredging of the material is proposed) describes sediments as bare sands that are predominately fine sands (DSITI 2016). The Backpass Deposition Areas Sediment Particle Size Distribution report (Hydrosphere Consulting (May 2018) – refer **Appendix K**) found that sediment samples taken off-shore of Fingal Beach, at similar depths to the entrance bar (ie -4 to -8m AHD) were shown to have very similar grain size characteristics to the entrance. Biological impacts on infauna have been found to be less for courser sands and those which are most similar to the receiving environment (Bishop et al 2006). This may also reduce the potential for long-term changes in the infauna assemblages within the deposition areas. The deposition of sand will also create new habitat that will be colonised by benthic animals. This colonisation process typically occurs by the settlement of propagules via the water column or migration of benthic fauna from nearby colonised areas (TEL 2011). Ultimately the deposition of sediment in these areas is likely going to be comparable, if not less than, the naturally occurring episodic events.

<u>Rocky reef areas</u>
Based on desktop review there appears to be minimal rocky substrate areas in the proposal area. Rocky substrate that may occur at times on the southern section of Fingal Head Beach, which may be directly impacted by this proposal. These areas appear in very shallow water, may be intertidal at times, and appear to be frequently covered in sand. Based on the conceptual sand transport model, the occurrence of these rocky substrates around Letitia Spit, are the result of eroding of sediment away from Fingal Head (Jacobs 2017). The smothering of rocky substrate from the proposal at the southern end of the Fingal deposition area in shallow areas adjacent to the beach is likely reflective of the natural sediment transportation and deposition patterns in the study area. Given that there appears to be a frequent natural deposition of sand in these areas, and any hard reef-like substrate is likely of minimal rugosity, any substantial sessile reef biota that is sensitive to smothering is likely to be absent. Review of aerial imagery indicates that the most potential to impact on rocky reef areas is on the southern side of the Fingal deposition area. In this area some permanent reef associated with the Cook Island Aquatic Reserve is evident on aerial imagery at approximately 200m from the proposed deposition boundary. Further indirect impacts due to water quality and sedimentation may also impact on nearby reefs.

<u>Cook Island Nature Reserve</u>
Cook Island is an important breeding and roosting site for some species of shorebirds and seabirds. This includes migratory species protected by international agreements

	under the *EPBC Act* such as CAMBA, JAMBA and ROKAMA. These species include the Crested Tern and Wedge-tailed Shearwater which are known to breed on the Island, while searches found a record of the Sooty Oystercatcher breeding on the Island. Many other species including migratory species are likely to roost on the island and utilise feeding habitat in the surrounding waters, which can be indirectly impacted from reduced water quality. Migratory bird species that utilise the waters and Island of the Cook Island Nature Reserve are also protected under numerous bilateral agreements for migratory birds. The conceptual model indicates that the migration of sediments will likely be in a northerly direction adjacent to the beach and pass between Fingal head and Cook Island. The migration of sediments to more substantial areas of reef to the north and east of Cook Island is not expected (Jacobs 2017). Thus, habitat adjacent to Cook Island impacted by this proposal is expected to primarily be areas on the Letitia Spit and within the natural sediment pathways driven by dominant winds and currents (see Jacobs 2017 for further information).
Water bodies *(Eg. coastline, wetland, watercourses, drainage channels; Whether land is flood prone; Distance of proposed activity to any water body).*	The dredging operations are contained wholly in the Tweed River entrance. The deposition/nourishment will occur in waters adjacent to Fingal Beach (north of Fingal Head) and adjacent to Dreamtime Beach (south of Fingal Head) on the Tweed Coast, situated approximately between 3m – 13m depth contours.
Topography / landforms	The deposition areas fall generally from the west down to the east, with the existing surface profiles being shown on the plans at **Appendix B**. The deposition will take place on the sea-bed between levels of approx. -3.5 to -12.5m AHD.
Soil type / stability / potential for erosion	There are no soil, stability or erosion issues
Cultural heritage *(List both Aboriginal and non-Aboriginal heritage).*	An AHIMS search and an Extensive search were undertaken (+1000m buffer) (refer **Appendix H**) which confirmed that: • 33 Aboriginal site are recorded in or near the deposition areas • 1 Aboriginal place has been declared in or near the deposition areas Due to the nature and location of the deposition works, there is not likely to be any disturbance to any items of Aboriginal heritage significance. As detailed above in Section A, representatives from the Tweed Byron LALC Aboriginal Cultural Heritage Unit were consulted by DoI – Crown Lands and undertook a joint inspection with the Crown on the 22nd January 2018 in respect of the proposed deposition (and consequential beach nourishment) with a copy of their inspection report being provided at **Appendix J**. There are three maritime heritage items listed in the OEH's

	Maritime Heritage Register in the vicinity of the deposition area being: • ship wreck – “Dellie” (Site ID 1563) • ship wreck – “Fido” (Site ID 1443) • Fingal Head Lighthouse (Site ID 2010)
Other features	The deposition/nourishment will occur in waters adjacent to Fingal Beach (north of Fingal Head) and adjacent to Dreamtime Beach (south of Fingal Head) on the Tweed Coast, situated approximately between 3m – 13m depth contours. The deposition areas are dynamic in nature (as noted in the sediment transport modelling – **Appendix F**) and located in the natural sand transport zone. There are no land based activities/works/operations associated with the back-passing by dredge.

Section F – Consideration of listings and agreements under other legislation [1]

Yes	No	
☐	☒	Does any conservation agreement under the *National Parks and Wildlife Act 1974* apply to the land?
☐	☐	If 'Yes', is there any associated plan of management?
		If 'Yes', will the proposed activity affect this agreement, and any associated plan of management?
☐	☒	Does any joint management agreement entered into under the *Biodiversity Conservation Act 2016* apply to the land?
		If 'Yes', will the proposed activity affect this agreement?
☐	☒	Does any biobanking agreement entered into under Part 7A *Threatened Species Conservation Act 1995 (funds now managed under section 6.34 of the Biodiversity Conservation Act 2016)* apply to the land?
		If 'Yes', will the proposed activity affect this agreement(s)?
☐	☒	Is there any wilderness area (within the meaning of the *Wilderness Act 1987*) in the locality of the proposal?
		If 'Yes', will the proposed activity affect this Wilderness Area(s)?

[1] The first six entries in this Section address the matters listed in s. 111 of the Act as matters that must be considered in an environmental assessment. The final entry is to record any other listings that should be considered.

☐ ☒	☒ ☐	Does the land: (i) comprise any critical habitat [2] (ii) include any threatened species, populations or ecological communities? If 'Yes': (i) will the proposed activity affect this critical habitat? (ii) will there be a significant effect on any threatened species, populations or ecological communities and their habitats? A detailed assessment of threatened species, populations and ecological communities is provided in the Aquatic Ecological Assessment at **Appendix E**, which includes: • Five Part Tests on threatened species listed under the *BC Act* • Seven Part Tests under the *EP & A Act* for species listed under the *FM Act* • Significant Impact Criteria assessments for MNES listed under the *EPBC Act*
☒	☐	Is there any other protected fauna or protected native plants within the meaning of the *National Parks and Wildlife Act 1974*? If 'Yes', will the proposed activity affect this protected fauna or native plants? An assessment of fisheries, threatened species, populations and ecological communities has been undertaken and is provided in Aquatic Ecological Assessment at **Appendix E**.
☒ ☐	☐ ☒	Are there any: (i) vulnerable species (ii) vulnerable ecological communities? [3] If yes, will the proposed activity affect these species or ecological communities? Refer Aquatic Ecological Assessment at **Appendix E**.
☐	☒	Is the land covered by any other listings or agreements? If 'Yes', list these listings and agreements here for future reference.

Section G – Guidelines, and other similar documents, in respect to the proposed activity[4]

Are there any Guidelines for this type of activity published by the Department of Planning? (*If 'yes', list*)	No

[2] This entry will also fulfill the requirement in s. 5B of the Act to have regard to critical habitat.

[3] Vulnerable species and ecological communities are listed in Schedule 5 of the *Fisheries Management Act 1994* and Schedules 1 and 2 of the *Biodiversity Conservation Act 2016* They are given a separate entry to other threatened species in this Section because they are not dealt with in the same way under the *Environmental Planning and Assessment Act 1979* – rather, protection/control is via the separate Acts (above) dealing with fisheries and threatened species.

[4] cl. 228 of the Regulation provides that the environmental impact of a proposal is to be assessed against any Guideline that has been published for the particular type of activity. It is useful in this Section to also list any other similar publications that can be used in designing and assessing the proposed activity.

Are there any other similar documents useful in assessing the proposed activity? (*If 'yes', list*)	Yes – REF's for: • Lower Tweed Dredging 2017 (Lower Tweed River and Terranora Inlet) • North Coast Priority Dredging 2015 (Lower Tweed River) • EIS and Representations Report for the proposed Tweed River Entrance Sand Bypassing project – Permanent Bypassing System (June 1997 and December 1997 respectively)

Section H – Environmental impacts [5]

Record all possible impacts on the environment likely to be caused by the activity, plus an analysis of the likely significance of those impacts. Refer to the accompanying Guidelines for assistance.

a. **Will there be any environmental impact on a community?**

☐ n/a or negligible ☐ positive ☒ low adverse ☐ medium adverse ☐ high adverse

Comment: The deposition areas are near-shore to beaches (>200m from MHWM) and are not proximate to and will not have any impacts on the community or community land. The dredge vessel will be able to operate without generating any adverse noise, odour, vibration or other operational or amenity impacts on the community.

The dredge activities will result in temporary partial obstruction of the boating navigation channel however subject to the control measures listed in Section B, it is expected that safe and efficient boat passage will be maintained. Sand deposition activities will only be for short periods of time for an estimated16 days in any 12 months and will only be during favourable weather and swell conditions.

Overall positive impacts will result for the community by improved on-going safety, efficiency and amenity of the Tweed River entrance for commercial and recreational boating and fishing (which are highly valued activities in the region) and from beach nourishment.

There has and will continue to be active stakeholder consultation for the duration of the sand bypassing project.

Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.

b. **Will there be any transformation of a locality?**

☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse

Comment: There is unlikely to be any significant transformation of the locality, and impacts if any, are likely to be short-term and temporary.

[5] This Section comprises the matters listed in cl. 228 of the Regulation as matters that must be considered in an environmental assessment (unless a Guideline for the particular type of activity has been published - .see Section G, above). Their general nature means there will be some overlap – both between these matters, and with the more specific matters required to be considered in s. 111 of the Act (Section F, above).

The proposed works, involving the supplementary placement (as required) of 50,000m3 *(maximum per annum)* between both deposition areas, with a limit of 20,000m3 *(per annum)* for the Dreamtime Beach deposition area, have the potential to raise the nearshore bed profile by 0.5m (from -4m to -3.5m) nearest the beach and 2m (-12.5 to -10.5m) along the sea-ward extent of the deposition area.

The greatest potential for impacts on wave transformation and wave breaking will likely occur in the shallow landward side (-3m to -6m) of the deposition areas where ambient to moderate wave conditions normally interact with the bed. Due to the low volumes of sand placement proposed, the bed level in this area is not likely to significantly increase (0.5m or less change in elevation). This will result in near-shore wave transformation and breaking being similar to adjacent beaches under ambient to moderate wave conditions.

All sand placement will be sub-tidal and not be emergent. Based on the requirements for draft and limiting wave conditions for operation of the dredge, the majority of sand will be placed seaward of the -3m contour away from the breaking wave zone. The sand placement will likely result in wave breaking occurring further sea-ward under energetic / large wave conditions, however surfing amenity is greatest in ambient to moderate wave conditions.

Any changes to wave transformation are expected to be short-term as sand placement is expected to quickly re-work into the active bar system natural littoral processes. There is potential for improvements to surfing amenity immediately following deposition where the changes in bed level are greatest before littoral process disperse the placed sand.

Deposition will utilise pattern placement so as to establish an even uniform increase in bed levels which will not result in increased wave shoaling and refraction in the near-shore.

In addition to the above, any impacts to surf amenity are likely to be identified through the existing monitoring and community consultative processes for the Tweed River Entrance Sand Bypass project such as:

- Advisory & Community Committee
- Aerial photography
- Coastal imaging system
- Wave monitoring

There is unlikely to be any impacts to visual amenity. The proposed operation is not intended to be permanent or fixed; rather it is supplementary to the existing approved Tweed Sand Bypass operations to aid in achieving the objectives of the Tweed River Entrance Sand Bypass Project as established under relevant legislation. The proposed activity allows for improved flexibility in the placement of sand for beach nourishment purposes e.g. erosion of Fingal Head/ Letitia Beach.

In reference to REF content, it is estimated that a typical back-passing dredge campaign would comprise a total of 10 days per year only (exclusive of 6 stand-by days) across both deposition areas. This calculation is based on 3 loads per day for each area. The return transit from dredge site to deposition area (inclusive of dredging, positioning and deposition) is estimated to be 60mins for Fingal and 80mins for Dreamtime. This equates to a total return transit of 180mins for Fingal and 240mins for Dreamtime in any one day, during the calculated 10 day per year window (exclusive of 6 stand-by days).

The dredge vessel will transit from the dredge site to the deposition areas, deposit the material and return to the dredge site.

	The proposed operation may or may not be used to its 'full' permitted extent e.g. the calculated 10 days per year in any given year; and the use of the back-passing option is largely dependent on the supplementary requirements of the TRESBP operations to meet its legislated objectives. Due to the 'mobile' and intermittent nature of the dredge-placement operation, which has a very limited working time for sand placement at its 'full' permitted extent - between June to September for approx. 16 days per year (inclusive of 6 stand-by days); impacts on the visual amenity of the area are likely to be negligible if any. The movement of the dredge in the near-shore will not result in significant changes in the visual amenity from nearby headlands and beaches. In addition, the dredge has a small size as compared to the working area (Length (OA): 49.5m and Width: 10.5m) and will present a small visual footprint while in operation. This REF further notes the establishment of the Tweed Sand Bypassing Advisory Committee as part of the current approved operations; and discussion of this back-passing by dredge proposal at the meeting held on the 1st August 2018. The Committee includes Fingal community members, dive charters and members of the public. Meetings are scheduled regularly approx. 2-3 times per annum. Community forums such as the Advisory Committee as noted in the REF provide a suitable feedback mechanism to identify any community concerns in relation to visual impacts associated with the proposal. There are substantial public needs and benefits to ensuring that the river entrance is maintained for safe and efficient boat navigation and that the local beaches are continually nourished/replenished with sand. Mitigation Measures: Continuation of existing community consultative processes such as the Advisory Committee.
c.	**Will there be any environmental impact on the ecosystems of the locality?** ☐ n/a or negligible ☐ positive ☒ low adverse ☐ medium adverse ☐ high adverse Comment: Possible environmental impacts (particularly on aquatic ecology) during deposition and transport. The aquatic ecological assessment (**Appendix E**) has confirmed that there are no likely significant impacts on State and/or Commonwealth listed threatened biodiversity or matters of national significance subject to the implementation of the aquatic ecologist's recommendations. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
d.	**Will there be any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The proposed works will not have any adverse impacts on the aesthetics and environmental quality of the locality during transport and deposition (refer to

	Aquatic Ecology Assessment at **Appendix E**). There will not be any significant adverse impacts on the aesthetic, recreational, scientific or other environmental quality/value of the locality. The return transit, dredging, positioning and deposition will take approx. 60 minutes to Fingal and approx. 80 minutes to Dreamtime, with 17 loads being taken to Fingal and 11 loads to Dreamtime, which based on 3 loads/day, equates to 6 days of operation to Fingal and 4 days of operation to Dreamtime in any 12 month period (excluding any stand-by days). The sand deposition will be of a minimal amount that will be approximately 10% of the estimated natural sand transport load per annum and is thus expected to have a negligible impact. There are substantial public needs and benefits to ensuring that the river entrance is maintained and that the local beaches are nourished with sand and there will thus be positive impacts on such. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
e.	**Will there be any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The deposition areas are removed from the known ship wreck sites and there will not be any impacts on or disturbance of these wrecks. There will also not be any impacts on any Aboriginal cultural heritage places or items resulting from the near-shore sand deposition (refer **Appendices H** and **J**). Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
f.	**Will there be any impact on the habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)?** [6] ☐ n/a or negligible ☐ positive ☒ low adverse ☐ medium adverse ☐ high adverse Comment: The aquatic ecological assessment (**Appendix E**) has confirmed that there are no likely significant adverse impacts on State and/or Commonwealth listed threatened biodiversity or matters of national significance subject to the implementation of the aquatic ecologist's recommendations. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
g.	**Will there be any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The proposed works will not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air (refer Aquatic Ecological

[6] The response for this entry can refer to the overlapping, entry in Section F, above.

	assessment at **Appendix E**). Five Part Tests were conducted on threatened species listed under the *BC Act*. Seven Part Tests were conducted for species listed under the *FM Act*. For MNES listed under the *EPBC Act*, significant impact criteria assessments were conducted (refer **Appendix E**). It is considered highly unlikely that the proposed works will endanger any species of animal, plant or other form of life. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
h.	Will there be any long-term effects on the environment? ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: Contingent upon the implementation of the safeguards and management measures detailed in **Section B**, there should not be any long term effects on the environment. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
i.	**Will there be any degradation of the quality of the environment?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: Generally the quality of the local environment will remain largely unchanged. Contingent upon the safety and environmental measures detailed in Section B being complied with and implemented, there should not be any degradation of the quality of the environment. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
j.	**Will there be any risk to the safety of the environment?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: Contingent upon the implementation of the safeguards and management measures detailed in **Section B**, there should not be any risk to the safety of the environment. The works will actually improve the safety and efficiency of the river entrance (which is heavily trafficked by all manner of vessels) and will ensure an on-going supply of sand for beach nourishment for local beaches (reducing the potential for beach erosion). Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
k.	**Will there be any reduction in the range of beneficial uses of the environment?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The range of beneficial uses of the river entrance (including its safety,

	efficiency and functionality) and the local beaches will be protected and improved by the works. The uses of the local environment by members of the community will not be adversely impacted due to the sporadic nature and small number of days in any year that the deposition will be undertaken. Mitigation Measures: Nil specifically required.
l.	**Will there be any pollution of the environment?** ☐ n/a or negligible ☐ positive ☒ low adverse ☐ medium adverse ☐ high adverse Comment: Possibility for increased turbidity, suspended solids and potential water contaminants in water sediments, waste materials, fuels and chemicals to be spilled during haulage and deposition. There is minimal potential for impacts on sediment quality from this proposal as the sands to be dredged for the beach nourishment have been determined as bare sands (being similar to clean marine sands) (DSITI 2016). However, flood events and or major storms have potential to change the sediment composition of the entrance to be dredged. Sediments outside the dredge area have also not been assessed for contaminants since 1997. Water quality parameters such as turbidity and sedimentation have the potential to impact on fauna, flora, the Aquatic Reserve, and adjacent reef communities, which include hard corals. Where increased risks of exposure of reef habitats within the aquatic reserve to elevated levels of suspended solids are expected or detected, monitoring for sedimentation and impacts to reef flora and fauna should be considered. Given the proposed safeguards and management procedures, pollution to the environment is unlikely. Mitigation Measures: Implement safeguards and management measures and develop Project Environmental Management Plan detailed in **Section B**.
m.	**Will there be any environmental problems associated with the disposal of waste?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: There will not be any particular waste stream generated by the works other than wastes associated with the operation of the dredge vessel (which such waste stream already existing due to the dredge already operating in the area). Mitigation Measures: All waste materials are to be appropriately disposed of or recycled where possible and practicable (refer **Section B**).
n.	**Will there be any increased demands on resources (natural or otherwise) that are, or are likely to become in short supply?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The project is not likely to place undue demands on any resources. Other than fuel, there are no other resources required. The deposition of the dredged sand will facilitate beach nourishment. Mitigation Measures: Nil specifically required.
o.	**Will there be any cumulative environmental effect with other existing or likely future activities?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The works will improve the current and long-term safety, efficiency and amenity of the river entrance and will provide an on-going supply of sand nourishment

	to the local beaches. The maintenance dredging has perpetual approval and is required to maintain the safe and efficient use of the river entrance. The proposed back-passing by dredge will comprise an integral component of that operation and the dredged material will provide a perpetual supply of sand to facilitate beach nourishment. Mitigation Measures: Nil specifically required.
p.	**Will there be any impact on coastal processes and coastal hazards, including those under projected climate change conditions?** ☒ n/a or negligible ☐ positive ☐ low adverse ☐ medium adverse ☐ high adverse Comment: The proposed works are the result of coastal processes (namely long-shore sand drift). There are no coastal hazards associated with the proposed haulage and deposition. Mitigation Measures: Nil specifically required.

Section I – Conclusions and Recommendations

☒ The environmental impacts are considered to be such that the proposed activity could take place without any modification.

☐ The environmental impacts are considered to be such that the proposed activity could take place, but only if modified in the following manner:

☐ The environmental impacts are considered to be such that the proposed activity should not take place.

☐ The environmental impacts are considered to be significant and the matter needs to be progressed by way of an Environmental Impact Statement, a Species Impact Statement prepared similar to an EIS, or a 'major project' application under Part 3A of the Act, depending on the circumstances.

In addition:

☒ (i) the proposed activity complies with and/or is consistent with relevant specific requirements in the following planning instruments:

State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (Coastal Management) 2018

☐ (ii) the environmental impacts of the proposed activity in respect to threatened species, populations or ecological communities, are considered to be significant and as such [*tick whichever is applicable*]:

☐ the concurrence of the Director-General of Environment and Climate Change is to be sought (where the Minister for Planning is not the determining authority)

☐ the Director-General of Environment and Climate Change is to be consulted (where the Minister for Planning is the determining authority)

in respect to the intention to allow the proposed activity to take place – prior to the issue of the necessary approvals for the carrying out of the proposed activity.

☒ (iii) the proposed activity will require the following approvals under other legislation:

Protection of the Environment Operations Act 1997

- Amendment to EPL No. 10432 (as per EPA's letter dated 20th June 2018)

Environment Protection (Sea Dumping) Act 1981

- Referral of REF and supporting information to Department of Environment and Energy for a determination of requirement if any for a sea dumping permit.

Fisheries Management Act 1994

- Notice of the proposed work is required in accordance with s199 of the FM Act.

Comment:

This REF has been prepared by APP on behalf of the Department of Industry – Crown Lands (DoI) who has responsibility for over-seeing the maintenance of the navigable depth of the Tweed River entrance. The DoI is the proponent and is also the determining authority for the project under Part 5 of the *EP & A Act*.

The REF relates to a project involving the back-passing of sand that will be dredged from the Tweed River entrance, so as to maintain a navigable depth/channel of the Tweed River entrance and the near-shore deposition of the sand that will facilitate beach nourishment. The proposal involves the back-passing of a maximum of 50,000m^3 of material per annum (in perpetuity) of material that will be dredged from the river entrance under the Minister's conditional approval under s115B(2) of the *EP & A Act* dated 20th July 1998 (Ref: G94/00236).

The deposition/nourishment of dredged sand will occur in waters adjacent to Fingal Beach (north of Fingal Head) and adjacent to Dreamtime Beach (south of Fingal Head) adjacent to Dreamtime Beach (south of Fingal Head) on the Tweed Coast, approximately between 3m – 13m depth contours. The deposition areas are dynamic in nature as they are located in the natural sand transport zone.

The works form part of the Tweed Sand Bypassing (TSB) project, which is a joint marine sand delivery project between the NSW and QLD State Governments.

The proposed works fall under the ambit of SEPP (Infrastructure) 2007, particularly Division 25 – Water or foreshore management activities. This REF describes the

proposed works, and provides an assessment of the likely impacts on the natural and man-made environment including ameliorative measures to be implemented in order to minimise/mitigate any environmental impacts associated with the works.

The proposed work is not considered to be such that will result in significant adverse impacts on the natural or man-made environment. The measures outlined in Section B of this REF are to be implemented and complied with at all times during back-passing to ensure that the findings/recommendations of the REF remain valid.

Name: Paul Snellgrove

Position: Senior Town Planner

Date: 2 July 2019

Section J – Determination

I accept and endorse the recommendation.

Comment:

Name: KIM BOWRA

Position: A/DIRECTOR INFRASTRUCTURE AND ASSETS

Date 11/07/2019

Appendix A
Photographs of project works area

Appendix B
Plans of proposed deposition areas

Appendix C
Zoning maps (Tweed LEP 2000 and 2014)

Appendix D
Plans of approved QLD waters placement areas

Appendix E
Aquatic ecological assessment

Appendix F
Tweed quantified conceptual sediment transport model

Appendix G
Stakeholder Consultation Summary

Appendix H
AHIMS search and Extensive search results

Appendix I
Map of Cook Island Aquatic Reserve

Appendix J
Tweed Byron LALC Aboriginal Cultural Heritage Unit inspection report

Appendix K
Backpass Deposition Areas Sediment Particle Size Distribution report

Appendix L
Tweed River Entrance Back-passing by Dredge- Approval Notice