Report and recommendations of the Environmental Protection Authority

Anketell Point Port Development, Antonymyre, Shire of Roebourne

API Management Pty Limited

Report 1445

July 2012

Public Environmental Review
Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
30/07/2009	Level of Assessment set (date appeals process completed)	
16/03/2010	Final Environmental Scoping Document approved	**32**
20/12/2010	Environmental Review Document (ERD) released for public review	**40**
28/02/2011	Public review period for ERD closed	**10**
05/04/2012	Final Proponent response to ERD issues raised	**57**
30/07/2012	Publication of EPA report (three days after report to Minister)	**16**
13/08/2012	Close of appeals period	**2**

STATEMENT ON TIMELINES

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority did not meet its agreed timeline objective of 12 weeks for the completion of the assessment and provision of a recommendation to the Minister. This was due to the complexity of the project and additional consultation on the conditions with the proponent and decision making authorities to ensure the conditions are auditable and can be implemented effectively by the proponent.

Dr Paul Vogel
Chairman
26 July 2012

ISSN 1836-0483 (Print)
ISSN 1836-0491 (Online)
Assessment No. 1794

Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal to establish and operate a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point. The Proposal by API Management Pty Limited (API) allows for facilities required by API and future third parties to be developed.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

1) Marine benthic habitats and environmental quality;
2) Marine fauna
3) Terrestrial fauna; and
4) Flora and vegetation.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- Precautionary Principle.
- Principle of Intergenerational Equity.
- Principle of Conservation of Biological Diversity and Ecological Integrity.
- Principles relating to improved Valuation, Pricing and incentive Mechanism.

- Principle of Waste Minimisation.

Conclusion

The EPA has considered the proposal by API to establish and operate a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point. API's initial requirements for the port (this proposal) are to export up to 45 Million tonnes per annum (Mtpa) and the initial capacity of the port is expected to be 115 Mtpa.

The proposal being assessed by the EPA is consistent with the draft Anketell Port and Strategic Industrial Area Port Master Plan (Port Master Plan) prepared by the Dampier Port Authority (DPA) and Department of State Development. The nominal ultimate capacity of the port is expected to be in the order of 350 Mtpa. Development of the port infrastructure up to this capacity will be staged and likely to occur over at least a twenty year period. The further expansion of the port to 350 Mtpa is not part of this assessment.

API has changed its port design (the proposal described in the PER) during the assessment to accommodate the requirements of the Port Master Plan. In particular, the Port Master Plan design comprises a single causeway stepping directly off the mainland which now avoids Dixon Island, an area important for indigenous heritage and fauna values. The changed proposal also reduces potential impacts on Bouguer Passage, an area with significant coral communities.

Marine Habitats and Environmental Quality

The EPA notes that the implementation of the proposal would result in unavoidable impacts to Benthic Primary Producer Habitat (BPPH) and other benthic communities, some of which would be permanent but the majority of which are predicted to recover within five years.

Sixty one point three (61.3) hectares (ha) of BPPH and 122.9 ha of non-BPPH would be permanently lost. In regard to BPPH, 19.2 ha of this loss would be hard coral communities, 41.5 ha algal mat and 0.6 ha mangroves. For non-BPPH, 102.3 ha of filter feeder habitat and 20.6 ha of pavement reef would be lost. Corals, macro algae and turf algae surrounding Bezout Island and Bells Reef could potentially be impacted by the proposal. Coral habitat located in the north-east corner of Dixon Island would also be potentially impacted. The EPA has recommended that the proponent ensure protection of at least 70% of baseline live coral cover on the designated coral habitats of Bezout Island, Bell's Reef and the north-east Dixon Island.

Cumulative loss thresholds would be exceeded for permanent loss for Local Assessment Unit (LAU) A (proposed Dampier Archipelago Marine Park) for algal mats and LAU B for coral. In relation to algal mats, the proponent has indicated that they are of relatively low organic content, patchy and already damaged due to vehicle activity. While the loss of coral exceeds the recommended LAU guideline of 10%, it is noted that API has accounted for

the loss for construction of the causeway to the ultimate size expected for the Port Master Plan proposal and therefore does not anticipate any further permanent loss of coral within this LAU.

The rock causeway has the potential to modify coastal processes affecting littoral drift and beaches in the area. The construction of the causeway could impact coral communities and tidal flows around Anketell Point, Dixon Island and Bouguer passage by sediment accumulation along the causeway. The proponent has undertaken additional modelling to predict the potential impacts of the changed causeway design on hydrodynamics. The results of additional modelling are described in the response to submissions. In summary, the predictions are that there is unlikely to be an impact on hydrodynamics of Bouguer Passage but there is likely to be a buildup of sediments along the western side of the causeway.

API will, however, only be constructing the first stage (in terms of width) of the causeway. The causeway will be constructed to approximately 30 m wide and be developed at a later date to its full width of 200 m. API's proposal is for a solid earthen and armoured causeway. No trestle structures are proposed on the main causeway as they are not expected to be able to accommodate the future large tonnage uses of the causeway proposed in the Port Master Plan.

The EPA has recommended Condition 8 to ensure that dredging and dredge disposal activities, and construction of the rock causeway achieve the following environmental protection outcomes:

i. no irreversible loss of, or serious damage to, benthic habitats outside of the Zone of High Impact;

ii. protection of at least 70% of baseline live coral cover on each designated coral habitat within the Zone of Moderate Impact; and

iii. no detectible net negative change to benthic habitats relative to the baseline state of those habitats, outside of the zones of High and Moderate Impact.

The proponent has prepared a Dredge Environmental Management Plan. The EPA considers this plan requires further work, particularly with regard to reviewing management and contingency measures to improve confidence that the dredging program can be managed to achieve the predicted outcomes.
A separate Port Marine Infrastructure Construction Monitoring and Management Plan is recommended as a condition to address construction of the jetty, causeway and boat harbours. This separate plan recognises that dredging and dredge spoil disposal is proposed to occur in a single campaign while the causeway is likely to be implemented over a longer period of time. Both plans provide for appropriate monitoring to demonstrate that environmental protection outcomes are being met. Noting that the causeway will be expanded over time, the EPA has also recommended Condition 9 to ensure that, following the initial causeway development, the results of available monitoring and management will be assessed to inform the design of the fully completed causeway. The EPA considers that direct and indirect impacts/risks remain to benthic primary producer habitats and has therefore

recommended a package of offset projects to mitigate the residual impacts of the proposal. The offset projects will improve the understanding and management of the impacts of dredging on tropical marine communities (Condition 19).

A condition (Condition 10) has also been recommended for the proponent to prepare a State of the Marine Environment survey that addresses provision of baseline and ongoing survey data to demonstrate compliance with environmental protection outcomes.

The ongoing operations of the port to achieve environmental quality objectives and maintain levels of defined ecological protection are addressed in Condition 14.

Marine fauna

Humpback whales were recorded adjacent to the proposal area during the southern migration (August - November). The greatest densities of adult whales and calves within the inshore area surveyed were recorded south-west of Delambre Island approximately 15 km from the proposed piling operations and south-east of Delambre Island approximately 10 km from the proposed piling operations. Low numbers of Bryde's whales and false killer whales were recorded offshore of the proposal area.

Dolphins and dugong were also observed during the aerial surveys of the broad area during this time. With the increase of coastal developments along the Pilbara coastline impacting potential habitat, further surveys are required to determine the relative importance of the Anketell area to the Priority 4 humpback and snubfin dolphins. The EPA has recommended that the proponent contribute to research projects that will add to the understanding and management of the impacts and risks to conservation significant marine fauna, including humpback and snubfin dolphins, from marine and coastal development in the Pilbara region (Condition 19).

The EPA notes that Flatback turtle nesting was observed at two beaches on Dixon Island and one beach at Anketell Point. The number of turtles recorded indicated that these beaches have a much low density of use compared to other nearby islands and beaches. Additionally, the flatback and hawksbill turtle rookeries of Dixon Island are not considered regionally significant when compared with other nearby island rookeries such as Delambre, Legendre and Angel Island. The EPA has recommended conditions that require the proponent to ensure lighting from port activities is designed and managed during operations so it does not cause significant disturbance at turtle nesting beaches in the region.

Piling activities could injure whales and dolphins if they are within the Zone of Possible Physical Injury which has been modelled at 22 m from the noise source. For turtles, this distance is expected to be 55 m. The EPA has recommended conditions that provide for a marine fauna observer to be present at all times during piling activities. Additionally, piling activities should be suspended if cetaceans (whales and dolphins) and dugong are sighted

within 1500 m or marine turtles are sighted within 300 m of the activity. The proponent, as part of its mitigation measures has proposed studies to understand the impact of project related marine noise on marine mammals. This is addressed as part of Condition 19.

Terrestrial fauna

It is noted that the proposal would directly impact fauna of conservation significance due to clearing, construction and operational activities. All conservation significant species that are likely to be impacted have extensive habitat outside the proposal area.

The proposal envelope includes 9.1 ha (or 1.8%) of the 498 ha of the total known *Lerista nevinae* (*L. nevinae*) habitat. The majority of habitat to be lost will be where the causeway crosses to the onshore port areas.

The proposal has been designed to avoid as much as possible the direct footprint impacts on *L. nevinae* habitat. The proponent will be constrained to remain within the footprint of the proposal as shown in Figure 1 in the schedule attached to the recommended Ministerial Statement. Condition 7 has been recommended to ensure direct impacts to *L. nevinae* habitat do not exceed that which is permitted. The condition also requires the proponent to actively manage *L. nevinae* habitat to ensure that its habitat value is maintained or enhanced. Additionally, Condition 19 requires the proponent to contribute to additional research to improve understanding of the ecology, population genetics and habitat requirements of the species.

Flora and vegetation

A Level 3 Priority Ecological Community (PEC) 'Horseflat Landsystem of the Roebourne Plain' was identified within the proposal envelope. The proposal would impact up to 107 ha of the PEC or 2.56% of the project area. The PEC is widely distributed outside the project area. The proposal is not expected to have an impact on the conservation status of the PEC. The proposal will be managed and monitored to ensure that impacts are contained to areas predicted.

The EPA has therefore concluded that it is likely that the EPA's objectives would be achieved provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4.

Other advice

The EPA has provided other advice in relation to cumulative impacts from dust. Dust for the current proposal (115 Mtpa) will be managed in accordance with the works approval and licence requirements of the EP Act. The nearest sensitive receptors from the proposal are Wickham and Point Sampson. Further studies will need to be conducted for the ultimate capacity of 350 Mtpa including considering any mitigation measures to ensure air quality at Point Sampson and Wickham is not significantly impacted.

The EPA also notes that the proposed expansion of the port to its ultimate capacity of 350 Mtpa would require additional water for operation and dust control. Additionally, the EPA is currently assessing other proposals within the region that will require desalination plants. It is therefore important that the impacts from any additional desalination plants discharging within the Anketell region are considered cumulatively and not in isolation so that appropriate decisions are made about their co-location and management actions can be taken to protect the marine environment.

The proposed second terminal to enable the port to reach its ultimate capacity would require approximately 30 Mm^3 of dredging and spoil disposal and would cause direct and indirect impacts to BPPH and alter water quality. The additional dredging could increase the loss of BPPH within the LAUs defined by the proponent. These impacts will have to be assessed prior to development to determine if the cumulative impacts are acceptable.

Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for a deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point;
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes the EPA has concluded that it is likely that the EPA's objectives would be achieved, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by API to establish and operate a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- Finalisation of the location of marine infrastructure prior to construction (Condition 6).
- Restricting clearing within potential habitat for the Schedule 1 listed species *Lerista nevinae* (Condition 7).
- Restricting impacts to marine benthic communities from dredging, dredge disposal and causeway construction activities to spatially

defined areas with provision to suspend activities if impacts exceeds these areas (Condition 8).

- Consideration for the final design of the rock causeway and materials off-loading facility (MOF) to ensure coral reefs are protected (Condition 9).
- Undertake State of the Marine Environment Surveys to monitor and report potential changes to the marine environment during the construction phase of the proposal (Condition 10).
- Ensuring near shore marine facilities do not have a significant impact on coastal processes (Condition 11).
- Managing light spill from port facilities on turtle beaches (Condition 12).
- Managing marine piling and dredging activities to minimise impacts on marine fauna (Condition 13).
- Ensuring water, sediment and biota in marine water within and around the proposal are managed and monitored to defined ecological protection values (Condition 14).
- Managing vessels within the port to prevent, detect and control marine pests (Condition 15).
- Setting decommissioning criteria prior to closure (Condition 16).
- Enabling management plans to be implemented and reviewed in stages (conditions 17 and 18).
- Residual impact and risk management measures (Condition 19).

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by API Management Pty Limited (API), to establish and operate a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities. The proposal is located at Anketell Point approximately 30 kilometres (km) north-east of Karratha and 6 km north-west of Wickham (see Figure 1). The proposal allows for facilities required by API and future third parties to be developed.

The proposal was referred to the EPA in June 2009. On 30 July 2009, the EPA determined that the proposal should be assessed at the level of Public Environmental Review (PER) with an eight week public review period due to potential impacts to a number of significant factors such as flora and vegetation, fauna, surface water and groundwater, noise, marine environment (water quality, fauna, coral), liquid and solid waste disposal, air quality and greenhouse gas emissions.

The proposal was also referred to the then Department of Environment, Water Heritage and the Arts (DEWHA). On 9 November 2009, DEWHA considered that the proposal should be a "controlled action" under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts to listed threatened species and communities under sections 18 and 18 A of the EPBC Act, listed migratory species and Commonwealth marine areas. DEWHA determined that the proposal would be assessed by Public Environment Report.

The proponent developed an Environmental Scoping Document (ESD) which highlighted the environmental issues related to the proposal, studies and/or surveys that would be required and potential management actions that would be developed to mitigate environmental impacts. The EPA approved the scoping document on 16 March 2010.

The PER document, developed by the proponent, was released for public review from 20 December 2010 to 28 February 2011. The EPA received a total of 20 submissions which were provided to the proponent on 8 March 2011. The proponent's response to submissions document was submitted to the EPA on 31 October 2011. The EPA received the proponent's final response to issues raised on 5 April 2012.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 notes matters of National Environmental Significance under the EPBC Act. Section 6 provides other advice by the EPA and Section 7 presents the EPA's recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

API proposes to develop a deepwater port at Anketell Point to provide for the export of iron ore and possibly other bulk commodities produced by the West Pilbara Iron Ore Project and projects of third parties. It is a requirement of the State Government that any port at Anketell Point be 'multi-user' that is, that port capacity be available to third parties on terms to be agreed with the State for the development of the port. As a multi-user port, the port will ultimately fall under the jurisdiction of the Dampier Port Authority (DPA). The land and water of the port will be vested in the DPA at a later time. Figure 1 shows the regional location of the proposal.

The nominal ultimate capacity of the port is expected to be in the order of 350 Mtpa. Development of the port infrastructure up to this capacity will be staged and likely to occur over at least a twenty year period. API's initial requirements for the port (this proposal) are to export up to 45 Mtpa and the initial capacity of the port is expected to be 115 Mtpa.

The main components of the proposal will be 22 km of railway to complete the rail corridor from API's West Pilbara Iron Ore Project Stage 1 mines to the port. Two car dumpers will initially be required to unload the ore from the rail cars onto stockpile conveyors with up to two slewing and luffing stackers to build the shipping stockpiles. A shipping stockpile pad will also be required to store iron ore fines and lump. Up to two bucket-wheel reclaimers to move the ore from stockpile to the export conveyor will be constructed and a conveyor will move the ore from the shipping stockpiles to the ship-loading facilities (API, 2010).

Marine infrastructure would include a 3 km causeway extending from the mainland and a 1.1 km piled trestle jetty and wharf supporting four berths. A 15.2 km shipping channel will be dredged including two berthing pockets and turning basin to provide sufficient water depth for cape size vessels. Three areas have been identified for disposal of dredge spoil with a total area of 2,202 ha. Sections of the dredge disposal areas are located within Commonwealth waters (API, 2011).

Other infrastructure required includes; offices, workshops, ancillary infrastructure; a 3.5 GL per annum desalination plant to provide water for dust suppression, potable purposes and infrastructure maintenance, a 40 MW power station, bulk fuel storage facilities to store 40 ML of diesel and a wastewater treatment/disposal system. See Figure 2 for an indicative layout of the proposal.

The proponent plans to develop a quarry located to the east of Anketell Point to provide rock for the construction of the causeways.

A temporary accommodation camp would be constructed to provide sleeping, messing, ablution, and recreational facilities for up to 900 people and peaking to 1,200.

A main access road and one or more port service roads would be developed to provide vehicular access to and within the port (API, 2010).

The main characteristics of the original proposal described in the PER are summarised in Table 1 below. A detailed description of the proposal is provided in Section 2 of the PER (API, 2010).

Table 1 - Summary of key proposal characteristics stated in PER

Element	Description
General	
Marine Components	
Marine footprint	Total marine footprint is not more than 2,380 ha, Comprising: - 590 ha marine infrastructure footprint, and - 1,790 ha marine dredge material disposal areas
Shipping channel	17.6 km long and 200 m wide (widening to 300 m at the seaward end) and dredged to a depth of -15.7 to -16.9 m Chart datum (CD) (480 ha)
Dredge volume	Total dredge volume 26.6 Mm^3 (30% hard material)
Dredging duration	Approximately 17 months
Piling duration	Approximately 18 months
Berth pockets and turning basin	Two berth pockets dredged to -20 m CD plus turning basin dredged to -11.5 m CD (90 ha)
Jetty and product-loading wharf	560 m long piled trestle jetty and wharf with two-sided berthing (two berths in total) incorporating the brine discharge diffuser from the desalination plant
Approach jetty causeway	920 m long (originating from the north-east end of Dixon Island) connecting to jetty and wharf (including a small tug harbour at the northern end)
Anketell Point – Dixon Island causeway	1000 m long rock armour causeway (including a 100 m long bridge) crossing Bouguer Passage
Dredge material disposal areas (DMDAs)	1,2 & 3. Total area 1,790 ha
Terrestrial Components	
Terrestrial Footprint	Total terrestrial footprint is not more than 770 ha, comprising: - 752 ha mainland footprint, and - 18 ha Dixon Island footprint
Ore transport and storage infrastructure (including rail link) for	Two car dumpers, conveyors, stockyards, ore stackers and ore reclaimers, pipelines, 14 km of railway (including two loops) terminating

115 Mtpa	approximately 3 km immediately south of Anketell Point.
Construction and operations support infrastructure	Accommodation camps, administration facilities, workshops, quarry and quarry infrastructure, power plant, desalination plant, fuel farm (including refuelling and ancillary infrastructure and bulk fuel storage facilities), waste water infrastructure, drainage controls, pipelines, service corridors, communication towers, sea wall, construction laydown areas, Dampier Port Authority facilities, magnetite filter and storage infrastructure, other industry facilities and infrastructure
Access roads	From the North West Coastal Highway parallel to railway, within the transport corridor; and from Wickham to Anketell Point
Desalination plant	Production of up to 3.5 GL of potable water per annum (intake of 18 ML/day of seawater). Brine discharge of 8.8 ML/day
Power plant	A 40 MW natural-gas-fired power station (with diesel back up) and transmission lines
Accommodation camps	Approximately 900 persons during construction
Quarry	Mainland: Adjacent to existing quarry site, to supply causeway construction materials Dixon Island: Quarry area west and east of the shipping conveyors will be used to supply causeway construction materials
Dixon Island conveyors	For transporting product from Anketell Point to the product-loading wharf

Since release of the PER, considerable changes to the proposal have been made by the proponent in response to submissions received during the public review period and the Dampier Port Authority's Anketell Port Land Use and Infrastructure Master Plan 2011 - 2041. In October 2011, API applied to the EPA under section 43A of the *Environmental Protection Act 1986* (EP Act) to change the proposal during the assessment. The EPA determined, on 8 December 2011, that these modifications and changes were acceptable as they did not introduce any additional significant environmental impacts. The changed proposal comprises a single causeway stepping directly off the mainland which now avoids Dixon Island, an area important for indigenous heritage and fauna values. The changed proposal also reduces impacts on Bouguer Passage, an area with significant marine habitat, as there is no longer a requirement for a causeway and trestle structure which potentially removed habitat and had consequential impacts on the hydrodynamics of the passage. Table 2 describes the changes to the proposal.

Table 2 - Key characteristics of changed Proposal

Element	Changed Proposal design
Marine Component	
Marine footprint	Total marine footprint of 2,710 ha, comprising: - 508 ha marine infrastructure footprint, and - ~2,202 ha marine dredge material disposal areas
Shipping channel	15.2 km long and 200 m wide (widening to 300 m at the seaward end) and dredged to a depth of -16.0 to -17.2 m CD
Dredge volume	Total dredge volume 34 Mm^3 (~31% hard material)
Dredging duration	Approximately 20 months
Piling duration	Approximately 22-24 months
Berth pockets and turning basin	Four berth pockets dredged to -20 m CD plus turning basin dredged to -11.5 m CD (152 ha)
Jetty and product-loading wharf	1,110 m long piled trestle jetty and wharf with two-sided berthing (four berths in total) incorporating the brine discharge diffuser from the desalination plant
Approach jetty causeway	3 km long and 200 m wide rock causeway running NNE off Anketell Point
Anketell Point– Dixon Island causeway	Removed
Dredge material disposal areas (DMDAs)	Increase in size of DMDA2 of 412 ha. Total area – 2,202 ha

Terrestrial Component	
Terrestrial Footprint	Total terrestrial footprint is not more than 1,275 ha, comprising: - 958 ha mainland footprint, and - 317 ha western rail corridor No footprint on Dixon Island
Ore transport and storage infrastructure (including rail link) for 115 Mtpa	Additional 8.1 km of rail corridor allowing for two rail lines and associated infrastructure.
Construction and operations support infrastructure	Relocation of desalination plant intake and discharge No other significant changes
Access roads	No change
Desalination plant	Slight change to intake and discharge locations associated with relocation of causeway
Power plant	No change
Accommodation camps	Approximately 900 persons during construction peaking at around 1,200 persons
Quarry	No quarry on Dixon Island
Dixon Island conveyors	Replaced by longer conveyors along approach jetty causeway

The potential impacts of the proposal initially predicted by the proponent in the PER document (API 2010) and their proposed management are summarised in Table ES 1.3 Executive Summary of the proponent's document.

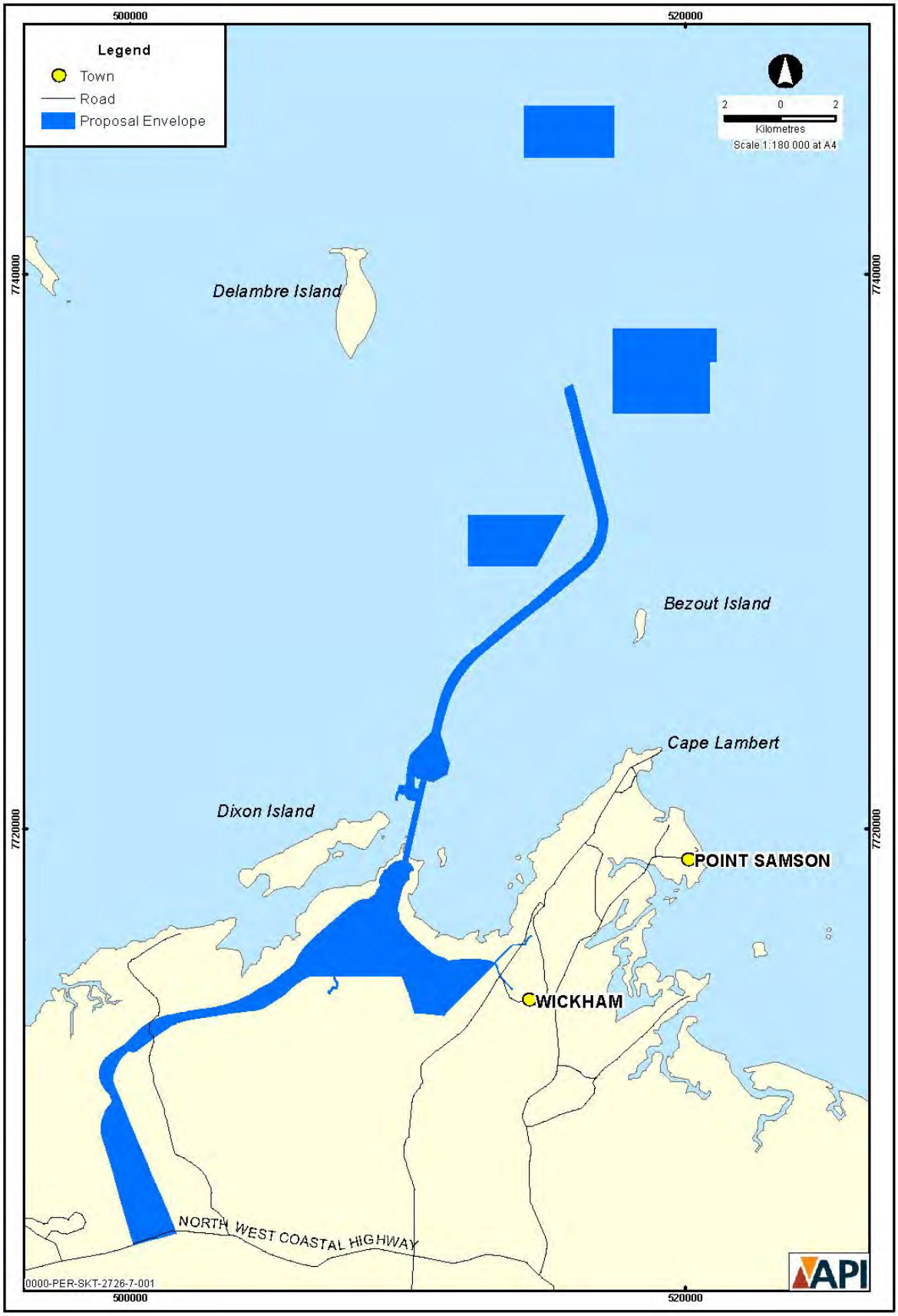

Figure 1 - Regional location of proposal

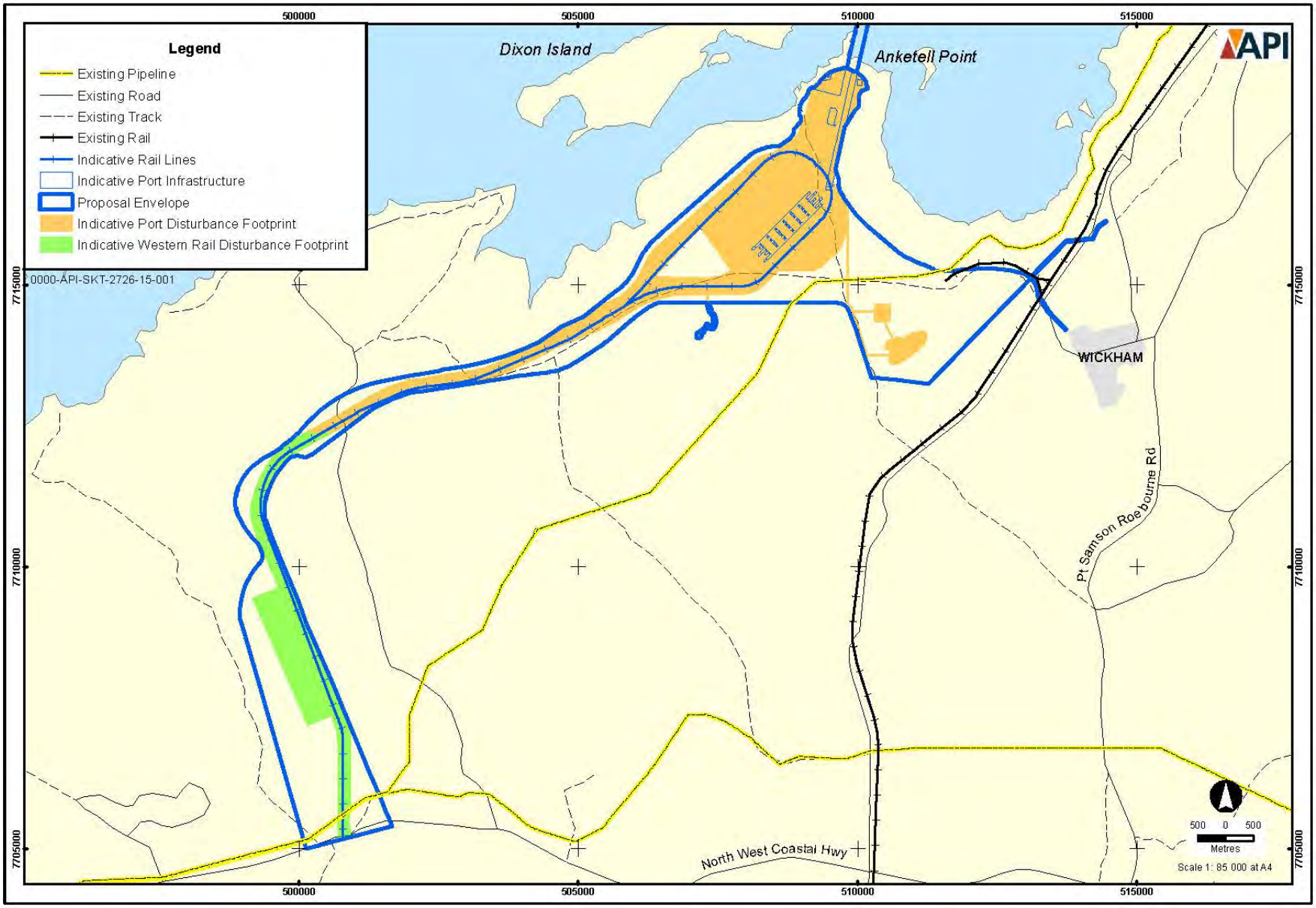

Figure 2 - Detailed layout of proposal

3. Key environmental factors and principles

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as soils, rehabilitation, noise, hydrocarbon spills, indigenous cultural heritage and recreation, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

- Marine habitats and environmental quality;
- Marine fauna;
- Terrestrial fauna; and
- Flora and vegetation.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in sections 3.1 - 3.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- Precautionary Principle.
- Principle of Intergenerational Equity.
- Principle of Conservation of Biological Diversity and Ecological Integrity.
- Principles relating to improved Valuation, Pricing and incentive Mechanism.
- Principle of Waste Minimisation.

3.1 Marine habitats and environmental quality

Description

Benthic habitats provide an important foundation for many ecosystem processes that underpin the marine environment. Benthic primary producer habitats (BPPH) are defined in Environmental Assessment Guideline (EAG) No. 3 (EPA, 2009) as seabed communities within which algae (e.g. macroalgae, turf and benthic microalgae), seagrass, mangroves, corals or mixtures of these groups are prominent components.

Dredging, disposal activities and construction of the causeway will result in the direct loss of BPPH. Dredging and disposal will also result in elevated turbidity and sedimentation potentially impacting BPPH. Vegetation clearing during construction may result in the direct loss of mangrove vegetation with the rail corridor footprint. he presence of the causeway may alter coastal processes within the Bouguer Passage and result in indirect impacts to mangrove vegetation.

The habitat adjacent to the proposal is predominantly unvegetated soft sediment. However, BPPH was recorded within the proposal area included seagrass, hard coral, macroalgae, mangroves and turf algae. Mangroves are present along the mainland shoreline both east and west of Anketell Point and along the southern shore of Dixon Island. *Avicennia marina* is the most abundant species. Figure 3 shows the mapped locations of BPPH (AECOM, 2010d).

Coral

Coral genera and species encountered in the surveyed areas were similar to those listed from the Dampier Archipelago. *Turbinaria*-dominated and mixed coral assemblages were observed in turbid coastal zones, while the *Acropora* assemblage occurred offshore in clearer water. The *Porites*-dominated assemblage appeared to be associated with good current flow and low to moderate turbidity, while the *Pavona*-dominated assemblage was found in relatively sheltered sites with moderate turbidity. Throughout many of the sites surveyed in the vicinity of Anketell Point, environmental variables appeared to relate to coral associations in a similar fashion, although there were exceptions. The main differences to corals within the project area compared to those from the Dampier Archipelego were that corals at Bezout Island were dominated by a single species, *Galaxea fascicularis* and the scarcity of *Turbinaria* throughout the project area (AECOM, 2010e).

It is likely that subtle differences in environmental conditions and ecological history between the Dampier Archipelago and the Cape Lambert area have produced slightly different coral communities and that no simple classification can apply to both areas.

Corals in the Pilbara area reproduce primarily in the mass spawning events of autumn (predominantly March with a component in February or April) with a secondary and much smaller spawning event in spring or early summer.

Larvae are released 6 to 10 days after the full moon at those times and spend a few days in the plankton before settling and becoming juvenile corals (AECOM, 2010d).

Mangroves

Mangroves are present along the mainland shoreline both east and west of Anketell Point and along the southern shore of Dixon Island. Mangrove stands around Anketell Point range from sparse/patchy clumps through to dense stands, while the southern shoreline of Dixon Island supports extensive areas of dense mangrove stands.

The mangrove species *Avicennia marina, Rhizophora stylosa* and *Ceriops tagal* were identified during field surveys. The grey mangrove, *Avicennia marina*, is the most dominant mangrove species in the proposal area (AECOM, 2010e).

Mangroves in proximity to the proposal could potentially be affected through direct loss due to vegetation clearing, or indirectly through altered coastal processes following causeway construction and dust generation. The proposal would result in the clearing of up to 0.6 ha of mangroves.

According to EPA Guidance Statement 1 (Guidance Statement for protection of tropical arid zone mangroves along the Pilbara coastline), mangroves within the proposal area are situated in Area 15 (Dixon Island Complex). Mangroves within this area are of very high conservation value (designated “regionally significant”) (EPA, 2001).

Macroalgae

The most abundant macroalgae in the region are brown algae (Phaeophyta) represented mostly by the genera *Sargassum*, *Dictyopteris* and *Padina*. Green algae (Chlorophyta) present in the region include species of *Caulerpa* and *Halimeda*. Red algae (Rhodophyta) have also been recorded and are represented by crustose coralline forms (*Amphiroa* sp.) and algal turf. The species *Sargassum* spp. was observed on the eastern side of Bezout Island, with smaller dense patches occurring within the coral flat on the western side of Delambre Island. The red alga *Asparagopsis* sp. was widespread, reaching its highest density on the eastern side of Bezout Island (AECOM, 2010e)

Seagrass

Surveys surrounding Anketell Point indicated that seagrasses were not common and were represented only by isolated monospecific patches of *Halophila ovalis*, *Thalassia hemprichii* and *Thalassodendron* sp. Seagrass meadows, predominantly *Thalassia hemprichii*, occur at low levels of cover only in shallow sandy environments east and west of Delambre Island.

The most commonly encountered seagrass species was *Halophila ovalis*, and this may be due to this species having a wide tolerance to adverse environmental conditions. The Anketell Point area is subject to frequent disturbance in the form of strong seasonal westerly and easterly winds and

relatively strong tidal currents that redistribute sediments and influence survivorship and distribution of seagrasses. *Halophila ovalis* is described as a colonising species that is the first to establish after disturbances (Lanyon and Marsh, 1995), which may explain why this is the dominant seagrass species recorded (AECOM, 2010e).

Turf algae

Turf algae were found to be widespread and abundant within the Proposal area but their taxonomy was not examined in detail. Areas of turf algae were found in Bouguer Passage, north-west of Dixon and Bezout islands, and in deep water east of Delambre Island. They were observed attach to reefs, coral or shell rubble with an approximate height of not more than 5 cm. Turf algal communities are often characterised by fast-growing, ephemeral or rapid coloniser species, such as *Hincksia mitchelliae* (a filamentous brown alga) and *Centroceras clavulatum* (a filamentous red alga) (AECOM, 2010e)

Filter feeder habitat

Filter feeders include sponges, ascidians, gorgonians, soft corals, bivalve molluscs and sea pens. Video surveys show these organisms were found exclusively on hard substrata where they could attach successfully. Previous investigations in the Dampier Archipelago have observed the highest densities of sponges and gorgonians over flat pavement in areas with strong current flow. This distribution reflects the availability of attachment sites and the plentiful food supply necessary for the persistence of these sessile fauna.

Filter feeders were most often found at low densities (<5% cover) associated with hard corals. However, higher densities of filter feeders were observed over flat pavement in deeper water (>10 m) north-east of Bezout Island, on the eastern and western ends of Dixon Island and to the north of Delambre Island. The Delambre Island filter feeder community occupies an extensive area. Its spatial extent, particularly to the north, could not be mapped precisely as it was relatively patchy. Based on chart bathymetry and depth sounder observations it continues at least to the northern boundary of the study area.

Oysters were observed within rocky parts of the intertidal immediate north of Dixon Island but without forming extensive banks. Clams of the genus *Tridacna* were seen occasionally in reef flat areas (AECOM, 2010e).

Proponent's prediction of impacts

The proponent has predicted the impacts of the proposal on benthic habitats in accordance with EPA's Environmental Assessment Guideline No.7 for Marine Dredging Proposals. A fundamental part of EAG No. 7 is guidance for the application of a spatial zonation scheme that has been designed to provide clarity and consistency to the way predicted impacts of dredging activities on benthic habitats are presented. This spatial zonation scheme allows impacts to be presented in simple map-forms that convey information about the predicted extent, severity and duration of impact (EPA, 2011).

Outputs of sediment transport and water quality modelling were interrogated against a number of pressure thresholds for benthic communities to allow the locations of boundaries for the Zone of High Impact, Zone of Moderate Impact and Zone of Influence to be predicted. Figures 3 and 4 show the proponent's predicted zones of impacts. A summary of impacts within each zone is as follows:

Zone of High Impact (ZoHI)

The ZoHI is the area immediately about the proposed dredging and dumping areas where indirect impacts are predicted to be severe and irreversible. This zone defines the area where mortality of, and long term serious damage to, biota and their habitats would be predicted.

Mapping has identified that 61.3 ha of BPPH and 122.9 ha of non-BPPH (filter feeder habitat and pavement reef) would be permanently lost within the ZoHI. 19.2 ha of this loss is expected to be hard coral communities. This loss is attributed to the construction of the rock causeway and subsequent sediment accumulation due to changes in coastal processes (API, 2011). The calculated loss is for the ultimate size expected for the Port Master Plan proposal which is a 200 m wide rock causeway. API plan to construct a rock causeway approximately 30 m wide for the first stage of the proposal.

Zone of Moderate Impact (ZoMI)

The ZoMI is described as the zone where sub-lethal effects on key benthic biota would be predicted, but there should be no long term damage to, or modification of, the benthic organisms, the communities they form or the substrates on which they grow.

It is estimated that up to 589.2 ha of BPPH and 1065.7 ha of filter feeder habitat would fall within the ZoMI (API, 2011). This zone includes BPPH surrounding Bezout Island and Bells Reef.

Zone of Influence (ZoI)

The ZoI is the area where at some time during the proposed dredging and spoil placement activities small changes in sediment-related environmental quality beyond the natural ranges which might be expected, however, the intensity and duration is such that no detectible effects on benthic biota or their habitats should be experienced (API, 2011).

Generating the predictions in this way has also allowed the proponent to calculate the potential permanent losses of BPPH and present those predictions in the context of Environmental Assessment Guideline No. 3 (EPA, 2009). EAG 3 provides a risk-based spatial assessment framework for evaluating cumulative irreversible loss of and/or serious damage to benthic primary producer habitats. Table 3 shows the cumulative loss guidelines for BPPH within defined local assessment units for six categories of marine ecosystem protection. The cumulative loss values for the environmental impact assessment of proposals are the sums of proposed and historic loss/serious damage for each different benthic primary producer habitat within

a defined sub-ecosystem scale area termed a ‘local assessment unit (LAU)’. For this assessment, the proponent has identified 9 LAUs in relation to benthic habitats as described in the Table 4 and shown in Figure 5.

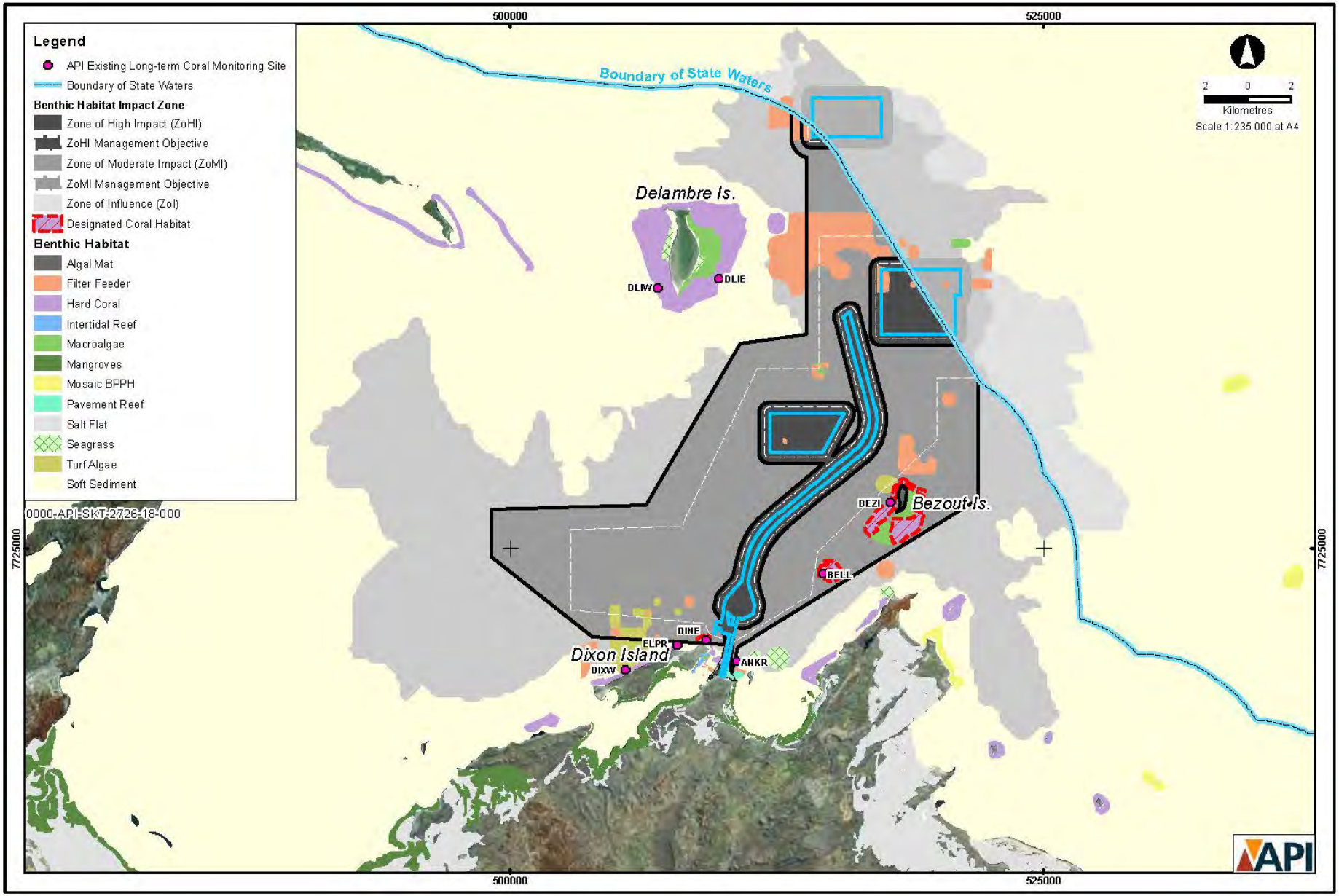

Figure 3 - BPPH location and impact zones - regional

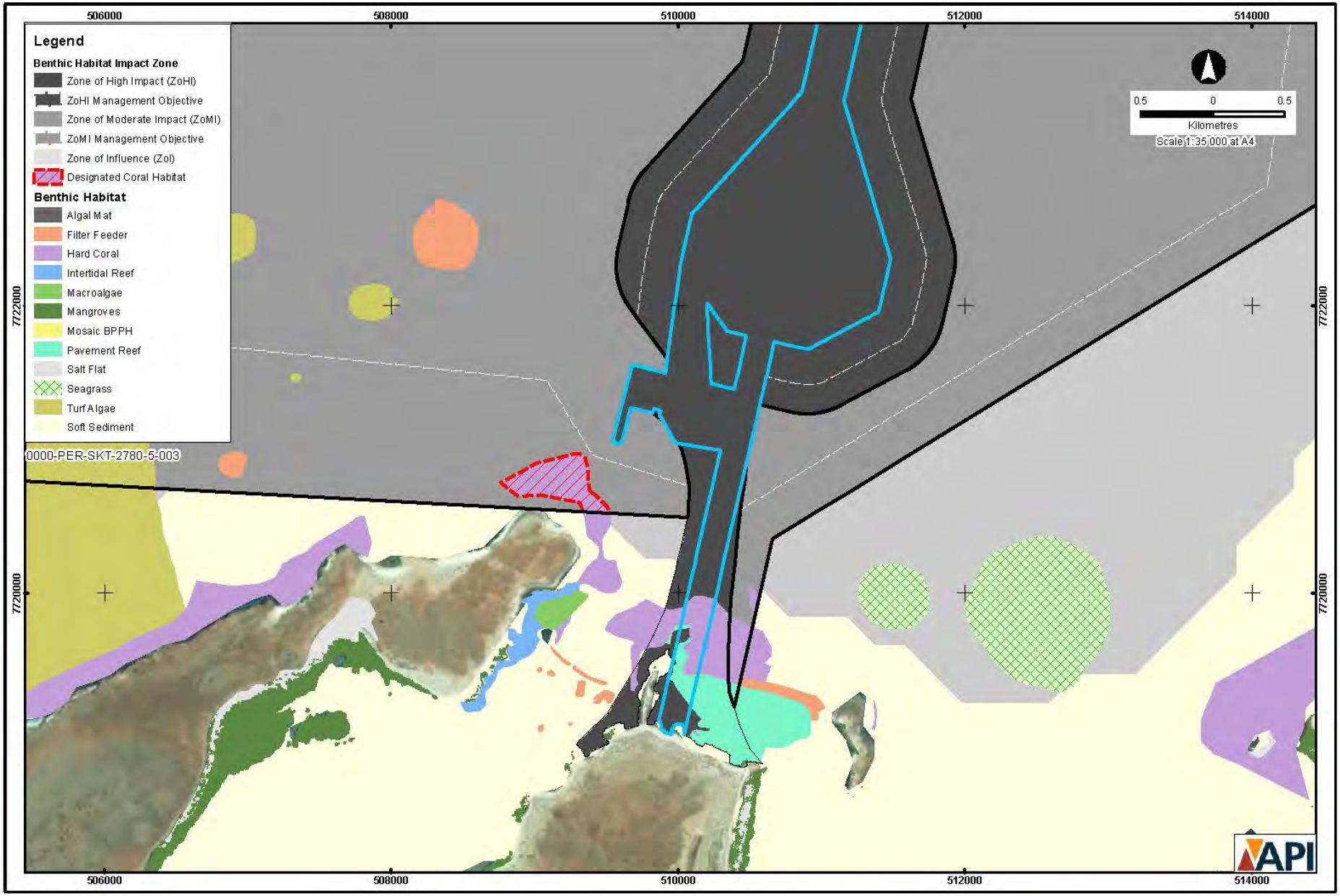

Figure 4 - BPPH impact zones - causeway

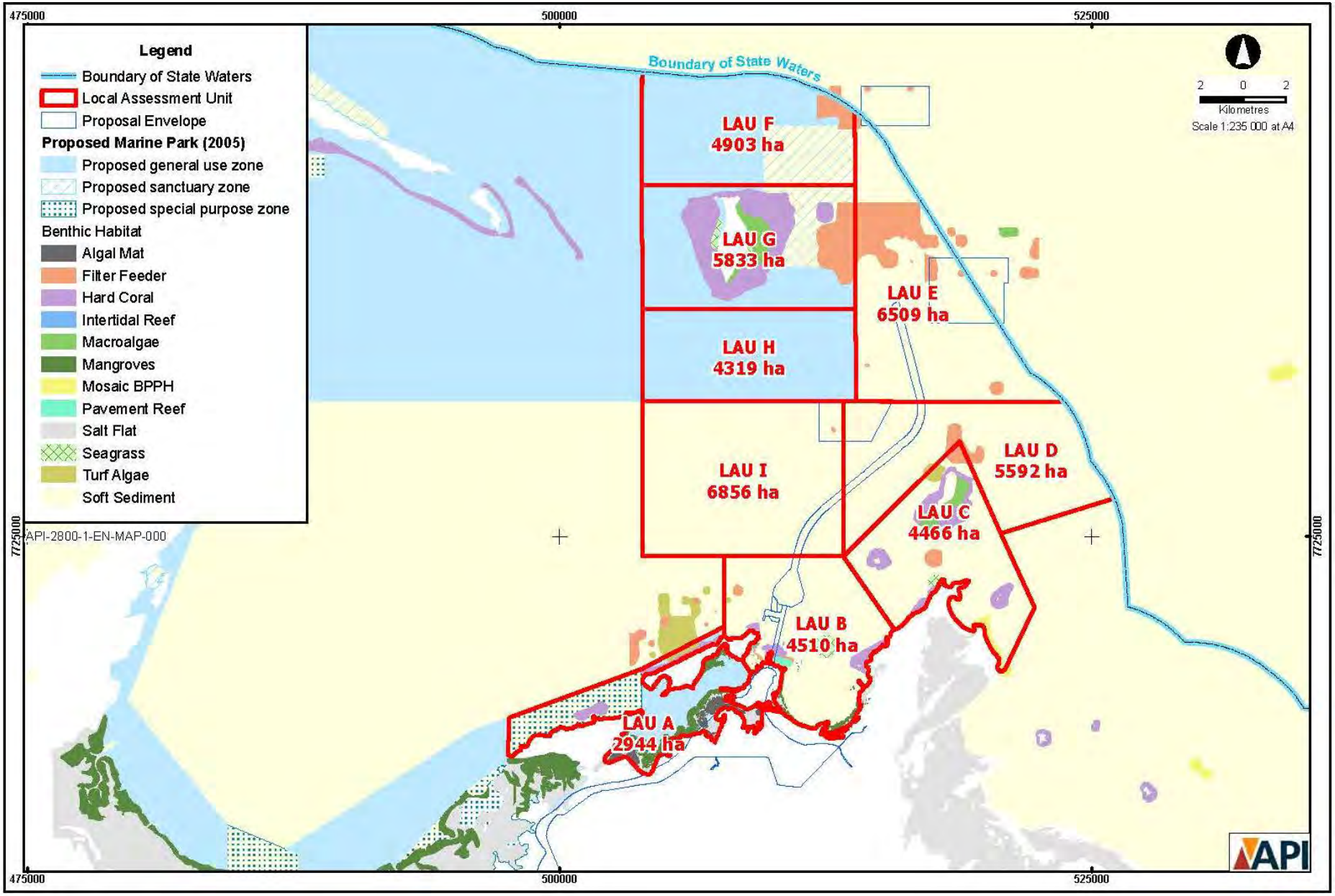

Figure 5 - LAU's defined for the proposal

Table 3 - Cumulative loss guidelines for BPPH within defined local assessment units for six categories of marine ecosystem protection.

Category	Description	Cumulative loss guideline [1]
A	Extremely special areas	0%
B	High protection areas other than above	1%
C	Other designated areas	2%
D	Non-designated areas	5%
E	Development areas	10%
F	Areas where cumulative loss guidelines have been significantly exceeded	No net damage / loss

[1] **Defined as a percentage of the original area of BPPH within a defined local assessment unit.**

Table 4 - Percentage Loss of BPPH within LAUs

LAU	Cumulative loss guideline	Permanent loss	Reversible loss
A	Category B 1%	0.2% (0.6 ha) mangroves 31.1% (41.5 ha) algal mat	Nil
B	Category E 10%	14.1% (19.2 ha) Hard Coral	14.6% Hard Coral 100% Turf Algae
C	Category E 10%	*3.2% Hard Coral*[*] *87.3% Seagrass*[*]	75.6% Hard Coral 100% Macroalgae 100% Turf Algae
D	Category D 5%	Nil	100% Turf Algae
E	Category D 5%	Nil	Nil
F	Category B 1%	Nil	Nil
G	Category B 1%	Nil	Nil
H	Category B 1%	Nil	Nil
I	Category D 5%	Nil	Nil

** Predicted loss due to Rio Tinto's approved Cape Lambert Port B development*.

As identified in Table 4, a total of 61.3 ha of BPPH would be permanently lost. Of this loss, 19.2 ha would be hard coral communities, 41.5 ha algal mat and 0.6 ha mangroves. For non-BPPH, 102.3 ha of filter feeder habitat and 20.6 ha of pavement reef would be lost.

Cumulative loss thresholds would be exceeded for permanent loss for LAU A (proposed Dampier Archipelago Marine Park) for algal mats and LAU B for coral.

Operational marine environmental quality

The Pilbara Coastal Water Quality Consultation Outcomes (DoE, 2006) recommends a set of environmental values and associated environmental quality objectives for the state's marine waters from Exmouth to Cape Keraudren.

Four levels of ecological protection are linked to the environmental quality objective for maintenance of ecosystem integrity, which protects the environmental value of ecosystem health. Each level of protection has corresponding environmental quality conditions (limits of acceptable change in contaminant concentrations and biological parameters) stipulated as described in Schedule 3 of the recommended conditions. The purpose is to allow for management of conservation values and multiple uses (with some localised effects) while still maintaining the overall structure and function of the ecosystem.

For the proposal, a maximum level of ecological protection is proposed for most of the proposed Dampier Archipelago Marine Park (general use zone), in which a target of no change from unimpacted background levels applies (DoE, 2006). A moderate level of ecological protection, which allows "elevated levels of contaminants" and "moderate change from natural variation" is anticipated for berth pockets and turning basin. A high level of protection is likely to apply to the surrounding areas, including the shipping channel and dredge disposal areas. The brine outfall of the desalination plant must be contained within the zone of moderate level of ecological protection.

Figure 6 shows the zones of ecological protection for the proposal.

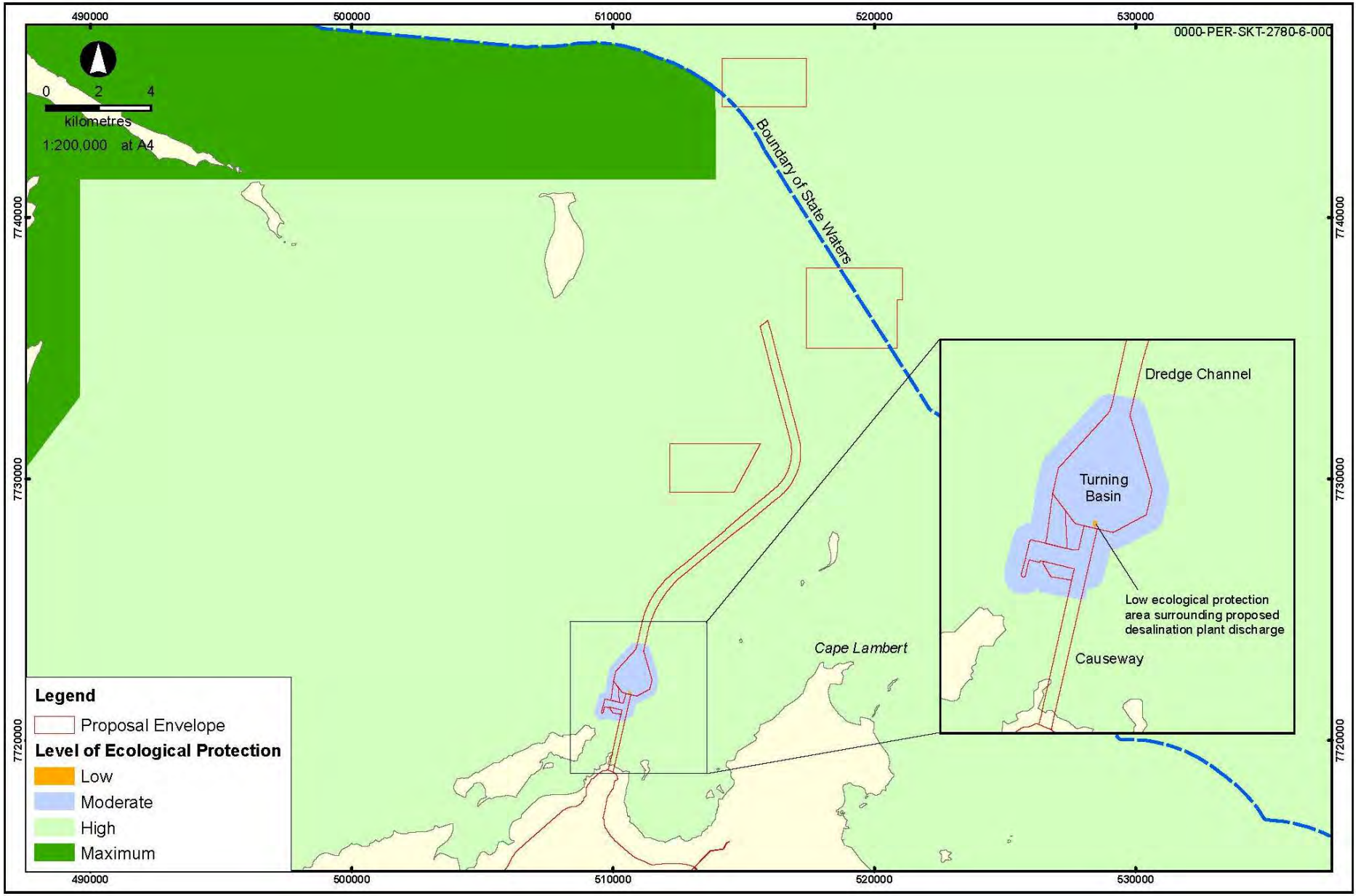

Figure 6 - Zones of ecological protection

Management

The main management actions proposed by the proponent include:

- Develop water quality triggers for contingency actions (e.g. modification of dredge program) to minimise the risk of impacts on coral health from elevated turbidity/sedimentation.

- Undertake ongoing monitoring of habitat health (hard corals) during construction.

- Undertake ongoing water quality monitoring during construction and operation.

- Ensure ongoing minimisation of TSS and sedimentation impacts by:
  - using the 'green' valve within the overflow pipes of the trailing suction hopper dredge;
  - increasing overflow levels to highest possible point during transport of dredge spoil, to minimise spillage; and
  - restricting hopper dewatering to the dredging and disposal areas.

- Avoid unnecessary direct losses of mangroves outside of the proposed infrastructure footprint.

- Implement shoreline protection measures should indirect impacts on mangroves be recorded as a result of the Proposal (API, 2010).

Submissions

The submissions for this factor raised the following issues:

- Comments on the benthic habitat impact assessment methodology and accuracy of predicted loss results.
- Suggestion of alternative infrastructure designs to minimise impact on benthic habitats.
- Submissions stating the existence of distinct coral communities to the east of the Burrup Peninsula, and identifying the presence of coral species additional to those reported within the supporting studies.
- Submissions suggesting that sediment fate model validation include turbidity measurements close to the dredge cutter head and the implementation of adaptive (rather than reactive) management.
- Querying the management triggers for the protection of BPPH.
- Submissions questioning the mapping and classification of habitats within Bouguer Passage, and stating that extensive areas of BPPH (including corals and seagrass) and filter feeder habitats occur in this area.

Assessment

The EPA's environmental objective for this factor is to maintain the integrity, ecological functions and environmental values of the seabed and coast; and to maintain the abundance, diversity, geographic distribution and productivity of flora and fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

The proposal has been changed in response to submissions received and strategic planning for the area. The shifting of the causeway further east so that the causeway no longer crosses Bouguer Passage to Dixon Island significantly reduces the impacts on coral and other marine habitats in Bouguer Passage.

The EPA notes that the implementation of the proposal would result in unavoidable impacts to BPPH and other benthic communities, some of which would be permanent but the majority of which are predicted to recover within five years.

The EPA has developed six categories of ecosystem protection and corresponding cumulative loss guidelines (Table 3) for BPPH, which provide guidance on acceptable values of cumulative loss (as percentages of area lost) due to historical and proposed activities (EPA, 2009).

Modelling of the worst case scenario for dredging and disposal impacts from turbidity and sedimentation is shown in Figures 3 and 4. The zone of high impact has been defined as a 500 m buffer around the turning basin, shipping channel and disposal grounds. The Zone of Moderate Impact shows reversible impacts to filter feeder habitat (1065.7 ha) and BPPH (589.2 ha) including corals, macro algae and turf algae surrounding Bezout Island and Bells Reef. Coral habitat located in the north-east corner of Dixon Island would also be within the Zone of Moderate Impact. The proponent has committed to managing dredging and monitoring water quality to avoid impacts to these coral habitats and has prepared a preliminary Dredge Environmental Management Plan. The EPA has recommended that the proponent ensure protection of at least 70% of baseline live coral cover on the designated coral habitats of Bezout Island, Bell's Reef and the north-east Dixon Island.

As identified in Table 4, 61.3 ha of BPPH and 122.9 ha of non-BPPH would be permanently lost within the ZoHI. In regard to BPPH, 19.2 ha of this loss would be hard coral communities, 41.5 ha algal mat and 0.6 ha mangroves. For non-BPPH, 102.3 ha of filter feeder habitat and 20.6 ha of pavement reef would be lost.

Cumulative loss thresholds would be exceeded for permanent loss for LAU A (proposed Dampier Archipelago Marine Park) for algal mats and LAU B for coral. In relation to algal mats the EPA notes the proponent has indicated that they are of relatively low organic content, patchy and already damaged due to vehicle activity. While the loss of coral exceeds the recommended LAU

guideline of 10%, it is noted that API has accounted for the loss for construction of the causeway to the ultimate size expected for the Port Master Plan proposal and therefore does not anticipate any further permanent loss of coral within this LAU.

The exceedance in LAU C for seagrass is attributed to Rio Tinto's approved Cape Lambert Port B development.

As discussed above the Government's Port Master Plan has resulted in no impact to Dixon Island and reduction of impacts to Bouguer Passage when compared to API's original proposal for a causeway to Dixon Island. Bouguer Passage contains a number of coral communities that were likely to be significantly impacted by the previous proposal. The decision to shift the causeway and to provide for a substantially wider (200 m) solid earthen and armoured causeway to accommodate Government's Port Master Plan has however, increased the impacts on nearshore corals where the causeway now leaves the mainland. The proponent has undertaken additional modelling to predict the potential impacts of the changed causeway design on hydrodynamics. The results of additional modelling are described in the response to submissions. In summary, the predictions are that there is unlikely to be an impact on hydrodynamics of Bouguer Passage but there is likely to be a buildup of sediments along the western side of the causeway.

API will however, only be constructing the first stage (in terms of width) of the causeway. The causeway will be constructed to approximately 30 m wide and be developed at a later date to its full width of 200 m. API's proposal is for a solid earthen and armoured causeway. No trestle structures are proposed on the main causeway as they are not expected to be able to accommodate the future large tonnage uses of the causeway proposed in the Port Master Plan.

The EPA has recommended Condition 8 to ensure that dredging and dredge disposal activities, and construction of the rock causeway achieve the following environmental protection outcomes:

i. no irreversible loss of, or serious damage to, benthic habitats outside of the Zone of High Impact;

ii. protection of at least 70% of baseline live coral cover on each designated coral habitat within the Zone of Moderate Impact; and

iii. no detectible net negative change to benthic habitats relative to the baseline state of those habitats, outside of the zones of High and Moderate Impact.

The proponent has prepared a Dredge Environmental Management Plan. The EPA considers this plan requires further work particularly with regard to reviewing management and contingency measures to improve confidence that the dredging program can be managed to achieve the predicted outcomes.

The recommended conditions require the proponent to update the Dredge Environmental Management Plan. A separate Port Marine Infrastructure Construction Monitoring and Management Plan is recommended to address

construction of the jetty, causeway and boat harbours. This separate plan recognises that dredging and dredge spoil disposal is proposed to occur in a single campaign while the causeway is likely to be implemented over a longer period of time. Both plans provide for appropriate monitoring to demonstrate that environmental protection outcomes are being met and it is expected that in developing the plans, monitoring effort will be proportionate to the significance of the environmental impacts of the dredging and dredge spoil disposal campaign and port marine infrastructure construction activities.

Noting that the causeway will be expanded over time, the EPA has also recommended Condition 9 to ensure that following the initial causeway development, the results of available monitoring and management will be assessed to inform the design of the fully completed causeway.

A condition (Condition 10) has also been recommended for the proponent to prepare a State of the Marine Environment Survey that addresses provision of baseline and ongoing survey data to demonstrate compliance with environmental protection outcomes.

Coastal processes

The rock causeway has the potential to modify coastal processes affecting littoral drift and beaches in the area. The construction of the causeway could impact coral communities and tidal flows around Anketell Point, Dixon Island, Bouguer passage by sediment accumulation along the causeway (Oceanica, 2011). The proponent has prepared a Coastal Habitat Management Plan that describes the proposed monitoring and management measures to limit the impacts of the rock causeway to beaches and coastal processes.

The EPA has recommended that this plan be updated and included as a condition (Condition 11).

Operational marine environmental quality

The ongoing operations of the port, including discharges to the marine environment, anchoring, and maintenance dredging campaigns need to be managed to ensure protection of the marine environment. The EPA has recommended a condition to be applied to the operational phase of the proposal requiring the proponent to monitor and demonstrate that a High Levels of Ecological Protection being achieved within the port area with the exception of the designated area of Moderate Ecological Protection.

Introduced marine pests

Construction vessels and equipment used for dredging and pile driving pose a risk of introducing pest species to Anketell Point Port if they are not appropriately managed. The EPA notes that the introduction of marine pest species has the potential to cause significant and widespread impacts to natural marine communities and to commercial fisheries and aquaculture in the Anketell Point area.

It is the EPA's view that:

- with the implementation of inspection and clearance procedures for construction vessels and equipment;
- the proponent's commitment to undertake regular marine pest monitoring; and
- ensuring monitoring design, implementation and reporting standards are consistent with the *National System for the Prevention and Management of Marine Pest Incursions (Marine Intergovernmental Agreement, April 2005)*

the risk of pest species incursions at Anketell Point Port can be managed to within levels that do not exceed the risks at other Pilbara ports. Condition 15 is recommended to address this issue.

Proposed environmental offsets

The EPA considers that direct and indirect impacts/risks remain to benthic primary producer habitats and has therefore recommended a package of offset projects to mitigate the residual impacts of the proposal. In relation to BPPH, the proponent proposes to commit $2.5 million over four years to improve the understanding and management of the impacts of dredging on tropical marine communities. The EPA is satisfied that the proposed offset project for this factor is reasonable given the scale of impacts and the residual risk of impacts to BPPHs. Accordingly, the EPA has recommended Condition 19 and Schedule 4 which incorporates the proponent's offset project.

Summary

Having particular regard to the:

- recommended Condition 8 requiring the proponent to monitor and manage its dredging and dredge disposal activities, and construction of the rock causeway to achieve environmental protection outcomes and boundaries for the Zone of High Impact, Zone of Moderate Impact and the Zone of Influence;
- recommended Condition 9 requiring the proponent to consider the final design of the rock causeway and marine offloading facility to minimise impacts to BPPH;
- requirement to undertake State of the Marine Surveys which will assess the impact of the proposal on the marine environment during keys stages of construction (Condition 10);
- requirement to minimise impact and manage coastal processes (Condition 11);
- requirement to manage ongoing port operations to achieve environmental quality objectives and maintain levels of defined ecological protection (Condition 14);

- requirement to manage and prevent the introduction of marine pests (Condition 15); and
- requirement to contribute to a project which would enhance the capacity within Government and the private sector to predict and manage the impacts of dredging on tropical marine communities in Western Australia (Condition 19),

it is the EPA's opinion that it is likely that the EPA's environmental objective for this factor can be achieved.

3.2 Marine fauna

Description

A total of 51 Threatened and Migratory marine species listed under the EPBC Act may occur in the proposal area. These consist of seven marine mammal species, six marine reptile species, one species of shark and 37 species of birds. One bird species is listed as Endangered, the Southern Giant Petrel, *Macronectes giganteus* (API, 2010). The marine mammal, reptile and sharks species are listed below in Table 5.

Table 5 - List of Conservation Significant marine species that occur or may occur in the proposal area

Scientific Name	Common Name	EPBC Act Listing Status	Wildlife Conservation Act / DEC listing
Dolphins			
Sousa chinensis	**Indo-Pacific humpbacked dolphin[1]**	Migratory	P4
Tursiops aduncus	**Spotted bottlenose dolphin[1]**	Migratory	
Whales			
Balaenoptera edeni	**Bryde's whale[1]**	Migratory	
Balaenoptera musculus	Blue whale	Endangered	Rare
Megaptera novaeangliae	**Humpback whale[1]**	Vulnerable	Rare
Orcinus orca	Killer whale	Migratory	
Marine Turtles			
Carretta caretta	Loggerhead turtle	Endangered	Rare
Chelonia mydas	**Green turtle[1]**	Vulnerable	Rare
Eretmochelys imbricata	**Hawksbill turtle[1]**	Vulnerable	Rare
Dermochelys coriacea	Leatherback turtle	Endangered	Rare

Scientific Name	Common Name	EPBC Act Listing Status	Wildlife Conservation Act / DEC listing
Natator depressus	**Flatback turtle**[1]	Vulnerable	Rare
Other			
Dugong dugon	**Dugong**[1]	Migratory	Specially protected
Rhincodon typus	Whale shark	Vulnerable	
Crocodylus porosus	Saltwater crocodile	Migratory	Specially protected
Pristis zijsron	**Green sawfish**[1]	Vulnerable	Rare

[1.] **Species has been recorded within or near the proposal area during surveys.**

The proponent has undertaken a number of studies to determine the potential impacts on marine fauna. Aerial surveys were completed during the humpback whale northern and southern migrations (2009 - 2010). Modelling of underwater noise caused by dredging and piling were completed in 2010. Surveys of regional beaches to assess turtle nesting activity were undertaken in February 2008 and January, March and October 2009. Modelling to determine impacts to turtle nesting beaches from light spill was undertaken in 2010.

Potential impacts to marine fauna include:

- Exposure to increased TSS during dredging and disposal.
- Injury or modified behaviour due to underwater noise emissions during construction and operational activities.
- Entrainment of turtles during dredging.
- Changes to turtle nesting beaches as a result of altered coastal processes during construction and operation.
- Surface strikes by vessels during construction or operation.
- Light impacts on turtle nesting.

Whales

Humpback whales were recorded adjacent to the proposal area during the southern migration (August-November). Low numbers of Bryde's whales and false killer whales were recorded offshore of the Proposal area.

The greatest densities of adult whales and calves within the inshore area surveyed in spring 2010 were recorded south-west of Delambre Island (approximately 15 km from the proposed piling operations) and south-east of Delambre Island (approximately 10 km from the proposed piling operations) as shown in Figure 7.

The proponent predicts that there would be a low likelihood of whales being present within the Zone of Possible Physical Injury or being exposed to noise levels above 160 dB re 1μPa^2.s. A small number of whales may pass within

4.5 km of the proposed piling operations (i.e. within the Zone of Avoidance for a single piling operation) and a small but slightly higher number of whales may pass within 6.5 km of the proposed piling operations (i.e. within the Zone of Avoidance for concurrent piling operations) (SVT, 2010)

Modelling of concurrent piling shows that the greatest distance from the noise source to the boundary of the zone of avoidance (or behavioural disturbance) is 6.5 km. Low numbers of whales were observed passing within 6.5 km of the proposed piling operations and therefore potential indirect impacts to humpback whales from piling noise are expected to be minor (short-term disturbance of a small number of individuals) (SVT, 2010).

Dolphins

Dolphins and 36 dugong were also observed during the aerial surveys of the broad area during this time.

A total of 1281 dolphins (178 pods) were sighted during aerial surveys, with peak numbers observed during the 21 May 2010 flight. Dolphins were not identified to species level due to limitations with identification from the aircraft. Observed animals were likely to be inshore species (including *Tursiops spp*. or *Sousa chinensis*) or offshore species, *Stenella spp* (API, 2010).

Turtles

Three marine turtle species nest routinely in the Dampier Archipelago – the green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*) and flatback turtle (*Natator depressus*) – while loggerhead turtles (*Caretta caretta*) are occasionally observed. There have been no records of leatherback (*Dermochelys coriacea*) or olive ridley (*Lepidochelys olivacea*) turtles nesting in the region, although anecdotal reports indicate these species are present in archipelago waters.

Low density Flatback turtle nesting was observed at two beaches on Dixon Island and one beach at Anketell Point. The flatback and hawksbill turtle rookeries of Dixon Island are not considered regionally significant when compared with other nearby island rookeries (such as Delambre, Legendre and Angel islands) (Pendoley, 2010). Figure 8 shows the location of turtle nesting beaches within the region.

Green Sawfish

A single specimen of green sawfish (*Pristis zijsron*) was captured (in mangrove habitat). This species is listed as vulnerable under the EPBC Act. and as critically endangered under the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

The proponent considers that habitat loss has the greatest potential to impact this species. Direct impacts from the proposal are unlikely as the impact to BPPH and mangroves is considered minor, any significant indirect impacts are also considered unlikely (API, 2010).

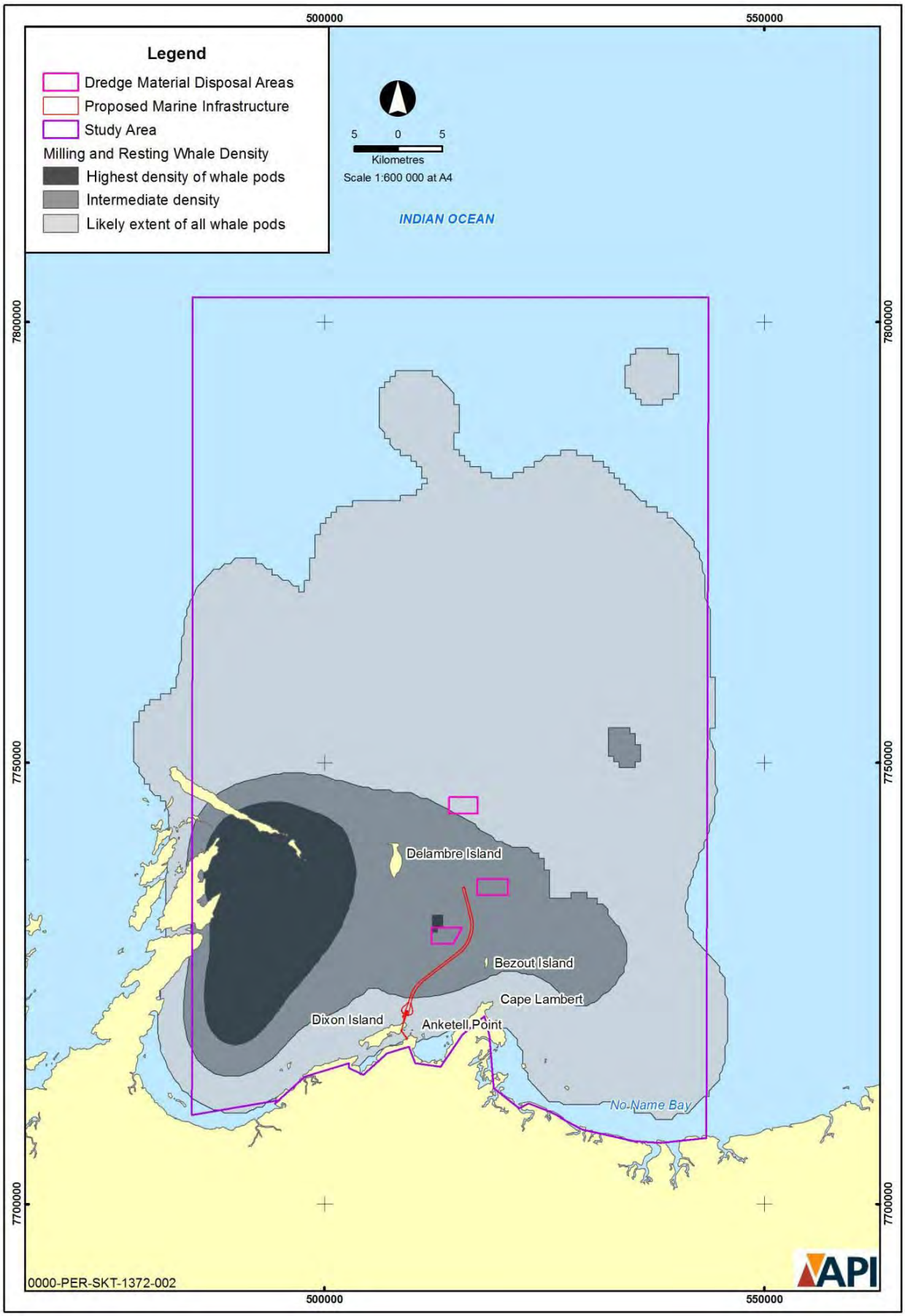

Figure 7 - Location of greatest whale densities

Management

The proponent has identified a number of management actions that it would undertake which are described in Section 9.4 of the PER document (API, 2010). Key management actions include:

- "soft-start" to piling operations.
- vibration monitoring at turtle nesting beaches.
- appropriate lighting design to avoid direct light on turtle nesting beaches.

Submissions

Submissions raised the following issues:

- The region is used by migrating humpback whales and marine turtles, and it was recommended that management zones be implemented around proposed piling operations.
- The need for proposed 'before, during and after' marine mammal behavioural study to investigate impacts associated with piling operations
- Management measures are needed to address protection of marine turtles from dredging, vessel strike and artificial light related impacts
- The collection of light and turtle hatchling emergence data prior to and during construction and operation of the port.

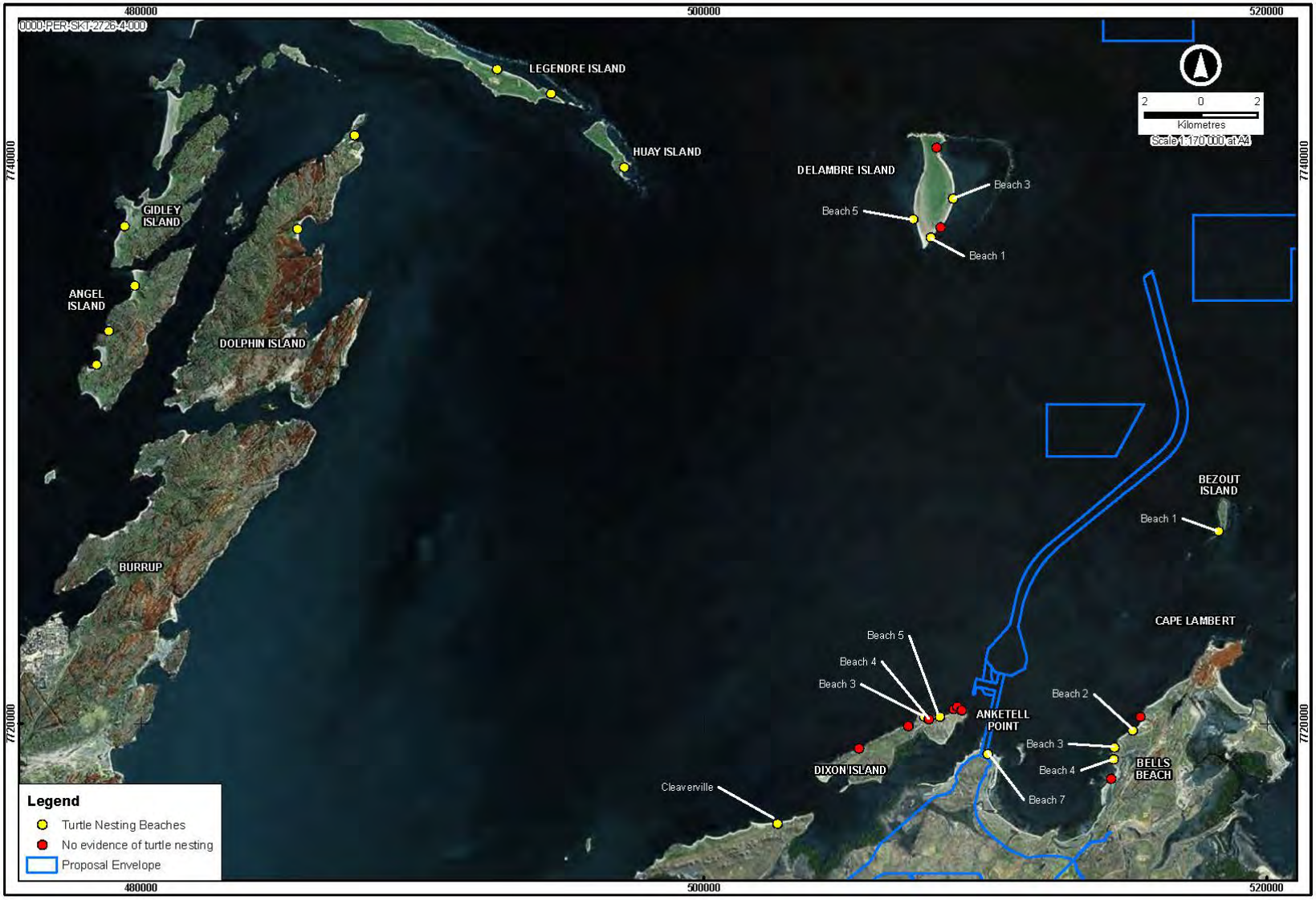

Figure 8 - Location of turtle nesting beaches

Assessment

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

Humpback whales were recorded adjacent to the proposal area during the southern migration (August - November). The greatest densities of adult whales and calves within the inshore area surveyed were recorded south-west of Delambre Island approximately 15 km from the proposed piling operations and south-east of Delambre Island approximately 10 km from the proposed piling operations. Low numbers of Bryde's whales and false killer whales were recorded offshore of the Proposal area.

Dolphins and dugong were also observed during the aerial surveys of the broad area during this time. Recent information provided by the Cetacean Research Unit of Murdoch University indicates that the Priority 4 humpback and snubfin dolphins forage in this area. Little is known about the distribution, abundance and behavioural ecology of these species of dolphin in the tropical north-west of Australia (Bejder, *et al*, in prep, 2012). With the increase of coastal developments along the Pilbara coastline impacting potential habitat, further surveys are required to determine the relative importance of the Anketell area to this species. The EPA has recommended, as part of Condition 19, that the proponent contribute to research projects that will add to the understanding and management of the impacts and risks to conservation significant marine fauna, including humpback and snubfin dolphins, from marine and coastal development in the Pilbara region.

The EPA notes that flatback turtle nesting was observed at two beaches on Dixon Island and one beach at Anketell Point. The number of turtles recorded indicated that these beaches have a much low density of use compared to other nearby islands and beaches. Additionally, the flatback and hawksbill turtle rookeries of Dixon Island are not considered regionally significant when compared with other nearby island rookeries such as Delambre, Legendre and Angel islands.

Piling activities could injure whales and dolphins if they are within the Zone of Possible Physical Injury which has been modelled at 22 m from the noise source. For turtles, this distance is expected to be 55 m. The EPA has recommended Condition 13 for marine fauna interaction that covers the activities of marine pile driving, dredging activities and marine construction vessels and onshore facility light sources. Requirements of the condition include a marine fauna observer to be present at all times during piling activities, soft start up procedures and the cessation of piling activities if cetaceans (whales and dolphins) and dugong are sighted within 1500 m or marine turtles are sighted within 300 m of the activity. The proponent is also required to address design features and operating procedures that will be used to minimise as far as reasonable practicable, adverse impacts on marine

turtles from dredging. The enforcement of this condition would significantly reduce the potential risk of injury to cetaceans and turtles.

The proponent, as part of its mitigation measures has proposed studies to understand the impact of project related marine noise on marine mammals. This is addressed as part of Condition 19.

Additionally, Condition 12 has been recommended to ensure that the proposal is designed so that there is no direct lighting impacts on beaches where turtle nesting has been observed.

The EPA is aware that within the Pilbara region, large marine projects such as Gorgon Gas Project, Wheatstone, Cape Lambert Port B, and BHP Billiton Outer Harbour are currently underway or have approval for development in the near future. The cumulative impacts to marine fauna from these projects are not well understood. The EPA has therefore recommended in Condition 19 that the proponent contribute to projects that will increase the understanding and management of the impacts and risks to conservation significant marine fauna (i.e. whales, dugong, dolphins, sea turtles) from marine and coastal development in the Pilbara region.

Summary

Having particular regard to the:

- requirement to manage light spill from the proposal including during construction and ongoing operations to ensure no significant impact to turtle nesting beaches (Condition 12);
- requirement to ensure a Marine Fauna Observer present during dredging and piling activities (Condition 13);
- requirement to cease piling activities if cetaceans, dugongs or turtles are observed within defined separation distances from the piling operations (Condition 13);
- commitment to contribute to studies to improve the understanding of impact of marine noise on whale behaviour (Condition 19); and
- commitment to contribute to research projects that will add to the understanding and management of the impacts and risks to conservation significant marine fauna from marine and coastal development in the Pilbara region (Condition 19),

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved.

3.3 Terrestrial fauna

Description

In accordance with EPA Guidance Statement 56 - *Terrestrial fauna surveys for environmental impact assessment in Western Australia*, the proponent has undertaken a Level 2 fauna survey for the proposal area. Factors that contributed to a Level 2 survey requirement included the scale of habitat clearing, isolated fauna populations or faunal assemblages present and species protected by international agreement or treaty (JAMBA/CAMBA) (EPA, 2004b).

A total of 193 vertebrate species, including avifauna, mammals, amphibians and reptiles, were recorded. Five vertebrate species of conservation significance were recorded from the Proposal area, comprising the skink *Lerista nevinae* (Schedule 1), Little North-western Freetail Bat (P1), Eastern Curlew (P4), Western Pebble-mound Mouse (P4) and Australian bustard (P4). The habitats of greatest significance within the port development area comprise mangroves, intertidal mudflats, coastal dunes, rock piles and drainage basins (Phoenix, 2010a). Table 6 lists conservation significant fauna species that have been identified as occurring or potentially occurring within the proposal area.

Vegetation clearing for the proposal will result in the direct loss of fauna habitat and the process of clearing may result in the deaths of individual terrestrial fauna. Construction and operation activities may result in indirect habitat modification through introduction of weeds, altered fire regime and changes on local hydrology.

Table 6 - List of Conservation Significant terrestrial fauna species potentially occuring within the proposal area.

Species	Status	Local extent of habitat[1] (ha)	Habitat within envelope (ha)	Loss at local scale (%)
Northern quoll (*Dasyurus hallucatus*)	Schedule 1, Endangered	1665.1	703.9	42.3
Peregrine falcon (*Falco peregrinus*)	Schedule 4	na	na	na
***Little northern freetail bat (*Mormopterus loriae cobourgiana*)**	Priority 1	428.7	4.1	1.0
Lerista nevinae	Schedule 1	280.0	9.1	3.3
***Eastern curlew (*Numenius madagascariensis*)**	Priority 4	904.2	214.7	23.7

Species	Status	Local extent of habitat[1] (ha)	Habitat within envelope (ha)	Loss at local scale (%)
***Australian bustard (*Ardeotis australis*)**	Priority 4	4218.7	2217.6	52.6
***Western pebble-mound mouse (*Pseudomys chapmani*)**	Priority 4	4218.7	2217.6	52.6
Bush stone-curlew (*Burhinus grallarius*)	Priority 4	2553.7	1513.7	59.3
Short-tailed mouse (*Leggadina lakedownensis*)	Priority 4	0.0	0.0	0.0
Blind gudgeon (*Milyeringa veritas*)	Vulnerable	0.0	0.0	0.0

*** recorded within the Proposal area**

The fossorial skink *Lerista nevinae* is known only from the Anketell/Cape Lambert area. A number of surveys for this species undertaken by the proponent and by Rio Tinto indicate that its mainland distribution is restricted to primary and secondary dune habitats between Pope's Nose Creek and Dixon Headland (Biota, 2008). This is an area of approximately 498 ha along about 18 km of coastline. The proposal envelope would impact 9.1 ha (or 1.8%) of the 498 ha of the total known *Lerista nevinae* habitat, the majority adjacent to the onshore end of the causeway as shown in Figure 9. The proposed rock causeway will fragment *Lerista nevinae* habitat on the mainland, which may isolate populations. The proponent has indicated that studies show the current distribution of *Lerista nevinae* in the locality occurs as a series of naturally isolated habitats and individuals are thought to have a range of no more than 300 m (API, 2010, 2011).

The migratory Grey-tailed Tattler (GTT) is listed under the *EPBC Act* and was observed within the proposal footprint. Sites considered important to migratory waders are those that regularly support greater than 1% of the flyway population of a species. Numbers of the GTT recorded from the proposal area and surrounds exceeded this threshold during surveys conducted in October and January 2011. GTT may also be indirectly impacted through noise and light disturbance adjacent to the footprint. Several small additional roosts were recorded within the area in which noise disturbance to the bird may occur. These noise levels are between 50 dB and 60 db (AECOM, 2011).

The proposal area contains some habitat suitable for short-range endemic (SRE) invertebrates most notably isolated coastal dunes, rock piles and drainage basins at the feet of minor hills. The coastal dune and rock pile habitats have largely been avoided by the proposal footprint. The rail alignment does intersect two drainage basins and will result in the removal of some of this habitat. Three possible and one likely SRE species were recorded during SRE surveys. Records of two of the potential SRE species

(*Eucyrtops* sp. and *Lychas* 'near *harveyi*') occur within the proposal area. The other two species (*Synsphyronus* sp. 1 and *Quistrachia* sp.) were recorded from locations outside the proposal area. *Synsphyronus* sp. 1 appears to be restricted to Dixon Island (Phoenix, 2010b).

An additional targeted survey for these four species of SRE outside the proposal area was conducted in May 2010. No additional specimens of *Synsphyronus* sp. 1 and *Eucyrtops* sp were found, however, suitable habitat for *Eucyrtops* sp was observed in several locations outside the proposal area. It is considered likely that the species' range extends beyond the proposal area. A number of sites recorded *Quistrachia* sp. and it was determined that *Lychas* 'near *harveyi*' is *Lychas harveyi* and therefore not a SRE (Phoenix, 2010c).

Sealing of surfaces and local changes in hydrology could potentially impact subterranean fauna. However, as the proposal does not involve groundwater dewatering and extensive excavations, the risk of impacts to subterranean fauna is low.

Management

The proponent plans to minimise impacts to terrestrial fauna by implementing the following management actions:

- Rehabilitate decommissioned construction areas to re-establish habitat.
- Maintain natural drainage flows wherever practicable and prevent ponding of water.
- Direct light spill of long wavelength (red) and high light intensity to be reduced as much as reasonably safely practicable.
- Careful placement and direction of lighting: all luminaires mounted as low in elevation as possible.
- Use of shrouded or timed lighting.
- Lighting along roadway and parking areas to use shielded low pressure sodium lighting.
- Apply speed limits to mining equipment and light vehicles.
- Ensure that all personnel are aware of fauna of conservation significance and related management protocols.
- Undertake a feral predator control program.

Submissions

Submissions for this factor raised the following issues:

- The proponent should undertake an assessment of the range of potential risks to *Lerista nevinae* and its habitat, including threats such as weeds, dust, changes in drainage and coastal processes, and increased human activity.

- The proposed *Lerista nevinae* monitoring program, including vegetation condition monitoring, the proposed introduced fauna monitoring program and the proposed migratory bird monitoring program be further developed to the requirements of the Department of Environment and Conservation (DEC).
- Greater detail required regarding potential impacts to the Grey-tailed Tattler.
- The proponent to prepare and implement a Fauna Management Plan which includes a feral animal control program for Dixon Island and Cleaverville Beach.

Figure 9 - Location of *Lerista nevinae* habitat

Assessment

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement of knowledge.

It is noted that the proposal would directly impact fauna of conservation significance due to clearing, construction and operational activities. All conservation significant species that would be impacted are located and have extensive habitat outside the proposal area.

The proposal envelope includes 9.1 ha (or 1.8%) of the 498 ha of the total known *Lerista nevinae* habitat with the majority of habitat to be lost adjacent to the onshore end of the causeway.

The proposal has been designed to avoid as much as possible the direct footprint impacts on *L. nevinae* habitat. The proponent will be constrained to remain within the footprint of the proposal as shown in Figure 1 in the schedule attached to the recommended Ministerial Statement. Condition 7 has been recommended to ensure direct impacts to *L. nevinae* habitat do not exceed that which is permitted. The condition also requires the proponent to actively manage *Lerista nevinae* habitat to ensure that its habitat value is maintained or enhanced. Additionally, Condition 19 requires the proponent to contribute to additional research to improve understanding of the ecology, population genetics and habitat requirements of the species.

The Grey-tailed Tattler is a migratory bird listed under the *EPBC Act*. Studies undertaken by the proponent indicate that the Anketell Point area can contain over 1% of the flyway population at particular times of the year indicating that the area is significant for this species. The EPA notes that the proposal would not have a significant impact on foraging areas and roosting sites as the majority were located outside the proposal footprint. Roosting areas were also located nearby at Bouguer Passage, Cleaverville and No Name Bay. Noise from construction and operational activities may cause some indirect impacts to a small proportion of the local GTT population. The EPA notes that given the majority of roosting sites in the Anketell region would not be located within proximity to areas exposed to noises levels over 60 dB and availability of alternative roosting sites, noise generated by port activities are not expected to impact regional habitation by the GTT population. The EPA also notes that the proponent will manage lighting design at the port to minimise disturbance.

Surveys for SREs determined that two species could be impacted by the proposal, *Eucyrtops* sp. and *Lychas* 'near *harveyi*'. Further surveys indicated that *Lychas* 'near *harveyi*' is *Lychas harveyi* and not a SRE. No further specimens of *Eucyrtops* sp. were discovered, however, the EPA notes that areas of suitable habitat were located in spinifex plain and low rocky slope habitats to the east and west of the project area. Additionally, the proponent will manage natural drainage flows within the project area to ensure areas of habitat suitable for *Eucyrtops* sp. are not subjected to water accumulation.

The EPA notes that within the proposal area over 50% of Australian bustard, Western pebble-mound mouse and Bush stone-curlew habitat would be impacted. However, these species are well represented outside the project area and regionally. There is also extensive habitat outside the project area. The proposal is not expected to impact the conservation significance of these species.

Summary

Having particular regard to the:

- requirement to limit impact on *Lerista nevinae* habitat to 9.1 ha (Condition 7); and
- commitment to contribute to additional research to improve understanding of the ecology, population genetics and habitat requirements of *Lerista nevinae* (Condition 19).

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved.

3.4 Flora and vegetation

Description

The proposal is situated within the Fortescue Botanical District of the Pilbara region, which is broadly characterised by tree and shrub steppe communities dominated by Eucalyptus trees, Acacia shrubs, *Triodia pungens* and *Triodia wiseana* grasses. The most frequently recorded species were from the Poaceae (grasses), Papilionaceae (pea family) and Malvaceae (hibiscus family). The proposal area has been subjected to varying degrees of disturbance with a range of 'moderate-to-almost complete' weed cover and a significantly altered vegetation structure (AECOM, 2011b).

With a total disturbance footprint of 1,275 ha, the proposal would cause the direct loss of native vegetation and flora due to clearing. Other impacts include changes in drainage resulting in degradation of native vegetation and habitat, introduction of weed species during operations, smothering of vegetation by dust during clearing and operations; and accidental fire during operations.

Level 2 flora and vegetation assessments in accordance with EPA Guidance Statement No. 51 (EPA, 2004a) were completed across the proposal area. Additional Level 1 surveys were conducted for the proposed accommodation area, the outer buffer of the proposed quarry site and the proposed power corridor. All areas which were surveyed to Level 1 detail in 2009 were re-visited to Level 2 detail in May 2010. An additional Level 2 survey of the proposal area was completed in March and April 2011.

Table 7 - Proportion of Land System unit areas within Proposal footprint.

Land System Unit	Extent Bioregion (ha)	Area within PER footprint (ha)	Loss at Regional Scale (%)
Boolgeeda	961,635	6.1	0.0
Cheerawarra	49,211	219.6	0.4
Littoral	210,733	271.6	0.1
Rocklea	2,881,200	27.5	0.0
Ruth	169,300	655.4	0.4
Uaroo	987,066	3.7	0.0

No Declared Rare Flora or Priority Flora were recorded within the Proposal footprint. o known individuals or populations of conservation significant flora will be affected by the Proposal. Four Priority Flora species were identified from the DEC Threatened and Priority Flora database searches as potentially present in the Proposal area: one Priority 1 species, *Helichrysum oligochaetum*; and three Priority 3 species, *Acacia glaucocaesia*, *Eragrostis lanicaulis* and *Terminalia supranitifolia*.

The Level 3 Priority Ecological Community (PEC) 'Horseflat Landsystem of the Roebourne Plain' was identified within the proposal envelope. The total area of this vegetation type recorded in the project area was 106.64 ha which equates to 2.56% of the project area. The 'Horseflat Landsystem of the Roebourne Plain' PEC is represented outside of the project area.

Two communities, Thg and AThg2, are considered to be locally significant due to supporting populations of Priority Flora and a further 14 vegetation communities are considered to be regionally significant within the Chichester IBRA region, due to limited representation. Vegetation communities AGThg, ATg, AxSH, AxT, CAThg1, CST, DCAT2, DEAT1, FACE, GT, MAC, Sam1, Sam2 and Thg(c) are locally significant due to the limited in representation (by area) within the local area. ATg, CST, GT, MAC, Sam1 and Thg(c) are also considered to be regionally significant as per the assessment discussed below. Since these communities have been determined to be under-represented in the wider region, they are considered to be of conservation significance.

The main phreatophytic species in the Proposal area is *Corymbia hamersleyana* and the inferred groundwater- dependent ecosystems in the Proposal area contain vegetation communities associated with this species are DCAT1 (Woodland of *Corymbia hamersleyana* over a Tall Shrubland mainly dominated by *Acacia bivenosa*, *Acacia tumida var*. *pilbarensis* and *Acacia ancistrocarpa)* and DCAT2 (Low Open Woodland of *Corymbia hammersleyana* over a Tall Shrubland of *Acacia pyrifolia* var. *pyrifolia, Acacia bivenosa* and *Grevillea pyramidalis* subsp. *leucadendron*). The Proposal area is considered to support approximately 13 ha of phreatophytic vegetation.

The proposal may alter local surface hydrology, which in turn may impact on surface water dependent vegetation. Impacts arising from alteration to local surface flows include inundation of upstream areas and water starvation to downstream areas, as well as scouring or erosion and siltation of drainage channels. Mulga communities represent a total area of 215 ha (or approximately 6%) of the total surveyed area. Mulga communities located down gradient from proposed infrastructure, which have the potential to be negatively impacted as a result of impeded sheetflow, are estimated to be approximately 34 ha.

Vehicle and machinery movement has the potential to introduce or spread weeds. The environmental weed; buffel grass and kapok are among the suite of weeds growing in the proposal area. A Declared Plant (pest weed); **Prosopis pallida*, listed by DAFWA has been recorded in the project area.

One species collected, *Isotoma* aff. *Pusilla* (AP 10-01) is most likely to be a new taxon and it is recommended that this species be recollected with the aim of collecting mature seeds to assist in further identification (AECOM, 2011b).

Submissions

Submissions raised the following issues:

- An additional flora and vegetation survey should be undertaken during more favourable conditions.
- The proponent should develop a weed management plan and terrestrial flora and vegetation management plan.

Assessment

The EPA's environmental objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

The EPA notes that flora and vegetation surveys were conducted in accordance with EPA Guidance Statement No. 51 (EPA, 2004a). No Declared Rare Flora or Priority Flora were recorded within the Proposal footprint. The proponent does not expect to impact any individuals or populations of conservation significant flora.

A Level 3 Priority Ecological Community (PEC) 'Horseflat Landsystem of the Roebourne Plain' was identified within the proposal envelope. The proposal would impact up to 107 ha of the PEC or 2.56% of the project area. The PEC is widely distributed outside the project area. The proposal is not expected to have an impact on the conservation status of the PEC.

The EPA considers that Table 1 of Schedule 1 of the recommended conditions describes and spatially defines the extent of clearing proposed for

the proposal. Clearing of vegetation will be restricted to the defined proposal envelope.

Summary

Having particular regard to the:

- proposal having no impact on DRF or Priority flora species; and
- clearing limited to the proposal boundary defined in Schedule 1 of the recommended conditions,

it is the EPA's opinion that it is likely that the EPA's environmental objective(s) for this factor can be achieved.

3.5 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

4.1 Recommended conditions

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by API, to establish and operate a deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- Finalisation of the location of marine infrastructure prior to construction (Condition 6).
- Restricting clearing within potential habitat for the Schedule 1 listed species *Lerista nevinae* (Condition 7).
- Restricting impacts to marine benthic communities from dredging, dredge disposal and causeway construction activities to spatially defined areas with provision to suspend activities if impacts exceeds these areas (Condition 8).

- Consideration for the final design of the rock causeway and MOF to ensure coral reefs are protected (Condition 9).

- Undertake State of the Marine Environment Surveys to monitor and report potential changes to the marine environment during the construction phase of the proposal (Condition 10).
- Ensuring near shore marine facilities do not have a significant impact on coastal processes (Condition 11).
- Managing light spill from port facilities on turtle beaches (Condition 12).
- Managing marine piling and dredging activities to minimise impacts on marine fauna (Condition 13).
- Ensuring the port in monitored and managed in the long term to defined levels of ecological protection (Condition 14).
- Managing vessels within the port to prevent, detect and control marine pests (Condition 15).
- Setting decommissioning criteria prior to closure (Condition 16).
- Enabling management plans to be implemented and reviewed in stages (conditions 17 and 18).
- Residual impact and risk management measures (Condition 19).

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Works approval and licensing by the DEC;
- Development approval from the DPA;
- Major hazard facility licensing from the DMP;
- Oil spill management plan requirement by the DoT,
- Sea dumping permit from the DSEWPC;
- Rezoning/development approval from the Shire of Roebourne;
- Water abstraction licences from the DOW; and
- Disturbance of Aboriginal sites - consent of the Minister for Indigenous Affairs.

4.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the Department of Environment and Conservation, Dampier Port Authority, Department of Fisheries, Department of Transport, Department of Water, Department of Indigenous Affairs, Department of Regional Development and Lands and the Department of State Development in respect of matters of fact and matters of technical or implementation significance.

Minor changes, which did not change the intent or scope, were made to conditions 4, 5, 6, 7, 9, 10, 12, 13, 15, 16 and 19.

More significant changes were made to conditions 8 and 11 to ensure the conditions were auditable and could be managed effectively by the proponent.

5. Matters of National Environmental Significance

The proposal is a "controlled action" under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential impacts to listed threatened species and communities under sections 18 and 18 A of the Act, listed migratory species and Commonwealth marine areas (Reference number: EPBC2009/5120).

Listed threatened species

It is noted that the proposal would directly impact terrestrial fauna of conservation significance due to clearing, construction and operational activities. All conservation significant species that would be impacted are located and have extensive habitat outside the proposal area. This is discussed in detail in section 3.3.

The Grey-tailed Tattler is a migratory bird listed under the EPBC Act. The Anketell Point area can contain over 1% of the flyway population at particular times of the year indicating that the area is significant for this species. The EPA notes that the proposal is not expected have a significant impact on foraging areas and roosting sites as the majority were located outside the proposal footprint.

The EPA also notes that within the proposal area, EPBC listed species Pilbara leaf-nosed bat, Mulgara, Northern quoll, Pilbara olive python, Banded hare-wallaby and Blind gudgeon could be impacted. However, these species and their habitat are well represented outside the project area and regionally and the proposal is not expected to impact the conservation significance of these species.

Listed migratory species

Dredging and piling activities could impact or injure whales, dolphins and turtles that are listed as Migratory species under the EPBC Act. This is discussed in detail in section 3.2.

Humpback whales were recorded adjacent to the proposal area with the greatest densities of adult whales and calves recorded southwest of Delambre Island approximately 15 km from the proposed piling operations and southeast of Delambre Island approximately 10 km from the proposed piling operations. Dolphins and dugongs were observed during the aerial surveys of the project area. Flatback turtle nesting was observed on Dixon Island and Anketell Point. Hawksbill and Green turtles were also recorded within the project area.

The EPA has recommended Condition 13 to mitigate impacts to marine fauna that covers the activities of marine pile driving, dredging activities and marine construction vessels and onshore facility light sources. Requirements of the condition include a marine fauna observer to be present at all times during piling activities, soft start up procedures and the cessation of piling activities if cetaceans (whales and dolphins) and dugongs are sited within 1500 m or marine turtles are sited within 300 m of the activity. The proponent is also required to address design features and operating procedures that will be used to minimise as far as reasonable practicable, adverse impacts on marine turtles from dredging. Additionally, Condition 12 has been recommended to ensure that the proposal is designed so that there is no direct lighting impacts on beaches where turtle nesting has been observed.

As part of the offsets package, the EPA has recommended, in condition 19, that the proponent contribute to projects that will increase the understanding and management of the impacts and risks to conservation significant marine fauna (i.e. whales, dugongs, dolphins, sea turtles) from marine and coastal development in the Pilbara region. Additionally, the proponent will be required to undertake studies to understand the impact of project related marine noise on marine mammals.

6. Other advice

Air quality

The nearest sensitive receptors from the proposal are Wickham and Point Sampson.

When the API port facility is considered in isolation, the maximum predicted 24-hour and annual average total suspended particulates (TSP), PM_{10} and $PM_{2.5}$ ground level concentrations (GLCs) are below the applicable guideline values at Wickham and Point Samson.

The cumulative air quality modelling that was undertaken for particulate emissions included background particulate concentrations and emissions from the API port facility and the proposed Pilbara Iron Cape Lambert port facility and examined the cumulative impact on Point Samson only. The potential cumulative impact on Wickham from the above sources was not considered in the cumulative air quality modelling as it was not considered to be a credible modelling scenario in view of Wickham's relative location.

The maximum worst case predicted cumulative 24-hour TSP, PM_{10} and $PM_{2.5}$ GLCs at Point Samson are 74 µg/m^3, 45 µg/m^3 and 13 µg/m^3, respectively (i.e. 49%, 90%, and 52% of the relevant standard, respectively). It should be noted that this prediction is very conservative and highly unlikely to occur due to the locations of Anketell Point and Cape Lambert in respect to Point Sampson (Environ, 2011). The percentage distribution frequency of the 24-hour average PM_{10} concentrations predicted at Point Samson for API's operations in isolation indicates that for 87% of the modelled year (i.e. 319

days), fugitive emissions from API's proposed operations are expected to result in 24-hour average PM_{10} concentrations at Point Samson of no more than 2 µg/m^3 (4% of the 24-hour PM_{10} National Environment Protection Measure (NEPM)). Daily concentrations of more than 5 µg/m^3 are predicted to occur on three days throughout the modelled year, with 24-hour average concentrations between 2 µg/m^3 and 5 µg/m^3 predicted to occur for 11.5% of the time (i.e. 42 days per year) (Environ, 2010).

The above cumulative air quality modelling for particulate emissions considers the API port facility at a capacity of 115 Mtpa and the Pilbara Iron Cape Lambert port facility at the recently approved capacity of 130 Mtpa. It did not take into account that the ultimate capacity of the API port facility would increase to 350 Mtpa in the future.

The EPA notes that dust for the current proposal (115 Mtpa) will be managed in accordance with the works approval and licence requirements of the EP Act However, in view of the above, the potential exists for maximum 24-hour TSP, PM_{10} and $PM_{2.5}$ GLCs at Point Samson to potentially exceed the relevant standards (especially the 24-hour PM_{10} standard) once the above mentioned expansions are implemented. Hence, further studies need to be conducted for the ultimate capacity of 350 Mtpa and mitigation measures considered to ensure air quality at Point Sampson and Wickham is not significantly impacted.

Exceedances of the New South Wales Department of Environment and Climate Change total monthly dust deposition criteria are predicted to occur up to approximately 2 km from the proposed port facility. Deposition rates predicted at the town sites of Wickham and Point Samson are 0.3 g/m^2 and 0.5 g/m^2 respectively, which are well below the NSW DECC guideline values (Environ, 2010).

Power station

The proposal includes a 40 MW natural gas-fired power station with diesel back up located adjacent to the eastern extremity of the proposed API railway loop within the terrestrial disturbance envelope.

When considered in isolation the maximum predicted CO, NO_2, SO_2 and PM_{10} GLCs associated with the proposed power station at any location across the modelled domain (including the townships of Wickham and Point Samson) are well below the relevant NEPM standards.

Cumulative air quality modelling predicts that 24-hour PM10 GLCs at Wickham and Point Samson due to power station and port operations would be well below the relevant NEPM standard. It should be noted that the power station contributes less than 0.3% to the maximum cumulative 24-hour PM10 GLC within the modelled domain (Environ, 2010).

Discharges to the marine environment

Construction marine discharges

The PER provides limited discussion on the potential impacts of dewatering during construction. The proponent has acknowledged that the area is likely to contain acid sulfate soils and has proposed that further investigations into the extent of any potential acid sulfate soils will be undertaken in accordance with the DEC guidelines and, if required, acid sulfate soils management procedures prepared in accordance with the management principles presented in the DoE's *Proposed framework for managing acid sulfate soils* (2004) and the DEC's *Draft treatment and management of soils and water in acid sulfate soil landscapes* (2009). The proponent has indicated it will not be discharging dewater to the marine environment. The proponent has committed to injecting any dewater from construction activities to the local area (WorleyParsons, 2009).

Brine discharges

The proposal requires a small scale desalination plant that would produce approximately 3.5 GL/pa for dust suppression. The discharge flow for the desalination plant will typically range from 8.8 ML/day at a salt concentration of 57,500 mg/L to 10.58 ML/day at a salt concentration of 53,700 mg/L (including backwash).

Initial mixing of the brine discharge following discharge is expected to result in a salinity of 0.5 psu or less above background within 25 m of the diffuser, year round, which is within the range of natural variation in salinity. Hence, a moderate level of environmental protection (DoE, 2006) will be met beyond this distance. The closest BPPH or filter feeder community to the proposed desalination discharge is hard coral habitat, which is located over 500 m inshore of the discharge location and is unlikely to be affected.

The chemicals used in maintaining and operating the plant may include coagulants (such as ferric sulphate/chloride), flocculants, antiscalants, sodium hypochlorite (bleach) and sodium metabisulphite. Given the low dosage, high dilution (dilution at the discharge diffuser of ≥ 30:1 applied to these chemicals) and natural breakdown of the chemicals listed above, impacts upon the marine biota, water quality or sediment quality of the proposal area as a result of operation of the desalination plant are not expected (CEE, 2010).

The EPA notes that the proposed expansion of the port to its ultimate capacity of 350 Mtpa would require additional water for operation and dust control. Additionally, the EPA is currently assessing other proposals within the region that will require desalination plants. It is therefore important that the impacts from any additional desalination plants discharging within the Anketell region are considered cumulatively and not in isolation so that appropriate decisions are made about their co-location and management actions can be taken to protect the marine environment.

Dredging for Terminal 2

The proposed second terminal to enable the port to reach its ultimate capacity would require approximately 30 Mm^3 of dredging and spoil disposal and would cause direct and indirect impacts to BPPH and alter water quality. The additional dredging could increase the loss of BPPH within the LAUs defined by the proponent. These impacts will have to be assessed to determine if the cumulative impacts are acceptable.

7. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister notes that the proposal being assessed is for a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point;
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is likely that the EPA's objectives would be achieved provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

Dampier Port Authority
Department of Environment and Conservation
Department of Fisheries
Department of Health
Department of Indigenous Affairs
Department of Mines and Petroleum
Department of State Development
Department of Transport
Fortescue Metals Group
MCCJH
Office of the Environmental Protection Authority
Point Samson Community Association
Taylor Linfoot & Holmes
WA Fishing Industry Council
Wong-Goo-Tt Group of Roebourne and Karratha

Individuals:
Ken Mulvaney
Robin Chapple MLC
Scott Szulc
Simon Hawke

Appendix 2

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Appendix 3

Summary of identification of key environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
BIOPHYSICAL			
Benthic Primary Producer Habitat (BPPH)	The dominant habitat adjacent to the Proposal is unvegetated soft sediment. BPPH recorded within the Proposal area included sparse seagrass, hard coral, macroalgae, and turf algae. Direct loss of BPPH will occur within the Proposal footprint due to dredging, spoil disposal and causeway construction. Direct losses to BPPH are: *Subtidal* Hard Coral – 19.2 ha Filter Feeder Habitat – 138.1 ha *Intertidal* Mangroves – 0.6 ha Algal mat – 41.5 ha Indirect BPPH losses may occur as a result of elevated turbidity or sedimentation due to suspension or migration of sediment during / following dredging.	<u>Department of Environment and Conservation</u> <u>Point Sampson Community Association</u> <u>Office of the EPA</u> • Submissions requesting that all benthic habitats, including BPPH and non-BPPH, be included within a consolidated habitat map. • Comments on the benthic habitat impact assessment methodology and accuracy of predicted loss results. • Suggestion of alternative infrastructure designs to minimise impact on benthic habitats. <u>Public Submission</u> • Submissions stating the existence of distinct coral communities to the east of the Burrup Peninsula, and identifying the presence of coral species additional to those reported within the supporting studies. <u>Dampier Port Authority</u> • Submissions raising the potential for biodiversity 'hotspots' within the region and requesting an assessment of the ecological value of these areas. • Submissions questioning the mapping and classification of habitats within Bouguer Passage, and stating that extensive areas of BPPH (including corals and seagrass) and filter feeder habitats occur in this area. • Submission identifying the need to map BPPH within	**Considered to be a key environmental factor. This is discussed further in Section 3.1**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		the upper littoral area of Anketell Point, to assess the ecological role and function of these areas and to determine losses within the framework of Environmental Assessment Guideline (EAG) 3. • Submissions suggesting that sediment fate model validation include turbidity measurements close to the dredge cutter head, suggesting the implementation of adaptive (rather than reactive) management and querying the management triggers for the protection of BPPH.	
Mangroves	Mangroves are present along the mainland shoreline both east and west of Anketell Point and along the southern shore of Dixon Island. *Avicennia marina* is the most abundant species. Vegetation clearing during construction may result in the direct loss of 0.6 ha of mangrove vegetation with the causeway footprint. The presence of the causeway may alter coastal processes within the Bouguer Passage and result in indirect impacts to mangrove vegetation.	<u>Department of Environment and Conservation</u> • Submissions noting that the Coastal Processes Investigation (Supporting Study 9.4) and the Marine Environmental Modelling Report (Supporting Study 7.1) identify that the proposed permanent and temporary causeways connecting Dixon Island to the mainland will change the tidal flow patterns and suggesting that inadequate data are presented to dismiss a risk that the causeway will lead to significant changes in coastal process and additional impacts on benthic habitats. <u>Office of the EPA</u> • Submission suggesting that Local Assessment Unit (LAU) 2 is too large for the assessment of mangroves impacts in that area. • Submission questioning whether changes to coastal processes may occur at nearby beaches, such as Port Walcott Beach and others on the western side of the Cape Lambert/Point Samson peninsula, as a result of the Proposal.	**Considered to be a key environmental factor. This is discussed further in Section 3.1**
Marine Fauna	Humpback whales were recorded	<u>Department of Environment and Conservation</u>	**Considered to be a key**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
(mammals and turtles)	adjacent to the Proposal area during the southern migration (August-November). Flatback turtle nesting at two beaches on Dixon Island and one beach at Anketell Point. Dolphins were recorded within the proposal area but were not identified to species level. Potential impacts to marine fauna include • Exposure to increased TSS during dredging and disposal. • Injury or modified behaviour due to underwater noise emissions during construction and operational activities. • Entrainment of turtles within the intake of the TSHDs during dredging. • Changes to turtle nesting beaches as a result of altered coastal processes during construction and operation. • Surface strikes by vessels during construction or operation. • Impacts on turtle nesting success due to vibration during construction.	• Submissions noting the use of the region by migrating humpback whales and marine turtles, and recommending the implementation of management zones around proposed piling operations. • Submissions suggesting the value of marine turtle satellite tracking and in-water studies to determine the seasonal usage and key areas important for inter-nesting turtles in the region. • Submission regarding the proposed 'before, during and after' marine mammal behavioural study to investigate impacts associated with piling operations. • Submission suggesting a number of management measures concerned with the protection of marine turtles from dredging, vessel strike, terrestrial blasting and artificial light related impacts. • Submissions recommending the collection of light and turtle hatchling emergence data prior to and during construction and operation of the port.	**environmental factor. This is discussed further in Section 3.2**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	• Disturbance of nesting adult turtles or misorientation of new hatchlings due to artificial light at nesting beaches on Dixon Island. • Temporary entrapment (hours) of marine fauna within Bouguer Passage at low tide following construction of a temporary solid causeway across Bouguer Passage. • Entrainment of turtles within desalination plant intake.		
Marine Fauna (epifauna)	Epifauna were recorded from the Proposal area included hard and soft corals and sponges on harder substrates and sea pens and crinoids (feather stars) on soft substrates. Potential impacts to marine epifauna include; direct loss due to removal (dredging) or smothering (dredge material disposal). Impacts following exposure to increased TSS concentrations and sedimentation rates.	<u>Department of Environment and Conservation</u> • Recommendation that the proponent refers the coral spawning impact assessment to an independent expert to provide confidence that the predicted impacts from dredging on coral spawning and settlement, particularly coral spawning around Delambre Island, will not have significant detrimental impacts on recruitment in the local area.	**Considered to be a key environmental factor. This is discussed further in Section 3.2**
Marine Fauna (introduced pests)	No listed introduced marine pests were recorded. Two listed introduced marine species (IMS) were observed (the colonial ascidian *Botrylloides leachii* and the barnacle *Megabalanus tintinnabulum*) within the Proposal area.	<u>Dampier Port Authority / Department of Fisheries / Public Submission</u> • Submissions noting that the proposed port has the potential to introduce pests and disease from ballast water into the area, and seeking to formalise the Department of Fisheries' role in the Introduced Marine Species (IMS) management process.	**Considered to be a key environmental factor. This is discussed further in Section 3.2**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	Possible effects on marine fauna include causing fundamental changes to ecosystem integrity following introduction of pests during construction or operation.		
Marine Fauna (aquaculture)	Fisheries within this region include: • the Nickol Bay Prawn Managed Fishery; • the Pilbara Fish Trawl (Interim) Managed Fishery; • the Pilbara Trap Managed Fishery; • the Pilbara Line Fishery; and • the North Coast Shark Fishery in the Pilbara and western Kimberley. Recreational fishing is common at Cleaverville beach, Dixon Island and Anketell Point. A pearling aquaculture lease is present north of Dixon Island.	<u>Dampier Port Authority / Department of Fisheries / WAFIC / Public Submission</u> • Submissions suggesting that impacts on the quality of pearl oysters and oyster products may occur during the construction and operation of the port, due to elevated concentrations of suspended solids and following spills or discharges. • Submissions identifying a number of commercial fisheries operating in the region in addition to those discussed within the PER/draft PER. • Submissions regarding the potential loss of key Nickol Bay Prawn Fishery fishing grounds as a result of the proposed Anketell Point Port. • Submissions raising the issue of increased recreational fishing pressure in the region due to workers from the proposed Anketell Point Port, and other developments.	Crabs within the recreational fishing areas within Nickol Bay will be subject to TSS concentrations generally below the lowest TSS concentrations reported to cause either acute or chronic mortality of adult and juvenile crustaceans. Given the relatively low levels of increased suspended sediment predicted to occur over the aquaculture lease area during the dredging campaign, no significant impact on any oysters within the area is expected as a result of the proposed dredging activities. Management measures will include water quality monitoring during construction to confirm modelling predictions for TSS.
Water and sediment quality	Baseline marine water quality of the proposal area was generally high, with levels of contaminants generally very low. Relatively high (20-25 NTU)	<u>Dampier Port Authority</u> <u>Department of Environment and Conservation</u> <u>Public Submission</u>	**Considered to be a key environmental factor. This is discussed further in Section 3.1**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	turbidity was recorded from inshore sites during spring tides. Sediment quality was good with concentrations of metals and tributyltin below the guideline concentrations. Dredging and disposal and causeway construction will result in increased turbidity in surrounding waters. Discharge of saline water from the desalination plant during operation may affect water quality of the surrounding waters. Hydrocarbon spill to the marine environment during construction and operation may affect water and sediment quality.	• Submissions regarding vessel and stormwater discharges. <u>Office of the EPA</u> • Submissions regarding the predicted initial dilution of the desalination plant discharge, delineation and verification of the boundaries of the Low, Moderate, High and Maximum Environmental Protection Zones, and the assessment of potential impacts to marine fauna and benthic habitats due to elevated salinity or temperature, the chemicals to be used within the desalination process or following bioaccumulation of metals.	
Terrestrial Flora and Vegetation	The Proposal is situated within the Fortescue Botanical District of the Pilbara region, which is broadly characterised by tree and shrub steppe communities dominated by Eucalyptus trees, Acacia shrubs, *Triodia pungens* and *Triodia wiseana* grasses. The most frequently recorded species were from the Poaceae (grasses), Papilionaceae (pea family) and Malvaceae (hibiscus family). The Proposal area has been subjected to disturbance with a range of 'moderate-to-almost complete' weed cover and a significantly altered	<u>Dampier Port Authority</u> • Submission requesting that an additional flora and vegetation survey be undertaken during more favourable conditions. <u>Department of Environment and Conservation</u> • Request that the proponent develops a weed management plan and terrestrial flora and vegetation management plan.	**Considered to be a key environmental factor. This is discussed further in Section 3.4**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	vegetation structure. The proposal would result in the direct loss of native vegetation and flora due to clearing. Changes in drainage could result in degradation of native vegetation and habitat during clearing and operations. Other potential impacts include Introduction of weed species during operations, smothering of vegetation by dust during clearing and operations; and accidental fire during operations.		
Terrestrial Fauna	A total of 193 vertebrate species, including avifauna, mammals, amphibians and reptiles, were recorded. Five vertebrate species of conservation significance were recorded from the Proposal area, comprising the Little North-western Freetail Bat (P1), Eastern Curlew (P4), Western Pebble-mound Mouse, Australian bustard (P4) and *Lerista nevinae*. The habitats of greatest significance within the port development area comprise mangroves, intertidal mudflats, coastal dunes, rock piles and drainage basins. Vegetation clearing for the Proposal will result in the direct loss of fauna	<u>Department of Environment and Conservation</u> <u>Point Sampson Community Association</u> <u>Private Submission</u> • Submissions requesting that the proponent undertake an assessment of the range of potential risks to *Lerista nevinae* and its habitat, including threats such as weeds, dust, changes in drainage and coastal processes, and increased human activity. • Request that the proposed *Lerista nevinae* monitoring programme, including vegetation condition monitoring, the proposed introduced fauna monitoring programme and the proposed migratory bird monitoring programme be further de veloped to the requirements of the DEC. <u>Dampier Port Authority</u> • Uncertainties regarding SRE species indicate that	**Considered to be a key environmental factor. This is discussed further in Section 3.3**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	habitat and the process of clearing may result in the deaths of individual terrestrial fauna. Construction and operation activities may result in indirect habitat modification through introduction of weeds, altered fire regime and changes on local hydrology. Sealing of surfaces and reduction in groundwater recharge (and reduction in surface nutrient inputs) and other localised changes to hydrology may affect subterranean fauna.	further survey work would be required. • Request to prepare and implement a Fauna Management Plan which includes a feral animal control program for Dixon Island and Cleaverville.	
Soils	Soils within the tidal flats may be potential acid sulphate soils. Disturbance of potential acid sulphate soils during terrestrial clearing may result in surface water and soil contamination. Hydrocarbon spills during construction or operation may result in soil contamination.	<u>Department of Mines and Petroleum / Dampier Port Authority</u> • Submissions supporting the commitment to complete a detailed acid sulphate soil survey prior to construction activities and minimise disturbance of this material and highlighting the need for detailed investigation and careful management of acid sulphate soils.	Further investigations into the extent of any potential acid sulphate soils will be undertaken in accordance with the DEC guidelines and if required, acid sulphate soils management procedures prepared in accordance with the management principles presented in DoE's Proposed framework for managing acid sulphate soils (2004) and DEC's Draft treatment and management of soils and water in acid sulphate soil landscapes (2009). **Factor does not require**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			further EPA evaluation
Offsets	Potential offsets that have been identified, include: • *Lerista nevinae* research to improve understanding of the ecology, population genetics and habitat requirements of the species; • Initiation of a cetacean monitoring program to improve understanding of migration patterns and utilisation of Nickol Bay and surrounds; • studies to improve understanding of impact of marine noise on whale behaviour; • management of Dixon Island to maximise conservation values, including the implementation of long term feral predator control, weed control and ecological monitoring; • Long term turtle monitoring on beaches in proximity to the project area and management to maximise hatchling success; • Long term coral monitoring near Dixon Island and Delambre Island, to understand natural temporal variations; and • research into Pilbara coastal samphire taxonomy.	<u>Department of Environment and Conservation</u> <u>Department of State Development</u> <u>Point Sampson Community Association</u> <u>WAFIC</u> Submissions expressed the view that API should develop and commit to offset actions as part of an overall offset strategy to address residual impacts on fauna of conservation significant, nature reserves and regionally significant habitats. It was considered that offsets should be developed to address the following: • Impacts on habitat of *Lerista nevinae* • Increased recreational activities within island nature reserves • Loss and degradation of threatened fauna habitats, including regionally significant marine communities surrounding island nature reserves • Impacts on marine turtles • disturbance to humpback whales • feral animal control on Dixon Island. It was also suggested that API: • contribute to appropriate 'ranger' type resources to manage compliance in fishing, crabbing, and marine activities, and to manage antisocial behaviours. • establish Marine Reserves/No Take zones in key	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		areas of Bouguer Passage. • hold discussions with the Department of Fisheries and other marine users, particularly in relation to research and development, monitoring and management of fish stocks.	
Rehabilitation	Rehabilitation works will be completed on decommissioned areas to lessen, over time, the impact on vegetation and flora.	Department of Mines and Petroleum • Minimal detail in the PER regarding rehabilitation.	API will work with the Dampier Port Authority in the development of relevant project plans to rehabilitate short term disturbance. API will be seeking to apply the standards and procedures that it will adopt for other areas of the West Pilbara Iron Ore Project (i.e. Mine and Rail) to borrow and quarry areas associated with the Port. **Factor does not require further EPA evaluation**
POLLUTION			
Air Quality	Environmental aspects of the Proposal that may potentially affect air quality include: • stockpiling, handling and transporting ore; and • operation of the power station. • Other minor dust related impacts may result from vegetation clearing, vehicle movements on unsealed surfaces and quarry operations have not been the focus	Dampier Port Authority Department of Environment and Conservation Department of Health FMG MCC Point Sampson Community Association • Recommendation that the background contribution to particulate levels be considered within the impact assessment. • Submissions regarding the dust impact predictions, including potential impacts to the community and	The maximum predicted 24-hour and annual average total suspended particulates (TSP), PM_{10} and $PM_{2.5}$ concentrations remain well below the applicable guideline values at the nearest towns of Wickham and Point Samson. The cumulative impact of PM_{10} emissions at Point Samson

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	of this assessment.	workforce.	from the combined operations of this Proposal and the Cape Lambert facility is expected to remain well below the 24-hour PM_{10} air quality standard of 50 $\mu g/m^3$. Exceedances of the New South Wales Department of Environment and Climate Change (NSW DECC) total monthly dust deposition criteria are predicted to occur up to approximately 2 km from the proposed port facility. Deposition rates predicted at the town sites of Wickham and Point Samson are 0.3 g/m^2 and 0.5 g/m^2 respectively, well below the NSW DECC guideline values. The maximum predicted CO, NO_2, SO_2 and PM_{10} ground level concentrations associated with the proposed power station at any location across the modelled domain (including the townships of Wickham and Point Samson) are well below the relevant National Environmental Protection Measure standards.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			Factor does not require further EPA evaluation. See Other Advice for additional information.
Noise	Noise will be generated during construction and operation of the port facilities and rail operations. Noise sensitive public receptors near the proposal are the town of Wickham and the Cleaverville Beach camping area. Modelling of port operational noise indicates that compliance with the assigned noise level criteria outlined in the *Environmental Protection (Noise) Regulations 1997* will be achieved at all noise sensitive premises. Noise modelling of the railway operations indicates that the predicted night-time noise levels from trains are within the noise level targets outlined in State Planning Policy 5.4 with the exception of the proposed location of the accommodation village. Modelling indicates that night time level could exceed LAeq(night) target of 50 dB by 3 dB.	<u>Dampier Port Authority</u> • Concern regarding potential noise exceedences at the proposed accommodation village and Cleaverville beach.	The State Planning Policy 5.4 provides guidance on acceptable transportation noise levels to noise premises as a result of rail infrastructure. The term "noise sensitive" relates to residential developments, schools and the like and does not cover temporary accommodation such as a construction village or casual camping areas such as Cleaverville. Significant impacts to recreational values of Cleaverville are not expected, though noise from railway operations may be audible under certain conditions. No "assigned noise limits" exist for the assessment of impacts on such areas. Use of the SPP 5.4 is considered a reasonable approach to determine potential noise impacts at the

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			construction camp. The final location of this camp is yet to be determined, and if possible the camp will be located to ensure that the LAeq (night) level is below 50 dB. **Factor does not require further EPA evaluation**
Hydrocarbon Spills	The construction and operation of the Proposal may present a risk of hydrocarbon spills to the marine environment. The environmental aspects that may lead to such spills are set out in this section, along with the characteristics of diesel, which is the main hydrocarbon to be handled in the implementation of the Proposal.	<u>Department of Environment and Conservation</u> • Requests that a hydrocarbon management plan be developed in consultation with DEC, and that commitments to reduce the risk of marine fauna exposure and undertake clean-up be made. • Request that a hydrocarbon management plan be developed, addressing both preventative management and contingency response measures in the event that a hydrocarbon spill occurs.	Risk will be managed through an Oil Spill Contingency Plan, which includes management and response measures for terrestrial and marine spill hazards, the marine component to be developed in compliance with the National Marine Oil Spill Contingency Plan (administered by the Australian Maritime Safety Authority) and the WestPlan Marine Oil Pollution (MOP) Emergency Management Plan (administered by WA Department of Transport). These measures will detail organisational responsibilities, actions, reporting requirements and resources available to ensure effective and timely management of an oil spill. **Factor does not require**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			further EPA evaluation
SOCIAL SURROUNDINGS			
Indigenous Cultural Heritage	Potential impacts from the Proposal considered relevant to indigenous cultural heritage in proximity to Anketell Point include: • possible disturbance of heritage sites during vegetation clearing, infrastructure establishment or operations; • possible disturbance or contamination of heritage sites by the workforce during construction or operation; and • possible restrictions or access to certain areas.	<u>Department of State Development</u> • Potential impacts to heritage sites within the project area. <u>Private submission</u> • Number of cultural heritage sites identified on Dixon Island, including sites that have spiritual significance. <u>Public Submission / Taylor Linfoot & Holmes / Wong-Goo-Tt Group</u> • Submissions concerned regarding consultation and engagement. • Cultural heritage and environmental impact assessment, including rights of Traditional Owners • Proposed Ministerial conditions. <u>Department of Indigenous Affairs</u> • Proponent's requirement for heritage surveys and management.	The proposal has been designed to avoid sensitive coastal dunes, except where the causeway crosses the coast. The proposal will no longer impact Dixon Island which is believed to contain a number of significant sites. Mitigation strategies for cultural management will primarily be undertaken through consultation with the Ngarluma People and the DIA with the objective of establishing internal systems to ensure the monitoring and compliance of cultural heritage management. A Cultural Heritage Management Plan (CHMP) is proposed to be developed in consultation with the Ngarluma People, to serve as the primary tool for management of impacts on indigenous cultural heritage. The EPA supports the preparation of the CHMP.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			Factor does not require further EPA evaluation
Recreation	Aspects of the Proposal that may potentially result in impacts to recreation include: • development of linear infrastructure (road and rail) and creation of a port area could restrict public access; • proclamation of a "port" by the state under the Port Authorities Act may involve associated restrictions on access to certain areas to meet security requirements; • restriction on access to or through operational areas to ensure public safety; • port construction and operational personnel (some of whom will be, or will become local residents) may participate in activities that increase recreational pressures, such as fishing, boating, picnicking etc.; and • port construction or operational activities may result in environmental impacts that in turn compromise recreational values.	<u>Dampier Port Authority</u> <u>Point Sampson Community Association</u> • Submissions raising the issue of increased recreational fishing pressure in the region due to workers from the proposed Anketell Port, and other developments. • Submissions relating to the maintenance of access to Cleaverville Beach. • Submissions raising concerns regarding the minimisation of impacts of increased population and recreational activity on sensitive areas, such as island nature reserves, threatened marine fauna habitats and regionally significant coral communities, and on local residents. <u>WAFIC / Department of Fisheries</u> • Submissions regarding the potential impacts to commercial fishing and aquaculture operations in the area.	API will aim to minimise impacts on recreation in the local area through the detailed design of its Proposal, which will need to conform with the broader plans to be developed in consultation with the state. The Proposal is expected to result in the following outcomes in relation to recreational use: • The Proposal will not restrict people from undertaking recreational activities associated with Cleaverville Beach as access to the area will be maintained. • As the construction workforce will be fly-in/fly-out, there will be very limited time available for any recreational activities off site. In addition, the use of private vehicles and fishing boats will be discouraged, so the workforce will have limited means to access off-site areas. • The residential workforce will result in a minor increase in

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			demand on recreational areas and fishing pressure. **Factor does not require further EPA evaluation**

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*		
	Yes	The proposal has the potential to impact benthic primary producer habitat, marine water quality, marine and terrestrial fauna, and terrestrial vegetation. Therefore, monitoring and management measures should be implemented to detect and avoid impact.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*		
	Yes	This proposal has the potential to impact the biodiversity of benthic primary producer habitat, marine and terrestrial fauna and fauna habitat of conservation significant species if not managed properly. These are key environmental factors that are addressed in this report.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*		
	Yes	The proposal has the potential to impact upon already threatened species of marine fauna. Marine fauna impacts have been considered in the assessment.

		The proposal also has the potential to impact on the ecological integrity of BPPH. Sub-tidal and intertidal BPPH have been considered in the assessment.
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.*		
	Yes	The proponent should bear the cost of avoiding or abating pollution. Where environmental assets are lost, the proponent should bear the cost of offsetting those losses.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.*		
	Yes	Emissions of greenhouse gas and pollutants to the air and marine environment should be avoided or minimised.

Appendix 4

Identified Decision-making Authorities
and
Recommended Environmental Conditions

Identified Decision-making Authorities

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

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for Water	Water extraction licence (*Rights in Water and Irrigation Act 1914*)
2. Department of Environment and Conservation	Works Approval and Licence (*Environmental Protection Act 1986*)
3. Shire of Roebourne	Planning approval
4. Minister for Indigenous Affairs	s18 clearances (*Aboriginal Heritage Act 1972*)
5. Department of Mines and Petroleum	Approvals and the transport, handling, use and storage of dangerous goods under the *Explosives and Dangerous Goods Act 1961*
6. Minister for Lands	Railways and land between high and low water marks (*Land Administration Act 1997*)
7. Minister for Transport	Construction and operation of a port; *Jetties Act 1926* *Harbours and Jetties Act 1928* *Shipping and Pilotage Act 1967* *Marine and Harbours Act 1981* *Western Australian Marine Act 1982*
8. Minister for State Development	State Agreement Acts

Statement No.

RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

ANKETELL POINT PORT DEVELOPMENT, ANTONYMYRE, SHIRE OF ROEBOURNE

Proposal: The proposal is to construct and operate a multi-user deepwater port with iron ore stockpiling, transfer and ship loading facilities and ancillary infrastructure at Anketell Point. The Proposal allows for facilities required by the Proponent and future third parties to be developed.

The proposal is further documented in schedule 1 of this statement.

Proponent: API MANAGEMENT PTY LIMITED
ACN: 112 677 595

Proponent Address: Level 2, Aquila Centre, 1 Preston Street
COMO WA 6152

Assessment Number: 1794

Report of the Environmental Protection Authority: 1445

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The terms and phrases used in the implementation conditions and procedures of this Statement are defined in Schedule 2. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as documented and described in Schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Contact Details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence

within 28 days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.

4-2 The proponent shall submit to the CEO the compliance assessment plan required by condition 4-1 at least six months prior to the first compliance report required by condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

(1) the frequency of compliance reporting;

(2) the approach and timing of compliance assessments;

(3) the retention of compliance assessments;

(4) the method of reporting of potential non-compliances and corrective actions taken;

(5) the table of contents of compliance assessment reports; and

(6) public availability of compliance assessment reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.

4-6 The proponent shall submit to the CEO the first compliance assessment report fifteen months from the date agreed with the OEPA in the Compliance Assessment Plan required under condition 4-2 addressing the twelve month period from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

(1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;

(2) include a statement as to whether the proponent has complied with the conditions;

(3) identify all potential non-compliances and describe corrective and preventative actions taken;

(4) be made publicly available in accordance with the approved compliance assessment plan; and

(5) indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Public Availability of Data

5-1 Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in condition 5-1 contains particulars of:

(1) A secret formula or process; or

(2) Confidential commercially sensitive information

The proponent may submit a request for approval from the CEO to not make this data publically available. In making such a request the Proponent shall provide the CEO with an explanation and reasons why the data should not be made publically available.

6 Final Marine Infrastructure Plan

6-1 Prior to the construction of the marine infrastructure listed in Schedule 1 for this Proposal, unless otherwise approved by the CEO, the Proponent must prepare a final Marine Infrastructure Plan which is to be approved by the CEO,

on advice of the Dampier Port Authority and Department of State Development, which details the marine infrastructure.

6-2 The Proponent shall provide the CEO with the approved Marine Infrastructure Plan described in Condition 6-1 and spatial data locating the marine infrastructure in a Geographical Information System (GIS) compatible format specified by the CEO.

6-3 The Proponent shall construct the marine infrastructure listed in Schedule 1 consistent with the approved Marine Infrastructure Plan.

7 Fauna Management

7-1 The proponent shall not clear or disturb:

(1) the ground or any vegetation beyond the proposal envelope depicted in Figure 2 and defined in Table 7 of Schedule 1;

(2) more than a total combined area of 9.1 hectares of vegetation from those portions of the proposal envelope that extend over potential habitat for the threatened (specially protected) fauna species *Lerista nevinae*, as depicted in Figure 3 and defined in Table 2 of Schedule 1.

7-2 The proponent shall not clear potential *Lerista nevinae* habitat as depicted in Figure 3 and defined in Table 2 of Schedule 1 for any purpose other than activities directly associated with the construction of essential port infrastructure.

7-3 The proponent shall submit a ground disturbance report to the CEO, as part of the compliance reporting required by condition 4-6, to demonstrate ongoing compliance status with conditions 7-1(2) and 7-2 above.

The report shall include:

(1) a clear, top down (not oblique) aerial or satellite image captured at the end of each compliance period for those areas of potential *Lerista nevinae* habitat within the proposal envelope depicted in Figure 3 and defined in Table 2 of Schedule 1;

(2) a spatial analysis that provides the actual total combined area of potential *Lerista nevinae* habitat disturbance.

7-4 The proponent shall, for the whole duration of the project, actively manage potential *Lerista nevinae* habitat as depicted in Figure 3 and defined in Table 2, to ensure that its habitat value is maintained or enhanced to the requirements of the CEO in consultation with the Department of Environment and Conservation (DEC). Active management shall include:

(1) feral animal control;

(2) the prohibition of stock;

(3) weed control;

(4) limited and controlled vehicle and pedestrian access including fencing and sign posting; and

(5) provision of equipment and appropriate training of personnel to enable rapid response in the event of wild fires.

8 Construction of Marine Infrastructure

Dredging and dredge disposal activities

8-1 The Proponent shall conduct dredging and dredge spoil disposal activities as described in Schedule 1, to achieve the following environmental protection outcomes:

i. no irreversible loss of, or serious damage to, benthic habitats outside of the Zone of High Impact shown in Figures 4 and 5 and defined in Table 3 of Schedule 1;

ii. protection of at least 70% of baseline live coral cover on each designated coral habitat within the Zone of Moderate Impact shown in Figures 4 and 5 of Schedule 1;

iii. no detectible net negative change to benthic habitats relative to the baseline state of those habitats, outside of the Zones of High and Moderate Impact, shown in Figures 4 and 5 and defined in Tables 3 and 4 of Schedule 1,

unless and until, at a specified site(s) outside the Zones of Moderate Impact or specified designated coral habitats in the Zones of Moderate Impact, a revised environmental protection outcome has been approved by the Minister in accordance with condition 8-10 to have effect for that specified site(s) or specified designated coral habitats in which case the approved revised environmental protection outcome for the specified site(s) or designated coral habitats shall be achieved during dredging and dredge spoil disposal activities.

8-2 At least six months prior to the commencement of dredging of the berth pockets, swing basin and shipping channel as described in Schedule 1, unless otherwise approved by the CEO, the Proponent shall revise the Dredge Environmental Management Plan (Rev 1, November 2010) in consultation with the DEC that meets the objectives set out in condition 8-3 to be approved by the CEO.

8-3 The objectives of the Dredge Environmental Management Plan are to ensure that dredging associated with the construction and maintenance of the marine infrastructure is managed:

i. to achieve the environmental protection outcomes set in condition 8-1; and

ii. with the aim of meeting the management targets, shown in Figures 4 and 5 of Schedule 1, and reducing adverse impacts on marine benthic habitats, as far as practicable, with a particular focus on the designated coral habitats identified in Figure 4 and 5 of Schedule 1.

8-4 The Dredge Environmental Management Plan shall include:

i. descriptions of impact and reference monitoring sites, including key physical attributes, geographic locations and measures of the baseline condition of benthic communities to be monitored;

ii. descriptions of the environmental indicators to be monitored and the environmental criteria for evaluating the achievement of the environmental protection outcomes set in condition 8-1 and the management objectives in condition 8-3;

iii. descriptions of the program for field validation/calibration and review of model predictions.

iv. the monitoring and data evaluation procedures to be applied so as to assess achievement of the environmental protection outcomes set in condition 8-1 and the management objectives in condition 8-3;

v. the monitoring methodologies to be applied to:

a. measure relevant physical indicators (e.g. water currents, water quality conditions including turbidity, photosynthetic radiation near the seabed and light attenuation coefficient, and sediment production and deposition rates) at sites and at a frequency to allow adaptive dredge management; and

b. measure relevant biological indicators with intervals between monitoring occasions at a frequency that informs adaptive environmental management (e.g. measures of live coral cover/coral mortality);

vi. define the metocean and other relevant conditions (eg. turbidity) that determine when it is unsafe to undertake field monitoring and the contingencies that will be implemented if monitoring cannot be undertaken;

vii. a risk-based tiered approach that uses trigger values for relevant physical and / or biological indicators for managing the environmental impacts of dredging and spoil disposal activities to meet the objectives of environmental protection outcomes of condition 8-1;

viii. evidence demonstrating that the monitoring required to assess achievement of environmental protection outcomes set in condition 8-1 is based on tests using appropriate effect size(s) and has statistical

power values of at least 0.8 (or alternative value(s) as approved by the CEO);

ix. management actions that will be implemented in the event that the management triggers values for each tier set in condition 8-4(vii) are not met;

x. methods and procedures that will be implemented to regularly characterise, spatially-define and report the observed plume caused by the dredging of the marine infrastructure and disposal of dredge spoil;

xi. procedures for coral reproductive status monitoring to assist with predicting the timing and duration of significant mass coral spawning events;

xii. the following, with respect to dredge spoil placement sites in State waters:

a. management actions to be undertaken during dredge spoil placement activities to minimise the environmental impact of those activities and any material incremental losses of dredge spoil which may occur following completion of dredge spoil placement at sites in State waters;

b. monitoring, including an outline of the timing of such monitoring events, to be undertaken of retention, stability and fate of dredge spoil placed at dredge spoil placement sites during and following the completion of dredge spoil placement at sites in State waters to verify the efficacy of the measures referred to in condition 8-4(xii)(a);

c. contingency measures to be implemented should monitoring required by condition 8-4(xii)(b) indicate management actions referred to in condition 8-4(xii)(a) are not effective; and

xiii. requirements for timely reporting of monitoring data, management responses and contingency measures.

8-5 The Proponent shall provide relevant stakeholders with a draft copy of the Dredge Environmental Management Plan required under conditions 8-2, and provide those stakeholders a reasonable opportunity to comment on the plan before it is submitted to the CEO for approval under condition 8-2.

8-6 The Proponent shall implement the approved Dredge Environmental Management Plan required under conditions 8-2 prior to the commencement of any dredging and make that plan publicly available in a manner approved by the CEO.

8-7 In the event that monitoring carried out under the approved Dredge Environmental Management Plan determines that any of the environmental protection outcomes set in conditions 8-1 (or any approved revised

environmental protection outcome) are not being achieved during dredging and dredge spoil disposal activities described in Schedule 1, the Proponent shall:

i. immediately suspend all turbidity-generating activities that may be contributing to the non-achievement;

ii. within 24 hours of that suspension, report the non-achievement to the CEO and that it has suspended the relevant turbidity-generating activities; and

iii. within 48 hours of that suspension, report to the CEO:

a. the results of the monitoring that led to that suspension;

b. the findings of investigations into the causes of the non-achievement of the environmental protection outcomes set in condition 8-1;

c. the turbidity-generating activities and metocean conditions which occurred in the monitoring period leading up to the non-achievement of environmental protection outcomes set in condition 8-1 (or any approved revised environmental protection outcome), and until the suspension of the turbidity generating activities; and

d. the results of the most recent water quality and sediment deposition monitoring.

8-8 If, after suspending any turbidity-generating activities under condition 8-7, in the report required by condition 8-7(iii), the Proponent:

i. determines that environmental protection outcomes set in conditions 8-1 (or any approved revised environmental protection outcome) are being achieved; or

ii. provides strong evidence that a particular turbidity generating activity did not cause the non-achievement,

and the CEO concurs with the findings of the Proponent's report, then the Proponent may recommence turbidity-generating activities which are part of:

iii. dredging and dredge spoil disposal activities if condition 8-8(i) applies; or

iv. which-ever particular dredging and dredge spoil disposal activities that are determined not to have caused the non-achievement if condition 8-8(ii) applies, consistent with relevant management plans.

8-9 If conditions 8-8(i) and (ii) do not apply, and the Proponent wishes to recommence the turbidity-generating activities which are suspended under condition 8-7, the Proponent:

i. shall submit to the Minister a report detailing the following:

a. the results of the most recent environmental monitoring for all monitoring and reference sites, including identifying where an environmental protection outcome (or any approved revised environmental protection outcome) is not being achieved, and those sites where there is strong evidence that non-achievement of an environmental protection outcome (or any approved revised environmental protection outcome) is reasonably expected to be recorded as part of the same event;

b. the turbidity-generating activities which were being undertaken in the monitoring period prior to the environmental protection outcome (or an approved revised environmental protection outcome) not being achieved and until the time of suspension;

c. the metocean conditions as monitored in the most recent monitoring period prior to the environmental protection outcome (or an approved revised environmental protection outcome) not being achieved and until the time of suspension;

d. the results of the most recent water quality and sediment deposition monitoring;

e. proposed revised environmental protection outcome(s) for the site(s) outside the Zones of Moderate Impact where an environmental protection outcome (or an approved revised environmental protection outcome) is not being achieved, and those sites where there is strong evidence that contravention of an environmental protection outcome (or an approved revised environmental protection outcome) is expected to be recorded as part of the same event, and or for the designated coral habitat(s) or site(s) inside the Zones of Moderate Impact where an environmental protection outcome (or an approved revised environmental protection outcome) is not being achieved; and

f. any other information considered relevant by the Proponent in support of its Proposal to recommence all turbidity-generating activities that remain suspended after implementing condition 8-8.

ii. shall, if an environmental protection outcome (or any approved revised environmental protection outcome) is not being achieved inside a Zone of Moderate Impact, include in the report required by condition 8-9(i), additional management actions proposed to be implemented so that the recommencement of turbidity-generating activities which are part of dredging and dredge spoil disposal activities:

a. will not contribute to non-achievement of a revised environmental protection outcome proposed by the Proponent in condition 8-9(i)(e) for that zone where an environmental protection outcome has not been achieved, having regard to the matters provided for in condition 8-9(i); and

b. will ensure environmental protection outcomes set in conditions 8-1 (or any approved revised environmental protection outcome) continue to be achieved outside the Zones of Moderate Impact.

iii. shall, if an environmental protection outcome (or any approved revised environmental protection outcome) is not being achieved outside the Zones of Moderate Impact (not including the Zone of High Impact), include in the report required by condition 8-9(i), additional management actions proposed to be implemented so that the recommencement of turbidity-generating activities which are part of dredging and dredge spoil disposal activities:

a. will not contribute to further non-achievement of environmental protection outcomes set in conditions 8-1 or any approved revised environmental protection outcome; or

b. will not cause non-achievement of a revised environmental protection outcome proposed by the Proponent in condition 8-9(i)(e) to apply at those sites where an environmental protection outcome (or any approved revised environmental protection outcome) has not been achieved or there is strong evidence that non-achievement of an environmental protection outcome (or any approved revised environmental protection outcome) is expected as part of the same event; and

c. will ensure the environmental protection outcomes set in conditions 8-1 (or any approved revised environmental protection outcome) continue to be achieved at all other sites and designated coral habitat(s).

8-10 The Minister may, having regard to the report submitted by the Proponent under condition 8-9 and on the advice of the CEO, approve revised environmental protection outcome(s) to have effect for the purpose of condition 8-1 in which case the Proponent may then recommence turbidity-generating activities which are part of dredging and dredge spoil disposal activities subject to the approved revised environmental protection outcome(s). The Minister may also, having regard to the report submitted by the Proponent under condition 8-9, require the Proponent to implement the additional management actions proposed in conditions 8-9(ii) and (iii) above, or other additional practicable management actions, as part of the approved Dredge Environmental Management Plan (condition 8-2).

8-11 The Proponent shall not conduct dredging and dredge spoil disposal activities during the period 3 days prior to the predicted commencement of mass coral spawning, or as soon as mass coral spawning is detected if prior to the predicted time, and those dredging activities are to remain suspended for 7 days from the commencement of mass coral spawning unless it supplies peer-reviewed scientific evidence that if those dredging activities were to continue during coral mass spawning events, any effect, if it were to

occur, would not significantly impact the functional ecology of local and regional reefs and the CEO provides a written exemption of those dredging activities from the requirement to cease over the period specified or alters the period that dredging activities must cease.

8-12 The Proponent shall undertake turbidity-generating activities which are part of the maintenance of the marine infrastructure listed in Schedule 1 to ensure that each of the environmental protection outcomes set in condition 8-1 (including any approved revised environmental protection outcomes) are achieved.

8-13 If under condition 8-10 any revised environmental protection outcomes for conditions 8-1 are approved, and/or additional management actions are required to be implemented, those approved revised environmental protection outcomes and additional management actions required by the Minister under condition 8-10 shall have effect as if they were part of the approved Dredge Environmental Management Plan.

Construction of Rock Causeway

8-14 The Proponent shall ensure the construction of the jetty causeway, boat harbours and associated terrestrial infrastructure as described in Schedule 1 achieves the following environmental protection outcomes:

i. no irreversible loss of, or serious damage to benthic habitats outside of the Zone of High Impact shown in Figures 4 and 5 and defined in Table 3 of Schedule 1;

ii. protection of at least 70% of baseline live coral cover on each designated coral habitat within the Zone of Moderate Impact shown in Figures 4 and 5 of Schedule 1;

iii. no detectible net negative change to benthic habitats relative to the baseline state of those habitats outside of the Zones of High and Moderate Impact, shown in Figures 4 and 5 and defined in Table 4 of Schedule 1,

unless and until, at a specified site(s) outside the Zones of Moderate Impact or specified designated coral habitat in the Zones of Moderate Impact, a revised environmental protection outcome has been approved by the Minister in accordance with condition 8-23 to have effect for that specified site(s) or specified designated coral habitat, in which case the approved revised environmental protection outcome for the specified site(s) or designated coral habitat shall be achieved in the construction of the nearshore and offshore marine facilities.

iv. achievement of the environmental quality objectives and levels of ecological protection indicated in Figure 7 of Schedule 1, defined through condition 14-2 and described in Schedule 3.

8-15 At least 6 months prior to the commencement of construction of the first stage of the jetty causeway, unless otherwise approved by the CEO, the Proponent shall prepare a Port Marine Infrastructure Construction Monitoring and Management Plan that meets the objectives set out in condition 8-16 to be approved by the CEO.

8-16 The objectives of the Port Marine Infrastructure Construction Monitoring and Management Plan are to ensure that construction of the jetty causeway, boat harbours and associated terrestrial infrastructure achieve the environmental protection outcomes set in condition 8-14; and

i. minimising impacts of the construction of the rock causeway on coral and mangrove communities and fauna habitats around Anketell Point, Dixon Island and Bouguer Passage and No Name Bay;

ii. Maintaining the natural tidal regime in Bouguer Passage.

8-17 The Port Marine Infrastructure Construction Monitoring and Management Plan shall include:

i. descriptions of impact and reference monitoring sites, including key physical attributes, geographic locations and measures of the baseline condition of benthic communities to be monitored;

ii. descriptions of the environmental indicators to be monitored and the environmental criteria for evaluating the achievement of the environmental protection outcomes set in condition 8-14 and the management objectives in condition 8-16;

iii. the monitoring and data evaluation procedures to be applied so as to assess achievement of the environmental protection outcomes set in condition 8-14 and the management objectives in condition 8-16;

iv. the monitoring methodologies to be applied to:

a. measure relevant physical and chemical indicators (e.g. water currents, water quality conditions including turbidity, photosynthetically active radiation near the seabed and light attenuation coefficient, sediment production and deposition rates and contaminant concentrations) at sites and at a frequency to allow adaptive management during construction of the jetty causeway, boat harbours and associated terrestrial infrastructure; and

b. measure relevant biological indicators (e.g. measures of live coral cover/coral mortality) with intervals between monitoring occasions at a frequency that informs adaptive environmental management of the jetty causeway, boat harbours and associated terrestrial infrastructure;

v. Define the metocean and other relevant conditions (eg turbidity) that determine when it is unsafe to undertake field monitoring and the contingencies that will be implemented if monitoring can not be undertaken;

vi. A risk-based tiered approach that uses trigger values for relevant physical, chemical or biological indicators for managing the environmental impacts of construction activities to meet the objectives of the environmental protection outcomes of condition 8-14;

vii. evidence demonstrating that the monitoring required to assess achievement of environmental protection outcomes set in condition 8-14 is based on tests using appropriate effect size(s) and has statistical power values of at least 0.8 (or alternative value(s) as approved by the CEO);

viii. management actions that will be implemented in the event that the management triggers values for each tier set in condition 8-17(vi) are not met;

ix. requirements for timely reporting of monitoring data, management responses and contingency measures.

8-18 The Proponent shall provide relevant stakeholders with a draft copy of the Port Marine Infrastructure Construction Monitoring and Management Plan required under conditions 8-15, and provide those stakeholders a reasonable opportunity to comment on the plan before it is submitted to the CEO for approval under condition 8-15.

8-19 The Proponent shall implement the approved Port Marine Infrastructure Construction Monitoring and Management Plan required under condition 8-15 prior to construction commencing and make that plan publicly available in a manner approved by the CEO.

8-20 In the event that monitoring carried out under the approved Port Marine Infrastructure Construction Monitoring and Management Plan determines that any of the environmental protection outcomes set in conditions 8-14 (or any approved revised environmental protection outcome) are not being achieved by construction of the jetty causeway, boat harbours and associated terrestrial infrastructure, the Proponent shall:

i. immediately suspend all construction activities that may be contributing to the non-achievement;

ii. within 24 hours of that suspension, report the non-achievement to the CEO and that it has suspended all the relevant construction activities; and

iii. within 48 hours of that suspension, report to the CEO:

a. the results of the monitoring that led to that suspension;

b. the findings of investigations into the causes of the non-achievement of the environmental protection outcomes set in condition 8-14; and

c. the construction activities and metocean and other relevant conditions occurring at the time of the non achievement of environmental protection outcomes set in condition 8-14 (or any approved revised environmental protection outcome).

d. the results of the most recent water, sediment and biological monitoring that is relevant to the environmental protection outcome that was not achieved.

8-21 If, after suspending any turbidity-generating activities under condition 8-20, in the report required by condition 8-20(iii), the Proponent:

i. determines that environmental protection outcomes set in conditions 8-14 (or any approved revised environmental protection outcome) are being achieved; or

ii. provides strong evidence that a particular construction activity did not cause the non-achievement,

and the CEO concurs with the findings of the Proponent's report, then the Proponent may recommence turbidity-generating activities which are part of:

iii. the construction of the jetty causeway, boat harbours or associated terrestrial infrastructure if condition 8-21(i) applies; or

iv. the particular construction activities that are determined not to have caused the non-achievement if condition 8-21(ii) applies, consistent with relevant management plans.

8-22 If conditions 8-21(iii) and (iv) do not apply, and the Proponent wishes to recommence the turbidity-generating activities which are suspended under condition 8-20, the Proponent:

i. shall submit to the Minister a report detailing the following:

a. the results of the most recent environmental monitoring for all monitoring and reference sites, including identifying where an environmental protection outcome (or any approved revised environmental protection outcome) is not being achieved, and those sites where there is strong evidence that non-achievement of an environmental protection outcome (or any approved revised environmental protection outcome) is reasonably expected to be recorded as part of the same event;

b. the construction activities which were being undertaken in the monitoring period prior to the environmental protection outcome (or an approved revised environmental protection outcome) not being achieved and until the time of suspension;

c. the metocean and other relevant conditions as monitored in the most recent monitoring period prior to the environmental protection outcome (or an approved revised environmental protection outcome) not being achieved and until the time of suspension;

d. the results of the most recent water, sediment and biological monitoring relevant to the environmental protection outcome that was not achieved;

e. proposed revised environmental protection outcome(s) for the site(s) outside the Zones of Moderate Impact where an environmental protection outcome (or an approved revised environmental protection outcome) is not being achieved, and those sites where there is strong evidence that contravention of an environmental protection outcome (or an approved revised environmental protection outcome) is expected to be recorded as part of the same event, and or for the coral habitat(s) or site(s) inside the Zones of Moderate Impact where an environmental protection outcome (or an approved revised environmental protection outcome) is not being achieved, and/or for those sites where environmental protection outcomes 8-14 (or an approved revised environmental protection outcome) is not being achieved; and

f. any other information considered relevant by the Proponent in support of its Proposal to recommence all construction activities that remain suspended after implementing condition 8-21.

ii. shall, if an environmental protection outcome in condition 8-14 (or any approved revised environmental protection outcome) is not being achieved outside the Zones of Moderate Impact (not including the Zone of High Impact), include in the report required by condition 8-22(i), additional management actions proposed to be implemented so that the recommencement of construction activities which are part of the jetty causeway, boat harbours or associated terrestrial infrastructure:

a. will not contribute to further non-achievement of environmental protection outcomes set in conditions 8-14 or any approved revised environmental protection outcome; or

b. will not cause non-achievement of a revised environmental protection outcome proposed by the Proponent in condition 8-22(i)(e) to apply at those sites where an environmental protection outcome (or any approved revised environmental protection outcome) has not been achieved or there is strong evidence that non-achievement of an environmental protection outcome (or any approved revised

environmental protection outcome) is expected as part of the same event; and

c. will ensure all environmental protection outcomes set in conditions 8-14 (or any approved revised environmental protection outcome) continue to be achieved at all other sites and coral habitat(s).

8-23 The Minister may, having regard to the report submitted by the Proponent under condition 8-22 and on the advice of the CEO, approve revised environmental protection outcome(s) to have effect for the purpose of condition 8-14 in which case the Proponent may then recommence construction activities which are part of the jetty causeway, boat harbours and associated terrestrial infrastructure subject to the approved revised environmental protection outcome(s). The Minister may also, having regard to the report submitted by the Proponent under condition 8-22, require the Proponent to implement the additional management actions proposed in conditions 8-22(ii) above, or other additional practicable management actions, as part of the approved Port Marine Infrastructure Construction Monitoring and Management Plan (condition 8-15).

8-24 If under condition 8-23 any revised environmental protection outcomes for conditions 8-14 are approved, and/or additional management actions are required to be implemented, those approved revised environmental protection outcomes and additional management actions required by the Minister under condition 8-23 shall have effect as if they were part of the approved Port Marine Infrastructure Construction Monitoring and Management Plan.

9 Future Expansion of the Rock Causeway and Materials Offloading Facility (MOF)

9-1 Following the initial rock causeway development, the results of monitoring and management measures required under conditions 8-17 shall be assessed and the potential environmental impacts of the fully completed rock causeway and MOF reviewed, with particular regard to the coral habitat at the north east end of Dixon Island and the hydrodynamic conditions and benthic habitats in Bouguer Passage and used to inform, the design and implementation of subsequent expansion stages of the causeway.

9-2 The proponent shall submit a report of the findings of condition 9-1 to the CEO with any proposed changes in the design and implementation of the subsequent expansion stages of the rock causeway and MOF necessary to ensure that the objectives of condition 8-16 are achieved.

10 State of the Marine Environment Surveys

10-1 The proponent shall, within six months following the date of publication of this Statement, or prior to the commencement of any marine works that may

impact the marine environment, whichever is sooner, prepare a draft Scope of State of the Marine Environment Surveys document in consultation with the DEC to the requirements of the CEO.

10-2 The draft Scope of State of the Marine Environment Surveys document shall be set out in parts that detail the specific survey requirements to establish:

i. the pre-development Baseline State of the Marine Environment;

ii. the State of the Marine Environment at mid-term of marine works associated with the capital dredging program and construction of marine infrastructure;

iii. the first post-development State of the Marine Environment within three months following completion of marine works associated with the capital dredging program and construction of marine infrastructure; and

iv. considerations for scoping a second post-development State of the Marine Environment Survey.

10-3 The draft Scope of State of the Marine Environment Surveys shall, having regard to requirements of Condition 10-2, address but not necessarily be limited to:

i. Procedures and methods for the collection of quantitative environmental data for:

a. water quality,

b. hydrodynamic conditions including direction and velocity of water currents,

c. the physical characteristics of native sediments and development-influenced sediments suspended in the water column and deposited on the benthos,

d. the natural and development-influenced rates, and spatial and temporal patterns of sediment deposition,

e. assessing sediment deposition influenced changes in the sediment characteristics with distance from the dredged channel and turning basin to the zone of moderate impact/influence boundary,

f. the spatial extent, distribution, community composition (at a suitable taxonomic resolution to differentiate different communities), seasonality and condition of benthic habitats; and

g. the preparation of benthic habitat maps at scales that will enable the identification of suitable marine turtle and marine mammal foraging habitats.

ii. timing for the implementation of the various surveys having regard for requirements of Condition 10-2; and

iii. timing and frequency of reporting.

10-4 Within a timeframe not longer than three months prior to the commencement of marine works, the proponent shall implement the Pre-development Baseline component of the approved Scope of State of the Marine Environment Surveys document to the requirements of the CEO.

10-5 At the time specified by the approved Scope of State of the Marine Environment Surveys document, the proponent shall implement the Mid-term component of the approved Scope of State of the Marine Environment Surveys document to the requirements of the CEO.

10-6 At the time specified by the approved Scope of State of the Marine Environment Surveys document, the proponent shall implement the first Post-development component of the approved State of the Marine Environment Survey document to the requirements of the CEO.

10-7 No longer than 5 years following completion of marine works required for the construction of marine facilities, the proponent shall implement a second Post-development State of Marine Environment Survey to determine compliance with the environmental protection outcomes set in condition 8-1 and 8-14 (or any approved revised environmental protection outcome) to the requirements of the CEO. The scope of the second Post-development State of Marine Environment Survey shall have regard to Condition 10-2 (iv) and the findings of the first Post-development State of Marine Environment Survey required by Condition 10-6.

10-8 The proponent shall report the findings of the Pre-development Baseline State of Marine Environment Surveys required by Condition 10-4, to the CEO within six months of having completed that survey.

10-9 The proponent shall report the findings of subsequent State of Marine Environment Surveys required by Conditions 10-5, 10-6 and 10-7 and include in each report an appraisal of compliance with environmental protection outcomes required by condition 8-1 and 8-14 having regard to any relevant approved Revised Environmental Protection Outcome, to the CEO within four months of having completed each survey. A copy of this report is to be provided to the Department of Fisheries.

11 Coastal Processes

11-1 The Proponent shall ensure that design, construction and operation of the nearshore marine facilities (as defined in Schedule 1) achieve the following outcomes as far as is reasonably practicable as measured under a Coastal Habitat Management Plan approved by condition 11-2:

i. minimise change to littoral sediment transport;

ii. maintain hydrodynamic flows within Bouguer Passage;

iii. maintain beach profiles at Cleaverville;

iv. maintain beach and dune integrity for turtle nesting purposes at all turtle nesting beaches potentially affected by the construction and operation of nearshore marine facilities (Figure 6);

11-2 Prior to construction activities, the Proponent shall revise the Coastal Habitat Management Plan (November 2010, Rev0) in consultation with the DEC to be approved by the CEO. The plan shall include:

i. beach profiles at Anketell Point using on-ground surveys which monitor beach width and slope, particle grain size, and records significant inflection points and features including primary dune, vegetation line, scarp, high tide mark, water line;

ii. tracking changes in sediment distribution and type within the near-shore area of Anketell Point and Bouguer Passage;

iii. management triggers relevant to achieving the outcomes specified in condition 11-1; and

iv. management measures that will be implemented in the event that management triggers are likely to be exceeded.

11-3 The Proponent shall implement the approved Coastal Habitat Management Plan referred to in condition 11-2.

11-4 The Proponent shall report any non achievement of the management trigger referred to in condition 11-2, along with measures taken and/or proposed to be taken, and strategies to be implemented in response to the non achievement, to the CEO within 21 days of the non achievement being identified.

11-5 The Proponent shall make the Plan required under condition 11-2 publicly available in a manner approved by the CEO.

12 Artificial Light Management – marine turtles

12-1 At all stages of the proposal including construction, operations and decommissioning, the proponent shall ensure that, other than at Anketell Point, all turtle nesting beaches as shown in Figure 6 are maintained in the shade at ground level or not subject to direct light exceeding 0.001 lux (± 0.0005 lux accuracy) from Port infrastructure or activities during the turtle nesting and hatching seasons defined as October to March in any year.

12-2 The proponent shall develop, to the satisfaction of the CEO, and implement a Light Management Plan that includes marine turtle mitigation measures for

avoidance, minimisation, monitoring and adaptive management for artificial light stressors during construction and operation of the Proposal. This Plan must include the following Objectives:

1 address the long-term management of marine turtles that utilise the beaches identified in Figure 6 and other nesting beaches and waters where there are Proposal related stressors;

2 establish a monitoring program to measure and detect changes to marine turtle populations that are potentially affected by artificial light related stressors; and

3 specify design features, management measures and operational controls to manage and where practicable, avoid adverse impacts on marine turtles with specific reference to reducing impacts from artificial light.

The Light Management Plan referred to in this condition shall include the following:

1. report the baseline information on the population(s) of marine turtles that utilise habitats within and adjacent to the Anketell Point including those habitats identified in Figure 6, Delambre Island and Legendre Island and waters where there are Proposal related light stressors;

2. identify the sources and location(s) of project related light stressors with the potential to cause adverse impacts on marine turtles;

3. define a monitoring program to measure and detect changes to marine turtle populations from artificial light;
4. specify design features, management measures and operating controls to manage artificial light, with the aim to avoid impacts on marine turtles, which include (but are not limited to):
    a. shrouding of lights or directional shading on marine and coastal infrastructure, ships and other vessels;
    b. marine vessel holding areas that aim to concentrate light effects from shipping in areas that will minimise light impacts on turtle nesting beaches and anchor damage in foraging habitats;
    c. low intensity and low elevation lighting;
    d. motion sensors and timer devices;

5. annual audits and reviews of the effectiveness of lighting design features, management measures and operational controls;

6. performance indicators against which the achievement of the objectives of the Plan and the effectiveness of mitigation measures can be determined;

7. contingency management response should monitoring of performance indicators indicate that the objectives of the Plan are not being met; and

8. protocols to detect, rescue and release adult and hatchling turtles that are or have been mis-orientated or disorientated by artificial light attributed to the Proposal.

12-3 The proponent shall report any harm, injury or mortality of marine turtles or other threatened or specially protected fauna to the DEC within 24 hours following detection.

13 Marine Fauna Interaction – Marine Pile Driving, Dredging and Marine Construction Vessels

13-1 The Proponent shall engage dedicated Marine Fauna Observers who must:

(1) demonstrate a knowledge of marine wildlife species in the Pilbara region, including Threatened and Migratory Species listed under the *Environment Protection and Biodiversity Conservation Act 1999*, Wildlife Conservation (Specially Protected Fauna) Notice 2012), *Fish Resources Management Act 1994* and priority listing, and their behaviours;

(2) have the capacity, subject to safety considerations, to move and make observations and other relevant records independently within the vicinity of marine construction activities (including pile driving and dredging);

(3) be on duty during all daylight hours when pile-driving and/or dredging operations are conducted; and

(4) maintain a log of:

a. observations of cetaceans in a format consistent with the National Cetacean Sightings and Strandings Database;

b. observations of marine fauna, including injured or dead fauna within 500 metres of the marine construction activities referred to in condition 13-1(2);

c. observations of fauna behaviour, in particular any behaviour that could be in interpreted as a display of disturbance or distress;

d. management response by the Proponent in relation to observation of disturbed or distressed fauna, and injured or dead fauna; and

e. observation hours in relation to the duration of the pile driving and dredge activity.

13-2 The Proponent shall within six months of completing pile driving operations, lodge cetacean records with the National Cetacean Sighting and Strandings Database at the Australian Antarctic Division and with the DEC.

13-3 At least one member of the crew on each vessel undertaking construction activities (dredge, piling vessels) will be trained in marine fauna observations and mitigation measures, including the requirements of the Wildlife Conservation (Closed Season for Marine Mammals) Notice 1998, as amended or replaced from time to time, and maintain a watch and a log of fauna observed during transit and construction activity consisting of Global Positioning System coordinates, species (if known), and behaviour.

13-4 Logs required under condition 13-3 are to be submitted to the DEC on an annual basis at the same time as submitting the compliance assessment report required by condition 4-6.

13-5 Vessels engaged in construction of the nearshore or offshore marine facilities shall not exceed those speeds specified in the Marine Fauna Management Plan required under condition 13-12 or a speed designated by the Department of Transport or relevant Port Authority, whichever is lesser.

13-6 No marine pile driving operations shall commence until the Marine Fauna Observer (or observers) required by condition 13-1 have verified that no cetacean(s) or dugong(s) have been observed within a radius of 1,500 metres or marine turtles within a radius of 300 metres from piling operations during the 20 minute period immediately prior to commencement of piling operations.

13-7 Prior to commencement of full power marine pile driving, the Proponent shall implement soft start-up procedures that slowly increase the intensity of noise emissions over a period of no less than 15 minutes.

13-8 If the Marine Fauna Observer(s) required by condition 13-1, or any other person, observes a marine turtle enter within 100 metres of a piling operation, or cetacean or dugong within 500 metres of a piling operation, that piling operation is to be suspended.

13-9 Marine pile driving that has been suspended in accordance with condition 13-8 shall not recommence until the cetacean or dugong has moved beyond 1,500 metres from the suspended piling operation or the marine turtle beyond 300 metres of their own accord, or the cetacean, dugong or marine turtle has not been observed within the exclusion zone for a period of 30 minutes. Marine pile driving that has been suspended for more than 15 minutes shall recommence with soft start-up procedures as required by condition 13-7.

13-10 No pile-driving shall occur between the hours of sunset and sunrise during:

1. the turtle nesting season defined as 20 October to 10 March in any year;

2. the peak southern migration of mother and calf humpback whale pods defined as 1 September to 31 October in any year.

13-11 Except during periods specified in 13-10(1) and (2) marine pile driving commenced prior to sunset can continue between the hours of sunset and sunrise, unless marine pile driving is suspended for more than 15 minutes.

Marine Fauna Management Plan

13-12 Prior to the commencement of construction and/or dredging and dredge spoil disposal activities, unless otherwise approved by the CEO, the Proponent shall revise the *Marine Fauna Management Plan (December 2010, Rev 2)*, in consultation with the DEC to the satisfaction of the CEO. The objective of this Marine Fauna Management Plan is to ensure that the Proponent constructs and operates the proposal so as to:

(1) detect, avoid, or where this is not practicable, mitigate, impacts upon conservation significant marine fauna, from construction and operation of the proposal.

(2) measure underwater noise from pile driving operations to establish a library of sound signals:

a. at varying distances from the noise source;

b. when driving piles of different sizes and types;

c. during the concurrent piling of different numbers of piles;

d. in conditions of different water depths; and

e. in different driving conditions (substrate types);

(3) review the predictive capacity of the noise propagation model used for the pile driving and make recommendations for improving the current management measures outlined in condition 13-1 and the accuracy of underwater noise modelling for future underwater noise assessments.

(4) Include the following marine turtle monitoring and management elements:

a. design features and operating procedures that will be used to minimise, as far as reasonably practicable, adverse impacts on marine turtles from dredging and spoil disposal activities;

b. operating procedures that will be used to detect, record and report to the DEC injury or mortality to listed marine turtles from dredging or spoil disposal and activities;

c. performance standards against which achievement of the objectives of this condition can be determined; and

d. management triggers and management responses.

(5) The Proponent shall include the following in the Marine Fauna Management Plan required under condition 13-12:

a. a description of the environmental stressors relating to the construction and operation of the marine components of the proposal which are likely to impact on conservation significant marine fauna. (environmental stressors may include, but are not limited to, noise, vibration, light spill and glow, vessel movements and strikes, dredge entrainment, and changes to coastal processes and water quality with the potential to impact on important marine fauna habitats);

b. a description of design features and management actions which the Proponent will implement to avoid, or where this is not practicable, mitigate impacts of the environmental stressors relating to the construction and operation of the marine components of the proposal on conservation significant marine fauna.

c. environmental performance standards to determine whether the design features and management actions are achieving the plan objectives referred to in condition 13-12.

13-13 The Proponent shall implement the approved Marine Fauna Management required under condition 13-12.

13-14 The Proponent shall make the Marine Fauna Management Plan approved pursuant to condition 13-12 publicly available in a manner approved by the CEO.

13-15 The Proponent shall review biannually the approved Marine Fauna Management Plan.

13-16 The Proponent shall report to:

(1) the CEO any non-achievement of the environmental performance standards referred to in condition 13-12 5 c and its recommendations for how the plan should be amended to ensure standards are achieved within 21 days of it having determined non-achievement; and

(2) the DEC any natural or Proposal attributable injury or mortality of conservation significant marine fauna within 24 hours of the observation.

14 Operational Marine Environmental Quality

14-1 Prior to the completion of the construction of marine infrastructure described in the approved Marine Infrastructure Plan, and prior to the commencement of the shipment of product from the Port, the Proponent must finalise a Port Operations Marine Environmental Monitoring and Management Plan in liaison with the Dampier Port Authority and approved by the CEO, and

provide any spatial data in a format compatible with a GIS acceptable to the CEO.

14-2 The objectives of the Port Operations Marine Environmental Monitoring and Management Plan will be to ensure that Port operational (eg. discharges, ship movements, etc) and maintenance (eg. dredging) activities are managed to achieve the following marine environmental protection outcomes:

i. achievement of the environmental quality objectives and levels of ecological protection defined through Condition 14-3(i) and described in Schedule 3 and shown in Figure 7.

ii. no detectible net negative change to benthic habitats relative to the baseline state of those habitats, outside of the Zones of High Impact, shown in Figures 4 and 5 and defined in Tables 3 of Schedule 1.

14-3 The Port Operations Marine Environmental Monitoring and Management Plan shall include:

i. Map(s) spatially representing the Zone of high impact, the environmental quality objectives to be achieved and the levels of ecological protection referred to below consistent with Schedule 3:

a. a Moderate Ecological Protection Area(s) (MEPA) defined as the area contained within 250 metres of the shipping berths and ship turning basin, and the area enclosed by the Marine Offloading Facility breakwaters;

b. a High Ecological Protection Area (HEPA) outside of the Moderate Ecological Protection Area, including the Shipping Channel;

Note: Schedule 3 describes Environmental Quality Objectives and associated Levels of Ecological Protection and provides guidance on allowable levels of change and appropriate guidance on trigger values.

ii. description of how the Port Operations Marine Environmental Monitoring and Management Plan complements and links with the Coastal Habitat Management Plan and the Marine Fauna Management Plan.

iii. descriptions of the port operational and maintenance activities that could significantly impact the marine environment and the impact and reference monitoring sites relevant to these activities, including key physical attributes, geographic locations and measures of the baseline condition of benthic communities to be monitored;

iv. descriptions of the environmental indicators to be monitored (physical, chemical and biological) and the environmental quality guidelines and standards that will be used in a risk-based tiered approach for assessing environmental performance against the environmental protection outcomes set in condition 14-2;

v. the monitoring methodologies to be applied to measure the relevant environmental indicators;

vi. the timing and frequency for monitoring the relevant environmental indicators at the different impact and reference sites to inform adaptive management of the identified port activities;

vii. the monitoring and data evaluation procedures to be applied so as to assess achievement of the environmental protection outcomes set in condition 14-2;

viii. management actions that will be implemented in the event that the management triggers values for each tier set in condition 14-3(iv) are not met;

ix. a requirement for all port-related operational and maintenance activities and wastewater discharges to be managed with the objective of achieving the environmental protection outcomes established in Condition 14-2.

x. a regular environmental performance monitoring and reporting schedule, including any contingency measures required to ensure achievement of the environmental quality objectives.

14-4 The Proponent must only discharge wastewater to the marine environment through purpose-built outfalls.

14-5 Wastewater treatment and wastewater discharge infrastructure must comply with contemporary best practice principles including modelling based on a specific port design, diffuser performance, effluent characteristics and toxicity, ambient water quality conditions and specific mitigation measures.

14-6 The Proponent shall implement the approved Port Operations Marine Environmental Monitoring and Management Plan required under condition 14-1 prior to the commencement of the shipment of product from the Port.

14-7 In the event that monitoring carried out under the approved Port Operations Marine Environmental Monitoring and Management Plan determines that any of the environmental protection outcomes set in condition 14-2 are not being achieved, the Proponent shall report the findings to the CEO as soon as practicable, but within five working days, along with a description of the management actions to be taken to meet the required level of environmental quality.

15 Introduced Marine Pests

15-1 The Proponent shall manage non-trading vessel activities and immersible equipment activities whilst engaged for the construction, operation,

maintenance and decommissioning of the Proposal so as to prevent the introduction of Introduced Marine Pests into State waters.

15-2 Prior to any non-trading vessels or immersible equipment entering the Port Area, the Proponent shall prepare an Introduced Marine Pest Risk Assessment Procedure to the satisfaction of the CEO in consultation with the Department of Fisheries which includes but is not limited to the following:

i. all factors to be considered in the risk assessment;

ii. limits for unacceptable risk of introducing an Introduced Marine Pest;

iii. a tool for performing Introduced Marine Pest Risk Assessments; and

iv. measures to be implemented to reduce risks to an acceptable level, where the risk assessment identifies an unacceptable risk.

15-3 The Proponent shall ensure that any non-trading vessels or immersible equipment are subject to an Introduced Marine Pest Risk Assessment, prior to entering or demobilising from the Port Area, in accordance with the Introduced Marine Pest Risk Assessment Procedure approved pursuant to Condition 15-2.

15-4 The Proponent shall ensure that any Introduced Marine Pest Risk Assessment undertaken pursuant to Condition 15-3 is recorded and that record is provided to the Department of Fisheries within seven days of the Introduced Marine Pest Risk Assessment being undertaken.

15-5 The Proponent shall ensure that any non-trading vessel or immersible equipment that poses an unacceptable risk, as defined by the limits identified under Condition 15-2ii, of introducing Introduced Marine Pests, as determined by an Introduced Marine Pest Risk Assessment undertaken pursuant to Condition 15-3, does not enter the Port Area.

15-6 Prior to any non-trading vessels or immersible equipment entering the Port Area, the Proponent shall prepare an Introduced Marine Pests Monitoring Program to the satisfaction of the CEO in consultation with the Department of Fisheries that:

i is consistent with monitoring design, implementation and reporting standards as set out in the *National System for the Prevention and Management of Marine Pest Incursions (Marine Intergovernmental Agreement, April 2005)*;

ii includes a minimum monitoring frequency of once per year; and

iii requires opportunistic sampling and analysis of specimens removed during port, vessel and immersible equipment monitoring activities.

15-7 The Proponent shall implement the Introduced Marine Pests Monitoring Program approved pursuant to Condition 15-6, or amended versions approved by the CEO for the life of the Proposal, prior to any entry to the Port Area by a non-trading vessel or immersible equipment.

15-8 The Proponent shall provide the results of monitoring undertaken pursuant to Condition 15-7 to the CEO and the Department of Fisheries annually.

15-9 Prior to any non-trading vessel or immersible equipment entering the Port Area, the Proponent shall prepare an Introduced Marine Pest Management Strategy to the satisfaction of the CEO in consultation with the Department of Fisheries, to prevent wherever practicable, the establishment and proliferation of any Introduced Marine Pest, aiming to control and potentially eradicate that Introduced Marine Pest, and to minimise the risk of that Introduced Marine Pest being transferred to other locations within Western Australia.

15-10 The Proponent shall notify the CEO, Department of Fisheries and any relevant Port Authority:

i within 24 hours following initial detection of a suspected Introduced Marine Pest; and

ii within 24 hours following subsequent analysis and confirmation of species identification of the suspected Introduced Marine Pest.

15-11 In the event that any Introduced Marine Pests are suspected or detected, the Proponent shall, in consultation with the Department of Fisheries and the CEO implement the Introduced Marine Pests Management Strategy.

15-12 The Proponent is to submit a report detailing the outcomes of any implementation of the Introduced Marine Pests Management Strategy to the Department of Fisheries and the CEO within 30 days of the commencement of the implementation of the Introduced Marine Pests Management Strategy and thereafter as required by the CEO in consultation with the Department of Fisheries.

16 Decommissioning

16-1 At least six months prior to the anticipated date of closure, the proponent shall prepare a decommissioning plan that meets the following decommissioning criteria.

(1) removal or, if agreed in writing by the appropriate regulatory authority, retention of plant and infrastructure agreed in consultation with relevant stakeholders;

(2) rehabilitation of all disturbed areas to a standard suitable for the new land use(s) as agreed pursuant to the consultation referred to in condition 16-1(1);); and

(3) identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

17 Staging of Plans

17-1 Where a plan, program, report or survey is required by the implementation conditions of this Statement to be prepared and approved prior to the commencement of an activity, it is required that the plan, strategy, report or survey can be prepared and approved as per the relevant condition requirements for a component or stage of the activity, allowing staged implementation.

18 Review of Plans

18-1 If the Proponent amends any plan, program, report or strategy or other document required by the implementation conditions of this Statement, the Proponent must implement the amended plan from the date of the amendment.

18-2 If any plan, program, report or strategy is required to be to the satisfaction of the CEO under the implementation conditions of this Statement, the Proponent may only make a significant amendment to the plan, program, report or strategy if the amendment is acknowledged by the CEO in writing as being to the CEO's satisfaction. Significant amendments are those amendments which alter the obligations of the Proponent, that is, are not minor or administrative.

19 Residual impact and risk management measures

19-1 In order to mitigate for significant residual impacts and risks (permanent and temporary) of the Proposal to marine benthic habitat, mangroves, significant marine and terrestrial fauna, the Proponent shall undertake the following residual impact and risk management measures, consistent with financial, governance and accountability arrangements described in Schedule 4 (Proponent residual impact and risk management measures – Anketell Point Port Development), unless otherwise agreed with the CEO.

19-2 The Proponent will contribute funds to relevant scientific research, on the basis described in Schedule 4 (Project A). The aim of the project is to add to the understanding and management of the impacts and risks to conservation significant marine fauna (i.e. whales, dugongs, dolphins, sea turtles) from marine and coastal development in the Pilbara region. Within the timeframe specified in Schedule 4, unless otherwise approved by the CEO, the Proponent, in consultation with the DEC, will submit a plan for approval by the CEO to undertake relevant research.

19-3 The Proponent will undertake studies to improve the understanding of impact of marine noise on marine mammal behaviour, on the basis described in Schedule 4 (Project B). The aim of the project is to add to the understanding and management of the impacts of noise from marine construction activities on marine mammal behaviour. At least six months prior to port marine infrastructure construction commencing or unless otherwise approved by the CEO, the Proponent will submit a plan to conduct relevant research.

19-4 The Proponent will contribute to the Western Australian Marine Science Institution (WAMSI) Dredging Science Node, on the basis described in Schedule 4 (Project C). The aim of the project is to enhance the capacity of Government and the private sector to predict and manage the environmental impacts of dredging on tropical marine communities in Western Australia. Within the timeframe specified in Schedule 4 or unless otherwise approved by the CEO, the Proponent will enter into a contract with the Centre Agent for WAMSI to fund the Dredging Science Node.

19-5 The Proponent will contribute to management and recovery and research for the *Wildlife Conservation (Specially Protected Fauna) Notice 2012* Schedule 1 species *Lerista nevinae*, on the basis described in Schedule 4 (Project D). The aim of the project is to provide for active management and recovery and to improve understanding of the ecology, population genetics and habitat requirements of the species. Within the timeframe specified in Schedule 4, or otherwise approved by the CEO, the Proponent will submit a plan to fund relevant research developed in consultation with DEC for the approval of the CEO.

19-6 The Proponent will contribute to management of Dixon Island, on the basis described in Schedule 4 (Project E). The aim of the project is to improve conservation outcomes on Dixon Island. At least six months prior to port marine infrastructure construction commencing or unless otherwise approved by the CEO, the Proponent will submit a plan to fund relevant management activities developed in consultation with DEC.

19-7 The Proponent shall make publicly available, in a manner approved by the CEO, all conservation and research outcomes from Projects A, B, C, D and E.

19-8 The CEO may approve redirection of all or part of the financial contributions from Projects A, B, C, D or E to another project identified in condition 19 if the Proponent and the CEO, in consultation with DEC, agree that better environmental outcomes may be achieved.

19-9 The real value of funds described in Schedule 4 will be maintained through indexation to the Perth consumer price index (CPI), commencing at the date of this Statement, unless otherwise agreed by the CEO. All funds referred to in Schedule 4 are exclusive of GST.

Schedule 1

Summary of the Proposal (Assessment No. 1794)

Proposal Title	Anketell Point Port Development
Proponent name	API Management Pty Ltd
Short description	The proposal is to construct and operate a deepwater port with iron ore stockpiling, transfer and ship loading facilities at Anketell Point. The Proposal allows for facilities required by API and future third parties to be developed. Operation of the port will require ongoing maintenance dredging. Marine infrastructure includes: • Dredged shipping channel (from turning basin) up to 16 kilometres long. • Jetty and product-loading wharf piled trestle jetty and wharf incorporating the brine discharge diffuser from the desalination plant. • Berth pockets and turning basin. • Materials offloading facility. • Boat harbours. • Rock causeway – up to 3 kilometres long and 200 metres wide. Terrestrial infrastructure includes: • Ore transport and storage infrastructure (including rail link) - car dumpers, conveyors, stockyards, ore stackers and ore reclaimers, magnetite filter and storage infrastructure, pipelines, rail loops. • Rail corridor allowing for rail lines and associated infrastructure. • Construction and operations support infrastructure. • A desalination plant. • A natural-gas-fired power station (with diesel back up) and transmission lines. • Accommodation camps. • Quarry for construction material. • Access roads. The location of the various project components is shown in Figures 1 and 2.

Table 1; Key Proposal Characteristics Table (corresponds to Figure 1)

Physical Elements

Element	Location	Proposed Extent Authorised
1. Marine infrastructure	Figure 1	Development envelope of not more than 510 ha.
2. Dredging Volume	Figure 1	Not more than 34 Mm^3 within a development envelope of 510 ha.
3. Dredging duration	Figure 1	Not more than 20 months within a development envelope of 510 ha.
4. Piling duration	Figure 1	Not more than 24 months within a development envelope of 510 ha.
5. Terrestrial infrastructure	Figure 1	Clearing within a development envelope of not more than 1275 ha. Clearing of not more than 0.6 ha of Mangroves.
6. Dredge Material Disposal Areas	Figure 1	Not more than 2,210 ha.

Operational Elements

Element	Location	Proposed Extent Authorised
1. Desalination plant (waste)	Figure 2	Brine discharge not more than of 9 ML/day. Location shown in Figure 7.

Abbreviations

CD	Chart Datum
GL	gigalitres (10^9 litres)
ha	Hectares
km	Kilometres
m	metres
ML	megalitres (10^6 litres)
Mm^3	million cubic metres
MW	megawatts (10^6 watts)

Figures (attached)

Figure 1 Proposal Envelope.

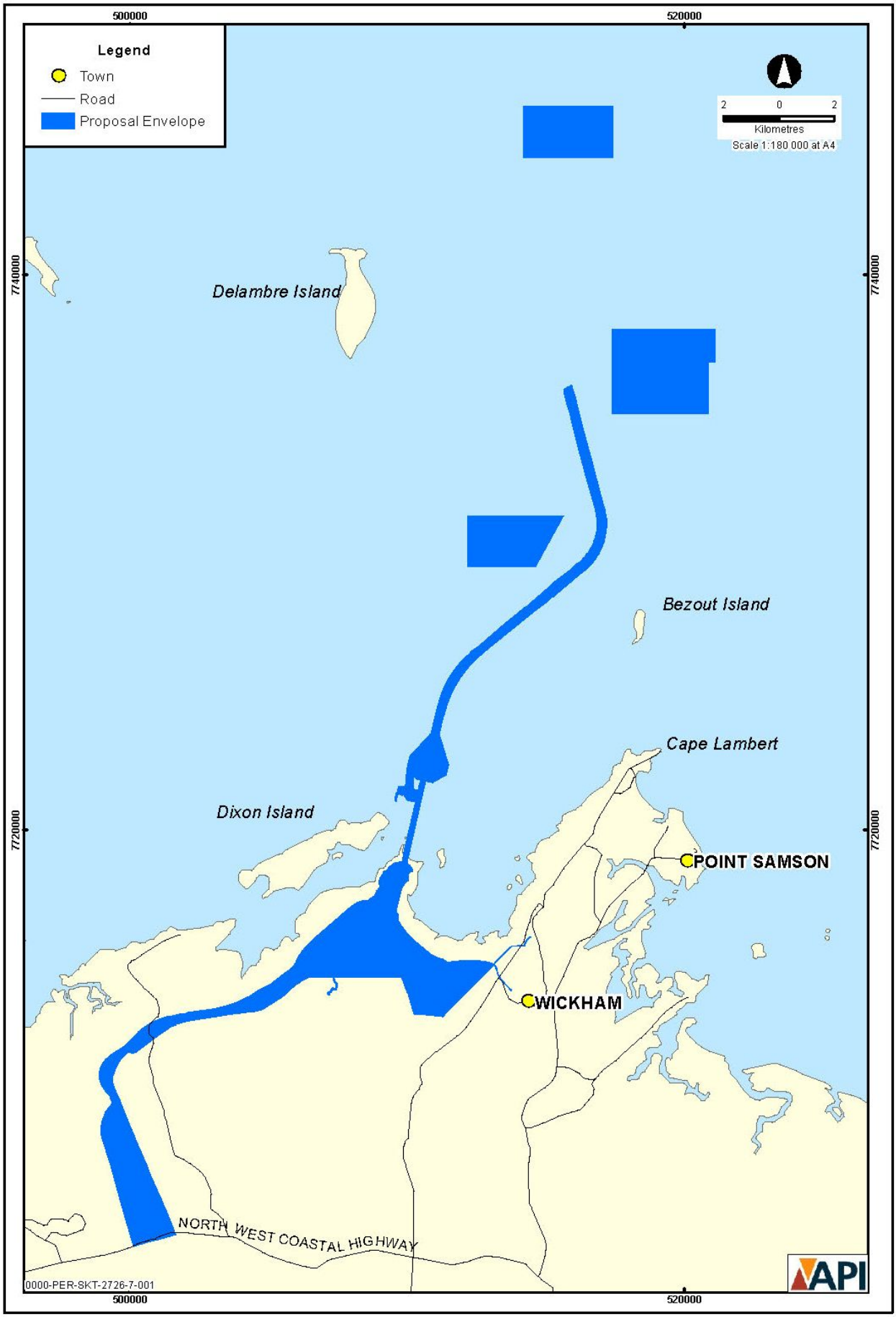

Figure 2 Location of terrestrial components of proposal.

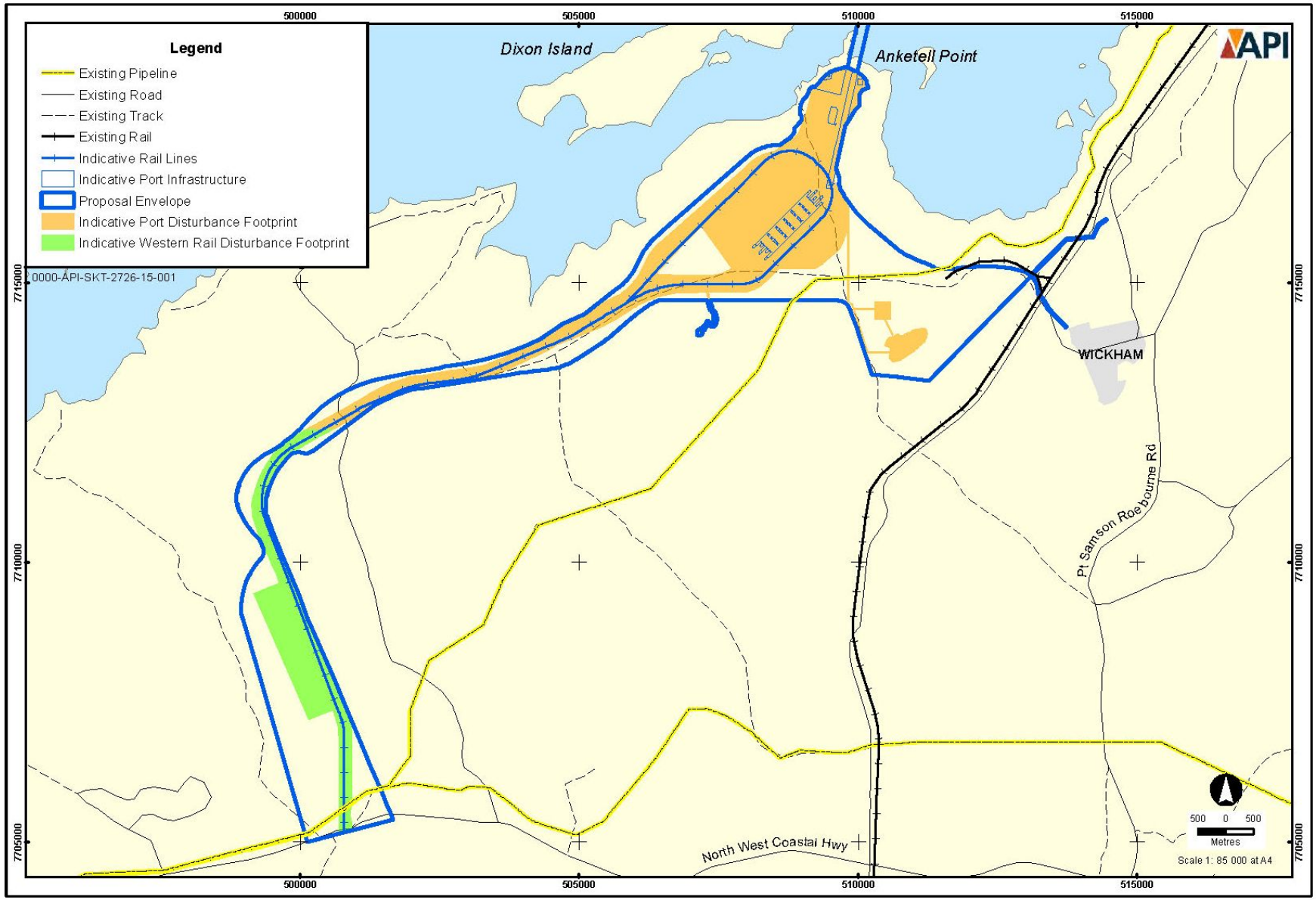

Figure 3 Location of Lerista nevinae habitat

Figure 4 Zones of High and Moderate Impact

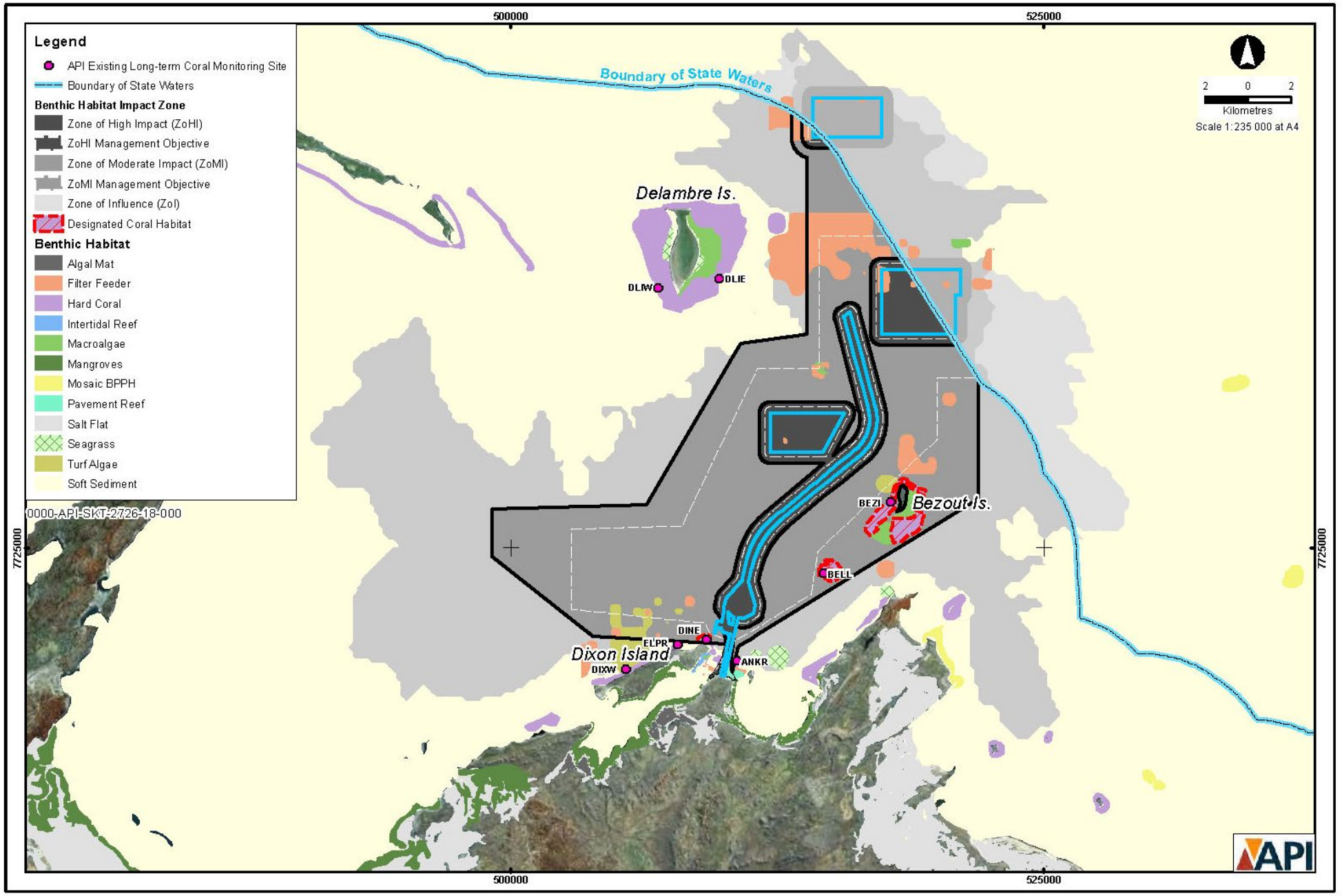

Figure 5 Zone of High and Moderate Impact for causeway, jetty and swing basin.

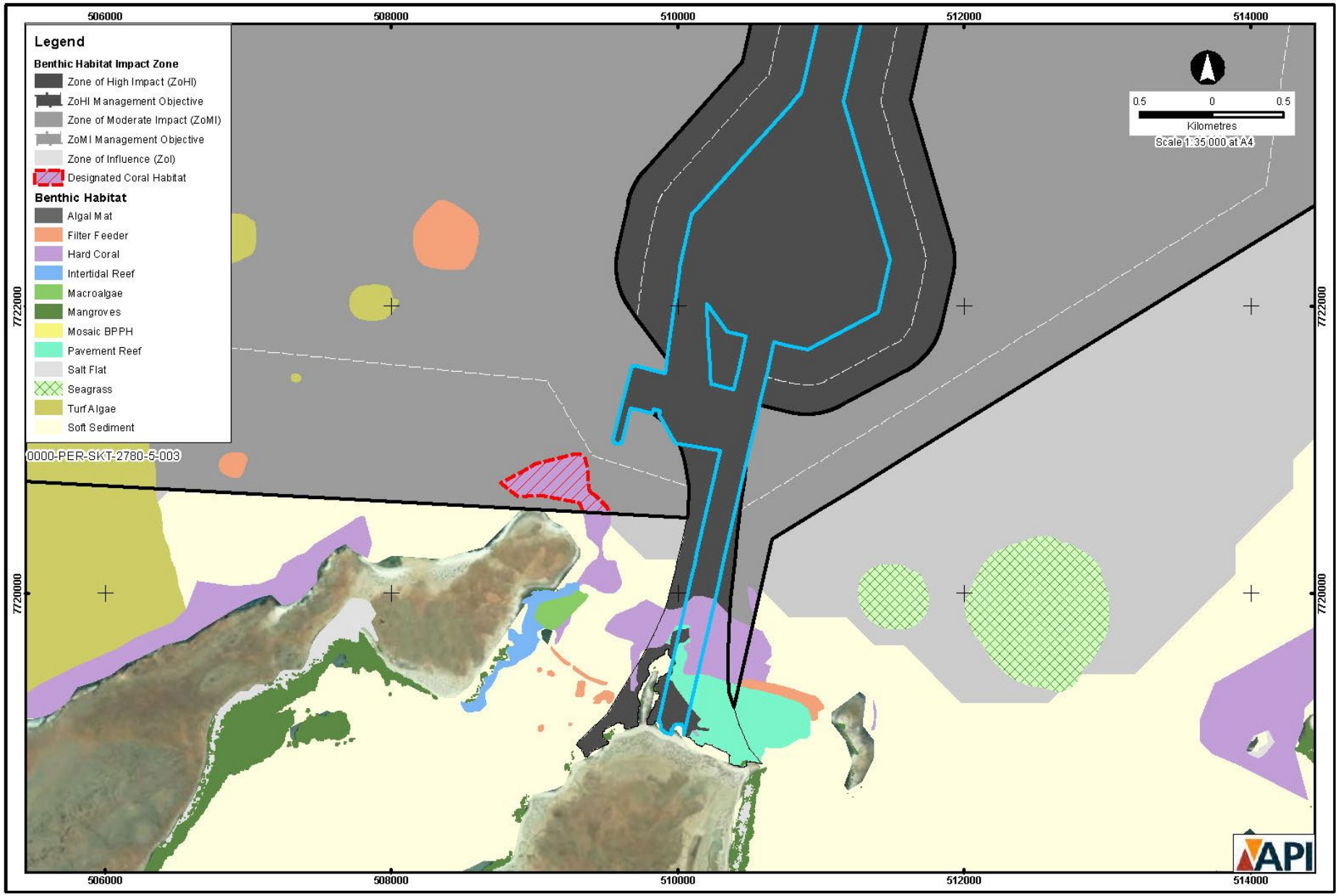

Figure 6 Modelled light spill during operations

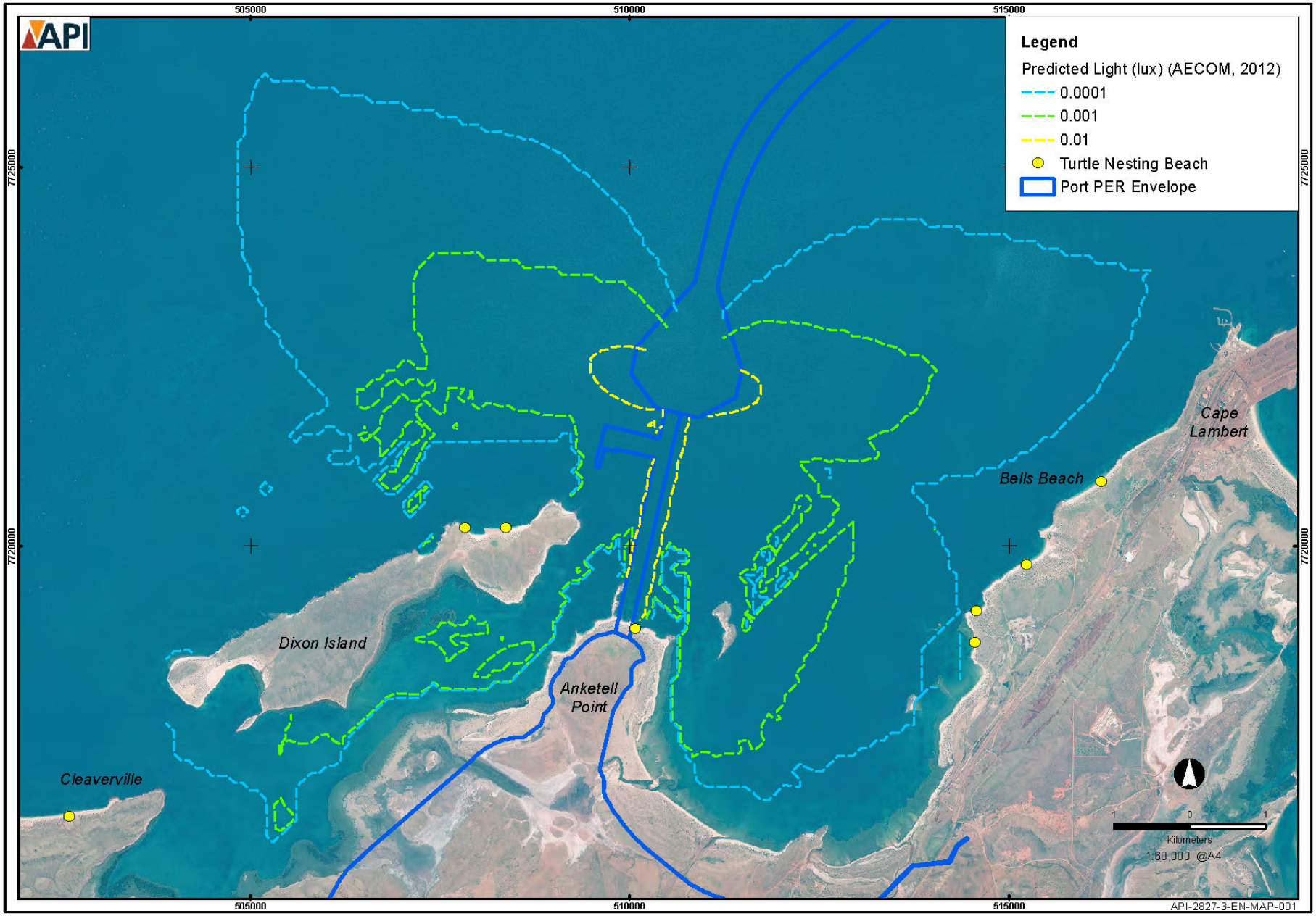

Figure 7 Zones of Ecological Protection

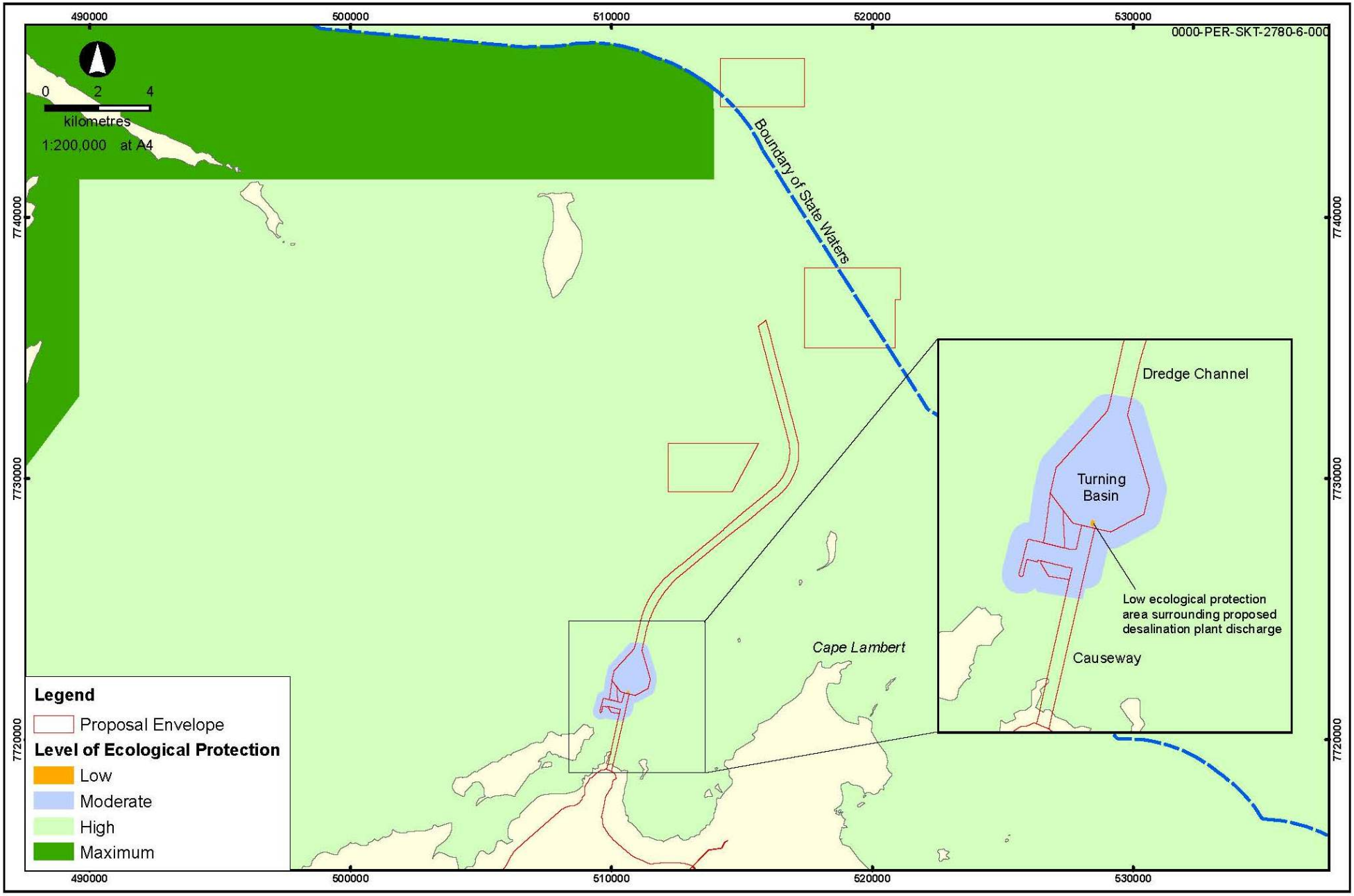

Table 2 Coordinates for Lerista Nevinae habitat

Point	Easting	Northing
1	507743	7717340
2	507914	7717292
3	507799	7717460
4	508132	7717580
5	508238	7717507
6	508399	7717606
7	508477	7717411
8	508563	7717450
9	508851	7717640
10	508438	7717815
11	507742	7717836
12	508685	7717958
13	508989	7718024
14	508946	7718168
15	508992	7718557
16	509165	7718544
17	509057	7718349
18	508863	7718125
19	509332	7718650
20	509295	7718687
21	509579	7718977
22	509804	7719037
23	509621	7718847
24	510243	7718858
25	510471	7718739
26	509939	7718826
27	510202	7718505
28	510043	7718382
29	510341	7718466
30	510175	7718369
31	510200	7717700
32	510108	7717730
33	510011	7717807
34	509939	7717633
35	509954	7718073
36	509745	7717735
37	509588	7717161
38	509841	7717247
39	509969	7717494
40	509921	7716984
41	510264	7716943
42	509702	7716853

43	509598	7716500
44	509905	7716427
45	510017	7716236
46	510373	7716757
47	511140	7716195
48	510856	7716234
49	510738	7715861
50	510344	7715994
51	511187	7716117
52	510944	7715972
53	510746	7715649
54	510875	7715533
55	511979	7715947

Table 3 Coordinates for Zone of High Impact

Point	Easting	Northing
1	513671	7745126
2	513817	7743891
3	515100	7743745
4	518358	7738554
5	517086	7738457
6	517002	7734695
7	520928	7734525
8	509288	7718943
9	510064	7720525
10	509576	7722184
11	509690	7722832
12	510451	7723709
13	514698	7728995
14	511800	7729148
15	511847	7731726
16	516057	7731610
17	515124	7729347
18	515186	7735948
19	516096	7736434
20	517565	7731603
21	517535	7730333
22	516858	7729171
23	512459	7725473
24	511621	7723443
25	511928	7722348
26	511738	7721673
27	510941	7721253
28	510571	7721313
29	510390	7719204
30	510585	7718809

Table 4 Coordinates for Zone of Moderate Impact

Point	Easting	Northing
1	510661	7720379
2	521942	7727318
3	521942	7732936
4	513171	7745462
5	513339	7743689
6	513873	7743291
7	513902	7735020
8	510787	7734581
9	506368	7727012
10	499145	7726814
11	499145	7724622
12	503864	7720872

Table 5 Coordinates for marine proposal envelope

Point	Easting	Northing
1	510230	7721459
2	509912	7721536
3	510014	7722272
4	510199	7722020
5	510333	7721162
6	510295	7720993
7	509984	7721047
8	509871	7721239
9	509876	7721272
10	510333	7721162
11	510857	7723487
12	511818	7725941
13	516430	7729891
14	516792	7731390
15	515624	7735813
16	515624	7735813
17	515623	7735856
18	515921	7736060
19	517126	7731503
20	516737	7729715
21	516737	7729714
22	516736	7729714
23	511156	7723429
24	511481	7722327
25	511397	7721959
26	510906	7721698
27	510343	7721826
28	510012	7722274
29	510096	7722641
30	510399	7721452
31	510477	7721795
32	510672	7721751

33	509990	7718791
34	509812	7718868
35	510333	7721162
36	509829	7721284
37	509822	7721254
38	509667	7721292
39	509572	7721042
40	509686	7721584
41	512098	7725742

Table 6 Coordinates for dredge material disposal areas within the proposal envelope

Point	Easting	Northing
1	514633	7729491
2	512164	7729491
3	512164	7731338
4	515637	7731338
5	514633	7729491
6	520855	7735020
7	517382	7735020
8	517382	7738054
9	521078	7738054
10	521078	7736867
11	520855	7736867
12	520855	7735020
13	517390	7744245
14	514171	7744245
15	514171	7746094
16	517390	7746094
17	517390	7744245

Table 7 Coordinates for terrestrial proposal envelope

Point	Easting	Northing
1	498931	7710879
2	499288	7711867
3	500268	7712681
4	501542	7713305
5	503958	7713839
6	505640	7714886
7	506296	7715752
8	508086	7717324
9	508596	7717477
10	508863	7717784
11	508982	7717917
12	508952	7718053
13	509022	7718302
14	509228	7718524
15	509587	7718827
16	509666	7718833
17	509783	7718880

18	509812	7718868
19	510185	7718507
20	510016	7718176
21	509791	7717848
22	509604	7717046
23	509604	7717045
24	509653	7716766
25	510173	7716059
26	511475	7715249
27	511477	7715249
28	513101	7715153
29	513725	7715790
30	514214	7715850
31	514309	7716058
32	514448	7716144
33	514320	7716048
34	514224	7715837
35	513732	7715776
36	513112	7715143
37	513724	7714208
38	513095	7715124
39	511272	7713260
40	511271	7713260
41	511271	7713260
42	511271	7713259
43	511270	7713259
44	511270	7713259
45	511269	7713259
46	511269	7713258
47	511269	7713258
48	511268	7713258
49	511268	7713258
50	511267	7713258
51	511267	7713258
52	511266	7713258
53	511266	7713258
54	511265	7713258
55	510242	7713369
56	509773	7714652
57	507356	7714687
58	507127	7714071
59	507305	7714687
60	506420	7714687
61	504662	7713502
62	502125	7713106
63	501346	7712818
64	500202	7711986
65	499871	7711960
66	499673	7711747
67	499377	7710915
68	501666	7705400
69	500136	7704987
70	500132	7704986

71	498941	7709109
72	499351	7710231
73	498931	7710879

Schedule 2

Term or Phrase	Definition
Capital Dredge Program	The program to dredge and dispose of 34 Mm^3 of seabed sediment required for the initial construction of the port facility.
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or his delegate.
Conservation significant marine fauna	Marine mammals, marine turtles and sawfish listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or Wildlife Conservation (Specially Protected Fauna) Notice 2012 as amended or replaced from time to time.
Coral Habitat	Means any hard substrate (whether of biogenic origin or not) that supports colonies of scleractinian corals within the areas mapped in Figures 4 & 5 of Schedule 1.
Introduced marine pests	Any marine species that poses a threat to the Western Australian environment or industry, if introduced, established or translocated. The marine species that are considered to pose a threat as outlined above include those detailed in the *Western Australian Prevention List for Introduced Marine Pests*, Department of Fisheries, 2012, as amended from time to time, and other species that appear to have clear impacts or invasive characteristics.
Irreversible loss	Same meaning as those terms in the *Environmental Protection Authority's Environmental Assessment Guideline Number 3 (2009)*.
Non-trading Vessel	A vessel either owned by the Proponent, or contracted for construction, maintenance, operation or decommissioning of the proposal, that meet the definition of non-trading vessels as appears in the *National Biofouling Management Guidance for Non-Trading Vessels (Department of Agriculture, Fisheries and Forestry, May 2009)*.
Permanent loss	The mortality of, or long term serious damage to, mangrove communities. This includes a long-term decline in the crown condition of the mangrove communities.
Port Area	(for the purposes of managing Introduced Marine Species) – means the area within the ZoMI Management Objective defined in Figure 4.
Serious damage	For the purpose of condition 9-1 the term "serious damage" has the same meaning as those terms in the Environmental Protection Authority's *Environmental Assessment Guideline Number 3 (2009)*.
Turbidity generating activities	Capital and maintenance dredging and dredge spoil disposal required for the construction and on-going operation of the Port as described in Schedule 1.

Schedule 3 The Environmental Quality Objectives and Levels of Ecological Protection to be achieved in marine waters for the Anketell Point Port Development project.

Area	Level of Ecological Protection for Maintenance of Ecosystem Integrity
Zone of initial dilution – maximum 50 metres radius around diffuser or discharge.	**Low** - To allow for large changes in the quality of water, sediment and biota (eg. Large changes in contaminant concentrations causing large changes beyond natural variation in the natural variation in the natural diversity of species and biological communities, rates of ecosystem processes and abundance/biomass of marine life, but which do not result in bioaccumulation/biomagnification in nearby high ecological protection areas). For this protection level only the 80% species protection guideline trigger values* for potentially bio-accumulating toxicants in water apply. There should be no bioaccumulation in adjacent high ecological protection areas.
Marine waters within 250 metres from ship turning basin and berthing areas and the area enclosed by the Marine Offloading Facility breakwaters.	**Moderate** - To allow moderate changes in the quality of water, sediment and biota (eg moderate changes in contaminant concentrations that cause small changes, beyond natural variation, in ecosystem processes and abundance/biomass of marine life, but no detectable changes from the natural diversity of species and biological communities). For this protection level the 90% species protection guideline trigger values* for toxicants in water apply and for other physical and chemical parameters the trigger values are based on the 95th percentile of natural background measurements. Trigger values should be derived in accordance with the recommended approaches in ANZECC & ARMCANZ (2000). For sediments the ISQG-low* apply. For dissolved oxygen the outfalls should preferably be managed so that they do not cause the median dissolved oxygen concentration in waters ≤0.5 metres from the seafloor, calculated over a period of up to 6 weeks, to fall below 80% saturation at any site, but they should never cause dissolved oxygen concentrations to fall below 60% saturation.
Marine waters beyond the areas of Moderate and Low Ecological Protection.	**High** – To allow small changes in the quality of water, sediment and biota (eg. small changes in contaminant concentrations with no resultant detectable changes beyond natural variation in the diversity of species and biological communities, ecosystem processes and abundance/biomass of marine life). For this protection level the 99% species protection guideline trigger values* for toxicants in water apply (except for cobalt for which the 95% species protection guideline should apply) and for other physical and chemical parameters the trigger values are based on the 80th percentile of natural background measurements. Trigger values should be derived in accordance with the recommended approaches in ANZECC & ARMCANZ (2000). For sediments the ISQG-low* apply. For dissolved oxygen the outfalls should preferably be managed so that they do not cause the median dissolved oxygen concentration in waters ≤0.5 metres from the seafloor, calculated over a period of up to 6 weeks, to fall below 90% saturation at any site, but they should never cause dissolved oxygen concentrations to fall below 60% saturation.
Marine waters within the proposed boundaries of the Dampier Archipelago Marine Park.	**Maximum** – No detectable changes beyond natural variation in ecosystem processes, the quality of water, sediment and biota, the diversity of species and biological communities or in the abundance/biomass of marine life.

* From National Water Quality Management Strategy Report 4, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000) or its updates.

Environmental Values	ENVIRONMENTAL QUALITY OBJECTIVES AND THEIR DESCRIPTIONS
Ecosystem Health	***Maintenance of ecosystem integrity.*** Ecosystem integrity is considered in terms of structure (eg. the biodiversity, biomass and abundance of biota) and function (eg. food chains and nutrient cycles). Three levels of ecological protection shall apply to the Port of Anketell (High, Moderate, and Low).
Fishing and Aquaculture	***Maintenance of seafood for human consumption*.** Seafood is safe for human consumption when collected or grown in Port waters. ***Maintenance of aquaculture.*** Water is of a suitable quality for aquaculture purposes.
Recreation and Aesthetics	***Maintenance of primary contact recreation values*** Primary contact recreation (eg. swimming) is safe to undertake in Port waters.
	Maintenance of secondary contact recreation values Secondary contact recreation (eg. boating) is safe to undertake in Port waters.
	Maintenance of aesthetic values The aesthetic values of the Anketell Port marine environment are protected.
Cultural and Spiritual	***Cultural and Spiritual values of the marine environment are protected*** Indigenous cultural and spiritual values are not compromised in Port waters.
Industrial water supply	***Maintenance of industrial water supply values*** Marine water quality in Anketell Port is of a suitable quality for industrial water supply purposes.

Schedule 4 Proponent Environmental Mitigation Measures – Anketell Point Port Development (Condition 19)

Project	Value & Timeframe	Responsibility to implement	Governance	Cost
RESEARCH				
Project A Long term distribution, abundance and behavioural studies of conservation significant cetaceans, dugong and marine turtles in Pilbara waters with an emphasis on the project area, including long term turtle monitoring on beaches in proximity to the project area and management to maximise hatchling success.	$750,000 per annum commencing within 6 months of project approval.	DEC	Proponent/ OEPA/ DEC	$3 million over 4 years
Project B Studies to improve understanding of impact of project related marine noise on marine mammals (including humpback whales).	$150,000 per annum commencing at least six months prior to port marine infrastructure construction commencing.	DEC	Proponent/ OEPA/ DEC	$450,000 over 3 years.
Project C Enhance the capacity within Government and the private sector to predict and manage the impacts of dredging on tropical marine communities in Western Australia	$625,000 per annum commencing within 6 months of project approval.	Proponent/ WAMSI	Proponent/ OEPA/ WAMSI	$2.5 million over 4 years
Project D Provide management funds for active management and recovery of Schedule 1 species *Lerista nevinae.*and to improve understanding of the ecology, population genetics and habitat requirements of the Schedule 1 species *Lerista nevinae.*	$200,000 per annum commencing within six months at least six months prior to port marine infrastructure construction commencing..	WA Museum/DEC	Proponent / DEC OEPA	$1million over 10 years.

Project E Management to improve conservation outcomes on Dixon Island – biological surveys, feral animal baiting.	$200,000 per annum commencing at least six months prior to port marine infrastructure construction commencing.	DEC	Proponent/ DEC/ OEPA	$1million over 5 years.

Notes

The following notes do not form a part of the implementation conditions of the Statement:

- The proponent for the time being nominated by the Minister for Environment under section 38(6) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal unless and until that nomination has been revoked and another person is nominated.
- If the person nominated by the Minister, ceases to have responsibility for the proposal, that person is required to provide written notice to the Environmental Protection Authority of its intention to relinquish responsibility for the proposal and the name of the person to whom responsibility for the proposal will pass or has passed. The Minister for Environment may revoke a nomination made under section 38(6) of the *Environmental Protection Act 1986* and nominate another person.
- To initiate a change of proponent, the nominated proponent and proposed proponent are required to complete and submit the Post Assessment Form 1 - Application to Change Nominated Proponent
- The General Manager of the Office of the Environmental Protection Authority was the Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986* at the time this Statement was signed by the Minister for Environment.
- Where a condition states “on advice of the Office of the Environmental Protection Authority”, the Office of the Environmental Protection Authority will provide that advice to the proponent.
- The Office of the Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.
- The Minister for Environment will determine any dispute between the proponent and the Office of the Environmental Protection Authority over the fulfilment of the requirements of the conditions.
- The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions