

Statement of Reasons

PROJECT SEA DRAGON PTY LTD – CORE BREEDING CENTRE AND BROODSTOCK MATURATION CENTRE, POINT CEYLON

PROJECT

The Proponent, Project Sea Dragon Pty Ltd, submitted the Notice of Intent (NOI) for the core breeding centre and broodstock maturation centre in Bynoe Harbour (the Project) to the Northern Territory Environment Protection Authority (NT EPA) on 19 February 2016 for consideration under the *Environmental Assessment Act* (EA Act).

The NT EPA requested further information on 7 March 2016. The Proponent responded to the further information request on 20 April 2016, and again on 26 May 2016 and 5 August 2016 with submission of position statements regarding waste discharge options and improved interrogation and clarification of waste water modelling.

The Project is one component of three proposed for the larger Project Sea Dragon in the NT, which also includes:

- a hatchery proposed to be located near Darwin. The hatchery would be assessed through a separate NOI
- the Stage 1 Legume Grow-out Facility proposed for Legume Station, which is being assessed separately at the level of an environmental impact statement (EIS).

The Project is located on vacant unregistered crown land Portion 3192 at Point Ceylon, on the southern side of Bynoe Harbour.

Site limitations for Point Ceylon were previously assessed under the NT *Environmental Assessment Act* for the construction of a land based prawn aquaculture facility proposed in 2003. The facility was never constructed and the lease lapsed.

The core breeding centre is to be used for the development, production and selection of high performing prawn stock. The top performing individual prawns would be transferred to the broodstock maturation centre to produce commercial numbers of broodstock for use in the hatchery.

The total development footprint for the centres and common facilities at full scale, including seawater intake pipeline and discharge channels, will be approximately 132 ha. Infrastructure will be scaled up in stages over time to support increased demand, however, the project headworks would be constructed to have a greater capacity than that required by stage 1 of the project to take into account future requirements.

Seawater for the farm would be piped from an intake in the deeper channel of Bynoe Harbour approximately 2 km through two 600 mm high density polyethylene pipes to Point Ceylon. The pipeline has been designed to avoid the adjacent Paspaley Pearling oyster leases and would be anchored to the seabed to maintain its alignment. Seawater would be stored in onshore settling ponds sized to accommodate at least 5 days' supply for normal site operations. At full scale, the expected maximum daily seawater intake volume for both the breeding and maturation centres would be 11 000 m³.

The initial discharge for stage 1 would be approximately 2200 m³/day with the full-scale project flow equivalent to the intake volume of 11 000 m³/day (approximately four gigalitres per annum). Saline waste water from the centres is proposed to be pumped to settling ponds and then discharged via a channel/pipe to a tidal pond with a rubble weir constructed adjacent to Wheatley Creek.

The organic wastes produced by the Project e.g. settling pond sludge and prawn bodies, are categorised as listed wastes under Schedule 2 of the *Waste Management and Pollution Control (Administration) Regulations*. Accordingly, an environment protection approval (for construction of the stockpiles, treatment facilities and disposal site/s) and environment protection licence (for ongoing operation of the waste facilities and disposal site/s) will be required under the *Waste Management and Pollution Control Act* (WMPC Act).

Fresh water for operational use and for potable supplies may be sourced through a combination of rainwater catchment, desalination plant(s) onsite and groundwater if groundwater capacity is found to be viable.

Construction of an access road into the site would be necessary with two options proposed. The preferred option is a road that runs north-south from Fog Bay Road and the alternative option is a road running east-west from Dundee Road. Both options provide public access, terminating at the Project site administration area.

Workforce requirements for the Project are estimated to be 27 personnel at stage 1 and 45 at full scale, with a mix of skills and expertise allowing for local employment opportunities.

The full-scale Project is proposed to operate for at least 25 years to support the Proponent's hatchery and grow-out facilities.

CONSULTATION

The NOI and further information have been reviewed in consultation with Northern Territory Government (NTG) advisory bodies, as required by clause 8(1) of the Environmental Assessment Administrative Procedures.

JUSTIFICATION

Review of the Notice of Intent and further information identified the following potential environmental impacts and risks associated with the Project:

- impacts to the environment from improperly-managed solid operational wastes (pond sludge, dead prawns etc.)
- potential impacts to water quality, marine habitats and trophic levels from nutrients in discharge water
- impacts on the marine and estuarine environment from installation of seawater intake pipe and discharge weir
- feasibility of fresh water supply for operations
- potential social impacts with respect to site access road and project traffic, access to recreational fishing areas and impacts on the marine environment
- impacts to the Project and local residents from biting insects and the potential to create additional biting insect breeding habitat
- potential impacts to Bynoe Harbour if acid sulfate soils are disturbed
- impacts to Bynoe Harbour from erosion and sedimentation
- potential to introduce and spread weeds.

Solid waste management

The Proponent states that biological waste (prawn bodies) would be incinerated and the ash disposed of on site, or alternatively handled through or ensiled (dissolved in organic acids) and the waste disposed of off-site at an appropriate facility. Pond sludge is proposed to be removed periodically from the settlement ponds and placed in a dedicated sediment storage area. The sediment would be allowed to sit for approximately six months and then spread as a top dressing.

No indication of the predicted volumes of waste was provided. Detailed information was not available in the NOI for either of these waste handling and disposal processes. Further information from the Proponent included a suggestion that engineering controls would be implemented to prevent nutrients and sediment from waste storage areas washing into adjacent waterways, and the Proponent has committed to preparing and implementing a detailed waste management plan. The NT EPA considers that significant impacts to the sensitive Bynoe Harbour environment cannot be ruled out if waste is not appropriately managed on site, and substantial uncertainty remains in relation to waste volumes produced, likely constituents and management.

Water quality

The Project proposes to discharge waste water into Wheatley Creek to provide a separation distance between its intake water and discharge, and to avoid the potential to conflict with the Paspaley Pearling leases in Bynoe Harbour. Paspaley Pearls pearling operations were a key issue during the Suntay Aquaculture assessment in 2003. Assessment Report 41 for the Point Ceylon (Suntay) Aquaculture Estate recommended that any discharge from the facility should be directed into Wheatley Creek to avoid potential contamination of the pearling leases.

The potential for impacts to water quality from waste water discharge into receiving waters is considered to be the key risk of the Project. While the Proponent has committed to ensuring no anti-biotic, anti-parasitic or anti-fouling agents will be discharged into the environment, elevated levels of phosphorus and nitrogen are likely. Elevated nutrients in receiving waters have the potential to create eutrophic conditions, which could lead to algal blooms and trophic level changes in estuarine ecosystems.

Numerical modelling of the discharge was conducted for the proposed full scale operations (11 000 m³/day) to predict the long-term, upper limits for nutrient concentration increases in receiving waters as a result of the Project. The modelling was considered conservative as it assumed nutrients would be discharged at proposed licence levels with no pre-discharge settlement (Figure 1); receiving waters and biological systems would have no nutrient assimilative capacity; and discharge would be direct and constant (no dilution from the proposed tidal weir).

There are currently no water quality guidelines or objectives for Bynoe Harbour and ambient water quality data are limited. The Proponent has conducted eight water sampling campaigns (Dry season and post Wet season) to date. In the absence of a robust baseline and specific water quality guidelines, the Proponent compared Darwin Harbour water quality guidelines, ANZECC criteria and guidelines from a tropical Queensland estuary to derive interim water quality guidelines for Bynoe Harbour and Wheatley Creek. Values across these sources were comparatively similar and the Proponent consequently adopted the Darwin Harbour water quality guideline values as interim guidelines (Figure 1). While there was some question from NTG advisory bodies regarding the suitability of the proxy sites used to derive the guidelines, the NT EPA considers that the interim guidelines provide a reasonable basis for assessment of potential impacts until the guideline values can be refined.

Figure 1 Comparison of discharge, modelled increase, ambient and proposed guideline concentrations of nutrients

	Model input (median proposed licence levels at point of discharge)	Modelled increase above ambient (12 months), upper limit in Wheatley Creek)	Bynoe Harbour ambient (80 th percentile from 3 campaigns)	Proposed Interim Guideline for Wheatley Creek
Total Nitrogen (mg/L)	2.0	0.06	0.2	0.3
Total Phosphorus (mg/L)	0.4	0.013	0.02	0.03

Further interrogation of the modelling predicted that occasional (4 - 5 times per month), short-duration (0.5 hour) exceedances of the interim guidelines for nutrients would occur within the immediate discharge vicinity to approximately 100 m upstream and downstream of the proposed outfall. The median value for total nitrogen in upper Wheatley Creek (0.26 mg/L) was compliant with the proposed interim guideline value (Figure 1) and the median value for total phosphorus (0.033 mg/L) marginally exceeded the proposed interim guideline value for Wheatley Creek (Figure 1). The distance from the discharge point in Wheatley Creek to Bynoe Harbour via McKenzie Arm and Geranium Channel is approximately 7 km. Within this context, the impacts from the discharge are likely to be localised and should not extend into the wider harbour.

Based on waste water quality data from its Cardwell aquaculture operation, which discharges into Great Barrier Reef Marine Park waters with no pre-discharge treatment, the Proponent expects that nutrient concentrations in waste water can be maintained well below its proposed licence limits. The addition of the tidal weir to facilitate timed discharges during the higher end of the daily tidal regime (for example, when the water level rises above Mean High Water Neap tides) would provide flow control and reduce the potential for peak concentrations to occur at low water slack tides. A review of the literature indicates that the Proponent's assumption in its modelling that there will be no decay or biological uptake of nutrients in the receiving environment is conservative. Accordingly, the NT EPA considers that the proposed discharge of waste water to Wheatley Creek is not likely to significantly affect the regional water quality of Bynoe Harbour into the long term, though there may be some localised, longer-term enrichment near the point of discharge in Wheatley Creek.

The discharge for the initial stages of the Project will be considerably smaller than the full-scale Project; in the order of 2200 m³/day. The discharge will ramp up at approximately two to three year intervals in increments of around 20-25%, to full scale. This will provide an opportunity for the Proponent to better understand background water quality and associated biological processes in receiving waters within the earlier stages of the discharge to Wheatley Creek.

The Proponent has committed to continuing its water quality sampling on a monthly basis to refine ambient water quality guidelines. This will inform the licence criteria in the Proponent's environment protection licence. During operation, the Proponent will monitor its discharge and the receiving environment in accordance with standard monitoring procedures. Contingencies to reduce nutrient discharges in the event of exceedances have been outlined in the NOI. These involve aquaculture system checks and feed optimisation rather than additional waste water treatment options.

While the NT EPA is satisfied that the modelling shows significant impacts to Bynoe Harbour from waste water discharge are unlikely, the sensitivity of Bynoe Harbour and hence the community interest in significant developments in the region, as well as the potential for visible, localised

impacts in Wheatley Creek, require public consideration of proposed waste water discharges from the Project.

Biodiversity

The proponent identified sixty-four (64) species listed as threatened under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) and/or the *Territory Parks and Wildlife Conservation Act*, and thirty-seven (37) EPBC Act listed migratory species that may occur within the region. The assessment of the likelihood of occurrence of these species was considered to be accurate.

The key issues identified in relation to listed species and communities included potential impacts from changes to water quality from nutrient discharges, and impacts to benthic communities at seawater intake and discharge locations, and from piling activities to anchor the intake pipe.

Potential impacts from waste water discharge

The NT EPA is satisfied that measurable water quality impacts are likely to be restricted to an area of Wheatley Creek in the vicinity of the waste water outfall, as discussed previously. Any impacts may include enrichment of sediments and may lead to localised changes in benthic communities. Additionally, there may be the potential for localised eutrophication and algal growth. If discharges are not managed appropriately, there may be some risk of localised fish kills. The NT EPA considers that any impacts are unlikely to be measureable within Bynoe Harbour and therefore are not expected to affect ecologically significant areas. However, the importance of the Bynoe region to the community in terms of the environmental and recreational values of the harbour are such that the Project would benefit from public consideration of the potential impacts of waste water discharge from the Project.

Potential impacts from seawater intake and discharge outfall installation

The seawater intake pipe is proposed to extend approximately two kilometres from Point Ceylon to guarantee water intake at any tide. The macrotidal environment of Bynoe Harbour leads to peak tidal current velocities of 0.7 m/s (<1.5 knots) near the intake point. Hence, the Proponent proposes to anchor the pipeline to the seabed using either (or both) concrete collar anchor blocks strapped to the pipe or weighted geotech matting, depending on local hydrodynamics, and seabed and subsurface geotechnology. The Proponent has ruled out the option of piling, removing a potentially significant source of noise that could impact marine megafauna.

Installation of the seawater intake pipeline will have direct, localised impacts to benthic habitats. The NOI indicated that approximately 5.5 ha of intertidal and subtidal substrates could be disturbed during works. This figure included a 30 m wide corridor to allow flexibility for pipeline sizing and placement depending on conditions. In reality, the direct footprint of the in-situ pipeline will equate to approximately 0.6 ha.

The Proponent has not undertaken surveys to characterise the benthos within the disturbance footprint but has conducted a desktop analysis and consulted with Paspaley Pearling. Seagrass beds have been previously recorded in the intertidal–subtidal interface and in the very shallow subtidal areas of Bynoe Harbour, including patchy seagrass beds near Point Ceylon. While Paspaley had not observed any seagrass within its adjacent leases, there is some potential for seagrass habitat to exist within the pipeline alignment and therefore for some seagrass to be removed or disturbed during pipe laying and anchoring. Short-term, localised increases in turbidity as a result of sediment disturbance are also expected. Generally, it is expected that benthic habitats would recover once the pipes are in place.

There may be short-term and localised behavioural changes to any marine megafauna present in the vicinity of works due to noise and vibration. No further disturbance of the pipeline is proposed

for the life of the Project. Accordingly, the NT EPA is satisfied that potential impacts and risks associated with installation of the seawater intake pipe are unlikely to be significant and can be adequately managed through the implementation of measures proposed in the NOI.

Technical specifications of the discharge point and dimensions of the proposed tidal weir on Wheatley Creek were lacking in the NOI. The soft sediments in the vicinity of the discharge support mangrove forest, however, the proposed location of the tidal pond is largely clear of mangrove habitat. While some fringing mangroves may be removed or disturbed during installation of the discharge pipe and weir, it is unlikely that impacts to mangroves would be significant relative to the extensive mangrove forest that exists along Wheatley Creek and more widely in the region. There is potential for acid sulfate soils to be disturbed in a limited area but impacts are likely to be localised and minimal if such material is managed appropriately.

Freshwater supply

The combined average demand for freshwater for the breeding and maturation centres is predicted to be 14 600 m³ per annum (14.6 million litres). The demand rate is up to 57 m³/day (peaking at 2.7 L/s over 12 operating hours) for the full scale development. The Proponent expects that freshwater would be supplied primarily by rainwater collection on site, with groundwater on the property and desalination making up the deficit.

There were concerns from advisory bodies that the capture of rainwater for the fully staged development would pose a possible Project feasibility risk and that excessive reliance on groundwater could impact other users of the aquifer.

The Proponent estimated that 2.5 million litres of storage could provide all of the site's freshwater demand at Stage 1 and that capture of rainfall from buildings and plant run-off would provide sufficient supply. However, it was unclear from documentation whether expansion of infrastructure in latter stages would provide adequate capture area to significantly boost rainfall capture at the volumes required for the full stage development. The NOI did not appear to account for the potential for dry Wet seasons (as occurred in 2015/2016) to impact on supply.

Historically, the groundwater resource in the region is acknowledged to be limited in its pumping capacity. The Proponent proposes to conduct a groundwater study and pumping tests on an existing bore at Point Ceylon, to determine whether it can be used to supplement stage 1 rainfall harvesting and to investigate the site's groundwater capacity. Should a reliable supply that does not impact upon the aquifers used by the local community prove feasible, the Proponent intends to drill an additional production bore to supplement the existing one on site.

In the event that groundwater cannot be reliably supplied without impacting the local community, the Proponent proposes the desalination option in conjunction with rainwater collection. Desalination would produce a brine waste product that could potentially impact the salinity range in Wheatley Creek and the wider harbour. The Proponent indicated that, in the unlikely event that freshwater requirements were met entirely from desalination, approximately 1 L/s of brine flow would result during the plant's operation. This brine waste would be pumped to the process wastewater channel for mixing in the settlement ponds. The process wastewater flow (at an average of 25 L/s) would provide a 25:1 dilution prior to delivery to the final retention pond before the discharge outfall.

The NT EPA considers it unlikely that impacts on the natural salinity range of Wheatley Creek from desalination brine would be significant, particularly with the site's freshwater requirements sourced from a combination of rainfall and desalination, and potentially groundwater. However, the availability of an adequate freshwater supply for Project operations remains a business risk for the Proponent and is a significant uncertainty for the NT EPA with respect to potential impacts to groundwater users and/or waste management practices.

Social impacts

The Proponent conducted community consultation in the Dundee area including Dundee Beach, Dundee Forest, Dundee Downs and Bynoe Haven, through the distribution of information brochures, attendance at two community events and informal communication with local residents. The key issues raised during the community consultation process included concerns about negative impacts to fishing in the region, discharge water quality, site road placement, restricted boat access to water and site access restrictions. Employment opportunities were viewed as a benefit of the Project, particularly for weekend residents with aspirations to permanently move to the area.

The NT EPA considers that the Proponent responded appropriately to local community concerns with its commitments to maintain water quality close to ambient and to ensure access to Bynoe Harbour for fishing is not restricted. The exception to this is the restriction of access to facilities on Point Ceylon via land, which would be a fully-fenced, secure area. This restriction is expected to affect only a small number of individuals.

Bynoe Harbour is considered to be an area of high environmental value and an important area for recreational fishing and mud crabbing, and other recreational activities. As well as local residents, the NT EPA considers that substantial development of the harbour would be of interest to the wider community in the Top End. A public process is considered necessary to enable broader community interests to be addressed.

Other potential impacts and risks

The NT EPA is satisfied that potential impacts and risks associated with erosion and sediment control, acid sulfate soils, biting insects and weeds can be adequately managed through the implementation of standard measures by the Proponent. The Proponent has committed to preparing and implementing detailed management plans for potential impacts of the Project.

While the NT EPA considers that many of the environmental impacts and risks associated with the Project are not significant, some issues remain that are capable of having a significant effect on the environment and cannot be adequately characterised without further studies. Further, public interest in the development of Bynoe Harbour is expected and should be addressed through a public process.

DECISION

The core breeding centre and broodstock maturation centre, Bynoe Harbour, are capable of having a significant effect on the environment and the environmental significance is such that an environmental impact statement is necessary with respect to the proposed action.



DR BILL FREELAND

CHAIR

NORTHERN TERRITORY ENVIRONMENT PROTECTION AUTHORITY

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