APPENDIX A: EIS SUBMISSIONS

NORTHERN TERRITORY GOVERNMENT

ATTACHMENT A

TABLE 1: NTG COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT TO ADDRESS IN THE SUPPLEMENT

TNG LIMITED – DARWIN PROCESSING FACILITY

Topic	Comment	Request for information to be provided in the Supplement
Proposal Description		
1. Management of stockpiles	The Draft EIS does not provide details on the stockpiles of concentrate and solid waste streams. There is potential for these to cause impacts on terrestrial environmental quality or inland water environmental quality (which could have flow-on impacts to marine environmental quality).	Provide information on the management of stockpiles of magnetite concentrate, neutralised digest residue and dry magnetic separation non-magnetics, including: • volume to be stored on site at any time, the surface area required to store this volume, and the location of the stockpiles • material characterisation relating to the potential for contaminated runoff or leachate (solubility, reactivity, etc.)
2. Ponds	The Draft EIS includes ponds on some maps but does not provide details about these ponds. There is potential for infiltration or runoff from these ponds to cause impacts on inland water environmental quality and potential for impacts on wildlife that may be attracted to the ponds.	Provide a map, design and description of each pond proposed on the site, including: • composition of material to be stored • the type and infiltration parameters of any proposed lining • intended freeboard for high rainfall events, and the ARI rainfall event that would be retained (e.g. 100-year)
3. Waste streams - constituents	The Draft EIS outlines the waste streams but does not give sufficient detail to give confidence in the following: • that all potential waste discharges and emissions have been identified, and the likely parameters of these wastes (including contents) • the ability of real-time monitoring to detect conditions that may affect waste parameters so that operational controls can be implemented to ensure compliance with relevant criteria.	Provide (a) detailed site layout diagram/s and (b) detailed process block/flow diagram/s showing: • location of all emissions and discharges of contaminants to air, water or land, including potential fugitive emissions, with a unique identifier for each emission/discharge source (to be carried through all environmental assessment documentation) • a description of all equipment to be used to emit/discharge waste • location of all proposed internal and external monitoring of the quality and quantity of process and waste streams • detailed description of the source, quantity and composition of all emissions and discharges of contaminants to air, water or to land from the whole Proposal, including for the construction phase, standard operations, shutdowns, and any other variation to

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		standard operations (normal operating conditions and likely worst case upset conditions). Quantities of contaminants of concern in emissions and discharges are to be based on the composition of all inputs (including, but not limited to, ore, coke and reagents).
4. Power generation and greenhouse gas emissions	The Draft EIS considered solar superior for renewable energy generation given its efficiency and low cost over the project life. However, the Draft EIS states solar will only be considered for implementation once the Project is established. The NT EPA may consider that the Proposal's predicted 6.2% increase in the NT's greenhouse gas emissions (over predicted 2019 levels) is a significant impact.	Provide information on the extent of land required for a potential solar electricity generation source for the Proposal. Identify where this may be located on site or off site. Discuss potential options for offsets for greenhouse gas emissions from the Proposal.
5. Alternatives for wastewater / reduction of water requirements	The Proposal includes the use of a high volume of water, equivalent to approximately 25% of Darwin's current total annual water consumption. The proposed volume of wastewater discharge (12 GL) would be the single largest contributor to point source inputs to Darwin Harbour, equivalent to about 70% of the volume of all current inputs. The Draft EIS did not address the Terms of Reference item (in section 4.3.2) requesting the assessment of the risk of unsustainable use and/or wastage of water resources. The Draft EIS has not proposed alternatives that would reduce water requirements and wastewater discharges to the Darwin Harbour.	Demonstrate application of the waste management hierarchy of avoidance, re-use and reduction to the use of water and the proposed controlled discharge of wastewater to Darwin Harbour by investigating, reporting on and considering alternatives to the use of water and the proposed discharge presented in the Draft EIS. Describe and justify why the adopted option has been chosen. Examples of potential options include increased re-use of water, off-site use of wastewater by a third party, or off-site discharge of wastewater or sludge from evaporative treatment (potentially using the return-rail movement to Mount Peake).

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6. Water balance	The water balance provided in the Draft EIS (Figure 4-6) was too general to demonstrate that process wastewater can be successfully managed within the site to prevent the discharge of any contaminated water (including contaminated stormwater) from the site.	Provide a more detailed water balance that illustrates the volume of all water entering and leaving the site, including the volume to be used for at least all of the following components: • processing components • dust suppression • water treatment plant • staff use Include the source of water entering the site (including in magnetite concentrate, reagents, rainfall) and the fate of water leaving the site (in products, vapour [off-gas], infiltration, surface runoff or controlled discharge offsite).
7. Volume of wastewater for controlled discharge	References in the Draft EIS to the volume of wastewater for discharge varied such that it was unclear how much water is proposed to be discharged. The hydrodynamic modelling used 34.6 ML/d with a discharge velocity of 8 m/s. Elsewhere in the Draft EIS, discharge volume is stated to be 12 GL per year (average 26 ML wastewater per day; peak discharge of 32 ML/d).	State the expected volume of wastewater to be discharged annually into Darwin Harbour from the wastewater treatment plant. Provide the expected annual and daily volume of the discharge (average and maximum). Explain what conditions would require daily discharges higher or lower than average, including tidal timing. Ensure that technical reports refer to the same volume, or if not, provide an explanation for the difference and the technical implications of the difference (e.g. how would modelled predictions differ?).
8. Wastewater treatment plant	The Draft EIS does not identify the proposed wastewater treatment methodology. It is unclear from the information provided in the Draft EIS whether the proposed wastewater treatment plant is capable of achieving the proposed wastewater quality criteria. This lack of detail has the potential to invalidate portions of the management and monitoring program, as it has been developed without a full understanding of the technology to be employed.	Provide information on • the water treatment methodology / technology and evidence that it is able to achieve the discharge water quality criteria for the intended volume of wastewater • how the treated wastewater will be discharged in real time to coincide with the outgoing tide • how/where treated wastewater will be stored on site in between discharge times • how often and under what circumstances the water treatment plant may need to shut down due to not having enough storage capacity for treated wastewater (or any other reason), and in such cases, where/how untreated wastewater would be stored • the waste product/s from the wastewater treatment plant, including state (liquid, solid), nature (physical and chemical parameters) volume, handling, storage and disposal.

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9. Wastewater discharge pipeline	The Draft EIS provides only an indicative location of the pipeline. This does not enable adequate assessment of potential impacts on the seafloor and other users of Darwin Harbour.	Provide an updated map of the discharge pipeline encompassing the whole pipeline route from the Proposal site to the outfall location in Darwin Harbour. Include the location of other existing or proposed infrastructure in the vicinity of the pipeline (e.g. other pipelines or dredged areas). Describe the methods that will be used to construct the pipeline. Include a consideration of how the laying and maintenance of the pipeline will impact other users, including seafloor dredging conducted to navigable access for INPEX and Darwin Port, and how it will be protected from damage by other Harbour users.
10. Domestic wastewater	The Draft EIS (section 4.6.16.3) mentions a sewage treatment plant onsite, and usage of greywater from this plant to irrigate the surrounding landscape, but details are insufficient to enable assessment of potential impacts from this.	Consider and discuss the proposed management of domestic wastewater in accordance with codes and guidelines for wastewater management published by the Department of Health. Provide details on the management of domestic wastewater (sewage and greywater) during both construction and operations phases, including: • location of the sewage treatment plant • details on the type of treatment to be used, the capacity of the plant • where 'greywater' irrigation would occur
Environmental Management Plan		
11. Definitions	The meaning of minor environmental impact and hazard is unclear.	Define 'minor environmental impact' and 'some minor actual or potential hazard to the environment'.
12. Land clearing	It is unclear how much vegetation will be cleared in the disturbance area of 264 ha.	Clarify the type, quality and extent of native vegetation to be cleared.

Approvals and regulatory framework		
13. Environmental approval	It is anticipated that the new *Environment Protection Act 2019* (EP Act) will commence in mid - 2020. If assessment of the Proposal is completed after commencement of the EP Act, once the assessment process (under the *Environmental Assessment Act 1983*) is completed, an environmental approval for the Proposal will be required in accordance with sections 301 and Part 5 of the EP Act. The purpose of the environmental approval is to manage the potentially significant environmental impacts of the Proposal. The decision on whether to grant environmental approval is made by the Minister, based on advice from the NT EPA including a draft environmental approval or draft statements of unacceptable impact. The Minister is required to take certain matters into account when making the decision. To inform the Minister in making a decision on an environmental approval for the Proposal the EIS should demonstrate how the matters at section 73 of the EP Act have been taken into account.	Provide information relating to the Minister's decision on an environmental approval. Matters that are additional to those addressed elsewhere in the EIS, and that require attention in the Supplement, include: • principles of ecologically sustainable development and management hierarchies, as outlined in Part 2 of the EP Act • the objects of the EP Act (section 3), including object 3(e) to recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes. It is considered that other objects of the EP Act (Section 2) are or will be addressed elsewhere in the EIS • that any proposed environmental offsets that form part of this Proposal and/or the EIS can be provided in accordance with the EP Act • a signed declaration that the Proponent is a fit and proper person to hold an environmental approval in accordance with section 62 of the EP Act.
Consultation		
14. Community engagement and consultation	Community engagement and consultation undertaken for the Draft EIS does not appear to have addressed the full range of potential environmental impacts and risks associated with the Proposal, particularly in relation to water usage (see Social, Economic and Cultural Surroundings below) and wastewater discharge to Darwin Harbour (see Marine Environmental Quality below). Also, while many stakeholders were identified, not all of these	Provide details of further community engagement and consultation on the Proposal in accordance with the NT EPA's Guidance for Proponents – Stakeholder Engagement (NT EPA 2019). Specifically, demonstrate that information has been provided to stakeholders on the Proponent's response to items 5, 7, 26-32, 34-35, 50-52 of this document, and provide details (in accordance with section 2.4 of the NT EPA's General Guidance for Proponents Preparing an Environmental Impact Statement (NT EPA 2019)) of the engagement and consultation undertaken on this.

	were actively engaged in consultation in relation to the Draft EIS.	Provide a Community and Stakeholder Engagement Plan (as proposed in Section 6.5 of the Draft EIS) that includes transparent reporting of monitoring results to all stakeholders.
Terrestrial Flora and Fauna		
15. Shorebirds	There is a potential risk that new exposed areas of freshwater are attractive to shorebirds particularly during the dry season when they move into the Darwin area. Should the settling ponds contain compounds toxic to waterbirds there would be potential for impacts on waterbirds. Relevant reference: Lilleyman A. and Garnett S. (2019). Shorebird values and knowledge gaps in Darwin Harbour. *Unpublished report of Department of Environment and Natural Resources,* RIEL Charles Darwin University	If ponds may contain materials that could be toxic to waterbirds, provide an assessment of the potential impacts and risks to waterbirds that may be attracted to the ponds especially during the dry season. As appropriate, describe any mitigation measures to address potential impacts.
16. MNES	Further information is required to adequately meet assessment requirements for matters of national environmental significance (MNES) in accordance with the *Environment Protection and Biodiversity Conservation Act 1999,* as specified in section 3.1 of the Terms of Reference.	For the MNES species listed below, clearly provide the following: • an assessment of the presence or likely presence of the species in the Proposal area and in any areas that may be impacted • the size and distribution of the local population, including at different life cycle stages, for example, when breeding, foraging, resting and/or migrating • The importance of the local population in a local, regional, NT, national and international context. • The identification of suitable habitat for the species (for breeding, foraging, aggregation or roosting), and the quality of this habitat, and how this may be disturbed or altered by the Proposal The relevant terrestrial MNES species are the curlew sandpiper, eastern curlew, greater sand plover, red knot, lesser sand plover, black-footed tree-rat, and northern quoll.

17. Environmental Assessment Guidelines	Policy and guidance material referred to in the EIS did not include some documents which were requested to be included in the EIS for assessing the Proposal under the *Environment Protection and Biodiversity Conservation Act 1999*:	Discuss how the following DAWE policy and guidance documents have been considered (including those already identified within the Draft EIS). That is, provide a brief discussion on the objectives of the documents and whether the Proposal is consistent with them. For example, the *Recovery Plan for marine turtles in Australia* states a Recovery Objective of: *"The long-term recovery objectives for marine turtles is to minimise anthropogenic threats to allow for the conservation status of marine turtles to improve so that they can be removed from the EPBC Act threatened species list'.* Provide a discussion on how the Proposal is consistent with this objective or alternatively, how the proposed avoidance, mitigation / management and offsetting will compensate for any residual significant impact, thereby ensuring consistency with the objective for relevant MNES. **Policy and Guidance documents:** Department of the Environment, Water, Heritage and the Arts (2009). Approved Conservation Advice for *Pristis clavata* (Dwarf Sawfish). Canberra, ACT: Department of the Environment, Water, Heritage and the Arts. http://www.environment.gov.au/biodiversity/threatened/species/pubs/68447-conservation-advice.pdf Department of the Environment (2014). Approved Conservation Advice for *Pristis pristis* (largetooth sawfish). Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/60756-conservation-advice.pdf Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for Green Sawfish. Canberra: Department of the Environment, Water, Heritage and the Arts. http://www.environment.gov.au/biodiversity/threatened/species/pubs/68442-conservation-advice.pdf Department of the Environment (2015). Sawfish and River Sharks Multispecies Recovery Plan. Canberra, ACT: Commonwealth of Australia.

		http://www.environment.gov.au/system/files/resources/062794ac-ef99-4fc8-8c18-6c3cd5f6fca2/files/sawfish-river-sharks-multispecies-recovery-plan.pdf Department of the Environment and Energy (2017). Recovery Plan for Marine Turtles in Australia. Australian Government, Canberra. http://www.environment.gov.au/system/files/resources/46eedcfc-204b-43de-99c5-4d6f6e72704f/files/recovery-plan-marine-turtles-2017.pdf Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017 Department of the Environment and Energy (2018). Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (2018). Canberra, ACT: Commonwealth of Australia. https://www.environment.gov.au/system/files/resources/e3318495-2389-4ffc-b734-164cdd67fe19/files/tap-marine-debris-2018.pdf Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra. https://www.environment.gov.au/system/files/resources/1846b741-4f68-4bda-a663-94418438d4e6/files/tap-fox-background.pdf Department of the Environment (2015). Threat abatement plan for predation by feral cats. Canberra, ACT: Commonwealth of Australia. https://www.environment.gov.au/system/files/resources/78f3dea5-c278-4273-8923-fa0de27aacfb/files/tap-predation-feral-cats-2015.pdf Department of the Environment (2015). Conservation Advice *Calidris ferruginea* curlew sandpiper. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/856-conservation-advice.pdf

		Department of the Environment (2015). Conservation Advice *Numenius madagascariensis* eastern curlew. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/847-conservation-advice.pdf Threatened Species Scientific Committee (2016). Conservation Advice *Calidris canutus* Red knot. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/855-conservation-advice-05052016.pdf Threatened Species Scientific Committee (2005). Commonwealth Listing Advice on Northern Quoll (*Oasyurus hallucatus*). http://www.environment.gov.au/node/16356 Threatened Species Scientific Committee (2016). Conservation Advice *Charadrius mongolus* Lesser sand plover. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/879-conservation-advice-05052016.pdf Threatened Species Scientific Committee (2015). Conservation Advice *Mesembriomys gouldii gouldii* Black-footedltree-rat (Kimberley and mainland Northern Territory). Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/87618-conservation-advice.pdf Threatened Species Scientific Committee (2016). Conservation Advice *Charadrius leschenaultii* Greater sand plover. Canberra: Department of the Environment. http://www.environment.gov.au/biodiversity/threatened/species/pubs/877-conservation-advice-05052016.pdf
18. Mitigation of impacts to listed	The Draft EIS does not appear to identify and discuss nationally significant aggregations of water birds sufficiently.	Identify and discuss nationally significant aggregations of waterbirds. Refer to relevant DAWE policy and guidance documents with respect to listed migratory species, and discuss

migratory species		the correlation between the Proposal and important habitat. Refer to the assessment of risk outlined in Section 4.2.2 of the Terms of Reference on a species case-by-case basis.
19. Mitigation and monitoring programs	The Draft EIS does not provide sufficient information to meet the requirements of section 4.2.3 of the Terms of Reference.	Provide further discussion regarding the mitigation and monitoring programs for terrestrial species, including but not limited to: • Eastern curlew (*Numenius madagascariensis*) • Curlew sandpiper (*Calidris ferruginea*) • Great knot (*Calidris tenuirostris*) • Northern quoll (*Oasyurus hallucatus*) • Red knot (*Calidris canutus*) • Lesser sand plover (*Charadrius mongolus*) • Black-footed tree-rat (*Mesembriomys gouldii gouldii*) • Greater sand plover (*Charadrius leschenaultii*). For example, address potential impacts to these species at or near the site as a result of impacts of the Proposal, for example, noise and light.
20. Proposal alternatives	The Terms of Reference (section 2.5) requested discussion of proposal alternatives on MNES but this was not provided in the Draft EIS.	Provide a comparative description of the impacts of Proposal alternatives on MNES as requested in Section 2.5 of the TOR.
Inland Water Environmental Quality		
21. Stormwater management plan	The Draft EIS does not provide sufficient detail on the management of stormwater to demonstrate that potential impacts to inland water environmental quality will be effectively mitigated.	Provide a stormwater management plan (include the infrastructure design parameters) for the site to demonstrate that the volume of contaminated stormwater will be minimised, and uncontaminated stormwater will be diverted away from areas where it could become contaminated. Provide details on the storage and treatment of contaminated stormwater, and where the treated water would be released.
22. Dust management	The Draft EIS does not address the potential contamination of surface water or groundwater from water	Demonstrate that water used for dust management will not transport contaminants to groundwater or to surface flows leaving the site.

	applied to stockpiles or other working areas for dust suppression.	
23. Potential contamination of groundwater	The Draft EIS does not address the potential for pond storages to contaminate groundwater.	Demonstrate that ponds will be constructed above the groundwater table to avoid any interaction between groundwater and the base of pond liners and pond contents and thereby prevent contamination of groundwater. This will require additional baseline groundwater level monitoring to ascertain the seasonal maximum groundwater level at the sites where ponds will be located. The groundwater levels that were measured in May and September 2019 do not reflect groundwater condition at the site that will occur during periods of extended wet weather. Provide a statement from a registered professional engineer stating that design and construction of all relevant containment structures is feasible within constraints of the site and specify the manner of construction that will be required to ensure that: a) groundwater is protected from impacts of the contents of storages of materials and wastes on site b) the liners for structures that contain waste / waste water must be designed and constructed to achieve permeability of not greater than 1×10^{9} m/s c) the cell liners are resistant to chemical and physical erosion d) the cell liners are able to withstand the weight of waste and any equipment used in the ponds (e.g. to remove sludge).
24. Sewage treatment and irrigation	The Draft EIS did not assess the potential impacts and risks to inland water environmental quality from the proposed onsite sewage treatment and irrigation.	Clarify the intended treatment of sewage effluent and greywater generated on site, and the intended discharge or use of this wastewater. Assess the potential impacts and risks to inland water environmental quality (surface water and groundwater) from any irrigation using treated effluent from sewage treatment onsite. Outline the measures that will be implemented to avoid or mitigate potential impacts, and how these matters would be monitored and reported.
25. Water quality	The Draft EIS did not adequately demonstrate that any impacts to groundwater would not influence receiving waters in Darwin Harbour	Demonstrate that any impact to groundwater quality will not influence receiving waters in Darwin Harbour, upholding relevant Water Quality Objectives or Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2008).

Marine Environmental Quality		
26. Conceptual site model	It is unclear from the Draft EIS if all sensitive receptors and ecosystem processes have been taken into account in the identification of potential impacts from controlled and uncontrolled water discharges to Darwin Harbour. The Terms of Reference requested a conceptual site model for discharges, wastes or contaminants, but this was not provided for discharges to Darwin Harbour.	Provide a conceptual site model of appropriate scale and complexity to illustrate potential environmental risks to sensitive receptors in the marine environment from controlled and uncontrolled discharges and other Proposal activities that may influence marine environmental quality (including via groundwater and/or surface water flows from the site).
27. Pollutant outfall modelling	The pollutant outfall modelling indicated an increase in background concentrations of contaminants in Darwin Harbour approaching equilibrium within 6 months. The 6-month modelling period does not cover seasonal or interannual variability in conditions in Darwin Harbour.	Provide updated pollutant outfall modelling based on the final Proposal specifications (i.e. taking into account any update to the discharge location and/or discharge regime, including rate) and based on a period suitable for understanding variability in Darwin Harbour within and between years (i.e. longer than 6 months).
28. Assess potential impacts to identified values in Darwin Harbour	Darwin Harbour is home to a multitude of environmental values that depend on high quality sea water (for example, it is an important nursery area for many fish species and is host to a significant recreational fishery). These could all be influenced by controlled or uncontrolled discharges from the Proposal site. There is uncertainty around the impact of the outfall discharge to these values, beyond water and sediment quality, particularly for aquatic biota, ecosystem processes and biogeochemical processes. The long term impacts of a warm buoyant plume are unknown. The draft EIS is general about the nature of pollutants expected to be released from the waste water discharge point in East Arm (e.g. page 56; Appendix P page 6; and Table 7-46 – it's unclear if this is a complete list of	Provide an updated assessment of the potential impacts and risks to marine environmental quality and dependent environmental values in Darwin Harbour, based on a detailed whole-of-environment analysis of risks to Darwin Harbour, taking into account ecosystem processes/functions. This analysis must consider the following (at a minimum) for all proposed controlled and potential uncontrolled discharges from the Proposal: • chemical composition (for controlled discharge, this is to be determined by analysis of the chemical component flows through the processing circuit and wastewater treatment plant) • chemical-physical properties (e.g. pH, electrical conductivity, ionic composition, Redox, temperature) • speciation of toxicant chemicals (as metal hydroxides can be as toxic as metal ions) after entry to Darwin Harbour where they may transform, precipitate or react in response to varying estuarine conditions (tidal, seasonal, etc.). • environmental fate and transport (e.g. biogeochemical transformations; incorporation of chemicals into biota or sediment; temperature effects on dissolved oxygen, redox potential, rates of remineralisation and microbiological processes) • consideration of contaminant loads entering the Harbour

	toxicants and chemicals that may be present in the wastewater discharge). The Draft EIS does not appear to have fully assessed all of the potential impacts that could arise from this discharge, taking into account wastewater composition and parameters; biodegradation, and bioaccumulation of chemical constituents; environmental fate and transport; toxicity; and more.	• ecotoxicity (including chronic and acute) and bioaccumulation • whole effluent toxicity (WET) as outlined in section 4.3.4 of Appendix R, and comparison to default guideline values for at least 95% species protection (ANZG, 2018) • biodegradation (under anaerobic and aerobic conditions – because the hot discharge will be low in oxygen and it is possible that anoxic conditions could be generated in bottom waters and sediment porewater in the vicinity of the outfall) and consideration of the risk of any metabolites • potential pathway to sensitive receptors and the receiving environment • potential scouring, erosion, suspension or deposition of sediments around the proposed discharge location on the sea floor, taking into account the discharge rate and existing hydrodynamics.
29. Cumulative impact assessment	The Draft EIS (Appendix G part 2) does not adequately assess cumulative impacts and risks to Darwin Harbour as requested in the Terms of Reference. A number of other operators are active in the East Arm domain. The proposed discharge of wastewater to Darwin Harbour is larger than the cumulative discharge of all other current point sources (wastewater treatment and other industry).	Provide assessment of the potential impacts of the Proposal to marine environmental quality that may contribute to cumulative impacts in Darwin Harbour, taking into consideration other existing human activities in East Arm and upstream. Address the following: • consideration (and a map) of other sources of discharge and sediment-disturbing activities (e.g. dredging) in East Arm and the Elizabeth River including, but not limited to: LNG facilities (INPEX and Conoco Philips), Darwin Port, wastewater treatment plants (Berrimah and Palmerston), stormwater and other diffuse sources • comparison with the discharge volumes and types of contained contaminants (e.g. nutrients, sediments) that enter Darwin Harbour from other sources (this could be obtained from online sources such as waste discharge or environment protection licences) • how any impacts of the Proposal would be discerned from other cumulative impacts in the East Arm domain (noting that proposed monitoring site Ref2 (Draft EIS figure 7-28) is a former discharge zone for the nearby INPEX operation) • how maintenance dredging in the East Arm area may influence the proposed discharge regime (including any contaminant plume) and monitoring results.

30. Water quality criteria for controlled discharge to Darwin Harbour	The proposed mixing zone may not be considered acceptable.	Based on the assessment of impacts and risks requested above, reconsider appropriate water quality criteria for the intended discharge to Darwin Harbour. To prevent significant impacts and environmental harm, the NT Government considers the appropriate level of protection for the proposed discharge location is for slightly disturbed aquatic ecosystems (95% level of species protection). It also considers that toxicant concentrations should be below the 10th percentile (with 95% confidence) of chronic effects concentration as determined by the WET assessment. Include reconsideration of the size of the mixing zone, with reference to the NT EPA Guidelines on Mixing Zones (NT EPA 2013), and demonstrate that the proposed mixing zone is as small as possible and is unlikely to result in any significant environmental impacts identified in the risk assessment. Include reconsideration of the diffuser type and discharge regime for minimising contaminant loads to Darwin Harbour (e.g. discharge only above certain tidal flow velocity, and/or cease discharge some minutes or hours prior to low tide to enable flushing of the plume to the outer Harbour). Demonstrate how compliance with the discharge regime will be verified using real-time monitoring of tidal parameters.
31. Baseline water quality	The baseline water quality study is limited by the sampling duration (two days in March and one day in May).	Update the baseline water quality assessment, to the extent required to account for the final Proposal specifications and the assessment of potential impacts requested above. This should cover all water quality measures that might be altered by the Proposal. Sampling should be appropriate to account for natural variability, both spatial (considering the zone of influence) and temporal.
32. Marine Environmental Quality Monitoring and Management Plan (MEQMMP)	Analysis for total metals in discharge process wastewater is not proposed in the monitoring plan. Analysis of total metals is an important parameter with which to understand if the treatment process has been able to retain contaminants on site rather than discharged to the environment. A change in state of a contaminant from dissolved to a total concentration may reduce its bioavailability, however various conditions in the receiving	Provide an updated MEQMMP that takes into account the final Proposal specifications and the impact assessment requested above. Include a commitment for further review and update following commissioning of the water treatment plant and following any changes to the Proposal that would alter the quality or discharge regime of any controlled or uncontrolled wastewater discharge. The following additional updates to the MEQMMP are required:

	environment have the potential to remobilise contaminants. As such, understanding of total concentrations should be included in the monitoring and management plan along with an annual assessment of loads discharged into the harbour.	• updates associated with changes to the proposed wastewater characteristics or discharge regime
		• updated figures of the final pipeline route
		• provide for analysis of total metals in discharge process wastewater
		• include annual assessment of contaminant loads discharged into the harbour
		• incorporate continuous data logging of key parameters; including pH, temperature, electrical conductivity, turbidity, pE (redox) and surrogates for key toxicants; of:
		  ○ the treated wastewater, prior to its the release to the outfall pipe
		  ○ receiving waters at locations within and outside the mixing zone including adjacent to the sea floor and both upstream and downstream of the discharge site
		• consideration of tide and seasonality, including whether any standardisation is required for the reporting of monitoring results
		• update Table 3-3 to include increased waterway sedimentation in the Potential Environmental Impact column
		• update Table 3-4 to include environmental quality indicators for increase waterway sedimentation, and updated for the remainder of the MEQMMP as appropriate
		• clarify what is meant by the term 'large scale deaths'
		• update terminology used in the MEQMMP to be more specific i.e. from "should" to "will"
		• include intertidal infauna and consideration of community composition in the marine monitoring program.

Benthic Habitat and Communities		
33. Benthic habitat modelling, assessment of sensitive receptors, and	The desktop review presented in the Draft EIS main report and Appendix S used data from 2012 or earlier and relied heavily on GeoOceans (2010) and Smit et al (2012) for describing benthic habitats and communities. Although new data was collected using side scan sonar and towed underwater video, no new data appears to be presented in the benthic habitats and communities maps presented	Provide a description of benthic communities and habitats for the entire zone of influence of the Proposal, encompassing the proposed pipeline route and area that could potentially be influenced by the discharge (with an appropriate buffer). This is to be based on modelling using a full suite of existing data. The updated modelling should be used inform site selection and further survey for the proposed pipeline alignment.

pipeline placement	in the EIS and Appendix S (e.g. Figure 7-32 (EIS main report) or Figure 14 (Appendix S)). The reports by GeoOceans (2010) and Smit et al (2012) attempted a modelling approach to predict the spatial distribution of benthic habitats and communities, predominantly in subtidal habitats. However, due to the lack of full spatial coverage of important environmental parameters (e.g. substrate type, sediment grainsize and mobility, current strength at the seafloor, salinity, temperature, wave characteristics), the presented maps were at best inferred from predominantly depth and expert knowledge. Since 2012, a number of reports and associated data sets have been publicly released that allow for a more comprehensive overview of the environmental settings for inner Darwin Harbour, including Elizabeth River. DENR holds spatial benthic habitat and community data sets from towed video and still imagery (epibenthic biota, including a seagrass site in Slack Creek). In addition, all data from the Darwin-Bynoe region habitat mapping program, which contains three detailed reports and over 90 spatial data layers, are now publicly available as a data package at the Geoscience Australia data portal: http://pid.geoscience.gov.au/dataset/ga/127494 Relevant references: iXSurvey. 2011. Bathymetric survey of Darwin Harbour. Hydrographic Survey Report D11-0219. iXSurvey Australia Pty Ltd: Brisbane. https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/83182 Siwabessy, J. 2015. p-rock (probability of rock) grids from the Darwin Harbour 2011 Marine Survey (GA0333).	Demonstrate that the placement and alignment of the pipeline will not cause significant impacts to benthic habitat and communities during construction or in the long term. Address all potential significant impacts including, but not limited to, those that could arise from disturbance of sediments, erosion or accretion of sediments, or interference with existing or proposed dredging activities in Darwin Harbour.

	Geoscience Australia, Canberra. http://pid.geoscience.gov.au/dataset/ga/83950 Siwabessy J, Tran M, Huang Z, Nichol S, Atkinson I. 2015. Mapping and classification of Darwin Harbour seabed. Geoscience Australia Record 2015/18. Geoscience Australia, Canberra, ACT, Australia. 58 pages	
34. Wastewater discharge	The EIS did not discuss the long-term impact from waste water discharge on benthic communities, in particular the fate of the elevated temperature and contaminants and decrease in salinity within the mixing zone and how this affects water quality, phyto-/zooplankton, sediment health and the fauna that live within the sediment (infauna). Infauna are an important factor for trophic structures and ecosystem processes within the marine ecosystem, including nutrient cycling, and locking up pollutants and contaminants. Contaminants can remain soluble with some becoming toxic to bacterial and micro-algae within the water column. Certain contaminants can also be often absorbed by organic matter and enter the trophic pathways through feeding zooplankton on contaminated organic matter; or contaminated organic matter can settle out of the water column and be deposited and accumulate on the seafloor after which it enters the nutrient recycling pathways within benthic environment.	Referring to the updated marine environmental quality assessment, consider and assess the potential long-term impacts from altered marine environmental quality, particularly in the proposed mixing zone, on phyto-/zooplankton, sediment health and sediment infauna.
Marine Flora and Fauna		
35. Factor assessment	Discharge outflows into the marine environment during operations have the potential to impact on marine fauna through physical changes to light in the water column relating to food availability, hunting and habitat	Referring to the updated marine environmental quality assessment, consider and assess the potential long-term impacts from altered marine environmental quality, particularly in the proposed mixing zone, on marine flora and fauna and the broader ecosystem processes within Darwin Harbour. Include assessment of the potential impacts and risks to sensitive

	degradation/community shifts; chemical alterations resulting in physical damage to gills, skin or eyes and toxic accumulation throughout the marine fauna food chain affecting the health and survival of fauna populations.	receptors in Darwin Harbour including Darwin Aquaculture Centre (production of marine animals and microalgae).
36. Environmental Quality Criteria	The proposed mixing zone has been positioned with a buffer of 250 m to the nearest sensitive receptors, however the classification of sensitive receptors is not clear other than 'hard substrate benthic habitat and communities'. The outflow point is within 1-2 km of the INPEX mixing zone. The EIS states that the presence of marine fauna within the mixing zone is transitory and fauna will be able to actively vacate and evade the mixing zone. This assumes that mobile fauna are able to detect a broad range of toxicants potentially hazardous to their health at fairly low concentrations. The proposed position of the outflow pipe channel species evading the mixing zone either towards the East Arm wharf or towards to INPEX outflow in order to access the Elizabeth River, or alternatively it may result in the entire area being avoided, effectively resulting in significant habitat loss. Alternatively, animals may continue to use the area and be exposed to potential impacts from substances discharged through the outflow. The draft EIS outlines a process for developing local Environmental Quality Criteria (EQC) based on whole effluent toxicity testing on a small number of local marine invertebrate species. However, clarity should be provided on how these EQC apply to vertebrate marine fauna. There is also the risk of bioaccumulation of toxicants up the food chain through consumption of contaminated prey, resulting in adverse health effects on in-shore dolphins and potentially other	Provide information on the applicability of the proposed local Environmental Quality Criteria (EQC) to avoiding or mitigating potential impacts on vertebrate marine fauna, given that the EQC will be based on WET testing on local marine invertebrate species.

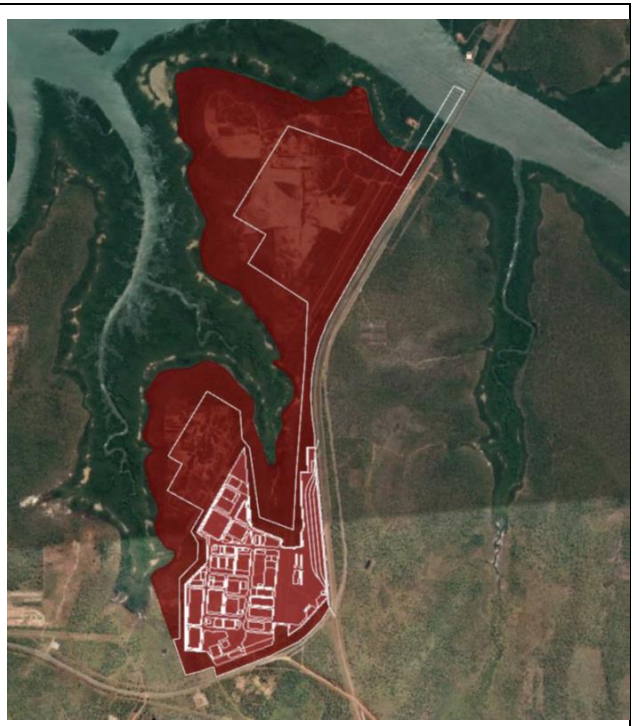
	fish species. The EIS only considers bioaccumulation in response to a significant event (i.e. fish kill or oil spill), but there is also potential for longer-term impacts on vertebrate marine fauna due to bioaccumulation of toxicants from the proposed discharge outflow.	
37. Noise and vibration	The EIS has not considered the risks and potential impacts of noise and vibration associated with underwater construction for the outflow pipe. Sub-trauma levels of sound can affect the fitness of marine megafauna individuals. These affects can take the form of masking of important signals, including echolocation signals, intra-species communication, and predator-prey cues; disrupting important behaviours through startle and repellence, or of acting as attractive nuisances, all of which may alter or result in abandonment of important habitats.	Provide an assessment of potential impacts on marine megafauna from noise and vibration associated with construction of the wastewater discharge pipeline, and associated measures that will be implemented to mitigate any potential impact.
38. Likelihood of occurrence of turtles and dolphins	The EPBC Act Protected Matters Report identified the Loggerhead Turtle (*Caretta caretta*) as "*Foraging, feeding or related behaviour known to occur within the area*" and Irrawaddy Dolphin (*Orcaella bfevostris*) as "*Species or species habitat known to occur within area*". The Draft EIS did not identify these species as likely to be present but did not justify why they are considered not present.	If discounting the presence of the Loggerhead Turtle (*Caretta caretta)* and Irrawaddy Dolphin (*Orcaella bfevostris*), provide a discussion on the rationale for this conclusion. If these species are considered to be present in the Proposal area or area of impact, provide an assessment consistent with the item below.
39. MNES	Further information is required to adequately meet assessment requirements for matters of national environmental significance (MNES) in accordance with the *Environment Protection and Biodiversity Conservation*	For the MNES species listed below, clearly provide the following: • an assessment of the presence or likely presence of the species in the Proposal area and in any areas that may be impacted

	Act 1999, as specified in section 3.1 of the Terms of Reference.	• the size and distribution of the local population, including at different life cycle stages, for example, when breeding, foraging, resting and/or migrating • The importance of the local population in a local, regional, NT, national and international context. • The identification of suitable habitat for the species (for breeding, foraging, aggregation or roosting), and the quality of this habitat, and how this may be disturbed or altered by the Proposal The relevant marine MNES species are turtles (green, hawksbill, flatback and Olive-Ridley) and sawfish (dwarf, largetooth and green).
Air Quality and Greenhouse Gases		
40. Elizabeth River boat ramp	The Elizabeth River boat ramp is considered to be a sensitive receptor but was not included as such in the Draft EIS (including Appendix U).	Provide maximum predicted gaseous impacts (ground level concentrations; as per Appendix U Tables 6-2 and 6-3) of combustion gases and other gases at the Elizabeth River boat ramp.
41. Pollution prediction contours	The stated air quality goals for chloride (Cl_2 - 50 micrograms/m^3) and hydrochloric acid (HCl - 140 micrograms/m^3) (Table 3-1 of Appendix U) are incorrectly indicated for an averaging time of annual. The averaging time for these criteria, as prescribed in the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, is 1 hour.	Provide an update of the pollution prediction contours (Appendix A) and maximum predicted gaseous impacts (Table 6-3) for chloride (Cl_2) and hydrochloric acid (HCl), based on an averaging time of 1 hour, as prescribed in the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.
42. Air quality assessment	It is unclear from the Draft EIS if air quality goals are suitable for avoiding impacts to air quality and if the air quality modelling and derived predictions are sufficiently robust to enable the incorporation of design features for mitigating significant impacts. Not all data required for the modelling of air emissions from the operation of the Project was available.	Present a third-party qualified person review of the Proposals Air Quality Assessment to: a) assess the suitability of the input data used for the model and the suitability of the air quality goals b) assess confidence in the model and its predictions c) provide recommendations for an air emissions monitoring program to regulate operational emissions from the Proposal d) provide recommendations on contingency options for reducing emissions if necessary after commissioning or start-up of operations

43. Odours	Organic matter in the ore concentrate, or other sources, may have potential to generate odours. This has not been addressed in the Draft EIS.	Consider whether odorous compounds may be emitted during the roasting process or if thickeners containing hot liquor are open to the atmosphere, or if people may experience odours from undiluted sulfur dioxide emissions coming to ground. If appropriate, provide an impact assessment for individual odorous air pollutants or for complex mixtures of odours (where appropriate) as per *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. Provide justification if an impact assessment is not considered necessary.

44. Mitigation and monitoring	The Draft EIS does not include an Air Quality Management and Monitoring Plan as requested in the Terms of Reference (section 4.6.3). There is inadequate information about air emissions and mitigation measures to enable assessment of potential impacts.	Provide an Air Quality Management and Monitoring Plan that includes the following:
		• A map showing all sources of emissions to air (including potential fugitive emissions).
		• Details on all of the emissions reduction equipment to be used for mitigating air emission to demonstrate that emissions will be reduced to the maximum extent possible in accordance with the waste management hierarchy and consistent with the design criteria prescribed by *Protection of the Environment Operations (Clean Air) Regulation 2010* for Group 6 items of equipment. It is noted that the predicted maximum cumulative impacts of $N0_2$ and $S0_2$ at some receptors are close to their 1-hour impact assessment criteria values (Appendix U); more efficient emission reduction equipment may be required than what is currently proposed.
		• Contingency options for reducing emissions after the facility has been built and operations have commenced, if emissions exceed the air quality goals.
		• Measures that will be implemented to mitigate the generation and release of dust and fugitive gaseous emissions.
		• A commitment to install continuous emissions monitoring equipment and sampling ports for manual sampling in all stationary source emission stacks.
		• Outline of a monitoring program for air emissions (dust and gases; from point-sources and fugitive emissions), including
		  ○ a map showing all sampling sites (onsite and offsite) and sensitive receptors
		  ○ the frequency of sampling, and the parameters to be monitored, including the establishment of baseline conditions
		  ○ indication of the equipment (e.g. high volume air samplers) to be used to establish baseline conditions and monitor particulates in air and gaseous

		emissions in ambient air, onsite and offsite, and a demonstration that this equipment is appropriate for detecting potential contaminants ○ the analyses to be undertaken to compare with the air quality goals.
Social, Cultural and Economic Surroundings		
45. Noise and vibration	The Noise Impact Assessment (NIA) in the Draft EIS did not adequately consider baseline background noise levels or the potential impacts from operation of the rail siding. Baseline noise monitoring was conducted at two of the four sensitive receptors from 26 - 28 August 2019 during times that did not adequately cover the 24-hour 7-days a week operating period, which is required for obtaining baseline information. The predicted rail noise was compared against noise criteria for rail infrastructure projects (Appendix X; Tables 4-5 and 7-4), however this is not considered sufficiently protective. As nearby sensitive receptors include residential areas, there is potential for noise from the Proposal to significantly impact amenity values (noting that widespread complaints could be a material environmental harm offence under the WMPC Act – see Table 2).	Conduct an assessment of the NIA (including noise modelling) for compliance with the *Northern Territory Environment Protection Authority - Northern Territory Noise Management Framework Guideline;* section 3.2 Commercial and Industrial noise. Provide an updated version of the NIA to address any issues identified in the revision, and to include (at a minimum): a) background noise monitored in accordance with the guideline b) noise assessment at all nearby sensitive receptors, including rail noise assessed against the industrial/commercial criteria c) noise mitigation measures where it is established that there is actual, or the potential for, excessive noise, to reduce the level of noise to acceptable levels.
46. Aboriginal Areas Protection Authority (AAPA) certificate	On 31 July 2019, the AAPA issued an Authority Certificate to Enigma Mining Limited in respect of the Proposal. It is understood that Enigma Mining is a wholly owned subsidiary of TNG. However, the Authority Certificate only provides an indemnity to prosecution under the *Northern Territory Aboriginal Sacred Sites Act 1989* to its holder, Enigma Mining (if compliant with terms and conditions), not TNG.	Clarify whether Enigma Mining or TNG is the operating entity.

47. AAPA certificate	There is a discrepancy in the Proposal area given in the Draft EIS (outlined in white) and the area covered by the Authority Certificate (shaded in red), so it is unclear if the Authority Certificiate issued to Enigma Mining covers all of the proposed activities and the Project site.	Clarify whether the Authority Certificate issued to Enigma Mining covers all of the proposed activities and the entire site. 
48. Traffic Impact Assessment	The Traffic Impact Assessment provided in the Draft EIS did not adequately consider potential transport impacts including consideration of wider transport network conditions and development proposals in the vicinity. The relevant contact is DevRoads.ntg@nt.gov.au	Provide an updated Draft Traffic Impact Assessment that includes consideration of the wider transport network conditions and development proposals in the vicinity of the Proposal, and demonstrates that impacts can be appropriately avoided or mitigated. This update is to be informed by communication with the Department of Infrastructure, Planning and Logistics (DIPL) Transport Civil Services Division on the identification and avoidance or mitigation of traffic-related impacts of the Proposal.
49. Commitments Register	The Draft EIS includes four separate tables containing commitments and mitigation measures relating to this factor (Draft EIS Table 7-84, Appendix W section 4.1 and Table 4-1, and Appendix E pages 14-17). This confuses	Include in the Supplement a single commitments register that clearly defines commitments relating to social, economic and cultural aspects of the Proposal and how potential impacts will be addressed.

	the identification and realisation of benefits and the mitigation of potential negative impacts.	
50. Water use	The Draft EIS did not address the Terms of Reference item (in section 4.3.2) requesting the assessment of the risk of unsustainable use and/or wastage of water resources. There is current community concern regarding low water levels in Darwin River Dam. This concern could be compounded by the significant amount of potable water required for this project relative to Darwin's current consumption.	Provide a discussion on the efficient and appropriate use of water in the context of competing strategic water use requirements (current and future) for community, cultural and industry purposes, and in the context of current community concern regarding low water levels in Darwin River Dam. Discuss fairness and equity associated with the use of a high volume of water that is equivalent to approximately 25% of Darwin's current total annual water consumption.
51. Discharge of toxicants to Darwin Harbour	Toxicants discharged into Darwin Harbour could accumulate to a level that approaches carrying capacity for the Harbour. This would limit the potential for further development within Darwin Harbour catchment.	Discuss the fairness and equity issues around discharging toxicants to Darwin Harbour.
52. Stakeholder engagement regarding water use and wastewater discharge	The Draft EIS does not report on any consultation undertaken on the issues of water use. The NT Government considers this is a matter for community consultation, as is concern around potential impacts from discharging wastewater into Darwin Harbour.	Provide an updated Community and Stakeholder Engagement Plan that specifically address water use and wastewater discharge to Darwin Harbour (and associated impacts). Demonstrate that Proposal information will be proactively disseminated and that community concerns will be managed.

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To whom it may concern,

Re: TNG Darwin Processing Facility Draft EIS

I write to you on behalf of the Amateur Fishermen's Association of the Northern Territory (AFANT). AFANT is the peak body for recreational fishing in the Northern Territory. It is our role to represent the interest of all of the (30,000) amateur fishers in the NT, including our 4,000 members, as well as, fishing clubs, associations and related businesses.

The most recent estimates available suggest that over one-in-five residents in the Northern Territory participate in recreational fishing each year. Survey data reveals that 79% of NT recreational fishers live in Darwin, with 27% of all fishing occurring within the confines of Darwin Harbour. As such, AFANT takes a keen interest in the sustainable development of the harbour. Recreational fishers, businesses and the general community enjoy many social and economic benefits that flow from the harbour's environmental services. We see this proposal as a threat to the existing social, cultural, economic and environmental values of Darwin Harbour.

AFANT support a future where growth and economic development are achieved alongside maintaining the productive natural values of the harbour. Therefore, we take issue with the application from TNG to develop the Darwin Processing Facility as proposed in the EIS. Our major concerns relate the quantity of water required to operate the facility and the long-term discharge of wastewater with elevated metal content into the waters of Darwin Harbour. Further, we consider that the proponent does not seem to have properly addressed the potential for damage to the ecosystem, nor alternative designs or locations that could make better use of water and renewable energy.

Volume of water

The proponent has detailed the need to use between 11.GL and 13.5GL of water from the Darwin water supply. At a time when there is talk of needing to bring the 14GL Manton Dam online to meet Darwin's short-term water needs, this ask seems entirely inappropriate to come from the existing pool. As such, it appears the project would either wholly or partially require the construction of a new dam to supply water and this should form part of the environmental impact assessment for the project. Furthermore, the EIS does not explore alternatives including water recycling or the use of non-potable water. We contend that the proponent should be asked to consider such alternatives.

Discharge of Wastewater into Darwin Harbour

As an organisation representing people, clubs and businesses that rely on a healthy ecosystem in Darwin harbour we find the proposal to release between 9.5 and 11.5GL of wastewater annually into the upper harbour over a 40-

year period to be an unacceptable proposition. The EIS sets out that the concentration of heavy metals and toxins in the wastewater would exceed safe limits in the surrounding areas if the tide was not running out.

The proponent has suggested that flowing wastewater out from Bladin Point for 5 hours could achieve satisfactory concentrations of heavy metals and toxins. While this clearly unacceptable in its own right, it says nothing of particular tides (spring tides vs neap tides) or what could happen to contaminant concentrations when wind is against the outgoing tide.

Lack of consultation

The proponent has suggested they will conduct community engagement after the EIS stage. As an organisation that is regularly consulted on major proposals that have the potential to impact our interests and stakeholders, we must say this approach is as unusual as it is unsatisfactory. This is made worse by the fact that I wrote to TNG on September 4, 2019 seeking a briefing on the proposal. I received no reply.

Should you require any further information, please do not hesitate to contact me directly.

Yours sincerely,

David Ciaravolo
Chief Executive Officer

21/02/2020

PASPALEY

Thursday, 20 February 2020

NT Environment Protection Authority
GPO Box 3675
Darwin NT 0801.

eia.ntepa@nt.gov.au

Comment on Draft Environmental Impact Statement: Darwin Processing Facility. TNG Limited.

Paspaley Pearling Company (Paspaley) has considered the Draft EIS prepared by TNG in respect of a metals processing facility located at Middle Arm, Darwin, Northern Territory.

Paspaley is alarmed with the proposal to discharge significant volume contaminated waste water containing toxic material, which will include heavy metals, from a metals processing facility into Darwin Harbour. Even at trace or undetectable levels the very large volume of discharge risks cumulative and chronic effect on the health of Darwin harbour. The fact that TNG is proposing a throughput system is itself evidence that the water to be discharged will be compromised, even to the extent that it is not suitable for TNG's own processing system.

The impact to Darwin harbour can only be considered significant and unacceptable.

Paspaley is strongly of the view that the plant should not be approved based on the information provided to date. Paspaley reserves its rights in respect of any loss or damage, apprehended or incurred, which it may suffer as a result of the facility being approved by the Regulator.

Paspaley is a significant Darwin based business which operates pearling aquaculture operations in and around Darwin Harbour. The pearling business relies on a shell breeding programme utilising the Darwin Aquaculture Centre and various harbour nursery sites where shells are grown. Its business relies upon the health of the harbour and the hygiene of its waters. Sensitive early life stages are known to be vulnerable and susceptible to very low levels of toxins, especially heavy metals, as is true of many marine fauna.

Paspaley makes the following observations on the EIS:

a) The EIS is inconstant in places and it remains unclear the actual demand for water and the resulting discharge volumes.
b) The proponent has not identified the hazard (chemical identification or concentration) that will be discharged or how the proponent will mitigate, manage, or remediate impacts due its discharge.
c) The proponent has not adequately considered alternatives to once-through high volume water resource use and discharge
d) The management of concentrated contaminated material in extreme events is unclear, particularly events such as extreme rainfall, surge or flood where concentrated contaminated runoff may discharge in an uncontrolled manner.

a) the approach to seek an approved discharge level for hazardous contaminants, and then retrospectively design a treatment plant to meet the requirements is unacceptable.
b) If the proponent can decontaminate the water used, then surely it is able to recycle and re-use the solution rather than consume and discharge high volumes of valuable resources.

As the proponent has not adequately responded to the Terms of Reference, the EIS remains incomplete and the public has not been adequately informed of the hazards, risks and management of the processing plant. Paspaley request the NTEPA require the proponent to properly address these issues and thereafter properly consult with stakeholders and potentially impacted persons and itself again seek public comment on the occasion the EIS is competently provided by the proponent.

Aside from direct impact to Paspaley business, the organisation is concerned that the facility discharge will impact the wider community that relies on Darwin harbour. Impacts include:

a) Health impacts to those consuming food from the harbour, either recreationally, customarily or commercially gathered
b) Impacts to tourism
c) Recreational use
d) Customary use
e) Reputation impact to Darwin and the Darwin community and Government

Paspaley is supportive of environmentally sustainable development of Darwin harbour. The proposal by TNG does not reflect the reasonable expectations of community or stakeholder values and should not be approved.

Yours sincerely

Dr. Sam Buchanan
Chief Operating Officer

NT Environment Protection Authority
GPO Box 3675
Darwin NT 0801

21st February 2020

Mode of delivery
Email to: eia.ntepa@nt.gov.au
21st February 2020

Dear Environmental Assessment Unit.

Re: Draft Environmental Impact Statement, Darwin Processing Facility – TNG Limited

The Environment Centre NT (ECNT) is the peak community sector environment organisation in the Northern Territory raising awareness amongst community, government, business and industry about environmental issues. We assist people to reduce their environmental impact and support community members to participate in decision making processes and action. ECNT welcomes the opportunity to comment on the TNG Limited (TNG) Darwin Processing Facility (the Project).

The ECNT is concerned about the significant environmental impact of this Project as presented in the Draft Environmental Impact Statement (EIS), particularly regarding the large volume of water extraction required for process input and the large volume of post- process contaminated water discharge to Darwin Harbour. We maintain that the management hierarchies have not been adequately applied in this EIS. It is a fundamental flaw that consideration to reusing and recycling the process water has not been offered as a feasible alternative.

Terms of Reference
We have identified the following significant areas where we believe the EIS does not address the Terms of Reference (TOR) identified for this project:

1. Alternatives – The TNG EIS does not adequately describe feasible alternatives to processing methods particularly regarding the use of alternative sources and re-use opportunities for water. The TOR identified the need for alternatives to be presented that will reduce net water use. The EIS simply identifies Darwin Water Supply as the water source at a rate of up to 13 GL per year.
2. Waste Management – The EIS has not identified alternatives to discharging the contaminated waste stream into the Darwin Harbour. It has failed to apply the waste management hierarchy of avoid, minimise, re-use, recycle, recovery and appears to go directly to treatment and disposal of the waste stream.
3. Assessment of risks – This EIS has failed to adequately identify the risks for the water discharge waste stream. The approach of seeking an approved discharge level for contaminants and then retrospectively designing the treatment plant to meet the requirements is unacceptable and means that the risks of the Proposal can not be assessed. The period of model data selection in the EIS of four weeks of a wet season in 2016 and four weeks of a dry season in 2019 does not consider inter-annual variability in water movement in the harbour, especially given recent 'dry wet' seasons. This missing data renders the hydrodynamic modelling of the discharge and the pollutant outfall as unreliable and the risk unable to be assessed. The absence of 'whole effluent toxicity' testing results means there are no details of how the chemicals in the waste discharge will

interact with the environment nor whether the collective mixture will be more toxic than the individual components. It is also not possible to assess the cumulative impact of heavy metal build up in the Darwin Harbour. Again the risk to the Darwin Harbour from the discharge chemicals and metals are unable to be assessed.

The only time the Proposal considers the alternatives in design or operating parameters is in their 'contingency management frameworks' in figures 7-23 to 7-26 pages 201 to 207 of the EIS main report. If their management triggers are exceeded regarding the wastewater then as 'corrective actions' they will consider extra processing trains to achieve greater levels of water treatment. Other corrective options also include redirecting the wastewater back through the process for further treatment or consider wastewater options onsite. This is a totally inadequate and an incorrect approach. These alternatives should be considered upfront, the preferred option should be clearly explained, including how it complies with the principles ecological sustainable development. The Proponent should seek to avoid impacts of their Project as a priority.

Approval and Regulatory Framework

The EIS has identified that following the commencement of the *Environment Protection Act 2019* (**EP Act**) the Project will require an environmental approval from the Minister for Environment and Natural Resources (the Minister) in accordance with section 301 of the EP Act. Under section 73 of the EP Act, in deciding on whether to grant an environmental approval, the Minister will need to be satisfied that the community has been consulted on the potential environmental impacts of this Project and the significant impacts have been appropriately avoided, mitigated and managed. We maintain that the EIS has not adequately demonstrated how the chemicals in the wastewater will interact with the environment, their cumulative effect and what the impact of the collective mixture will be. Without this knowledge the community cannot comment on the potential environmental impacts of the project. If the risks and impacts cannot be adequately identified, then meaningful consultation is not possible. Nor can the impacts from the Project be avoided or mitigated nor appropriately managed. We submit that if further information outside of the supplementary submission process is provided that addresses the potential environmental impacts of this Project and how the significant impacts have been appropriately avoided, mitigated and managed, then this information needs to be provided for comment to the community to satisfy the condition of adequate consultation. If the Proponent chooses to significantly alter the project, for example by changing the process method to reuse and recycle the wastewater, then we maintain this is a significant variation and must be referred as an action needing assessment under the EP Act.

Consultation

We assert that consultation has been minimal for this project. ECNT received a briefing on this project to ascertain our 'potential interest areas'. It was at our insistence and organising that the Project was presented to the Darwin Harbour Advisory Committee, that included industry and community groups. A significant number of community and industry stakeholders identified have not directly and adequately been consulted.

Key Environmental Factors

Terrestrial Environmental Quality

<u>Acid Sulfate Soils</u>

We note that that Acid Sulfate Soils (ASS) were detected at numerous sites. The estimated time frame for initial construction is approximately 2 years, with erosion and sedimentation risks expected to be the highest during the construction phase of the project. This means that a large portion of the 'industrial area'

will leave the soils exposed to increase run off and may generate acid from oxidation of sulphide minerals (generation of ASS), that may result in a degradation of groundwater quality. The EIS maintains that with proper management sedimentation and erosion will not present a long term significant impact. We note that there may be an impact in the short term particularly given the risk of the area to be impacted by increased storm surge activity as shown in figure 7-1. In the erosion and sediment control plan (ESCP – Appendix N) there is a recommendation for a diversion bund around the site infrastructure to be implemented. The freeboard or spillways in place must be adequate to capture the sediment/drainage to reduce the impact mangroves and waterways.

Terrestrial Flora

The EIS identifies the loss of 84 hectares of high quality native vegetation and indicates an unspecified area to be rehabilitated. There is an area of Lot 1817 to the west of the main development site that is outside of the development envelope. This area has the potential to be zoned conservation with a wide mangrove protection zone. Offset funds could be allocated to enable the management of this conservation site.

The EIS identifies suitable habitat for the *Typhonium praetermissum* (recognised under the *Territory Parks and Wildlife Conservation Act* (**TPWC Act**) as vulnerable) on the Project site but failed to locate these species in the Study area. We contend that the methodology to locate this species was flawed and that further onsite studies need to occur. Whilst the study period of February was an ideal time to locate the species, identification should have been via a vegetative survey of the leaf material and a genetic analysis rather than relying on flowering material and habitat. There is no evidence to suggest they visited a reference site nor that the performed an intensive habitat survey with close transacts of 2 -5 metre spacing.

<u>Recommendation</u>

Further onsite surveys are needed to determine the presence or lack thereof for the *Typhonium praetermissum*

Marine Environmental Quality

As asserted above we maintain that the EIS does not provide adequate information to assess the impact and risk to the Darwin Harbour and the marine environmental quality. The information that has been provided raises significant and serious inadequacies of the Project that are unacceptable. The EIS should identify the bioabsorption of heavy metals. By their very nature heavy metals don't disappear, they are taken up by the system somehow be it in the sediment, plants or animals. Understanding their discharge concentrations relative to the surrounding environment is important is vital.

We raise specific concerns as follows:

<u>Appendix O: Technical report for hydrodynamic modelling of discharge</u>

On page 31-32 the period of model data selection only uses one year and identifies that data is missing during the period. The reduces the reliability of the data. Page 34 details the modelling validation dates (wet season 05 January 2016 –05 February 2016 and dry season 01 April 2019 – 30 April 2019 and 20 June 2019 – 20 July 2019) are essentially the same as those used to develop the modelling (p 31-32 wet season 01 January 2016 – 31 January 2016, dry season 20 June – 20 July 2019 for wind and April 2019 for water). This is a very poor method of model validation as it means they are essentially checking that the model matches the data being inputted, rather than data from a different time period that you are trying to estimate using the model.

The Project will use an outfall to discharge 12 GL/year of treated process water into the Darwin Harbour. The company believes that the tidal processes in East Arm will adequately dilute the waste discharged from its outfall, but 'Darwin Harbour is poorly flushed, especially in the dry season when the residence time in the upper reaches is of the order of 20 days' because of the 'complex bathymetry of headlands and embayments generate complex currents comprising jets, eddies, and stagnation zones that can trap pollutants inshore'… 'The environment in Darwin Harbour has the potential to degrade and the water circulation in the harbour must be considered when planning developments'. [1]

Appendix P: Technical report for pollutant outfall modelling

This modelling is based on the modelling down in Appendix O so brings across the problem identified above. Detail on page 28 states that "The results confirm that whilst the background level of tracer has increased over the one-month seasonal scenarios, for the longer-term model cases (6-months) there is an equilibrium reached where the background level reaches stability for the locations examined in East Arm, upstream Elizabeth River and sites in Darwin Harbour." This means that the activity will permanently increase the salinity and temperature of the waters surrounding the discharge location. More than 6 months needs to be modelled to understand inter-annual variability in water movement in the harbour given our recent very 'dry wet' seasons.

Appendix Q: Technical report for marine environmental quality

As stated on page 30 the "Water samples collected by O2M along Elizabeth River provided results that only detected aluminium and manganese." This means that baseline studies have not yet been conducted for chemicals that we already know will be a component of the wastewater discharge.

Appendix R: Marine environmental quality monitoring and management plan

Limits of acceptable change on page 16 has interpreted "No change to natural values" as being the same as "within the limits of natural variation". This is problematic as you can have high natural variability where for example you have very high salinity for short periods of time. However, if the salinity in the area permanent shifts to that high end, it will still be within natural variability but have a significant impact on the environment and organisms adapted to cope with occasional high salinity but not a permanent shift.

The table 3.5 on page 23 seems to fundamentally misinterpret ANZECC Guidelines – it appears to suggest that the proponent can define an area of currently unimpacted waters as high impact under the project scenario and then say the ANZECC guidelines assumes pollutants at a certain level are acceptable. This is not the ANZECC guideline process. The EIS needs to identify the existing environment and ensure that the Project stays within an acceptable range of that.

It is stated on page 27 that the "Whole effluent toxicity (WET) testing results are not yet available for interpretation and application to the development of specific EQS, however Section 4.3.4 defines the process of collecting WET testing results and their application to establishing EQS". This suggests the EIS has not determined how the chemicals in the waste water will interact in the environment and whether the collective mixture will be more toxic than the individual components. TNG are not proposing to do this until the facility has effectively been commissioned. The full impacts would therefore be unknown until after the facility has been constructed.

[1] Williams D, Wolanski E and Spagnol S 2006, p.475. Hydrodynamics of Darwin Harbour

The ongoing Marine Environmental Quality Monitoring detailed on page 60 is proposed to be done annually, this is completely inadequate and should be done at least monthly. The monitoring results must also be publicly released.

In conclusion, the risks and impact of this Proposal can not be adequately assessed. What has been presented raises significant concerns about the impact particularly to the marine environmental quality.

We look forward to being further consulted on this Project.

Yours Sincerely

Shar Molloy
Director