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Department of
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Our ref: DEPWS2023/0044

Mr Rod Johnson
Department of Environment, Parks and Water Security
Floor 1, Arnhemica House, 16 Parap Street, Parap
Darwin NT 0801

Dear Mr Johnson

Re: Draft Terms of Reference – Provaris Energy Pty Ltd - Tiwi H2 Project

The Department of Environment, Parks and Water Security (DEPWS) has assessed the information contained in the above application, draft Terms of Reference (ToR) for the Tiwi H2 Project and provides the following comments:

Flora and Fauna Division

Staff from the Flora and Fauna Division has reviewed the documentation and have provided relevant comments in **Attachment A**.

Rangelands Division

Land Assessment Unit
The development has the potential to create acid sulfate soils and consideration should be made to manage and mitigate acid sulfate soils during the development. Any proposed works should be undertaken in accordance with the National Acid Sulfate Soils Guidance and further information is available at https://www.waterquality.gov.au/issues/acid-sulfate-soils. Jurisdictional guidelines such as the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines v4.0 (Dear et al. 2014) and the Western Australian Acid Sulfate Soils Guidelines Series (DER 2015) may also be referenced.

Essential to an investigation is the requirement for Chromium Reducible Sulfur (CRS) soil testing at an appropriate site density and to a soil depth immediately below the proposed disturbance. If acid sulfate soils are detected through CRS testing, and exposure of these soils is unavoidable then an acid sulfate soil management plan is required. Depending on the scale of the project, the acid sulfate soil management plan should include the following:

- exact location of the proposed disturbance;
- depth and volume of soil to be disturbed (m^3);
- clearly presented CRS results;
- acid base accounting results which clearly indicate an accurate liming rate;
- appropriately designed treatment pads; lime/soil mixing regimes; and
- an appropriate monitoring program.

Land Management Unit
Due to capacity issues within the Land Management Unit, reference is made to the previous comments and recommendation on the referral, refer to **Attachment B**.

Weed Management Branch
Weed Management Branch has reviewed the draft ToR and refer to the previous comments in **Attachment B**.

Water Resources Division
The terms of reference adequately reflect what the proponent should address in an Environmental Impact Statement whilst incorporating the feedback already provided.

Take of surface or groundwater for rural stock and domestic purposes does not require a water extraction licence. Should take of surface or groundwater be proposed for commercial activities advice should be sought from Water Resources (08) 8999 4455 or by email to water.licensing@nt.gov.au

Should you have any further queries regarding these comments, please contact the Development Coordination Branch by email DevelopmentAssessment.DEPWS@nt.gov.au or phone (08) 8999 4446.

Yours sincerely

Maria Wauchope
Executive Director, Rangelands

31 March 2023

Attachment A – Flora and Fauna Divisional comments

Attachment B – Comments previously provided to Northern Territory Environment Protection Authority

Attachment A - Submission on the draft Terms of Reference

Provaris – Tiwi H2 Project

Government authority: Department of Environment, Parks and Water Security – Flora and Fauna Division

Section of the Draft TOR	Theme or issue	Recommended Update
2.4.1 Terrestrial Ecosystems	Environmental Values	The table requiring information for Terrestrial Ecosystems has the following typo's: Butler's Dunnart is spelt incorrectly The scientific name for the Northern Brush-tailed Phascogale is *Phascogale pirata*. The scientific name for the Red Goshawk is *Erythrotriorchis radiatus*.
		The ToR requires the proponent to reassess the potential for significant impacts by applying a threshold of high and very high stand density for important mature populations of *C. armstrongii*. It is recommended that this footnote is removed. The Flora and Fauna Division recommends that the ToR is reworded to require the proponent to: "identify areas that support high density stands of *C. armstrongii* (>400stems per hectare)". If high density stands are identified, the EIS needs to quantify the impacts and provide an assessment of the importance of those stands from a local and regional context.
	Environmental Values	The ToR states: "Additionally, provide an assessment of large (diameter at breast height>40cm) and very large trees (diameter at breast height>50cm) in the construction footprint and surrounding areas that may provide a suitable habitat for threatened species. The assessment should be based on recent survey data." It is recommended that this paragraph is removed from the ToR to reduce unnecessary duplication with the threatened species assessment and consideration of significant and sensitive vegetation.
	Environmental Values	The ToR states: "For species where surveys are required (e.g. where likelihood of occurrence or regional significance is uncertain or high), consult with the Flora and Fauna Division of the Department of Environment, Parks and Water Security regarding the survey design and methodology as needed". The wording in the ToR appears to be passive and should be reworded to: Targeted surveys may be required for threatened species where there is insufficient information to inform a significant impact assessment. Information on the recommended

		survey design and methodology can be provided by the Flora and Fauna Division and/or Australian and NT Survey Guidelines.
	Potential Impacts and Risks	The ToR states: "impacts to groundwater dependent ecosystems (e.g. spring-fed rainforest, wetlands, deep-rooted vegetation) from drawdown of the water table". The ToR does not require the proponent to consider individual species that are groundwater dependent. It is recommended that these species are included in the above dot point.
		It is recommended that the following dot point is added to the Table: • "impacts to threatened or sensitive flora species and populations due to changes to hydrology and drainage, reduced habitat availability or quality, or fragmentation and edge effects."
		The ToR states: "impacts to *Typhonium* spp. through changes to surface hydrology arising from vegetation clearing and soil compaction". It is unclear why the ToR focuses only on *Typhonium* spp. and not phreatophytic or partial phreatophytic species. It is recommended that the dot point is removed and replaced with: • "impacts to threatened or sensitive flora species and populations due to changes to hydrology and drainage, reduced habitat availability or quality, or fragmentation and edge effects."
	Avoidance, mitigation and management	The ToR includes the following dotpoint: "fauna relocation and management" The Flora and Fauna Division generally does not have expectations with respect to fauna relocation and management. This is due to uncertainties with the success of relocation and potential animal welfare issues. It is strongly recommended that this requirement is removed from the ToR. It is noted that relocation may be a potential mitigation measure for impacts on threatened species, but this should be considered in relation to each species, and in the context of DEPWS Translocation Policy.
		The ToR includes the following sentence: "All vegetation clearing and vegetation buffers should comply with the NT Land Clearing Guidelines." The Flora and Fauna Division recommends that this sentence is amended to state: The EIS should demonstrate that the proposal has been appropriately sited and has taken into consideration the minimum requirements outlined in the NT Land Clearing Guidelines.
	Monitoring and Reporting	The Flora and Fauna Division recommends that the following additions (underlined text) are included: Describe clear and measurable <u>indicators</u>, outcomes and commitments that will ensure the environmental objective is met and impacts of

		implementing the proposal will be acceptable. Specify timeframes for monitoring and reporting.
2.4.4 – Marine Ecosystems	Environmental Values	The ToR appear to cover the existing environment information requirements comprehensively. As the area is located in the Top End it is recommended that the ToR specify that the description of the existing environment includes consideration of the changes in seasonal conditions (i.e. build-up, Wet Season, Dry Season and transition from Wet to Dry Season).
		As the proposal includes discharges of wastewater into Apsley Straight, it is important to understand the baseline condition of benthic habitat and communities within the zone of influence. As such, it is recommended that the ToR is updated to include the following information requirements: • Describe the benthic communities (epibenthic, infauna, mangrove and salt flat habitats); and • Undertake habitat mapping of benthic environments within the zone of influence.
	Potential Impacts and Risks	In addition to the information requirements covered in the ToR, the Flora and Fauna Division recommends that the following is also included: "Describe plume behaviour in spring high tide, neap tides and spring low tide circumstances; describe near field, mid field and far field 3D characteristics (the nature of the plume); thickness of brine layer on the seafloor and potential areas where brine can be trapped and/or poor dilution areas due to topography or epibenthic fauna/mangrove habitat". This information is necessary to understand the pattern of discharge and how the brine may affect benthic flora and fauna (i.e. What is the behaviour of the brine plume during spring low tides when there is confined channel due to potentially large mud/sand flats). Further additions to the ToR could include: • Describe hydrological processes and how these may be impacted on by discharge of brine; • Describe near- and far-field hydrodynamics, tides, wind and currents; mixing characteristics of marine waters and freshwater inflow by nearby creeks, mangroves and salt flats; flushing characteristics of Apsley Strait; seasonal aspects of the above; • Establish biochemical model for salinity (to be coupled with the hydrodynamic model) for the purpose of understanding processes and the ranges and variability in salinity concentration across the whole spatial extent of the zone of influence under natural / seasonal conditions and freshwater inflow from neighbouring creeks; and • Provide a salinity spatial model (i.e., biochemical model) (e.g., akin to coupling Photosynthetically Active Radiation (PAR) model to hydrodynamic model), to allow for modelling of natural seasonal conditions.

		The environmental conditions will have a natural tipping point where impacts are irreversible. Salinity tipping points have severe implications (e.g., reproductive pathways, eggs, juveniles). The EIS should establish critical salinity thresholds for key species in Wet/Dry tropics, and/or macrotidal environment and include the following information: • Review and discuss how salinity impacts on biological traits of threatened species, sensitive receptors (benthic primary producer habitats, mangroves), benthic filter feeders infauna, and traditional, commercial and recreational caught species; • Review and summarise salinity tolerance ranges and tipping points where salinity affects biological traits and species behaviour; • Review recovery rates and mechanisms from impacts from brine discharge for benthic communities (epifauna and infauna), threatened species and traditional, commercial and recreational caught species; • Discuss, review and undertake whole effluent toxicity testing; • Identify potential species that could be used as an indicator of zero-impact for elevated salinity impacts; • Establish appropriate triggers, taking into account, seasonal conditions, species responses and tolerances; and • Discuss alternatives to direct brine disposal to marine environment, potentials for beneficial reuse or resource recovery (e.g. can the brine be pre-diluted on site with seawater to a lower salinity level so that has no effect of the health of the Apsley Strait, or can it reused somehow).
		The referral provided limited information about the desalination process and methodologies. As such it is assumed that no heating is required, but some desalination plants do. Copper discharge is associated with heating and is very toxic to marine biota. As such, this should be clarified in the EIS. It is recommended that the ToR require the EIS to provide an overview of the desalination plant operation, process inputs, including a schematic overview. The EIS also needs to outline the chemicals that are being used in the operational processes.
		The referral has included a Geoscience 30 m DEM. This is considered to be acceptable at the referral level but should be further refined for the EIS. As such, Flora and Fauna Division recommends bathymetric and Lidar surveys are provided to adequately create a DEM from the high water mark and below (critical for plume modelling at a scale relevant the impact area, which the proponent predicts to be less than 200 m). It is recommended that the ToR require the proponent to provide the following: • A 3D hydrodynamic model based on bathymetry at a 1 m cell size for the intertidal and subtidal environment within the zone of influence and entrance of Apsley Strait and the Mermaid shoal;

		• Incorporate biochemical / key chemical species modelling and sediment processes; • Assess overall accumulation of metals and nutrients for near field and far field effects; and • EMP to assess, validate modelled predictions.
		It is recommended that the ToR include a requirement for the proponent to provide information on vessels use and mooring within Apsley Straight. In particular, the proponent needs to demonstrate that mooring sites have been selected appropriately (using benthic habitat mapping) and avoid impacting on sensitive benthic habitats due to dragging chains and anchors.

ATTACHMENT B

Land Management Unit
The Land Management Unit provide the following comments:

Section of Referral	Theme or issue	Comment
2.4 & 5.1 Solar Precinct	Erosion and Sediment Control	Land resource information SRTM DEM indicates slope between 2-3% and areas of slope >3% occurring within the proposed Solar Precinct. The Land Clearing Guidelines (LCG) describe erosion risk associated with clearing slope 2 to 3% as high and >3% very high and highlights these areas would require very careful and detailed planning, and intensive on-going management to prevent erosion and land degradation. The LCGs recommend in instances where exclusion of land with slope greater than 2% is deemed to be unfeasible, the proponent will be required to demonstrate the reasons why exclusion is not feasible and how the risk will be mitigated. Clearing method and timing has not been described by the proponent. The LCGs require the proponent to demonstrate best practice will be adopted and every clearing operation should comply with best practice. Best practice clearing methods (at a minimum) include: • Clearing when soil moisture conditions are optimal; • Working machinery across the slope; • Timing and staging works to minimise exposure of bare soil; and • Removing windrows and machinery tracks.

[6] https://nt.gov.au/__data/assets/pdf_file/0007/236815/land-clearing-guidelines.pdf

		The proponent has described a buffer zone of up to 50m is being considered between the surrounding native vegetation and the edge of the solar farm, to account for sun shading and to act as a firebreak. Works required for the establishment and maintenance of a buffer/firebreak should be included in the project Erosion and Sediment Control Plan (ESCP). Vegetation clearing associated with the creation of a buffer zone/fire break should be undertaken utilising minimum disturbance clearing methods to maximise the retention of stabilising groundcover e.g. slashing, blade up clearing or mulching. The development is scheduled to occur over two years and will involve significant disturbance during the clearing and construction phases including excavation, cutting and filling, drainage works, construction of access roads, hardstand areas, fencing, stockpiling with a number of gravel pits potentially being created resulting in an extreme erosion risk. The referral describes sowing native grasses between solar panels across as much of the solar precinct as practicable. The application, establishment and maintenance of suitable, stable long term cover must be considered and implemented for all disturbed areas including drains, batters and hardstand areas. Details of types, application and maintenance of temporary and permanent cover must be included in an ESCP for the project. The end land use should also be considered in order to determine decommissioning and rehabilitation requirements for the project area.
2.5 & 5.2 Transmission Line	Erosion and Sediment	Land resource information SRTM DEM indicates some slope between 2-3% approximately midway along the proposed transmission line corridor and areas of 3-5% slope along the southern portion of the corridor. The LCGs describe erosion risk associated with clearing slope 2 to 3% high and >3% very high and highlights these areas would require very careful and detailed planning, and intensive on-going management to prevent erosion and land degradation. The LCG recommend in instances where exclusion of land with slope greater than 2% is deemed to be unfeasible, the proponent will be required to demonstrate the reasons why exclusion is not feasible and how the risk will be mitigated. The referral identifies 7 waterway crossings along the proposed transmission line corridor. Land resource information and aerial imagery show these features along with another potential drainage line associated with a first order stream approximately 1.07km to the north of what has been described in the referral as *Drainage Line 1*. The LCG recommend 25m buffers be retained over drainage depression and first order streams and buffers of 50m, 100 and 250m be retained over low, medium and high value wetlands. The proponent must ensure that native vegetation buffers to waterways are maintained in accordance with LCG recommendations. Works associated with the development of the transmission line includes clearing areas of approximately 30mx30m to accommodate the construction of transmission towers and the construction of access tracks to each tower. The remaining vegetation within the corridor is proposed to be cut at ground level leaving the roots in situ with low shrubs under 1m being retained. DEPWS supports minimal disturbance clearing methods to maximise the retention of ground cover. However, the creation of access roads and other ground disturbing activities should be carried out in such a way as to minimise the

		erosion risk and in accordance with the project Erosion and Sediment Control Plan (ESCP). Land resource information SRTM DEM indicates slope between 2-3% and >3% occurring within the proposed H2 production and export precinct. The LCG describe erosions risk associated with clearing slope 2 to 3% high and >3% very high and highlights these areas would require very careful and detailed planning, and intensive on-going management to prevent erosion and land degradation. The LCG recommend in instances where exclusion of land with slope greater than 2% is deemed to be unfeasible, the proponent will be required to demonstrate the reasons why exclusion is not feasible and how the risk will be mitigated.
5.3 H2 Production and Export Precincts		The development of the H2 production and export precinct will result in significant disturbance and is likely to include clearing of native vegetation, earthworks works involving excavation, cutting and filling, drainage works, the construction of access roads, hardstand areas, stockpiles, fences and firebreaks with the likelihood of gravel pits being created. These activities combined with the size of the development will result in an extreme erosion risk. The south eastern boundary of the H2 production and export precinct is situated adjacent to an area identified through land resource information as spring fed rainforest. Construction activities likely to be associated with the development of the H2 production and export precinct may lead to habitat degradation through altered surface water hydrology, accelerated erosion and sediment deposition. The LCG recommend sensitive/significant vegetation types be assessed for the values they possess and appropriate buffers (low value 25m, medium value 100m and high value 250m) be retained.
General Comment	Soils	Soils within the proposed project areas have not been described in the referral. A suitable soil sampling regime should be implemented prior to disturbance to determine amongst other things the erosivity, sodicity (percentage sodium) and potential for acid sulphate soils (PASS) within the project area. This information should be available for utilisation in the ESCP so appropriate remediation and mitigation measures can be developed and implemented.

<u>Recommendation</u>

Considering the extreme risk of erosion associated with the clearing, construction and operation of the Tiwi H2 Project the Land Management Unit recommends any subsequent environmental approval should include the following conditions.

Prior to the commencement of works, a Type 3 Erosion and Sediment Control Plan (ESCP) must be developed in accordance with the Department of Environment, Parks and Water Security Erosion and Sediment Control Plan (ESCP) procedures available at https://depws.nt.gov.au/rangelands/technical-notes-and-fact-sheets/land-management-technical-notes-and-fact-sheets. The ESCP must be certified by a Certified Professional in Erosion and Sediment Control (CPESC), and must be subsequently reviewed and approved by an independent CPSEC auditor; to the satisfaction of the approving authority. The auditor-approved ESCP should be submitted for acceptance prior to the commencement of any ground disturbing activities (including clearing and early works) to the approving authority.

All works relating to this approval must be undertaken in accordance with the endorsed Type 3 Erosion and Sediment Control Plan (ESCP) to the requirements of the approving authority. Should the endorsed Type 3 Erosion and Sediment Control Plan (ESCP) need to be amended, the revised ESCP must be developed and

certified by a Certified Professional in Erosion and Sediment Control (CPESC), and must be subsequently reviewed and approved by the independent CPESC auditor; to the satisfaction of the approving authority.

Onsite implementation of the endorsed Type 3 Erosion and Sediment Control Plan (ESCP) must be regularly monitored and reported on by the CPESC auditor in accordance with the audit schedule in the ESCP to ensure erosion and sediment control management is in accordance with the endorsed ESCP and is effective; to the satisfaction of the approving authority.

All reasonable and practicable measures must be undertaken to prevent: erosion occurring onsite, sediment leaving the site, and runoff from the site causing erosion offsite. Appropriate erosion and sediment control measures must be effectively implemented throughout the construction phase of the development (including clearing and early works) and all disturbed soil surfaces must be satisfactorily stabilised against erosion at completion of works, to the satisfaction of the approving authority on advice from the CPESC auditor. For further information refer to the information below.

Note: Information regarding erosion and sediment control can be obtained from the IECA Best Practice Erosion and Sediment Control 2008 books available at www.austieca.com.au and the Department of Environment, Parks and Water Security ESCP Standard Requirements 2019 and Land Management Factsheets available at https://nt.gov.au/environment/soil-land-vegetation. For further advice, contact the Development Coordination Branch: (08) 8999 4446.

Weed Management Branch
The Weed Management Branch provide the following comments:

Section of Referral	Theme or issue	Comment
General Comment	Weed management as it pertains to EPA themes: World Heritage properties • National Heritage places • Wetlands of international importance (listed under the Ramsar Convention) • Listed threatened species and ecological communities • Migratory species protected under international agreements	Relative to weeds, the proposal does have the potential to have significant environmental impact through the introduction and spread of weeds on to Melville Is. Weeds are capable of adversely affecting social, cultural, physical, biological and economic interests on the Island. The species *Andropogon gayanus*, *Cenchrus polystachios*, *Cenchrus pedicellatus* are identified as components of the Key Threatening Process 'Invasion of northern Australia by Gamba Grass and other introduced grasses' listed under the Commonwealth legislation the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and do occur on the Tiwi Island at varying levels.
Section 10	Weeds	Degradation and or loss of "Land, Water and People" environmental objectives is possible from weed introduction and/or spread on Island. The referral does discuss this threat in a limited capacity but is not comprehensive about how this will be managed. In Section 10 of the referral, five of the nine Matters of National Environmental Significance (MNES) protected under

		the EPBC Act could be adversely affected by weeds (Key Threatening Process). The five matters are: • World Heritage properties • National Heritage places • Wetlands of international importance (listed under the Ramsar Convention) • Listed threatened species and ecological communities • Migratory species protected under international agreements The proponent does mention some of the potential adverse impacts of weeds that could occur as a result of the project. The proponent claims that these potential adverse impacts will be managed through a Weed and Groundcover Management Plan. No Plan was provided. To address the specific threats posed by weeds to the identified values will require a comprehensive weed management plan.
General Comment	Weeds	DEPWS Weed Management Branch recommends the following specific information and or documentation to be developed and implemented pre, during and post construction including the operational phase of the project: 1. comprehensive weed management plan that, at a minimum, addresses: a) Weed control prior to construction phase (reduce weed seed load within and adjacent to project areas); b) Hygiene procedures for all items coming on to the Island. How will this be assured and monitored; c) Managing weed spread of weed species already present in and adjacent to the project areas and corridors (power lines, roads and tracks etc.); d) If soil/sand or 'fill' or other construction elements are brought in from elsewhere (i.e. the mainland) to the project area, how the proponent intends to ensure that these items are free of weed seeds or plant parts; e) Current weed management aspirations of the Tiwi Is Rangers and Tiwi Land Council; f) The timing and management of weeds in the project areas and adjacent areas; g) Detection and management of new weed species incursions in the project areas; h) Assessing effectiveness of the implementation of the weed plan and capacity of the plan to be dynamic if the

	aims and goals of the plan and statutory obligations are not being met; i) Statutory weed management requirements including all relevant NTG statutory weed management plans; j) If the EPBC Act is applicable to this project then requirements of the Threat Abatement Plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses should be met; k) Ongoing weed management and weed monitoring post construction (operational phase). 2. Implementation and monitoring of a - k above.