



Application for Works Approval

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number W6669/2022/1

Applicant Yuri Operations Pty Ltd

ACN 655 596 919

File number DER2022/0000097

Premises Project Yuri
Lot 564 Village Road
BURRUP WA 6714

Legal description -
Part of Lot 564 on Deposited Plan 31023

As defined by the premises map attached to the issued works approval

Date of report 17 August 2022

Decision Works approval granted

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and of the premises. As a result of this assessment, works approval W6669/2022/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Application summary and overview of premises

On 3 March 2022, Yuri Operations Pty Ltd (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act) for the construction of a Renewable Hydrogen Plant on the Burrup Peninsula, approximately 9km north west of Dampier.

The Renewable Hydrogen Plant uses electrolysis to split water into hydrogen and oxygen in order to produce green hydrogen. The plant will be located within the development envelop of the existing Ammonia Plant operated by Yara Pilbara Fertilisers Pty Ltd under Licence L9224/2019/1. Hydrogen produced will provide a green hydrogen feed source for the Ammonia Plant. The nominal design capacity of the plant is 1,533 tonnes of hydrogen per annum (tpa) although it is expected that about 640 tonnes of hydrogen will be supplied to the Ammonia Plant per year; supplementing about 0.4% of natural gas currently used to feed ammonia production. The hydrogen plant is being developed as a commercial demonstration for a longer-term, larger-scale renewable hydrogen project.

The premises relates to the Category 31: Chemical manufacturing and the assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6669/2022/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6669/2022/1.

2.2.1 Process overview

The electrolyser consists of two 5 MW electrolyser cell stacks that generate hydrogen and oxygen gas from water (feed water) using electricity and lye solution (an aqueous solution of 25-30% potassium hydroxide and a small quantity of vanadium pentoxide). Lye solution reacts with electrically charged cathodes/anodes within the cells to produce hydrogen and oxygen gases. Gases in solution are transferred to the Gas Liquid Treater Units which separate the hydrogen and oxygen from the lye solution. Hydrogen gas produced by the process is transferred to the Hydrogen Purification Unit to remove residual impurities (oxygen and water) prior to being compressed and piped to the Ammonia Plant. Oxygen is vented to atmosphere as a waste gas.

Two Feed Water tanks supply demineralised water to the process. Recovered wastewater from the Hydrogen Purification Unit is recycled back into the Feed Water Tanks and used as make-up water in the Gas Liquids Treater Units. Lye solution is contained within a close loop circuit and no wastewater discharged to the environment.

An 18 MWp (megawatt peak) solar photovoltaic farm and Battery Energy Storage System

(BESS) supplies power to the process. The solar farm is outside the boundary of the premises and not within scope of this application.

2.3 Legislative context

2.3.1 Part IV of the EP Act

The hydrogen plant proposal was referred to the EPA under Part IV of the EP Act on 28 July 2020 and was assessed at a level of Referral Information with additional information required. The proposal was referred as a revised proposal to the existing Ammonia Plant, which was approved through Ministerial Statement (MS) 586. Given that the hydrogen plant proposal was a significant amendment to the existing Ammonia Plant proposal, the EPA's assessment was undertaken in the context of the existing Ammonia Plant, having regard to combined and cumulative effects on the environment.

The EPA released its report and recommendation on the project (EPA Report 1722) and MS 1194 was granted on 5 August 2022. The approved proposal is to construct and operate a renewable hydrogen production plant for the production of 640 tpa on the existing Ammonia Plant development envelope; within the Burrup Strategic Industrial Area (BSIA) on the Burrup Peninsula.

The following environmental factors were considered in the assessment:

- Social surroundings;
- Flora and vegetation; and
- Terrestrial fauna.

MS 1194 Conditions 2-3 and 3-3 require the submission of environmental management plans for managing impacts to these factors. These documents must be submitted at least one month prior to ground disturbing activities and the applicant must not undertake the commencement of ground disturbing activities until the CEO has confirmed in writing that the management plans have been submitted and satisfy the conditions. To ensure heritage and cultural values continue to be considered in a holistic way, the EPA has recommended that Murujuga Aboriginal Corporation be consulted by the proponent when it submits and reviews management plans for key environmental factors.

A summary of conditions relevant to the works approval is included in Table 1.

Table 1: Summarised conditions of MS 1194 relevant to assessment of the category 31 proposal under Part IV of the EP Act.

Environmental Factor	Condition	Condition summary
Cultural heritage and visual amenity	2	<p>The proponent shall implement the proposal to meet the following objectives:</p> <ol style="list-style-type: none"> (1) avoid, where possible, and otherwise minimise indirect impacts to social, cultural, heritage, and archaeological values within and surrounding the disturbance footprint; and (2) avoid, where possible, and otherwise minimise direct and indirect impacts to the visual and amenity values of social and cultural places and activities of significance. <p>At least one month prior to Ground Disturbing Activities, the proponent shall, in consultation with the Murujuga Aboriginal Corporation and the DPLH, submit to the CEO and the Registrar of Aboriginal Sites a Cultural Heritage and Visual Amenity Management Plan to meet the objectives specified in condition 2-2. The plan shall</p>

		<p>specify construction and operational environmental management activities, including noise and dust, management action to demonstrate compliance with objectives of condition 2-2, measurable targets and monitoring measures to determine their effectiveness.</p> <p>The proponent must not commence Ground Disturbing Activities until the CEO has confirmed in writing that the plan submitted under condition 2-3 satisfies the requirements of condition 2-3.</p>
Terrestrial fauna and weed management	3	<p>The proponent is restricted from clearing specific vegetation species that may provide habitat to fauna. Further, that impacts to short-range endemic fauna species be avoided where possible.</p> <p>At least one month prior to Ground Disturbing Activities, the proponent shall, in consultation with the Murujuga Aboriginal Corporation, submit to the CEO a Terrestrial Fauna and Weed Management Plan to meet the objectives specified in condition 3-2 and include provisions to avoid impacts from lighting, noise and vibration and dust.</p> <p>The proponent must not commence Ground Disturbing Activities until the CEO has confirmed in writing that the Terrestrial Fauna and Weed Management Plan satisfy the requirements of condition 3-3.</p>

Key determination: The scope of this assessment is limited to emissions and discharges relevant to Category 31 activities. In accordance with DWER’s *Guidance Statement: Setting Conditions*, conditions of a Part V works approval must not be “...contrary to, or otherwise than in accordance with, an implementation agreement or decision under Part IV of the EP Act.” Further, that conditions “will not unnecessarily duplicate requirements imposed on licensees directly by the EP Act or another written law.”

Based on conditions applied through MS 1194, the Delegated Officer has determined not to unnecessarily duplicate the requirements of MS 1194, or reassess the following Environmental Factors already assessed through EPA Assessment 1722:

- Cultural heritage, including potential impacts from dust and noise generated during construction; and
- Terrestrial fauna, including potential impacts from light, dust, noise and vibration.

Production capacity

The delegated officer notes that the proposal referred under Part IV of the EP Act relates to the plant having a maximum design capacity of 640 tonnes of hydrogen per year although the works approval application states that the plant will have a design capacity of 1,533 tonnes per year. To ensure the works approval is not contrary to approval granted under Part IV of the EP Act, the works approval specifies that the production capacity of the plant is limited to 640 tonnes of hydrogen per year. The EPA has advised that any increase in the production capacity beyond this amount will require the applicant to submit a request to the EPA to change the proposal under section 45C of the EP Act.

2.3.2 Department of Mines, Industry Regulation and Safety

The existing Ammonia Plant operated by Yara Pilbara Fertilisers Pty Ltd is a major facility and holds a Dangerous Goods Licence (DGS017039) under the *Dangerous Goods Safety Act 2004*. The existing Major Hazard Facility Safety Report and Dangerous Goods Licence will be required to be updated to include the proposed hydrogen production plant.

2.4 Exclusions

The following matters are out of the scope of this assessment and have not been considered within the technical risk assessment detailed in this report:

- the solar photovoltaic farm which is located outside of the premises boundary (refer to Schedule 1 of W6669/2022/1);
- preparatory works unrelated to the prescribed activity, such as clearing, levelling and construction of access roads, carparks, laydown areas, office buildings, workshops, warehouse/storage, and construction of hardstands for use in construction works;
- vehicle movements on public roads; and
- those Environmental Factors already assessed through EPA Assessment 1722 and listed in the key determinations of section 2.3 of this Decision Report.

The works approval is related to category 31 activities only and does not offer the defence to offence provisions in the EP Act (see s.74, 74A and 74B) relating to emissions or environmental impacts arising from non-prescribed activities, including those listed above.

The existing Ammonia Plant is outside the scope of this works approval application and emissions and discharges associated with the operation of the Ammonia Plant have not been reassessed through this application process.

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this decision report are detailed in Table 2 below. Table 2 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 2: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Construction works – earthmoving, vehicle movements	Air / windborne pathway	Water carts will be available onsite and used for dust suppression. Vehicle speeds will be restricted and vehicles restricted to designated roads and tracks to minimise dust generation. Visual dust inspections will be undertaken and dust suppression applied as necessary.

Emission	Sources	Potential pathways	Proposed controls
Noise		Air / windborne pathway	<p>Activities will be limited to mostly daylight hours (7am to 7pm) Monday to Sunday.</p> <p>Mobile plant will be inspected, maintained and replaced to ensure noise levels are minimised.</p> <p>Construction noise will be restricted to levels set out in <i>AS 2436-2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites</i>.</p>
Operation			
Noise	Operation of electrolyser and supporting equipment	Air / windborne pathway	<p>Electrolyser stacks, Gas Liquids Treater Units, Hydrogen Purification Unit and feed water and lye supply pumps are located within a dedicated building / vented enclosure.</p> <p>Noise monitoring is currently carried out by Yara Pilbara Fertilisers Pty Ltd and Yara Pilbara Nitrates Pty Ltd (Yara) in accordance with conditions of Licence L9224/2019/1 and Licence L9223/2019/1 for the Ammonia Plant and Technical Ammonium Nitrate (TAN) Production Facility and will continue throughout operation of the premises to confirm that noise meets the assigned noise levels at the boundary of the Ammonia Plant.</p>
Lye solution	Breach of containment / spills / leaks from electrolyser/lye tank	Direct discharge	<p>Lye solution is contained within a closed loop system.</p> <p>Lye solution circuits will include leak detection system per <i>AS 22734:2020 Hydrogen generators using water electrolysis - Industrial, commercial, and residential applications</i> consisting of a level sensor in the collection sump that will indicate if a leak has occurred.</p> <p>The facility will be monitored from a central control system and personnel attending as required from the Yara Ammonia Plant.</p> <p>All equipment containing lye solution, i.e. Electrolyser stacks, Gas Liquids Treater Units and lye tank, will be installed in a containment area (either a shared area or separate) with one or more concrete sumps to capture spillages. The containment area(s) and sumps will comply with <i>AS 22734:2020 Hydrogen generators using water electrolysis - Industrial, commercial, and residential applications</i>, i.e. will have a containment capacity of 110% of the maximum stored volume.</p> <p>Spent waste liquids and lye filters will be removed from site periodically by a licenced controlled waste contractor and disposed of at approved and certified facilities.</p> <p>Spent lye filters will be stored within the bunded area prior to removal from site.</p> <p>The vented enclosure is bunded by a 150mm high bund wall.</p>

3.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 3 and Figure 1 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from activity / prescribed premises
Hearson Cove (recreational area)	1,500m east south east of the premises
Ngajarli (Deep Gorge)	1,500m south of the premises
Industrial receptor	Pilbara Port Authority lease area (multiple users) 1,500m west
Dampier Townsite	7.4km southwest of the premises
Environmental receptors	Distance from activity / prescribed premises
Parks and Wildlife Managed Lands and Waters	Murujuga National Park - Borders Lot 3017 to the east, 500 m from the boundary of the Ammonia Plant lease boundary to the north and 900 m to the south.
Threatened/Priority Ecological Communities	Several priority ecological communities have been identified in the area. Priority 1 ecological communities exist within 5 km of the premises including the Burrup Peninsula rock pool and rock piles communities. The Burrup Peninsula rock pile communities consist of short-range endemic land snails.
Threatened / Priority Fauna	State and Commonwealth listed threatened species of fauna have been identified within a 10 km radius of the Premises including the Northern Quoll.
King Bay – mangroves and marine ecosystem	A supratidal flat is located 350m to the south. Mangrove community is located 1,500 m south west.
Hearson Cove (marine ecosystem)	1,530 m south east of premises boundary
National Heritage Listed place – Dampier Archipelago (including	The Dampier Archipelago including the Burrup Peninsula is listed on the National Heritage List due to the presence of rock engravings and other Aboriginal heritage sites such as stone arrangements.
Groundwater	Groundwater is generally shallow; encountered between 0.5m and 8m below ground level. Depth to groundwater decreases towards the tidal flat with variation driven by tidal movements and rainfall. Flow is generally to the southeast towards the supra-tidal flats that connect to King Bay. Groundwater is not used for potable or industrial purposes.
Acid sulphate soils	The premises is not located within an area identified as having a risk of acid sulphate soils. Soil mapping shows that there is potentially high

	risk areas 150m south of the premises.
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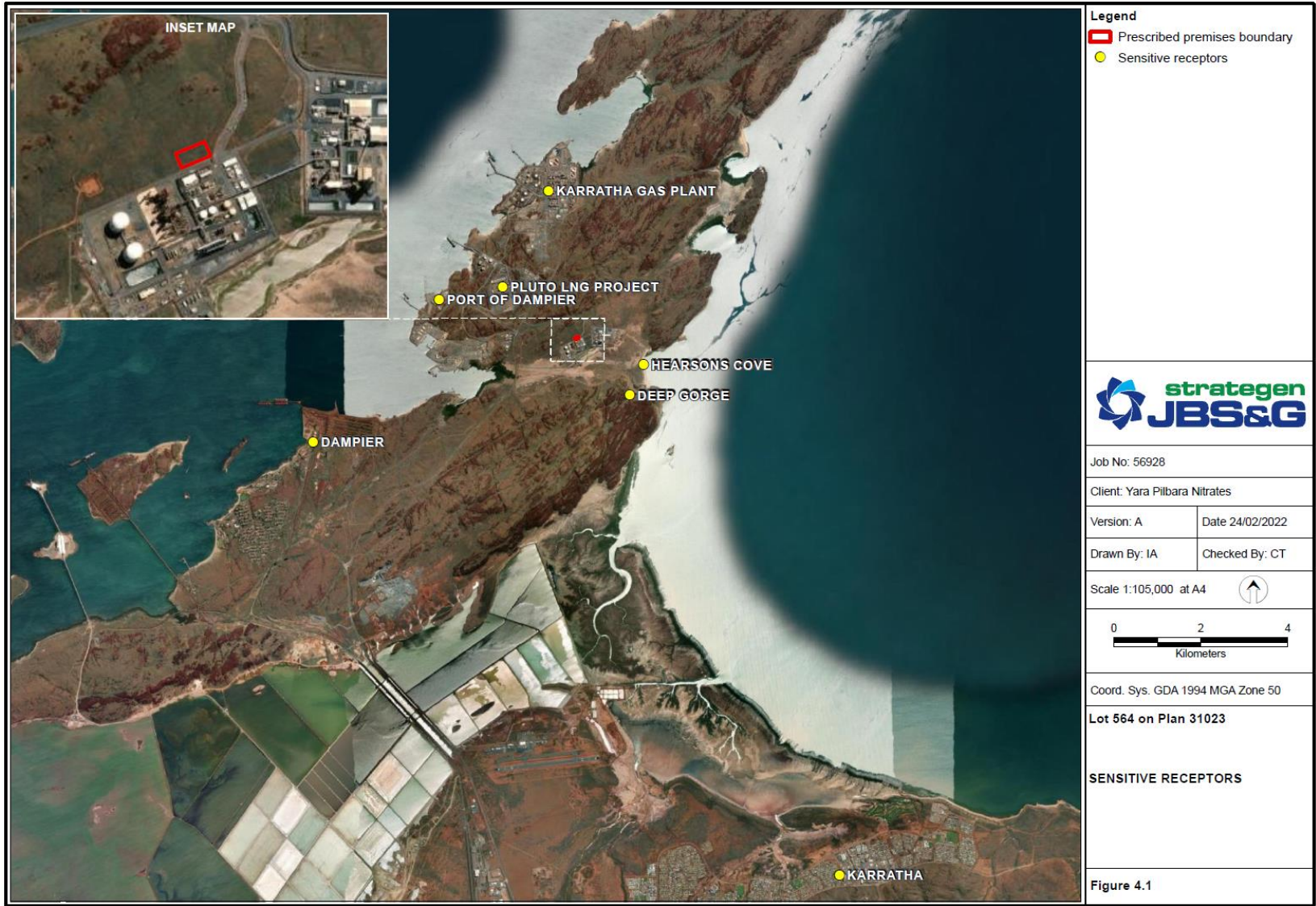


Figure 1: Distance to sensitive receptors

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4 and Table 5.

Works approval W6669/2022/1 that accompanies this decision report authorises construction and time-limited operations. The conditions in the issued works approval, as outlined in Table 4 and Table 5 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.

Table 4: Risk assessment of potential emissions and discharges from the premises during construction

Risk events					Risk rating ¹ C = consequence L = likelihood	Applicant controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Construction works – earthmoving, vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity Impacts on fauna	Industrial site adjacent to premises Residential receptors 7.4km away	Refer to Section 3.1	N/A	N/A	Managed under MS 1194 via implementation of the Cultural Heritage and Visual Amenity Management Plan and Terrestrial Fauna and Weed Management Plan	N/A
		Deposition of particulate matter on rock art causing erosion through abrasion	Within and immediately adjacent to premises boundary	Refer to Section 3.1	N/A	N/A		N/A
	Noise	Air / windborne pathway causing impacts to amenity. Impacts to fauna	Industrial site adjacent to premises Hearson Cove 1.5km away. Residential receptors 7.4km away Conservation significant fauna present on the Burrup Peninsular (Murujuga)	Refer to Section 3.1	N/A	N/A	Managed under MS 1194 via implementation of the Cultural Heritage and Visual Amenity Management Plan and Terrestrial Fauna and Weed Management Plan The proposal is required to comply with the Environmental Protection Noise Regulations 1997	N/A

Table 5: Risk assessment of potential emissions and discharges from the premises during operation

Risk events					Risk rating ¹	Applicant controls sufficient?	Conditions ² of works approval	Justification for additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
Operation of the electrolyser	Noise	Air / windborne pathway causing impacts to health and amenity	Industrial site adjacent to premises Hearson Cove 1.5km away. Residential receptors 7.4km away	Refer to Section 3.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1, 6, <u>7</u> , <u>8</u> and <u>9</u>	<i>Environmental Protection (Noise) Regulations 1997</i> apply. Applicant controls conditioned. Conditions applied for noise monitoring consistent with L9224/2019/1 and L92243/2109/1 to ensure assigned noise levels can be achieved to avoid amenity impacts to recreational users of Hearson Cove from cumulative noise. A requirement to implement noise mitigation if assigned noise levels are not complied with has also been applied.
		Impacts to fauna	Conservation significant fauna present on the Burrup Peninsular (Murujuga)		N/A	N/A	Managed under MS 1194 via implementation of the Terrestrial Fauna and Weed Management Plan	N/A
	Breach of containment causing release of lye solution from electrolyser or lye tank	Overland transport causing impacts to surface water and leaching through soil profile to cause impacts to groundwater	Supratidal flats south of the premises. Underlying groundwater. No beneficial groundwater uses	Refer to Section 3.1	C = Moderate L = Rare Low Risk	Y	Condition 1	Applicant controls conditioned.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 31 May 2022	None received	N/A
Local Government Authority advised of proposal on 2 June 2022	None received	N/A
Other Stakeholders advised of proposal on 2 June 2022 (DMIRS, DBCA and Murujuga Aboriginal Corporation)	None received	N/A
Applicant was provided with draft documents on 20 June 2022	The Applicant provided a revised site plan showing minor changes including the removal of the Hydrogen Purification Unit from the list of equipment containing lye solution.	Noted and updates made to Condition 1 of the works approval and premises layout maps.

5. Decision

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

In granting the works approval the delegated officer has taken into consideration conditions applied under Part IV of the EP Act through MS 1194, and DWER's *Guidance Statement: Setting Conditions*. In keeping with DWER's published guidance, the delegated officer has determined that the following environmental factors are managed through the Ministerial Statement (MS 1194) and therefore require no further regulation under the Part V works approval:

- Social surroundings including cultural heritage; and
- Terrestrial fauna.

The works approval limits the throughput of the premises to 640 tonnes of hydrogen per annum, which is consistent with the approval issued under Part IV of the EP Act (refer to section 2.3.1).

Condition 6 of the works approval requires that noise monitoring is undertaken during time limited operations to verify that assigned noise levels specified in the Environmental Protection (Noise) Regulations 1997 will be achieved, and to minimise amenity impacts to recreational users of Hearson Cove from cumulative noise. Noise monitoring is already undertaken at the adjacent Yara operated Ammonia Plant and TAN Production Facility.

Noise monitoring is to be carried out within the first 60 days of time limited operations and under normal operating conditions. The works approval also requires that the neighbouring Ammonia Plant and TAN Production Facility are operational during the period of noise monitoring to ensure that results are reflective of actual cumulative noise.

The works approval holder is required to submit a report demonstrating that assigned levels can be achieved and, where noise emissions do not comply with the Environmental Protection (Noise) Regulations 1997, is required to prepare a plan detailing measures that will be implemented to ensure compliance moving forward.

Time limited operations has been authorised for a period of 180 days to allow sufficient time for the above noise monitoring and reporting to be completed as well as enable processing of the licence application; the assessment of which will be informed by the outcome of the above noise conditions.

References

1. Department of Environment (DoE) 2006, *Pilbara Coastal Water Quality Consultation Outcomes — Environmental Values and Environmental Quality Objectives*, Department of Environment, Government of Western Australia, Marine Series Report No. 1.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
5. EPA 2022, *Ammonia Plant, Murujuga (Burrup Peninsula), Renewal Hydrogen Project, Yara Pilbara Fertilisers Pty Ltd, Report 1722*, Environmental Protection Authority, Perth, Western Australia.