



Environmental
Protection
Authority

Ammonia Plant, Murujuga (Burrup Peninsula), Renewable Hydrogen Project

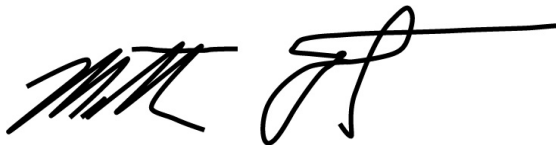
Yara Pilbara Fertilisers Pty Ltd

Report 1722
April 2022

This assessment report has been prepared by the Environmental Protection Authority (EPA) under section 44 of the *Environmental Protection Act 1986* (WA). It describes the outcomes of the EPA's assessment of the Ammonia Plant, Murujuga (Burrup Peninsula) – Renewable Hydrogen Project proposal by Yara Pilbara Fertilisers Pty Ltd.

This assessment report is for the Western Australian Minister for Environment and sets out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment.
- the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject.
- other information, advice and recommendations as the Authority thinks fit.

A handwritten signature in black ink, consisting of stylized, overlapping loops and strokes, likely representing the name Matthew Tonts.

Prof. Matthew Tonts
Chair
Environmental Protection Authority

28 April 2022

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Summary

Proposal

The Ammonia Plant, Murujuga (Burrup Peninsula) – Renewable Hydrogen Project (the proposal) is located approximately 11 km north-west of Karratha, in the Pilbara region of Western Australia. The proposal is a significant amendment to the existing Ammonia Plant which was referred to the Environmental Protection Authority (EPA) in 2001 and was approved subject to conditions set out in Ministerial statement 586 (MS 586).

The proponent for the proposal is Yara Pilbara Fertilisers Pty Ltd.

The proposal includes an electrolysis plant and a dedicated solar photovoltaic (PV) farm. Energy from the PV farm will be used in the electrolysis plant to split water into hydrogen and oxygen. The hydrogen will be piped to the adjacent Ammonia Plant. The proposal will produce about 640 tonnes of ‘green hydrogen’ per annum for use in the Ammonia Plant. This is about 0.4% of the hydrogen required by the Ammonia Plant and is the commercial demonstration (Phase 0, pilot project) for a future longer term, larger scale renewable hydrogen proposal.

Context

Murujuga is the traditional Aboriginal name for the Dampier Archipelago and surrounds, including the Burrup Peninsula and Murujuga National Park. Murujuga has been listed on Australia’s National Heritage List under the Dampier Archipelago (including Burrup Peninsula) by the Australian Government since 2007¹. Portions of the National Heritage Listing Area forms the Murujuga National Park.

On 23 January 2020, the Murujuga Cultural Landscape was added to the Australia’s World Heritage Tentative List by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre².

Consultation

The EPA published the proponent’s referral information for the proposal on its website for seven days public comment. The EPA also published the proponent’s referral information including an updated Referral Supporting Report and appended additional information (GHD 2021a) on its website for public review for 4 weeks (from 12 April 2021 to 10 May 2021). The EPA considered the comments received during these public consultation periods in its assessment.

¹ Commonwealth of Australia (2007). Gazette Special No. S127, Tuesday, 3 July 2007

² Australian Government (2020). World Heritage Tentative List Submission, Murujuga Aboriginal Corporation in cooperation with Western Australian Government (Department of Biodiversity, Conservation and Attractions) and Australian Government (Department of Environmental and Energy).

Mitigation hierarchy

The mitigation hierarchy is a sequence of proposed actions to reduce adverse environmental impacts. The sequence commences with avoidance, then moves to minimisation/reduction/rehabilitation, and offsets are considered as the last step in the sequence.

The proponent has considered the mitigation hierarchy in the development and assessment of its proposal, and as a result will:

- exclude the rocky outcropping in the north-west of the development envelope from the disturbance footprint to avoid impacts to the National Heritage Listing Area
- exclude all Aboriginal heritage sites identified during the surveys from the disturbance footprint
- establish an 'appropriate buffer' around the perimeter of each of the remaining 9 heritage sites and demarcation in consultation with the Murujuga Aboriginal Corporation (MAC)
- include MAC heritage monitors during all ground disturbing activities
- minimise visual impact through sight layout design including locating the majority of the solar photo voltaic panels on lower elevations to limit visual prominence and locating the hydrogen production plant close to the Ammonia Plant
- minimise vegetation clearing through site selection and layout, and develop and implement ground disturbance procedures for clearing within the development envelope
- undertake a weed monitoring program to minimise existing weed populations and reduce the potential spread into adjacent land
- avoid impacts to fauna by configuring the disturbance footprint to avoid the Burrup Peninsula Rock Pile Communities, Priority 1 Priority Ecological Community (PEC) and the Sand Plain habitat, and reduce disturbance to other fauna habitats and conservation significant fauna
- have trenches inspected by a 'fauna spotter' on a regular basis (commencement of day shift, midday, and prior to sunset) and will establish ramps in trenches that are left open overnight to permit native fauna to escape.

Assessment of key environmental factors

The EPA has identified the key environmental factors (listed below) in the course of the assessment. As the proposal is a significant amendment to an existing proposal the EPA's assessment has been undertaken in the context of the existing proposal, having regard to the combined and cumulative effects on the environment. The EPA has also considered whether to inquire into the implementation conditions for the existing proposal.

Social surroundings

Residual Impact	Assessment finding
<p><u>Proposal (significant amendment to the existing proposal)</u></p> <p>Potential loss of Aboriginal heritage sites and intangible heritage values.</p> <p>An Archaeological Site Verification study identified 18 Aboriginal heritage sites in the development envelope.</p> <p>Further surveys located three additional archaeological sites including a men-only site identified as having deeply sensitive cultural and spiritual associations, and the whole site as having high cultural and heritage value to the traditional owners.</p> <p><u>Context of existing Ammonia Plant (existing proposal)</u></p> <p>Under section 18 of the <i>Aboriginal Heritage Act 1972</i> the construction of the existing Ammonia Plant disturbed four sites.</p> <p>No additional sites will be disturbed.</p>	<p>The EPA has assessed that direct impact to Aboriginal heritage sites will be avoided if the proposed exclusions from the development footprint (exclusion zones) are subject to the implementation of condition 1 which limits the extent of the proposal and condition 2 which defines the exclusion zones.</p> <p>Indirect impact to these sites through dust, fly rock, and vibration caused during construction can be managed through the implementation of recommended condition 2, the objective of which is to avoid and minimise indirect impacts and requires the proponent to prepare a Cultural Heritage and Visual Amenity Management Plan in consultation with the Murujuga Aboriginal Corporation (MAC).</p> <p>Condition 2 also ensures that the proponent's commitment to a 50 m buffer around the men-only site is implemented.</p> <p>The implementation of the conditions will minimise the residual impact to the intangible heritage values identified within the development envelope.</p>
<p><u>Proposal</u></p> <p>Potential loss of traditional owner and custodian access and connection to the Aboriginal heritage sites.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>Traditional owner and custodian access to the development envelope is currently managed via the proponent's existing Aboriginal Heritage Management Plan that was developed and implemented under MS 586.</p>	<p>The EPA advises that the residual impact to cultural heritage through the loss of access to, or restriction of access to Aboriginal heritage sites within the development envelope is likely to be able to be regulated through recommended condition 2. This condition ensures access to Aboriginal heritage sites subject to reasonable health and safety requirements.</p>

Residual Impact	Assessment finding
<p><u>Proposal</u></p> <p>Potential impacts to a portion of the Dampier Archipelago (including Burrup Peninsula) National Heritage Listed Area.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>The northern end of the development envelope intersects a portion of the National Heritage Listed Area. The existing Ammonia Plant was constructed at the southern end of the development envelope and disturbance of the National Heritage Listed Area was not required.</p>	<p>The EPA considers that direct impact to the National Heritage Listed Area by the proposal will be avoided through the implementation of recommended condition 1 which limits the extent of the proposal and condition 2 which conditions exclusion zones.</p> <p>The residual impact of indirect impact to the National Heritage Listed Area through, dust, fly rock, and vibration caused during construction can be regulated through the implementation of recommended condition 2 the objective of which is to avoid and minimise indirect impacts and requires the proponent to prepare a Cultural Heritage and Visual Amenity Management Plan in consultation with the MAC.</p> <p>See 'Other advice' in section 6 of this report on a strategic approach to cumulative industrial impacts such as the existing Ammonia Plant on Murujuga.</p>
<p><u>Proposal</u></p> <p>Potential impacts to the values of the tentative World Heritage listing.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>The boundary for the tentative World Heritage listing area for the Murujuga Cultural Landscape is yet to be defined. However, the existing Ammonia Plant is located within the Burrup Strategic Industrial Area.</p>	<p>The EPA has concluded that the proposal will not significantly impact on values underlying the tentative World Heritage listing area of the Murujuga Cultural Landscape.</p> <p>See 'Other advice' in section 6 of this report on a strategic approach to cumulative industrial impacts on Murujuga.</p>
<p><u>Proposal</u></p> <p>Potential indirect impacts to visual amenity.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>The existing Ammonia Plant has material impacts on visual amenity, including from places of social and cultural significance.</p>	<p>The EPA has concluded that there is a residual risk of additional impacts to visual amenity.</p> <p>The residual indirect impacts should be subject the implementation of recommended condition 2, the objective of which is to avoid and minimise impacts to the visual amenity of social and cultural places and activities in the surrounding area.</p>

Flora and vegetation

Residual impact	Assessment finding
<p><u>Proposal</u></p> <p>Clearing of 21.23 ha of native vegetation of which 20.42 ha are in 'Good to Excellent' condition.</p> <p><u>Combined effect</u></p> <p>The proposal disturbance footprint of 22.94 ha includes 21.23 ha of native vegetation that will be cleared and 1.71 ha of previously disturbed (cleared) land. The combined effect of the existing Ammonia Plant (29 ha) and the proposal will be up to 51.94 ha cleared within the 73 ha development envelope.</p>	<p>There are no flora species listed as threatened under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) or the <i>Biodiversity Conservation Act 2016</i> (BC Act) that are known to occur on the Burrup Peninsula.</p> <p>The clearing of 'Good to Excellent' condition vegetation is likely to be significant, both on its own and in the context of the existing Ammonia Plant. This vegetation contributes to biological diversity and ecological integrity in the local area, and provides habitat for conservation significant fauna species.</p> <p>Due to the remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in accordance with the <i>WA Environmental Offsets Guidelines</i>.</p> <p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint (recommended condition 1) and recommended conditions 4 and 6, respectively. These conditions require the provision of offsets and the development and implementation of a Decommissioning and Rehabilitation Plan.</p>
<p><u>Proposal</u></p> <p>Removal of one individual of <i>Terminalia supranitifolia</i> (Priority 3 species) within the disturbance footprint.</p> <p><u>Combined effect</u></p> <p>No individuals of <i>Terminalia supranitifolia</i> were located within the disturbance footprint during the surveys for the existing Ammonia Plant. Therefore, the combined effect is the removal of one individual of <i>Terminalia supranitifolia</i>.</p>	<p>The EPA assessed that this is not likely to be a material impact given the known extent of this species on the Burrup Peninsula and in the wider Pilbara region.</p> <p>The environmental outcome is likely to be consistent with the EPA's objective for this factor.</p>
<p><u>Proposal</u></p> <p>Indirect impacts on the surrounding area from the introduction and spread of weeds. Surveys identified 3 weed species (*<i>Cenchrus ciliaris</i> (Buffel grass), *<i>Aerva</i></p>	<p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint (recommended condition 1) and recommended conditions 3 and 6 respectively requiring the development and implementation of a Terrestrial Fauna and Weed Management Plan and a Decommissioning and Rehabilitation Plan.</p>

<p><i>javanica</i> (Kapok bush) and *<i>Vachellia farnesiana</i> (Mimosa bush).</p> <p><u>Combined effect</u></p> <p>Surveys for the existing Ammonia Plant identified 2 weed species (<i>Aerva</i> and <i>Cenchrus ciliaris</i>). Therefore, the combined effect is the identification / introduction of an additional weed species within the development envelope.</p>	
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Terrestrial fauna

Residual impact	Assessment finding
<p><u>Proposal</u></p> <p>Clearing of 1.26 ha [0.16 ha of Floodplain habitat and 1.1 ha of Waterbody (tidal flats)] of EPBC Act and BC Act listed marine and migratory bird habitat in 'Good to Excellent' condition.</p> <p><u>Combined effect</u></p> <p>The combined effect (existing Ammonia Plant and proposal) of clearing Floodplain habitat and Waterbody (tidal flats) habitat types will be up to approximately 11.19 ha and 10.05 ha respectively within the 73 ha development envelope.</p>	<p>The residual impact on 1.26 ha of EPBC Act listed marine and migratory bird habitat is likely to be significant, both on its own and in the context of the existing Ammonia Plant.</p> <p>Due to remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in accordance with the <i>WA Environmental Offsets Guidelines</i>.</p> <p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint (recommended condition 1) and recommended conditions 3, 4, and 6, respectively. These conditions require the development and implementation of a Terrestrial Fauna and Weed Management, Plan, the provision of offsets, and the development and implementation of a Decommissioning and Rehabilitation Plan.</p>
<p><u>Proposal</u></p> <p>Clearing of 20.27 ha [18.11 ha of Foothills, 1.06 ha of Minor Drainage Line, and 1.1 ha of Waterbody (tidal flats)] of Pilbara olive python habitat in 'Good to Excellent' condition.</p> <p><u>Combined effect</u></p>	<p>The residual impact on 20.27 ha Pilbara olive python habitat is likely to be significant, on its own and in the context of the existing Ammonia Plant.</p> <p>Due to remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in accordance with the <i>WA Environmental Offsets Guidelines</i>.</p> <p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint (recommended condition 1) and</p>

Residual impact	Assessment finding
The combined effect (existing Ammonia Plant and proposal) on Pilbara olive python is approximately 32.97 ha within the development envelope.	recommended conditions 3, 4, and 6, respectively requiring the development and implementation of a Terrestrial Fauna and Weed Management Plan, the provision of offsets, and the development and implementation of a Decommissioning and Rehabilitation Plan.
<u>Proposal</u> Unlikely to have a material impact on the north-western free-tailed bat.	The roosting habitat for this species will not be directly disturbed by construction activities. Only a small area of suitable foraging habitat will be cleared. The EPA considers that the proposal is unlikely to have a material impact on the north-western free-tailed bat. The environmental outcome is likely to be consistent with the EPA's objective for this factor.
<u>Proposal</u> Unlikely to have a material impact on the western pebble-mound mouse.	The EPA considers that the proposal is unlikely to have a material impact on the western pebble-mound mouse as it is no longer considered to be present on the Burrup Peninsula. The environmental outcome is likely to be consistent with the EPA's objective for this factor.

Holistic assessment

Given the link between social surroundings, flora and vegetation and terrestrial fauna, the EPA has also considered connections and interactions between relevant environmental factors and values to inform a holistic view of impacts to the whole environment.

The EPA recognises that Murujuga is an area of outstanding conservation and heritage value. The EPA is also aware of the potential for industry and other activities located within Murujuga to influence the complex interactions between environmental factors. These interactions have the potential to influence the environment in a holistic and non-linear nature, effecting all environmental values which are physically and intrinsically linked to social surroundings, specifically cultural heritage.

The EPA formed the view that holistic impacts would not alter the EPA's conclusions about consistency with the EPA's factor objectives. The EPA has recommended several conditions which support the holistic management of impacts, including protection of terrestrial fauna which form part of the Murujuga cultural landscape and conditions to ensure the protection of and connection to Aboriginal heritage sites.

Conclusion and recommendations

The EPA has taken the following into account in its assessment of the proposal:

- the environmental values which may be significantly affected by the proposal
- residual impacts, emissions, and effects in relation to the key environmental factors, separately and holistically (this has included considering cumulative impacts on heritage and cultural values within and from the Burrup Strategic Industrial Area)
- the likely environmental outcomes (and taking into account the EPA's recommended conditions), and the consistency of these outcomes with the EPA's objectives for the key environmental factors
- the EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- the principles of the *Environmental Protection Act 1986* (EP Act).

The EPA has recommended that the proposal may be implemented subject to conditions recommended in Appendix A.

1 Proposal

The Ammonia Plant, Murujuga (Burrup Peninsula) – Renewable Hydrogen Project (the proposal) is a significant amendment to the existing proposal (existing Ammonia Plant) located approximately 11 km north-west of Karratha, in the Pilbara region of Western Australia (see Figure 1). The existing Ammonia Plant was referred to the Environmental Protection Authority (EPA) and approved subject to conditions set out in Ministerial statement 586 (MS 586).

The proposal includes an electrolysis plant and a dedicated solar photovoltaic (PV) farm. Energy from the PV farm will be used in the electrolysis plant to split water into hydrogen and oxygen. The hydrogen will be piped to the adjacent Ammonia Plant. The proposal will produce about 640 tonnes of ‘green hydrogen’ per annum for use in the Ammonia Plant. This is about 0.4% of the hydrogen required by the Ammonia Plant and is the commercial demonstration (Phase 0, pilot project) for a future longer term, larger scale renewable (green) hydrogen proposal.

The proponent for the proposal is Yara Pilbara Fertilisers Pty Ltd. The proponent referred the proposal to the EPA on 28 July 2020. The referral information was published on the EPA website for seven days public comment. On 17 December 2020, the EPA decided to assess the proposal at the level of Referral Information with additional information required. The EPA also published the referral information including an updated Referral Supporting Report and appended additional information (GHD 2021a) on its website for public review for 4 weeks (from 12 April 2021 to 10 May 2021).

The elements of the proposal which have been subject to the EPA’s assessment are included in Table 1 below.

Table 1: Location and proposed extent of proposal elements

Proposal element	Location	Approved proposal (MS 586) (Ammonia Plant)	Proposal (significant amendment) (Renewable Hydrogen Project)	Combined proposal (Ammonia Plant, and Renewable Hydrogen Project)
<i>Physical elements</i>				
<ul style="list-style-type: none"> Ammonia plant Laydown area Desalination plant Access road and product pipeline to plant PV solar plant, hydrogen production plant, site tracks, and 	Figure 2	Clearing of no more than 29 ha within a 73 ha development envelope	Increase in disturbance of 22.94 ha	Clearing of no more than 51.94 ha within a 73 ha development envelope

Proposal element	Location	Approved proposal (MS 586) (Ammonia Plant)	Proposal (significant amendment) (Renewable Hydrogen Project)	Combined proposal (Ammonia Plant, and Renewable Hydrogen Project)
associated infrastructure.				
<i>Operational elements</i>				
Ammonia Plant capacity		Up to 2,600 t/day of ammonia		Up to 2,600 t/day of ammonia
Oxygen emissions			Approximately 14,400 kg/day	Approximately 14,400 kg/day

Application of Environmental Protection Act 1986 amendments to the proposal

The proposal was referred as a revised proposal to the existing Ammonia Plant which was approved through MS 586. The EPA decided to assess the proposal in December 2020. The EP Act was subsequently amended on 22 October 2021, and one result of the amendments is that the proposal is now considered to be a significant amendment to the existing Ammonia Plant.

Given the proposal is a significant amendment to an existing proposal, the EPA's assessment has been undertaken in the context of the existing Ammonia Plant, having regard to combined and cumulative effects on the environment. The EPA has also considered whether to inquire into the implementation conditions for the existing Ammonia Plant.

However, the EPA has not re-assessed the approved proposal (MS 586) which is currently regulated through a variety of mechanisms.

Proposal amendments

The proponent requested changes to the proposal during the assessment under section 43A of the EP Act. The changes were assessed to be unlikely to significantly increase any impact the proposal may have on the environment. The EPA Chair's notice, of 20 April 2022, consenting to the change is available on the EPA website.

Proposal alternatives

Section 2.5.1 in the proponent's Referral Supporting Report (GHD 2021a) indicates that the following three alternative locations were considered for the proposal:

- locating the solar PV farm and electrolyser off Murujuga and connecting them to the existing Ammonia Plant with a hydrogen pipeline which crosses the causeway near Karratha airport

- locating the solar PV farm off Murujuga and connecting it to an electrolyser on Murujuga with a high voltage electricity transmission line which crosses the causeway near Karratha airport
- locating the solar PV farm and electrolyser on Murujuga.

The land parcel adjacent to the existing Ammonia Plant within the existing lease on Murujuga was chosen by the proponent as the preferred location for the proposal mainly because:

- its proximity to the existing Ammonia Plant eliminates the requirement for a hydrogen pipeline and a high voltage electricity transmission line between the Renewable Hydrogen Plant and the existing Ammonia Plant and enables the proponent to take advantage of synergies (like utilities) with the Ammonia Plant
- the preferred location inside the existing lease mitigated several project risks around land access and approvals
- the Murujuga Aboriginal Corporation expressed their support for this location.

The proponent therefore referred the proposal in its current location, and this is the proposal alternative which the EPA is required to assess.

Proposal context

Murujuga is the traditional Aboriginal name for the Dampier Archipelago and surrounds, including the Burrup Peninsula and Murujuga National Park. Murujuga has been listed on Australia's National Heritage List under the Dampier Archipelago (including Burrup Peninsula) by the Australian Government since 2007³. Portions of the National Heritage Listing Area forms the Murujuga National Park.

On 23 January 2020, the Murujuga Cultural Landscape was added to the Australia's World Heritage Tentative List by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre.

Original proposal implementation

The existing Ammonia Plant was approved through MS 586 which was issued in 2002.

The first licence to operate the original proposal was granted on 25 April 2005 (L7997/2002/1). The original proposal commenced operations in 2006. The current operating licence is L9224/2019/1.

Annual compliance assessment reports have been submitted since July 2004 as required by MS 586.

³ Commonwealth of Australia (2007). Gazette Special No. S127, Tuesday, 3 July 2007.



Figure 2: Development envelope and disturbance footprint

2 Assessment of key environmental factors

This section includes the EPA's assessment of the key environmental factors. The EPA also evaluated the impacts of the proposal on other environmental factors such as air quality and greenhouse gas emissions and concluded these were not key factors for the assessment. This evaluation is included in Appendix D.

The EPA has assessed the proposal in the context of the approved proposal (MS 586) while having regard to the combined and cumulative effect that the implementation of the approved proposal may have on the following environmental factors.

2.1 Social surroundings

2.1.1 Environmental objective

The EPA environmental objective for social surroundings is *to protect social surroundings from significant harm*.

2.1.2 Investigations and surveys

The EPA advises the following survey and investigation were used to inform the assessment of the potential impacts to social surroundings:

- Yara Development Envelope Archaeological Site Verifications, Burrup Peninsula, WA-Report (Appendix A of the Referral Supporting Report) (LAS 2020)
- Report of an Ethnographic Site Avoidance Survey for Yara's Project Yuri Solar Hydrogen Plant Development, Burrup Peninsula, Western Australia (Archae-aus 2022)
- Report of an avoidance level survey at the Yara Development Envelope, Murujuga, Western Australia undertaken by Murujuga Aboriginal Corporation representatives and Scarp Archaeology (Scarp Archaeology 2022)
- Ammonia Plant, Burrup Peninsula – Renewable Hydrogen Project Visual Considerations Report and photomontage (appendix E of the Referral Supporting Report) (GHD 2020a).

As a result of consultation with the Murujuga Aboriginal Corporation (MAC) after the submissions period, the proponent undertook an additional ethnographic survey to the east and west of the existing Ammonia Plant in December 2021.

The surveys and investigations that were undertaken are consistent with the *Environmental factor guideline – Social surroundings* (EPA 2016a).

The EPA considers that it has sufficient information to assess impacts on social surroundings.

2.1.3 Assessment context: existing environment

Cultural heritage values, National and World Heritage Listings

The proposal is located within the 73 ha development envelope for the existing Ammonia Plant. The development envelope is located in the Burrup Strategic Industrial Area which is situated within Murujuga (the Dampier Archipelago and Burrup Peninsula).

Murujuga has been listed as a National Heritage Listing Area on Australia's National Heritage List under the Dampier Archipelago (including Burrup Peninsula) since 2007⁴. Portions of the National Heritage Listing Area form the Murujuga National Park.

On 23 January 2020, the Murujuga Cultural Landscape was added to the Australia's World Heritage Tentative List by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre⁵.

The Ngarluma, Yindjibarndi, Yaburara, Mardudhunera and Wong-Goo-Tt-Oo groups, collectively known as the *Ngurra-ra Ngarli*, are represented by the MAC who are the custodians of Murujuga. The MAC was established in 2003 under the Burrup and Maitland Industrial Estates Agreement (BMIEA)⁶.

The EPA acknowledges the role that the MAC and the Western Australian Government have in establishing appropriate and effective management and conservation measures relevant to Murujuga (including the Burrup Peninsula and the Dampier Archipelago) that is critical to the success of the World Heritage Nomination. Murujuga is sacred to the *Ngura-ra Ngarli*. It is a place where everything is connected, through the Ancestral Beings – the land, the sky, the plants, the animals, the Lore and the spiritual world. This is the belief system that underlies life on Murujuga today⁷.

The MAC provided the following definition of intangible heritage value to the Department of Water and Environmental Regulation (DWER) in December 2021:

'Intangible heritage values are the non-material aspects of heritage that are valued, including cultural, spiritual, aesthetic and social aspects. Intangible heritage values are intergenerational and formed through interaction with the environment. Expressions of intangible heritage include practices, representations, expressions, knowledge, skills, traditions, practices, performance, use, knowledge and language.'

The following cultural values have been identified in proximity to the proposal:

⁴ Commonwealth of Australia (2007). Gazette Special No. S127, Tuesday, 3 July 2007

⁵ Australian Government (2020). World Heritage Tentative List Submission, Murujuga Aboriginal Corporation in cooperation with Western Australian Government (Department of Biodiversity Conservation and Attractions) and Australian Government (Department of Environment and Energy)

⁶ State of Western Australian, Western Australian Land Authority and Contracting Parties (2002) Burrup and Maitland Industrial Estates Agreement)

⁷ Murujuga Aboriginal Corporation (2016). Murujuga Cultural Heritage Management Plan. Pindan Printing Pty Ltd Broome

- Murujuga National Park which is located about 115 m north of the proposal's development envelope, and jointly managed by the MAC and the Department of Biodiversity, Conservation and Attractions (DBCA) (see Figure 3)
- Deep Gorge (now known as Ngajarli), which is located about 800 m south-east of the proposal's development envelope within the Murujuga National Park and includes rock art and a new boardwalk and interpretive signage to educate visitors about its cultural significance to the traditional owners
- the National Heritage Listed Area which is partially within the proposal's development envelope (see Figure 3)
- the World Heritage Tentative Listing of Murujuga, whose boundary is yet to be defined.



Figure 3: Development envelope, National Heritage Listed Area, and the Murujuga National Park

Amenity

The Burrup Peninsula is a popular tourist and recreational destination characterised by coastline, rocky outcrops, lowlands. The Burrup Peninsula also features a number of large industrial facilities located within the Burrup Strategic Industrial Area. Industrialisation began on the Dampier Archipelago in the 1950s (DWER 2019). These facilities include the Karratha Gas Plant, Pluto LNG Plant, Yara Pilbara Fertilisers Pty Ltd Ammonia Plant, and the Yara Pilbara Nitrates Pty Ltd Technical Ammonium Nitrate Production Facility.

Hearson Cove is located about 1.4 km to the east of the development envelope and Hearson Cove beach is a popular recreational area with a strong social value for local residents and visitors. The Hearson Cove foreshore is zoned as 'Conservation, Recreation and Natural Landscapes' in the City of Karratha Local Planning Scheme No. 8 (DPLH 2020). Hearson Cove is currently accessed via Hearson Cove Road about 250 m to the south of the development envelope. Hearson Cove Road also enables the public and tourists to access Ngajarli.

2.1.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in the Response to Submissions document (Strategen-JBS & G 2022).

The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in the sections below. The sections and impacts they address are:

1. section 2.1.5 – the impact of emissions on rock art and the World Heritage Listing and the impact of truck noise on amenity
2. section 2.1.6 – direct impact to identified Aboriginal heritage sites
3. sections 2.1.7 and 2.1.8 – indirect impact to Aboriginal heritage sites, access to sites for traditional owners and visual amenity.

The EPA recognises the positive relationship between the proponent and the MAC which has resulted in extensive and ongoing consultation on the proposal since 2019.

2.1.5 Potential impacts from the proposal

An issue was raised during the public consultation about the proposal's hydrogen production (or any future expanded hydrogen production) extending the life of the existing Ammonia Plant. There was concern that any increased time that air emissions would come from the plant would contribute to potential continuing impacts to rock art and subsequently the tentative World Heritage Listing. The proponent has advised that it does not seek to extend the life of, or increase emissions from, the existing Ammonia Plant as part of this proposal (Strategen-JBS & G 2022), and that the proposal is for a commercial demonstration hydrogen plant only.

The EPA's consideration of the impact of air emissions from the existing Ammonia Plant is set out in the 'Other advice' section and Appendix D of this report, and the EPA advises that it recommends that a section 46 inquiry into the air emissions from the existing Ammonia Plant be undertaken.

Other issues raised during the public consultation relating to the impact of increased truck emissions on rock art and the impact of increased truck noise and movements on amenity and tourism are considered unlikely to be material. This is because:

- The construction for the proposal will take about 8 months and the main deliveries to the construction site will take place over six months (Strategen-JBS & G 2022), limiting emissions, noise and traffic to a relatively short timeframe.
- Vehicles will access the site via Village Road and will not use Hearson Cove Road (Strategen-JBS & G 2022) avoiding increased traffic on Hearson Cove Road which is used by visitors to Hearson Cove and Deep Gorge (Ngajarli).
- Vehicles will be switched off when not in use (GHD 2021b).
- Low sulfur fuels will be used in construction vehicles and machinery (GHD 2021b).
- The report on the Study of the Cumulative Impacts of Air Emissions in the Murujuga Airshed (Ramboll 2021) notes that the main emissions from vehicles include oxides of nitrogen (NO_x) and oxides of sulfur (SO_x). One of the findings of the report was that NO_x and SO_x peak ground level concentrations show that industrial facilities and shipping are the main contributors to emissions in the area. Noting the short duration of truck movements during construction, and vehicle movements not being the main contributor of NO_x and SO_x within Murujuga, the amendment to the proposal is not considered to be material from an air quality perspective.
- The proponent's proposed noise management measures include:
 - limiting construction activities between 7 am and 7 pm Monday to Saturday, excluding public holidays unless otherwise approved by the City of Karratha
 - the use of slower speeds.
- The proposal will be required to comply with the assigned noise levels in the Environmental Protection (Noise) Regulations 1997.
- A traffic management plan will be required by the City of Karratha.

Therefore, these issues are not considered further in this assessment report.

The proposal has the potential to significantly impact on social surroundings from:

- construction causing disturbance of Aboriginal heritage sites, sites of ethnographic significance and intangible Aboriginal cultural heritage
- construction causing indirect damage to Aboriginal heritage sites
- construction and new infrastructure preventing access by traditional owners to Aboriginal heritage sites
- new infrastructure visually impacting the landscape and its values.

2.1.6 Avoidance measures

Cultural heritage values, National and World Heritage Listings

The proponent has designed the proposal to avoid impacts to social surroundings by excluding the National Heritage Listing Area and the 18 Aboriginal heritage sites that were identified during the Archaeological Site Verification survey from the proposal's disturbance footprint.

The issue raised during the public consultation about potential direct impacts to Aboriginal heritage sites has been addressed through the above avoidance measures which ensures no direct removal or disturbance to any sites through the use of exclusion areas.

2.1.7 Minimisation measures (including regulation by other DMAs)

Cultural heritage values, National and World Heritage Listings

The proponent has proposed the following measures to minimise impacts to cultural heritage values and National and World Heritage Listings:

1. an 'appropriate buffer' around the perimeter of each of the 9 heritage sites and demarcation in consultation with the MAC
2. MAC heritage monitors to be present during all ground disturbing activities (including blasting) and salvage operations
3. MAC heritage monitors to be engaged to assist in managing heritage values of the sites and adjacent areas
4. a stop work procedure will be implemented in the event of a discovery or the identification or an object reasonably suspecting of being an Aboriginal artefact
5. ongoing consultation between the proponent and the MAC
6. if blasting is required, a number of measures will be employed to minimise indirect impacts to sites and the National Heritage Listing Area from vibration, fly rock and dust, including blasting design, low percussion explosives, blast mats/shield, and water carts
7. heavy vehicle movements will be minimised to reduce vibration
8. water carts and speed limits will be used to reduce dust.

Issues raised in submissions relating to potential indirect impacts (dust, blasting, vibration) to Aboriginal heritage sites during construction have been considered through the minimisation measures outlined above.

Management measures 1 to 8 referred to above are detailed in the Construction Environmental Management Plan (CEMP) (GHD 2021b) provided as Appendix E of the proponent's Response to Submissions document, September 2021 (Strategen-JBS & G 2022).

Amenity

The proponent has proposed measures to minimise impacts to amenity (including tourism) include:

1. minimising visual impact through sight layout design including locating the majority of solar photo voltaic panels on lower elevations to limit visual prominence and locating the hydrogen production plant close to the Ammonia Plant (GHD 2021b)
2. vegetation or landform screening will be used where appropriate (Strategen-JBS & G 2022)
3. undertaking a glint and glare assessment and prepare and implement a glint and glare management plan to ensure that reflected sunlight does not impact the safety and amenity of other users in the area (GHD 2021b).

2.1.8 Assessment of impacts to environmental values

The EPA considered that the key environmental values for social surroundings likely to be impacted by the proposal are cultural heritage values, National and World Heritage Listings, and amenity (visual).

The EPA has assessed the proposal in the context of the existing proposal (MS 586) and has had regard to the combined and cumulative effect that the implementation of the approved proposal may have on social surroundings.

Cultural heritage values, National and World Heritage Listings

Cultural heritage values – Aboriginal heritage sites

EPA Report 1036 for the Ammonia Plant (EPA 2001) identified ten archaeological sites within the development lease. The construction of the existing Ammonia Plant resulted in the disturbance of four registered Aboriginal heritage sites. This disturbance involved the salvage of three sites and the relocation of one site. The disturbance was undertaken in accordance with section 18 of the *Aboriginal Heritage Act 1972* and under the supervision of traditional owners and custodians from the Wong-Goo-Tt-Oo Native Title Claimant Group, the Yaburara/Marduduhenera Native Title Claimant Group, and the Ngaluma/Yindibarrndi Native Title Claimant Group.

The proponent commissioned an archaeological site investigation across the proposal area for the proposal. The Archaeological Site Verification report (LAS 2020) presented an analysis of a search of the Department of Planning, Lands and Heritage (DPLH) Aboriginal Heritage Inquiry System and identified 18 Aboriginal heritage sites (registered sites and lodged sites) within the development envelope. Nine of these 18 sites are located in the rocky outcropping in the north-west of the development envelope and would not be impacted, therefore the survey focused on the 9 sites in the disturbance footprint. The archaeological survey identified the boundaries of 8 of the 9 sites in the disturbance footprint but was unable to identify Site 20266 despite finding the original peg marking the site location. The 9 remaining sites in the development footprint include engravings, artefact scatters, quarries and grinding patches.

As a result of COVID-19 restrictions and social distancing, field work was conducted by archaeologists and the results of this field work were presented to the MAC representatives. The MAC advised that the sites were of cultural importance and should not be disturbed.

Subsequent to receiving the MAC's submission relating to intangible heritage values, the proponent consulted the MAC and two additional surveys were undertaken in conjunction with the MAC. The follow up surveys included an ethnographic survey (Archae-aus 2022) (which is discussed in the intangible heritage values section below) and an archaeological survey (Scarp Archaeology 2022). The Response to Submissions document (Strategen JBS & G 2022) notes that the archaeological survey identified three new archaeological sites within the development envelope, two of which are located within the disturbance footprint. Additional site features were also recorded at one of the previously identified sites, and a revised boundary was provided. The report recommended the following:

- avoidance of the three new sites within and just outside of the survey areas
- a 50 m buffer from the northern boundary to avoid exposed granophyre boulders likely to feature engravings.

In consultation with the MAC the proponent has committed to implementing the recommendations listed above and managing the sites in accordance with the CEMP (Strategen JBS & G 2022).

The proponent has designed the proposal to avoid direct impacts to the 21 identified Aboriginal heritage sites through their exclusion from the disturbance footprint (i.e. exclusion zones).

The CEMP of September 2021 (GHD 2021b) was provided to the MAC as part of the proponent's ongoing engagement process. On 26 October 2021, the MAC provided a letter of support in which it considered that the changes in CEMP of September 2021 continues to support the MAC's Aboriginal heritage requirements (MAC 2021b).

The EPA considers that the avoidance and minimisation measures committed to in the proponent's CEMP of September 2021 (GHD 2021b) and the commitments made in the Response to Submissions document (Strategen JBS & G 2022) are appropriate to maintain consistency with the EPA's objective for social surroundings. The EPA advises that avoidance and minimisation measures should be required to be implemented in a Cultural Heritage Management Plan required under recommended condition 2.

The EPA advises that the passing of the *Aboriginal Cultural Heritage Act 2021* means that it may be possible, once the guidelines and regulations under that Act are in place, for the EPA's recommended outcomes and objectives of the Cultural Heritage and Visual Amenity Management Plan to be managed under that Act to meet the EPA's objectives. The EPA has therefore recommended a condition to enable consideration of this as appropriate in the future.

Intangible heritage values

Intangible heritage values were not addressed in the Archaeological Site Verification report (LAS 2020).

In its submission dated 8 June 2021, the MAC requested that an ethnographic survey of the development envelope be conducted to identify and protect intangible Aboriginal cultural heritage and sites of ethnographic significance including ceremony, songlines and creation stories, knowledge, language, and dance (MAC 2021a). Other submitters were also concerned that sites would be isolated and site connectivity would be prevented (Strategen-JBS & G 2022).

In response to this, the ethnographic survey was undertaken on 17 December 2021 and a report produced in March 2022 (Archae-aus 2022). The survey did not locate any previously unrecorded ethnographic sites. However, the report identified an engraving 20 m outside of the survey areas with a men-only motif with deeply sensitive cultural and spiritual associations. The report also considered the entire project area to be of high cultural and heritage value to the traditional owners. The report recommended the following:

- 50 m buffer for men-only site located 20 m from the boundary of the survey areas
- the construction of a track from existing Sites 20897 to 9838
- the Circle of Elders should review the recommendations of the archaeological and ethnographic survey teams.

In consultation with the MAC the proponent has committed to exclude the 50 m buffer area for the men-only site from the disturbance footprint (Strategen JBS & G 2022). The Response to Submissions document states that the Circle of Elders has reviewed the recommendations made in the ethnographic survey report and no other actions, including requirements for further surveys, were requested other than the agreed establishment of a 50 m buffer around the men-only site.

As noted in the cultural heritage values – Aboriginal heritage sites section above, the MAC provided a letter of support for the CEMP of September 2021 (GHD 2021b) in which it considered that the changes in the CEMP of September 2021 continue to support the MAC's Aboriginal heritage requirements (MAC 2021b).

On 22 January 2022, the MAC advised that it is satisfied with the consultation undertaken by Yara in the interest of ensuring ongoing protection of Murujuga's environmental and cultural values addresses.

The EPA recognises the proponent's efforts to identify intangible heritage values, the proponent's commitment to avoid the men only site and provide a 50 m buffer, the cultural and spiritual associations identified within the development envelope and the proponent's consultation with the MAC and the Circle of Elders. The EPA has recommended a condition requiring the implementation of a Cultural Heritage and Visual Amenity Management Plan that will allow for management during construction and operation and clearly define a framework for ongoing consultation with the MAC.

The EPA advises that the passing of the *Aboriginal Cultural Heritage Act 2021* means that it may be possible, once the guidelines and regulations under that Act are in place, for the EPA's recommended outcomes and objectives of the Cultural Heritage and Visual Amenity Management Plan to be managed under that Act to meet the EPA's objectives. The EPA has therefore recommended a condition be imposed to enable consideration of this as appropriate in the future.

Restriction of access to land

The MAC raised the issue of open access to cultural sites within the development envelope to appropriate members of its community. In the Response to Submissions document the proponent indicated that the access during construction would be subject to personal safety considerations and that the operational access arrangements would include swipe card access to MAC members who have completed appropriate inductions. The proposed access during operation is consistent with the current arrangement for the existing Ammonia Plant (Strategen-JBS & G 2022).

The CEMP (GHD 2021b) does not contain management actions to facilitate access to cultural sites within the development envelope during operation or after decommissioning.

The EPA considers the access to sites within the development envelope is of importance to the people that MAC represents and should be formalised through a condition to ensure consistency with the EPA's objective for this factor. This condition requires that in consultation with MAC the proponent prepare and submit a Cultural Heritage Management Plan with the objective that, subject to reasonable health and safety requirements, traditional owner and custodian access to culturally significant areas in the development envelope is allowed during operation and following decommissioning of the proposal.

National Heritage Listed Area

A portion of the National Heritage Listed Area is located in the north-west of the proposal's development envelope (see Figure 2) and overlies the rocky outcropping. The existing Ammonia Plant avoided impact to this area by limiting construction to the southern end of the development envelope. The proponent has made a commitment to avoid the National Heritage Listed Area through an exclusion zone and a management target of no direct impacts to the area, and will implement measures to minimise, dust, vibration and fly rock if the blasting of hard rock [CEMP of September 2021 (GHD 2021b)].

The EPA considers that these measures are appropriate to maintain consistency with the EPA's objective for social surroundings. The EPA advises that avoidance and minimisation measures should be required to be implemented through a recommended condition.

World Heritage Tentative List

The values of the Murujuga Cultural Landscape, which have led to its submission to the World Heritage Tentative List, are acknowledged by the EPA. It is noted that the boundaries of the Murujuga Cultural Landscape are yet to be defined.

The EPA does not consider that this proposal will significantly add to cumulative impacts on the Murujuga Cultural Landscape through impacts to Aboriginal heritage sites and intangible heritage values. The EPA notes that the proponent would be avoiding the National Heritage Listed Area.

Conclusions

The EPA concludes that the:

1. direct impacts to Aboriginal heritage sites or the National Heritage Listed Area can be avoided through the implementation of the exclusion zones in recommended condition 2-1(1)
2. potential residual impact to cultural heritage through indirect impacts to the Aboriginal heritage sites should be subject to implementation of condition 2-2, the objective of which is to avoid and minimise indirect impacts, and condition 2-3, which requires a Cultural Heritage and Visual Amenity Management Plan
3. potential residual impact to intangible heritage values through direct impacts to the men-only site can be avoided through the implementation of condition 2-1(1) and indirect impacts will be minimised through the implementation of conditions 2-1(1) and 2-1(2)
4. potential residual impacts to the intangible heritage values identified within the development envelope will be minimised through the implementation of condition 2
5. potential access limitations to Aboriginal heritage sites on traditional owners and custodians by the implementation of the proposal presents a residual impact
6. residual impact to cultural heritage through the loss of access to, or restriction of access to Aboriginal heritage sites should be subject to conditions 2-1(2) and 2-1(3) to ensure access to sites is maintained subject to reasonable health and safety requirements
7. direct impacts to the National Heritage Listed Area by the proposal can be avoided subject to the implementation the proposed exclusion zone in recommended condition 2-1(1)
8. residual impact to cultural heritage through indirect impacts to the National Heritage Listing Area be subject to the implementation of condition 2-2(1) to avoid and minimise impacts
9. proposal is unlikely to change the World Heritage Listing of the Murujuga Cultural Landscape and the EPA has provided 'Other advice' in section 6 of this report on a strategic approach to cumulative industrial impacts.

Amenity

The existing Ammonia Plant impacts on the visual amenity of sensitive receptor areas such as Deep Gorge (Ngajarli) and Hearson Cove [See Viewpoints 3 and 4 in Referral Supporting Report, Revision 3, Appendix E (GHD 2021a)].

During the seven-day referral comment period about half of the 66 submitters raised concerns relating to the visual impact of the proposal on visited areas of Murujuga rock art.

To address this issue, the proponent commissioned a visual impact assessment which analysed the impact of the 4 m high solar PV panels on 6 viewpoints. The results of this residual visual impact assessment were provided in the Visual Considerations Report (GHD 2020a) provided as Appendix E in the proponent's Referral Supporting Report, Revision 3 (GHD 2021a). The residual visual impacts are summarised in Table 2 below.

Table 2: Predicted visual impacts¹

Viewpoint and reference location	Receptors	Residual impact
Entry into Hearson Cove Road (Viewpoint 1)	Tourists, road users, local visitors and traditional owners	Looking north-east towards the existing Ammonia Plant the solar panels would be partially behind the plant. A portion of the solar panels would be visible against the lower sections of the hill. The solar panels would be facing north and away from this view, therefore, only the back of the panels would be visible.
East on Hearson Cove Road almost directly south of the existing Ammonia Plant. (Viewpoint 2)	Tourists, local visitors and traditional owners	The proposal would be located mainly behind the existing Ammonia Plant. A portion of the solar panels and associated infrastructure would be visible to the left of the view.
Deep Gorge (Ngajarli), Murujuga National Park (Viewpoint 3)	Tourists, local visitors and traditional owners	Looking north from the highest viewpoint at the northern end of the Deep Gorge (Ngajarli) boardwalk, the existing industrial structures would generally screen views of the proposal. Most of the solar panels that would be visible would be located behind the gantry that links the existing Ammonia Plant to the west, with the Yara Pilbara Nitrates facility to the east. Some of the solar panels would also be visible to the right of the white storage tanks associated with the Yara Pilbara Fertilisers Plant. Views to the rocky hills in the background would not be interrupted.

Viewpoint and reference location	Receptors	Residual impact
Hearson Cove (Viewpoint 4)	Tourists, local visitors and traditional owners	The existing Ammonia Plant and vegetation on the dune foreshore would likely screen most if not all views to the solar farm from this location.
Murujuga National Park to the north-east of the proposal (Viewpoint 5)	Tourists, local visitors and traditional owners	The proposal is not likely to be visible from this location given the intervening terrain and vegetation in front of the existing facility.
Village Road (Viewpoint 6)	Tourists, road users, local visitors and traditional owners	Looking south from Village Road the solar panels associated with the proposal would generally be concealed from view given the intervening terrain in the foreground. However, the tops of some of the solar panels may be visible above the pipeline to the left of the view. Views toward the rocky formations associated with Deep Gorge (Ngajarli) would not be interrupted.

¹ Data sourced from Visual Considerations Report (GHD 2020a)

A submission raised concerns that the Visual Considerations Report (GHD 2020a) only included an assessment of the solar PV panels and not the renewable hydrogen plant and its associated infrastructure. The proponent provided the following information in its Response to Submissions document (Strategen-JBS & G 2022):

- the hydrogen plant and associated infrastructure will be located close to the existing Ammonia plant
- the hydrogen plant and associated infrastructure is lower than the structures of the existing Ammonia Plant. For example, the vented enclosure, the highest structure of the proposal, is 11 m compared to the structures of the existing Ammonia Plant such as the 37.5 m ammonia tank dome, the 26 m reformer building and the 36 m stack
- the view of the hydrogen plant and associated infrastructure at Deep Gorge (Ngajarli) would be obstructed by the existing Ammonia Plant
- the hydrogen plant and associated infrastructure is not likely to be seen from Hearson Cove.

The EPA considers that the proposal will contribute to industrial development in the central location of the Burrup Strategic Industrial Area on the Burrup Peninsula. The design of the PV farm and associated infrastructure in association with the landscape and vegetation obscures the proposal at Hearson Cove. Furthermore, the existing industry including the existing Ammonia Plant obscures the majority of the proposal with some views of the solar PV visible behind the existing Ammonia Plant at Deep Gorge (Ngajarli). As the solar array is relatively low lying the view of the hills behind would not be interrupted.

The EPA has also considered the circumstances in which the combined cumulative impact to visual amenity from the existing Ammonia Plant and the proposal would increase. As highlighted in Table 2 above, when they are both viewed together from the entry into Hearson Cove Road from Burrup Road and from Hearson Cove Road almost directly south from the location of both proposals, there will be an increased impact to visual amenity due to the solar panels.

The EPA notes the avoidance and minimisation measures committed to in the proponent's CEMP of September 2021 (GHD 2021b) which include the proposal design, undertaking a glint and glare assessment, the preparation of a glint and glare assessment management plan, and implementation of the recommended measures derived from the assessment.

The EPA advises that the residual impacts on visual amenity can be regulated via recommended conditions 2-2(2) and 2-3 so that the environmental outcome is consistent with the EPA's objective for social surroundings.

Conclusions

1. The EPA has concluded that there is a residual risk of indirect impacts to visual amenity.
2. The residual indirect impacts to social surroundings should be subject to the implementation of recommended conditions 2-2(2) and 2-3 to ensure the environmental outcome is likely to be consistent with the EPA's objective for this factor.

2.1.9 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal in the context of the existing Ammonia Plant (MS 586) on social surroundings. In doing so, the EPA has considered whether reasonable conditions could be imposed to ensure consistency with the EPA factor objective. The EPA's assessment findings are presented in Table 3.

The EPA has also considered the principles of the EP Act (see Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 3: Summary of assessment for social surroundings

Residual impact	Assessment finding	Recommended conditions and DMA regulation
<u>Proposal</u> Potential loss of Aboriginal heritage sites and intangible heritage values. An Archaeological Site Verification study	The EPA has concluded that direct impact to Aboriginal heritage sites can be avoided if the proposed exclusions from the development footprint (exclusion zones) are subject to the implementation of condition 1 which limits the extent of the proposal and	Regulated through recommended conditions: Condition 1 – Limits of proposal extent (development envelope and footprint)

Residual impact	Assessment finding	Recommended conditions and DMA regulation
<p>identified 18 Aboriginal heritage sites in the development envelope. Further surveys located three additional archaeological sites including a men-only site identified as having deeply sensitive cultural and spiritual associations, and the whole site as having high cultural and heritage value to the traditional owners.</p> <p><u>Context of existing Ammonia Plant (existing proposal)</u></p> <p>Under section 18 of the <i>Aboriginal Heritage Act 1972</i> the construction of the existing Ammonia Plant disturbed four sites. No additional sites will be disturbed.</p>	<p>condition 2 which defines the exclusion zones.</p> <p>There is a residual impact of indirect impact to these sites through, dust, fly rock, and vibration.</p> <p>There is a residual impact to the cultural and spiritual associations identified within the development envelope.</p> <p>Residual impact should be subject to conditions so that the environmental outcome is likely to be consistent with the EPA's objective for social surroundings.</p>	<p>Condition 2 – (Cultural Heritage and Visual Amenity) including:</p> <ul style="list-style-type: none"> – exclusion zones including the 50 m buffer around the men-only site – objective to avoid and minimise indirect impacts – the preparation of a Cultural Heritage Management Plan in consultation with the MAC.
<p><u>Proposal</u></p> <p>Potential loss of traditional owner and custodian access and connection to the Aboriginal heritage sites.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>Traditional owner and custodian access to the development envelope is currently managed via the proponent's existing Aboriginal Heritage Management Plan that they committed to develop and implement (MS 586).</p>	<p>There is a residual impact to cultural heritage through the loss of access to, or restriction of access to Aboriginal heritage sites within the development envelope.</p> <p>Residual impacts should be subject to conditions to ensure access to Aboriginal heritage sites subject to reasonable health and safety requirements. This will ensure the environmental outcome is likely to be consistent with the EPA's objective for social surroundings.</p>	<p>Regulated through recommended conditions:</p> <p>Condition 2 – (Cultural Heritage and Visual Amenity) including:</p> <ul style="list-style-type: none"> – an outcome to maintain access to sites during construction, operation and after decommissioning – Cultural Heritage and Visual Amenity Management Plan that includes measures to minimise impacts to access.
<p><u>Proposal</u></p> <p>Potential impacts to a portion of the Dampier Archipelago (including Burrup Peninsula) National Heritage Listed Area.</p>	<p>The EPA has concluded that direct impact to the National Heritage Listed Area by the proposal can be avoided subject to the implementation of recommended condition 1 which limits the extent of the proposal and condition 2 which defines the exclusion zones.</p>	<p>Regulated through recommended conditions:</p> <p>Condition 1 – Limits of proposal extent (development envelope and footprint)</p>

Residual impact	Assessment finding	Recommended conditions and DMA regulation
<p><u>Context of existing Ammonia Plant</u></p> <p>The northern end of the development envelope intersects a portion of the National Heritage Listed Area. The existing Ammonia Plant was constructed at the southern end of the development envelope and disturbance of the National Heritage Listed Area was not required.</p>	<p>There is a residual impact of indirect impact to these sites through, dust, fly rock and vibration.</p> <p>Residual impact should be subject to conditions so that the environmental outcome is likely to be consistent with the EPA's objective for social surroundings.</p> <p>See 'Other advice' in section 6 of this report on a strategic approach to cumulative industrial impacts such as the existing Ammonia Plant on Murujuga.</p>	<p>Condition 2 – (Cultural Heritage and Visual Amenity) including:</p> <ul style="list-style-type: none"> – exclusion zones – objective to avoid and minimise indirect impacts.
<p><u>Proposal</u></p> <p>Potential impacts to the values of the tentative World Heritage listing.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>The boundary for the tentative World Heritage listing area for the Murujuga Cultural Landscape is yet to be defined. However, the existing Ammonia Plant is located within the Burrup Strategic Industrial Area.</p>	<p>The EPA has concluded that the proposal will not significantly impact on values underlying the tentative World Heritage listing of the Murujuga Cultural Landscape.</p> <p>See 'Other advice' in section 6 of this report on a strategic approach to cumulative industrial impacts on Murujuga.</p>	<p>Regulated through recommended conditions:</p> <p>Condition 1 – Limits of proposal extent (development envelope and footprint)</p> <p>Condition 2 – (Cultural Heritage and Visual Amenity) including:</p> <ul style="list-style-type: none"> – exclusion zones – objective to avoid and minimise indirect impacts.
<p><u>Proposal</u></p> <p>Potential indirect impacts to visual amenity.</p> <p><u>Context of existing Ammonia Plant</u></p> <p>The existing Ammonia Plant has material impacts on visual amenity, including from places of social and cultural significance.</p>	<p>The EPA has concluded that there is a residual risk of additional impacts to visual amenity.</p> <p>The residual indirect impacts should be subject the implementation of recommended conditions to ensure the environmental outcome is likely to be consistent with the EPA's objective for this factor.</p>	<p>Regulated through recommended conditions:</p> <p>Condition 2 – (Cultural Heritage and Visual Amenity) including:</p> <ul style="list-style-type: none"> – an objective to avoid and minimise indirect impacts – the preparation of a Cultural Heritage and Visual Amenity Management Plan in consultation which includes visual amenity management.

2.2 Flora and vegetation

2.2.1 Environmental objective

The EPA environmental objective for flora and vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained*.

2.2.2 Investigations and surveys

The EPA advises the following survey was used to inform the assessment of the potential impacts to flora and vegetation:

- GHD 2020d, *Yara Pilbara Fertilisers Pty Ltd Renewable Hydrogen Project Flora and Fauna Survey*, prepared by GHD Pty Ltd on behalf of Yara Pilbara Fertilisers Pty Ltd, June 2020.

The survey was consistent with the *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016c).

2.2.3 Assessment context: existing environment

The proposal is located on the Burrup Peninsula directly adjacent to the Murujuga National Park and within the Pilbara Interim Biogeographical Region (IBRA) and the Roebourne IBRA sub-region. The Burrup Peninsula lies within the Fortescue Botanical District, which is part of the biogeographical region known as the Eremaean Botanical Province.

No flora species listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Biodiversity Conservation Act 2016* (BC Act) were recorded during the surveys. No Threatened Ecological Communities (TEC) listed under the EPBC Act or the BC Act were recorded in the survey area (GHD 2020d).

The Flora and Fauna Survey report (GHD 2020d) identified seven vegetation communities within the development envelope. The proposal will directly disturb five of these communities during construction.

The Burrup Peninsula Rock Pile Community (Priority 1) Priority Ecological Community (PEC) was recorded within the development envelope. However, it is not located within the proposal's disturbance footprint.

Three priority flora species were identified within the development envelope (GHD 2020d). These included *Terminalia supranitifolia* (Priority 3), *Vigna triodiophila* (Priority 3), and *Rhynchosia bungarensis* (Priority 4). Of the three, only *Terminalia supranitifolia* (Priority 3) is located in the proposal's disturbance footprint.

Three introduced flora species were recorded during the field surveys; buffel grass (*Cenchrus ciliaris*), Kapok bush (*Aerva javanica*), and Mimosa bush (*Vachellia farnesiana*). None of these species are Weeds of National Significance or listed as Declared Pests under the *Biosecurity and Agricultural Management Act 2007*.

2.2.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in section 3 of the referral information (GHD 2021a).

Public consultation on the proposal raised concerns about the loss of native flora during construction, some of which are rare and threatened, and the possible need for more surveys to be undertaken.

The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in section 2.2.5.

2.2.5 Potential impacts from the proposal

The proposal has the potential to impact on flora and vegetation through the:

- clearing of 21.23 ha of native vegetation within the 73 ha development envelope
- introduction and/or spread of weeds, altered fire regimes and altered surface water flow regime.

The issue raised during the public consultation about potential impacts to rare and threatened flora is considered unlikely to be material because there are no flora species listed as threatened under the EPBC Act that are known to occur on the Burrup Peninsula. Nor have any flora species listed as threatened under the BC Act been recorded on the Burrup Peninsula (GHD 2020d).

2.2.6 Avoidance measures

The proponent has designed the proposal to avoid impacts to flora and vegetation by designing the disturbance footprint to avoid:

1. the Burrup Peninsula Rock Pile Communities, Priority 1 PEC located in the north-western portion of the development envelope
2. impacts to significant vegetation and reduce the disturbance to 1 individual of a Priority flora species.

2.2.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed the following measures to minimise impacts to flora and vegetation:

1. minimise vegetation clearing through site selection and layout
2. develop and implement ground disturbance procedures for clearing within the development envelope
3. undertake a weed monitoring program to minimise existing weed populations and reduce the potential spread into adjacent land
4. vehicles and equipment access limited to designated roads/access tracks and cleared areas
5. the proposal's footprint boundary will be demarcated using appropriate visual markers prior to ground disturbing activities

6. the proposal's footprint boundary will be visually inspected and approved prior to ground disturbing activities
7. vehicles and equipment to be inspected and cleaned of soil, vegetative material and seeds on entry/exit to site
8. a quarterly weed monitoring and management program will be implemented following completion of ground disturbance activities
9. dust suppression, including the use of water carts on access roads will be implemented during construction activities as required
10. local drainage features to be considered during site design and layout and disturbance to drainage lines will be minimised where practicable.

2.2.8 Rehabilitation measures

The proponent's CEMP does not include any information on proposed rehabilitation measures.

2.2.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for flora and vegetation likely to be impacted by the proposal are locally significant vegetation communities and priority flora species.

The EPA has assessed the proposal in the context of the approved proposal (MS 586) while having regard to the combined and cumulative effect that the implementation of the approved proposal may have on flora and vegetation.

Vegetation communities

The proponent has advised the EPA that construction activities associated with the proposal will result in the clearing of about 21.23 ha of native vegetation from within the development envelope of which approximately 20.42 ha is in 'Good to Excellent' condition (DWER 2021). The 20.42 ha of vegetation in 'Good to Excellent' condition that will be cleared includes 7.90 ha of *Grevillea/Acacia* open shrubland (VT01), 10.51 ha of *Triodia* hummock grassland (VT03), 0.47 ha of *Triodia* closed hummock grassland (VT04), 1.07 ha of *Tecticornia* scattered to open low shrubland (VT05), and 0.48 ha of *Acacia* high shrubland vegetation (VT07). These vegetation communities are considered significant as they provide habitat for the conservation significant fauna species such as the Pilbara olive python which is listed as Endangered under the EPBC Act, and EPBC Act listed migratory and marine birds. These matters are considered further in section 2.3 of this report.

The proposal's disturbance footprint area of 22.94 ha includes 21.23 ha of native vegetation that will be cleared and 1.71 ha of previously disturbed (cleared) land. The combined effect of the clearing for the existing Ammonia Plant (29 ha) and the proposal will be up to 51.94 ha within the 73 ha development envelope (i.e. 71.1%).

The EPA has assessed the likely residual impacts of the proposal on vegetation communities to be significant due to their regional and local value as fauna habitat for conservation significant fauna species. The EPA advises that the significant

residual impacts can be regulated through reasonable conditions and counter-balanced by offsets so that the vegetation communities are protected, and the environmental outcome is consistent with the EPA objective for flora and vegetation.

Priority flora species

The proponent's Response to Submissions document indicates that the proposal will require the removal of one individual of *Terminalia supranitifolia* within the disturbance footprint from a total of 33 individuals that were identified within the development envelope (Strategen-JBS & G 2022). This species is known from 75 records within the Pilbara region over a range of 225 km (DBCA 2007). The majority of the known records (60) occur on the Burrup Peninsula (Strategen-JBS & G 2022).

The EPA has assessed the likely residual impacts of the proposal on *Terminalia supranitifolia* to be insignificant given the known extent of this species on the Burrup Peninsula and in the wider Pilbara region.

Conclusion

The EPA advises that the residual impacts to vegetation communities are likely to be able to be regulated through recommended conditions 1 (Extent of the development envelope and disturbance footprint), 4 (Offsets), and 6 (Decommissioning and Rehabilitation Plan) so that the environmental outcome is consistent with the EPA objective for flora and vegetation. The EPA considers that the proposal is unlikely to have a material impact on *Terminalia supranitifolia*.

2.2.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal in the context of the approved proposal (MS 586) on flora and vegetation environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can mitigate potential inconsistency with the EPA factor objective. The EPA assessment findings are presented in Table 4.

The EPA has also considered the principles of the EP Act in assessing whether the residual impacts will be consistent with its environmental factor objective (see Appendix C) and whether reasonable conditions can be imposed (see Appendix A). The EPA also had regard to its conclusions in other recent assessments, including the Perdaman Urea Project (EPA Report 1705).

Table 4: Summary of assessment for flora and vegetation

Residual impact or risk to environmental value	Assessment finding	Recommended conditions and DMA regulation
<u>Proposal</u> Clearing of 22.94 ha of native vegetation of which 20.42 ha is in 'Good to Excellent' condition.	The clearing of 'Good to Excellent' condition vegetation is likely to be significant in the context of the biological diversity and ecological integrity in the local area as it provides habitat for conservation significant fauna species.	Regulated through recommended conditions: <ul style="list-style-type: none"> Condition 1 – Limits on the extent of the proposal (development envelope and clearing within the disturbance footprint)
<u>Combined effect</u>		

<p>The proposal disturbance footprint of 22.94 ha includes 21.23 ha of native vegetation that will be cleared and 1.71 ha of previously disturbed (cleared) land. The combined effect of the existing Ammonia Plant (29 ha) and the proposal will be up to 51.94 ha within the 73 ha development envelope.</p>	<p>The significant residual impact could be counterbalanced in accordance with the <i>WA Environmental Offsets Guidelines</i>. See section 4 for consideration of offsets.</p> <p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint and the recommended conditions requiring the provision of offsets and decommissioning and rehabilitation.</p>	<ul style="list-style-type: none"> • Condition 4 – Offsets, including a contribution to the Pilbara Environmental Offsets Fund • Condition 6 – Decommissioning and rehabilitation, requiring the proposal to be decommissioned and rehabilitated in an ecologically sustainable manner.
<p><u>Proposal</u></p> <p>Removal of one individual of <i>Terminalia supranitifolia</i> (Priority 3 species) within the disturbance footprint.</p> <p><u>Combined effect</u></p> <p>No individuals of <i>Terminalia supranitifolia</i> were located within the disturbance footprint during the surveys for the existing Ammonia Plant. Therefore, the combined effect is the removal of one individual of <i>Terminalia supranitifolia</i>.</p>	<p>Unlikely to be a material impact and likely to be consistent with the EPA objective given the known extent of this species on the Burrup peninsula and in the wider Pilbara region.</p>	<p>Conditions 1, 4, and 6, as above.</p>
<p><u>Proposal</u></p> <p>Indirect impacts on the surrounding area from the introduction and spread of weeds. Surveys identified 3 weed species (*<i>Cenchrus ciliaris</i> (Buffel grass), *<i>Aerva javanica</i> (Kapok bush), and *<i>Vachellia farnesiana</i> (Mimosa bush).</p> <p><u>Combined effect</u></p> <p>Surveys for the existing Ammonia Plant identified 2 weed species s (<i>Aerva</i> and <i>Cenchrus ciliaris</i>). Therefore, the combined effect is the identification of an additional weed species within the development envelope.</p>	<p>The environmental outcome is likely to be consistent with the EPA's objective for this factor, subject to limitations on the proposal footprint and recommended conditions requiring a Terrestrial Fauna and Weed Management Plan and a Decommissioning and Rehabilitation Plan.</p>	<p>Regulated through recommended conditions:</p> <ul style="list-style-type: none"> • Condition 1 – Limits on the extent of the proposal (development envelope and clearing within the disturbance footprint) • Condition 3 – Terrestrial fauna and weed management plan • Condition 6 – Decommissioning and rehabilitation, requiring the proposal to be decommissioned and rehabilitated in an ecologically sustainable manner.

2.3 Terrestrial fauna

2.3.1 Environmental objective

The EPA environmental objective for terrestrial fauna is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.

2.3.2 Investigations and surveys

The EPA advises the following survey was used to inform the assessment of the potential impacts to flora and vegetation:

- GHD 2020d, *Yara Pilbara Fertilisers Pty Ltd Renewable Hydrogen Project Flora and Fauna Survey*, prepared by GHD Pty Ltd on behalf of Yara Pilbara Fertilisers Pty Ltd, June 2020.

The survey was mostly consistent with the *Technical guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020b). The EPA advises that field surveys for short-range endemic invertebrate fauna species were not fully consistent with the guidance. The EPA determined it could proceed with its assessment because this issue can be addressed through reasonable conditions (see section 2.3.9 in this report).

2.3.3 Assessment context – existing environment

Six broad fauna habitat types were recorded within the proposal's development envelope. Five of these fauna habitats are located within the proposal's disturbance footprint including Rocky Outcroppings, Foothills, Minor Drainage Lines, Floodplain, Sand Plain, and Waterbody (tidal flats) (GHD 2020b).

There were 113 terrestrial fauna species recorded within in the survey area during the fauna survey, including 19 mammals, 57 birds, 36 reptiles, and one amphibian.

Eight conservation significant species comprising 5 migratory / marine bird species, one bat species, one reptile species, and one mammal species were recorded during the survey (GHD 2020b).

2.3.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in section 3 of the referral information (GHD 2021a).

Public consultation on the proposal raised concerns about the loss of native fauna during construction, the potential for some fauna species that may be new to science to be located in the area, and the need for more surveys to be undertaken and potential impacts to be assessed.

The issues raised during the public consultation about the potential for some fauna species that may be new to science to be located in the area and the need for more surveys to be undertaken and potential impacts to be assessed are considered unlikely to be material because the proponent has undertaken surveys which did not

identify any species that are new to science. The habitat in this area is generally well represented across the area. The other issue raised during the public consultation about the loss of native fauna during construction has been identified by the EPA as a potential impact from the proposal in section 2.3.5 below. The EPA has also considered the management measures that the proponent will implement to minimise impacts on terrestrial fauna in section 2.3.7 below.

2.3.5 Potential impacts from the proposal

The EPA identified the following proposal activities that could impact on terrestrial fauna:

- loss of fauna habitat, including habitat for conservation significant fauna through vegetation clearing
- habitat fragmentation
- injury and/or death of fauna as a result of vehicle strike
- noise and vibration during construction and operations.

The EPA notes that the proposal's disturbance footprint avoids the Rocky Outcropping habitat located in the northern portion of the development envelope and the Sand Plain habitat situated in the southern portion of the development envelope. However, the proposal will require the clearing of 22.94 ha of native vegetation which includes:

- 18.6 ha of Foothills habitat
- 1.06 ha of Minor Drainage Line habitat
- 0.16 ha of Floodplain habitat
- 1.45 ha of Waterbody (tidal flats) habitat.

Of the above 22.94 ha of vegetation that will be cleared approximately 20.42 ha is in 'Good to Excellent' condition and consists of:

- 18.11 ha of Foothills habitat for the Pilbara olive python
- 1.06 ha of Minor Drainage Line habitat for the Pilbara olive python
- 0.16 ha of Floodplain habitat for marine and migratory bird species listed under the EPBC Act and the north-western free-tailed bat
- 1.1 ha of Waterbody (tidal flats) habitat for the Pilbara olive python, marine and migratory bird species listed under the EPBC Act, and the north-western free-tailed bat.

2.3.6 Avoidance measures

The proponent has designed the proposal to avoid impacts to fauna by configuring the disturbance footprint to avoid the Burrup Peninsula Rock Pile Communities, Priority 1 PEC and the Sand Plain habitat, and reduce disturbance to other fauna habitats and conservation significant fauna.

2.3.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed the following measures to minimise impacts to terrestrial fauna:

1. personnel and contractors to be provided with appropriate training to ensure conservation significant fauna and associated habitat are protected
2. if trenches are constructed which native fauna are unable to escape from, they will be inspected by a 'fauna spotter' on a regular basis (commencement of day shift, midday and prior to sunset)
3. if trenches are left open overnight, ramps will be established to permit native fauna to escape
4. any native fauna injured during construction or operation will be taken to a designated veterinary clinic or a nominated wildlife carer
5. dust, noise, and vibration management measures will be implemented during construction and operation
6. ground disturbing activities limited to the proposal's disturbance footprint and vehicle and equipment access will be limited to designated roads/access tracks and cleared areas
7. night-time vehicle movements during construction will be restricted where possible to minimise the potential for vehicle strikes
8. vegetation clearing to occur outside of the Pilbara olive python breeding season
9. a trapping and relocation program for conservation significant fauna will be undertaken by a qualified fauna specialist prior to clearing
10. observations of conservation significant fauna species by site personnel are to be reported to the site environment representative.

2.3.8 Rehabilitation measures

The proponent's CEMP does not include any information on proposed rehabilitation measures.

2.3.9 Assessment of impacts to environmental values

The EPA considers the key environmental values likely to be significantly impacted by the proposal are conservation significant fauna species including marine and migratory birds, Pilbara olive python, north-western free-tailed bat, western pebble-mound mouse, and short-range endemics which are likely to utilise the habitats within the development envelope that will be disturbed (GHD 2020d).

The EPA has assessed the proposal in the context of the approved proposal (MS 586) while having regard to the combined effect that the implementation of the approved proposal may have on significant terrestrial fauna and their habitats.

Listed marine and migratory birds

Marine and migratory bird species listed under the EPBC Act are expected to seasonally utilise the Waterbody (tidal flats) habitat and opportunistically utilise the

Floodplain habitat around high tide events as they provide foraging habitat for migratory shore bird species (GHD 2020d). The following species were identified as likely to utilise the Waterbody (tidal flats) and Floodplain habitats (GHD 2020d):

- caspian tern (*Hydroprogne caspia*) – Listed Marine and Migratory (International Agreements) under the BC Act and the EPBC Act
- gull-billed tern (*Gelochelidon nilotica*) – Listed Marine and Migratory (International Agreements) under the BC Act and the EPBC Act
- common sandpiper (*Actitis hypoleucos*) – Listed Marine and Migratory (International Agreements) under the BC Act and the EPBC Act
- common greenshank (*Tringa nebularia*) – Listed Marine and Migratory (International Agreements) under the BC Act and the EPBC Act
- red-necked stint (*Calidris ruficollis*) – Listed Marine and Migratory (International Agreements) under the BC Act and the EPBC Act.

The proposal will require 0.16 ha of Floodplain habitat and 1.1 ha of Waterbody (tidal flats) habitat to be cleared which is in ‘Good to Excellent’ condition. The existing Ammonia Plant required clearing of up to 11.03 ha Floodplain habitat and 8.95 ha Waterbody (tidal habitats)⁸ habitat (SKM 2001). Therefore, the combined effect of the clearing these two habitat types within the development envelope will be up to approximately 11.19 ha and 10.05 ha, respectively. The King Bay / Hearson Cove supratidal to intertidal flat area located to the south of the development envelope includes Floodplain and Waterbody (tidal habitats)⁹ habitat. The EPA has assessed there to be a significant residual risk to the listed migratory and marine bird species due to the impact on the Waterbody (tidal flats) and Floodplain habitats. This is consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014) definition of significant residual impact regarding rare and endangered animals.

The EPA advises that the significant residual impact is likely to be able to be regulated through reasonable conditions and counter-balanced by offsets so that listed migratory and marine bird species are protected; and the environmental outcome is consistent with the EPA objective for terrestrial fauna. See section 4 of this report for the EPA’s assessment of offset requirements.

Pilbara olive python

The Pilbara olive python was recorded twice during the survey, one large adult in the northern part of the development envelope and one dead juvenile (roadkill) outside the development envelope. Suitable habitat for the Pilbara olive python includes the Rocky Outcropping, Foothills, Minor Drainage Line, and Waterbody (tidal flats) habitat types. The core habitat for this species includes the Rocky Outcropping and Minor Drainage Line habitat types.

⁸ Note that the habitat types within the (SKM 2001) were adapted for comparison with the habitat types described within the GHD, 2020.

⁹ Note that the habitat types within the (SKM 2001) were adapted for comparison with the habitat types described within the GHD, 2020.

The proposal's disturbance footprint will avoid the Burrup Peninsula Rock Pile Communities, Priority 1 PEC and will only require 1.06 ha of Minor Drainage Line and 1.1 ha of Waterbody (tidal flats) habitat in 'Good to Excellent' condition to be cleared. However, approximately 18.11 ha of the Foothills habitat type in 'Good to Excellent' condition will be cleared within the proposal's disturbance footprint. Whilst the Foothills habitat type is well represented outside the development envelope and occurs over much of the Burrup Peninsula, often adjacent to rocky hills or below boulder piles (GHD 2021a and 2021b), the EPA has determined that there is a significant residual risk to the Pilbara olive python.

The proposal will impact on 20.27 ha of Pilbara olive python habitat in 'Good to Excellent' condition, and the existing Ammonia Plant may have impacted up to 12.7 ha of similar habitat. Therefore, the combined affect is approximately 32.97 ha within the development envelope.

Although the 20.27 ha of Foothills, Minor Drainage Line, Waterbody (tidal flats), and Floodplain habitat that will be cleared represents about 0.53% of the known combined extent of these habitats on the Burrup Peninsula (DWER 2021), the EPA considers that the potential impact to habitat for this conservation significant species from the proposal is a significant residual impact. This is consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014) definition of significant residual impact regarding listed fauna species.

The EPA advises that the significant residual impact is likely to be able to be regulated through reasonable conditions and counter-balanced by offsets so that the Pilbara olive python is protected, and the environmental outcome is consistent with the EPA objective for terrestrial fauna. See Section 4 of this report for the EPA's assessment of offset requirements.

North-western free-tailed bat

The north-western free-tailed bat was recorded during the survey from calls over five nights. It is likely that this species opportunistically forages within the development envelope and adjacent areas and roosts in the mangroves to the west in King Bay or to the east in the northern portion of Hearson Cove (GHD 2020d). Suitable foraging habitat for the north-western free-tailed bat includes Rocky Outcropping habitat, Floodplain habitat, and the Waterbody (tidal flats) habitat.

The proposal will not disturb the Rocky Outcropping habitat within the development envelope or the nearby mangrove communities and will only require 0.16 ha of Floodplain habitat and 1.1 ha of Waterbody (tidal flats) habitat to be cleared.

The existing Ammonia Plant may have impacted up to 19.9 ha and the proposal will impact on a further 1.26 ha of North-western free-tailed bat habitat, therefore the combined effect is approximately 21.16 ha within the development envelope.

Given that roosting habitat for the north-western free-tailed bat will not be impacted by the proposal and the relatively small area of clearing within the Floodplain and Waterbody (tidal flats) habitat types which are also found in areas adjacent to the

southern portion of the development envelope, the EPA considers that the proposal is unlikely to have a material impact on this species.

Western pebble-mound mouse

During the survey evidence of the western pebble-mound mouse was recorded via the presence of five disused and inactive mounds within the Foothills habitat in the survey area. These mounds were between about 6 months to 2+ years old and this species is considered no longer present on Murujuga (GHD 2021d). On this basis, the EPA considers that the proposal is unlikely to have a material impact on this species.

Short-range endemics (SREs)

The proponent has not undertaken a full SRE survey but has designed the proposal to avoid impacts by configuring the disturbance footprint to avoid the Burrup Peninsula Rock Pile Communities, Priority 1 PEC and the Sand Plain habitat, and reduce disturbance to other fauna habitats. Based on previous SRE surveys undertaken in the wider project area, the EPA understands that SRE species such as Camaenidae, 3 species of Pupillidae, and 1 species belonging to the Helicodiscidae family have been recorded (Cardno 2020) in habitats which will be impacted by the proposal. The EPA considers that other species of conservation value may occur on the Burrup Peninsula. Due to the limited survey information to enable the composition of the SRE fauna assemblage to be determined, there remains a residual risk of impacts to SRE species. This residual risk can be addressed through reasonable conditions to require detailed surveys for SREs before ground disturbing activities, and that the proponent must avoid impacts on SREs unless it can be demonstrated that it is reasonably likely any affected SRE populations are outside the development envelope in an area which is not under threat. The EPA notes that habitat within the disturbance areas is represented outside the development envelope.

Conclusion

The EPA advises that the residual impacts to marine and migratory bird species listed under the EPBC Act, the Pilbara olive python, and conservation significant SRE species are likely to be able to be regulated through recommended conditions 1 (Limits on the extent of the development envelope and disturbance footprint), 3 (Fauna Management Plan), 4 (Offsets), and 6 (Decommissioning and Rehabilitation Plan) so that the environmental outcome is consistent with the EPA objective for terrestrial fauna. The EPA considers that the proposal is unlikely to have a material impact on the north-western free-tailed bat and the western pebble-mound mouse.

2.3.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on terrestrial fauna environmental values in the context of the existing Ammonia Plant approved under MS 586. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can mitigate potential inconsistency with the EPA factor objective. The EPA assessment findings are presented in Table 5.

The EPA has also considered the principles of the EP Act in assessing whether the residual impacts will be consistent with its environmental factor objective (see Appendix C) and whether reasonable conditions can be imposed (See Appendix A).

The EPA has also had regard to its conclusions in other recent assessments, including the Perdaman Urea Project (EPA Report 1705).

Table 5: Summary of assessment for terrestrial fauna

Residual impact or risk to environmental value	Assessment finding	Recommended conditions and DMA regulation
<p><u>Proposal</u></p> <p>Clearing of 1.26 ha [0.16 ha of Floodplain habitat and 1.1 ha of Waterbody (tidal flats)] of EPBC Act and BC Act listed marine and migratory bird habitat in 'Good to Excellent' condition.</p> <p><u>Combined effect</u></p> <p>The combined effect (existing Ammonia Plant and proposal) of clearing Floodplain habitat and Waterbody (tidal flats) habitat types will be up to approximately 11.19 ha and 10.05 ha respectively within the 73 ha development envelope.</p>	<p>The residual impact on 1.26 ha of EPBC Act listed marine and migratory bird habitat is likely to be significant.</p> <p>Due to remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in accordance with the <i>WA Environmental Offsets Guidelines</i>.</p>	<p>Regulated through recommended conditions:</p> <ul style="list-style-type: none"> Condition 1 – Limits of proposal extent (development envelope and footprint). Condition 3 – Terrestrial fauna management, including: <ul style="list-style-type: none"> outcomes and objectives Fauna Management Plan monitoring, contingency measures and reporting requiring the Murujuga Aboriginal Corporation be consulted by the proponent when it submits and reviews the Fauna Management Plan. Condition 4 – Offsets, including contribution to the Pilbara Environmental Offsets Fund. Condition 6 – Decommissioning and rehabilitation, including Decommissioning and Rehabilitation Plan.
<p><u>Proposal</u></p> <p>Clearing of 20.27 ha [18.11 ha of Foothills, 1.06 ha of Minor Drainage Line, and 1.1 ha of Waterbody (tidal flats)] of Pilbara olive python habitat in 'Good to Excellent' condition.</p>	<p>The residual impact on Pilbara olive python habitat (20.27 ha) is likely to be significant.</p> <p>Due to remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in</p>	<p>Conditions 1, 3, 4, and 6 as above.</p>

Residual impact or risk to environmental value	Assessment finding	Recommended conditions and DMA regulation
<p><u>Combined effect</u></p> <p>The combined effect (existing Ammonia Plant and proposal) on Pilbara olive python habitat is approximately 32.97 ha within the development envelope.</p>	<p>accordance with the <i>WA Environmental Offsets Guidelines</i>.</p> <p>The environmental outcome is likely to be consistent with the EPA's objectives for this factor, subject to limitations on the proposal footprint and the recommended conditions requiring implementation to achieve outcomes and objectives, management of key threats, associated monitoring and reporting, and decommissioning and rehabilitation.</p>	
<p><u>Proposal</u></p> <p>Unlikely to have a material impact on the north-western free-tailed bat.</p> <p><u>Combined effect</u></p> <p>The combined effect (existing Ammonia Plant and proposal) on the habitat for this species is approximately 21.16 ha within the development envelope.</p>	<p>The roosting habitat for this species will not be directly disturbed by construction activities. Only a small area of suitable foraging habitat will be cleared. The EPA considers that the proposal is unlikely to have a material impact on the north-western free-tailed bat.</p> <p>Likely to be consistent with the EPA's objective for this factor if conditions which will protect other fauna and habitat are implemented.</p>	Conditions 1, 3, 4, and 6 as above.
<p><u>Proposal</u></p> <p>Unlikely to have a material impact on the western pebble-mound mouse.</p>	<p>The EPA considers that the proposal is unlikely to have a material impact on the western pebble-mound mouse.</p> <p>Likely to be consistent with the EPA's objective for this factor if conditions which will protect other fauna and habitat are implemented.</p>	Conditions 1, 3, 4, and 6 as above.
<p><u>Proposal</u></p> <p>Potential risk of impacts to SREs.</p>	<p>There is a risk of impacts to SRE species. Likely to be consistent with the EPA's objective for this factor if a condition requiring avoidance of impacts to all SRE species unless they are found outside the development envelope.</p> <p>In addition, the proposal should be subject to limitations on the proposal's footprint and the recommended conditions requiring implementation to achieve outcomes and objectives, management of key threats, associated monitoring and reporting, and decommissioning and rehabilitation.</p>	<p>Condition 3-1 (5) – requiring avoidance of SREs not found outside the development envelope.</p> <p>Condition 3-3 (2) – requiring a suitable survey for SREs.</p> <p>Conditions 1, 3, 4, and 6 as above.</p>

3 Holistic assessment

While the EPA assessed the impacts of the proposal against the key environmental factors and environmental values individually in the key factor assessments above, given the link between social surroundings, flora and vegetation, and terrestrial fauna, the EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole environment.

The EPA's evaluation of other environmental factors (that is, those which were not considered key factors for assessment) is included in Appendix D. Figure 4 below illustrates the connections and interactions between the key environmental factors to inform the EPA's holistic assessment.

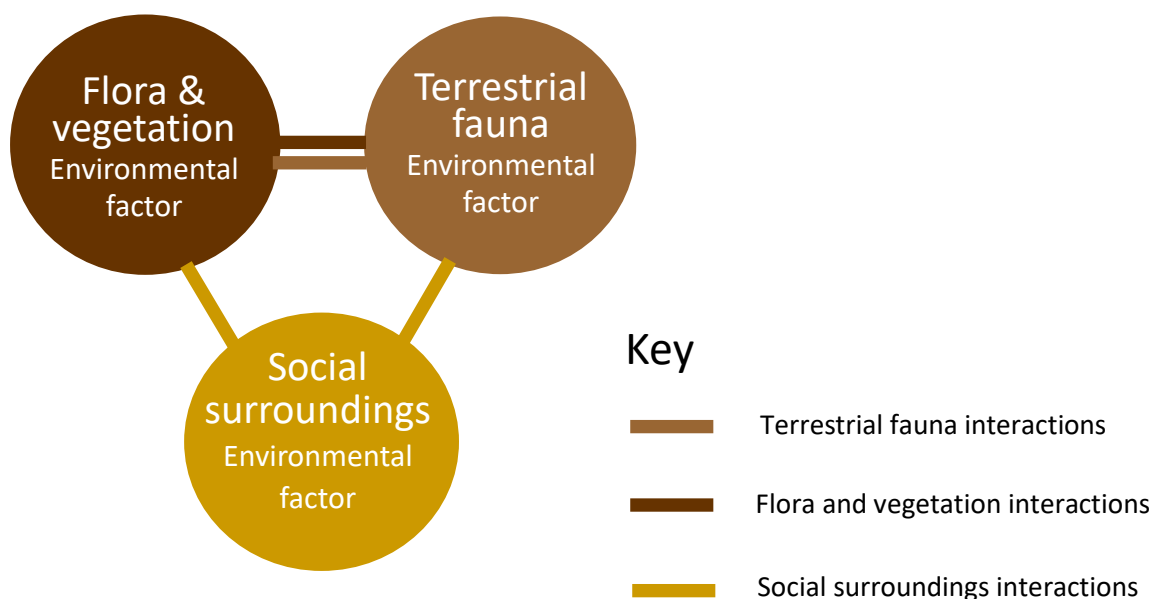


Figure 4: Intrinsic interactions between environmental factors

Social surroundings

Intangible heritage values, including traditional Aboriginal customs, directly link to the physical or biological aspects of the environment. This may include, for example, traditional hunting activities for native fauna that has been recorded on rock art. The impact assessment considered the strong connection of the traditional owners and custodians to the land, and the potential impacts to flora, vegetation and terrestrial fauna as a result of this proposal on this connection.

The EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to social surroundings will also mean the inter-related impacts to other factors of the environment including the values associated with flora and vegetation and terrestrial fauna are likely to be consistent with the EPA environmental factor objectives.

The EPA has also recommended conditions where the proponent will be required to consult with the traditional owners and custodians regarding proposed management plans which protect social surroundings, flora and vegetation and terrestrial fauna.

Flora and vegetation and terrestrial fauna

The proposal will clear 22.94 ha of native vegetation including five locally significant vegetation communities (DWER 2021) and 20.42 ha of 'Good to Excellent' condition foraging habitat for EPBC Act and BC Act listed fauna species including migratory / marine birds and the Pilbara olive python.

Furthermore, clearing native vegetation and fauna habitat has the potential to change the relationship traditional owners hold with country.

The impact on flora and vegetation and terrestrial fauna is assessed as being significant and is required to be counterbalanced through the provision of offsets.

The EPA considers that the proposed mitigation measures and recommended conditions for impacts to flora and vegetation and terrestrial fauna will also mean that the impacts to the other factors of the environment including the values associated social surroundings are likely to be consistent with the EPA's environmental factor objectives.

Summary of holistic assessment

The EPA recognises that Murujuga is an area of exceptional conservation and heritage value. The EPA is also aware of the potential for industry including the existing Ammonia Plant and other activities located within Murujuga to influence the complex interactions between environmental factors. These interactions have the potential to influence the environment in a holistic and non-linear nature, affecting all environmental values which are physically and intrinsically linked to social surroundings and specifically cultural heritage.

When the separate environmental factors and values affected by the proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the proposal would not alter the EPA's views about consistency with the EPA's factor objectives as assessed in section 2.

The EPA has recommended that a condition be imposed on the proponent to submit an Environmental Performance Report to the Minister and the MAC every five years which details the proposal's impacts on the state of flora and vegetation, terrestrial fauna, social surroundings including cultural heritage and visual amenity, and the holistic environment.

4 Offsets

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal.

Consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014), the EPA may consider the application of environmental offsets to a proposal where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

The EPA considers that the clearing of native vegetation and impacts on other associated environmental values in the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion is significant where the cumulative impact may reach critical levels if not managed. The proposal is located within the Roebourne IBRA subregion of which only 3.45% is currently reserved for conservation.

In its advice on cumulative impacts in the Pilbara (EPA 2014), the EPA considered that without intervention, the increasing cumulative impacts of development and land use in the Pilbara region will significantly impact on biodiversity and environmental values.

In the case of this proposal, likely significant impact is the:

- clearing of 20.42 ha of 'Good to Excellent' condition native vegetation including foraging habitat for EPBC Act and BC Act listed migratory / marine birds and the Pilbara olive python.

The EPA notes that the proponent has not proposed to provide offsets to account for the vegetation clearing associated with the proposal.

However, the EPA has concluded that the vegetation clearing is significant on its own and in the context of the existing Ammonia Plant, and in the context of the biological diversity and ecological integrity in the local area as it provides habitat for conservation significant fauna species.

Due to the remaining quantity and quality of habitat types in the local area and region, the significant residual impact could be counterbalanced in accordance with the *WA Environmental Offsets Guidelines* by a contribution to the Pilbara Environmental Offsets Fund.

The EPA recommends that condition 4 in Appendix A be imposed on the proponent to provide an offset in the form of a contribution to the Pilbara Environmental Offsets Fund (PEOF) to counterbalance the significant residual impacts of the proposal.

5 Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values likely to be significantly affected by the proposal
- residual impacts, and effects in relation to the key environmental factors, separately and holistically (this has included considering cumulative impacts on heritage and cultural values within and from the Burrup Strategic Industrial Area)
- EPA's confidence in the proponent's proposed mitigation measures
- the likely environmental outcomes (and taking into account the EPA's recommended conditions), and the consistency of these outcomes with the EPA's objectives for the key environmental factors
- consistency of environmental outcomes with the EPA's objectives for the key environmental factors
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the EP Act.

The EPA recommends that the proposal may be implemented subject to the recommended conditions in Appendix A.

6 Other advice

The EPA is aware of the potential for industry and other activities located within Murujuga to impact on the Murujuga marine and terrestrial environments, and further that these issues are beyond the control of any one proponent or agency.

The EPA is committed to supporting the Australian Government, the Western Australian Government and the MAC to achieve a World Heritage listing formally recognising the long-term, ongoing protection and conservation of the values of the Murujuga Cultural Landscape.

This advice is provided to inform the regulatory management framework to contribute to the future integrated governance arrangements for the holistic protection of the international, national, state, and local values of Murujuga.

The EPA notes that the legal management of Murujuga, through the Burrup and Maitland Industrial Estates Agreement (BMIEA), is the responsibility of both the MAC and the Western Australian Government who engage with the Commonwealth, State and local government agencies and other organisations to ensure effective management and conservation arrangements are in place¹⁰.

The EPA notes that the State Government is committed to protecting the Murujuga Cultural Landscape and considers that the unique Aboriginal culture and heritage values of Murujuga can continue to co-exist with well-regulated industry¹¹. The EPA understands that the maintenance of appropriate and effective management and conservation measures are critical to the success of the World Heritage Nomination. The EPA acknowledges the role that the MAC and the State Government have in establishing appropriate and effective management and conservation measures relevant to Murujuga that is critical to the success of the World Heritage Nomination.

The EPA acknowledges the many individual management arrangements that are in place including, but not limited to, the establishment of the Murujuga National Park, the twenty eight islands vested in the Conservation and Parks Commission of Western Australia and associated management planning under the *Conservation and Land Management Act 1984*, the BMIEA (2003) and various Australian Government signed Conservation Agreements with Rio Tinto and Woodside Energy Ltd to protect and research the National Heritage Values of the Dampier Archipelago.

In addition, the following legislation provides further management and protection of the Murujuga Cultural landscape:

¹⁰ State of Western Australian, Western Australian Land Authority and Contracting Parties (2002) Burrup and Maitland Industrial Estates Agreement)

¹¹ Department of Biodiversity Conservation and Attractions and the Department of Water and Environmental Regulation (2020). *Draft DBCA and DWER Communication and Engagement Strategy for the Murujuga World Heritage Nomination and the Murujuga Rock Art Strategy*.

- *Aboriginal Heritage Act 1972 (WA)*¹²
- *Heritage Act 2018 (WA)*
- *Environmental Protection Act 1986 (WA)*
- *Conservation and Land Management Act 1984 (WA)*
- *Environmental Protection and Biodiversity Conservation Act 1999 (Cwth)*
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cwth)*.

The Murujuga Rock Art Strategy (DWER 2019), which is currently being implemented by the DWER, establishes a framework for the long-term management and monitoring of environmental quality to protect Murujuga's petroglyphs from impacts of industrial emissions. Environmental quality criteria standards are scheduled to be available mid-2023. To support the Murujuga Rock Art Strategy, the DWER's Study of the Cumulative Impacts of Air Emissions in the Murujuga Airshed (Ramboll 2021) will inform the Murujuga Rock Art Monitoring Program and the establishment of the Murujuga Ambient Air Quality Monitoring Network. The Study will also inform current and future industrial development proposals that are located within the Murujuga airshed.

To support the existing measures to manage impacts to Murujuga, the EPA considers that there is a need for government to establish an overarching and Strategic Environmental Management Framework (e.g. an Environmental Protection Policy under Part III of the EP Act) to strategically manage the potential for cumulative effects on the marine environment and airshed of Murujuga.

The EPA considers that an overarching strategic approach to managing the Murujuga marine environment and airshed would provide a mechanism building on the existing management instruments, strategically protecting the marine and air environment and cultural values (including ethnographic values) from cumulative effects.

In the meantime, the EPA notes that there is likely to be lack of a consensus about whether any further industrial development which may affect the Murujuga can proceed in a way which is consistent with the EPA's objectives until the strategic environmental management framework is in place.

The EPA took the above into account when undertaking its assessment in the context of the existing Ammonia Plant. Consistent with its conclusion in Report 1648, the EPA recommends that a section 46 inquiry may be initiated to require the EPA to review whether the existing conditions in MS 586 require additional measures for the existing Ammonia Plant to reduce the risk of cumulative impacts to rock art from air emissions. This could occur before or after the Murujuga Rock Art Strategy is complete.

In making this recommendation, the EPA notes that:

¹² the *Aboriginal Cultural Heritage Act 2021* received Royal Assent on 22 December 2021. This Act will replace the *Aboriginal Heritage Act 1972* after a transitional period during which regulations and statutory guidelines and operational policies will be developed.

- This is not inconsistent with a section 46 inquiry undertaken at the request of the proponent in relation to the existing Ammonia Plant in respect of greenhouse gas emissions (see Appendix D of this report).
- While air emissions were removed from MS 586 in 2015 on the basis they could be regulated under Part V of the *Environmental Protection Act 1986*, a section 46 inquiry would be able to consider the likely environmental outcomes, and consistency with current EPA objectives, of ongoing air emissions from the proposal.
- While there are currently no appropriate air quality standards which could be used to inform an inquiry into whether there are additional measures that the proponent could take to reduce the risk of cumulative impacts to rock art, the outcomes from the Murujuga Rock Art Monitoring Program are expected to provide this information. The program will include current and future industrial development proposals that are located within the Murujuga airshed, including the existing Ammonia Plant.
- Environmental quality criteria standards from the MRAS are scheduled to be available mid-2023.
- A section 46 inquiry will ensure air emissions are considered for the remaining life of the Ammonia Plant.

The EPA further notes that the Department of Jobs, Tourism, Science and Innovation is seeking to facilitate an ethnographic survey of cultural values within Murujuga which extends beyond the proposal's development envelope.

The EPA recognises that the MAC are the custodians of Murujuga and it supports the MAC in working in partnership with industry in the Burrup and Maitland Strategic Industrial Estates to establish beneficial offset projects.

The existing Ammonia Plant discharges into King Bay via the Water Corporation's Multi-User Brine Return Line (MUBRL) ocean outfall which was approved under Ministerial statements 567 and 594 in 2001 and 2002, respectively. The EPA notes that the proposal will increase current through put of the desalination plant. The desalination plant has an authorised discharge capacity of 208 ML/day which the proposal will not exceed (Strategen JBS & G 2022). The EPA recommends that a review of implementation conditions in Ministerial statements 567 and 594 may be required to ensure adequate management measures are in place to protect the marine environmental quality values of King Bay, Mermaid Sound, and Murujuga.

The EPA notes that the City of Karratha will assess the proposal under the provisions of the Planning and Development (Local Planning Schemes) Regulations 2015 in the assessment of the Development Approval, particularly with respect to the management of traffic, engineering and heritage (visual amenity).

The EPA considers that the values of the Sea and Country of Murujuga and its surrounds are unique environmental assets of global significance that require a cautious approach. The EPA notes future activities and developments should assess compatibility with the protection of key values in Murujuga and its surrounds. The EPA considers that there is an opportunity to strengthen the protection of Murujuga

through avoidance of activities and development proposals that could use alternative locations for example in the Maitland Industrial Estate. The EPA will scrutinise activities and future proposals that impact upon key values of significance.

Appendix A: Recommended conditions

Section 44(2) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This appendix contains the EPA's recommended conditions and procedures.

STATEMENT THAT A SIGNIFICANT AMENDMENT TO AN APPROVED PROPOSAL MAY BE IMPLEMENTED (*Environmental Protection Act 1986*)

AMMONIA PLANT, MURUJUGA (BURRUP PENINSULA), RENEWABLE HYDROGEN PROJECT

Proposal: The proposal is to amend the existing Ammonia Plant project to include the development of a Renewable Hydrogen Plant and associated infrastructure. The proposal is located 11 kilometres (km) north-west of Karratha, in the Pilbara region of Western Australia

Proponent: Yara Pilbara Fertilisers Pty Ltd
Australian Company Number: 095 441 151

Proponent Address: Level 5, 182 St Georges Terrace
PERTH WA 6000

Assessment Number: 2274

Report of the Environmental Protection Authority: 1722

Previous Assessment Number: 1370

Previous Report of the Environmental Protection Authority: 1036

Previous Statement Number: 586

Pursuant to section 45, read with section 45A of the *Environmental Protection Act 1986* (EP Act), it has been agreed that:

1. the significant amendment to the approved Proposal as described and documented in section 2 of the proponent's section 38 Referral Supporting Report (GHD 2020a) may be implemented;
2. this Statement only applies to the significant amendment to the approved Proposal pursuant to section 40AA(6)(a) of the EP Act; and
3. the implementation of the significant amendment to the approved Proposal, is subject to the following implementation conditions and procedures:

1 Limitations and Extent of Proposal

When implementing the proposal, the proponent shall ensure the proposal does not exceed the following extents:

Proposal element	Location	Maximum extent or range
Physical elements		
Development envelope	Figures 1, 2, and 3.	73 ha
Disturbance footprint	Figures 2 and 3.	22.94 ha (which includes 21.23 ha of vegetation and 1.71 ha that has been previously cleared)
Timing elements		
Project life		Up to 20 years from date of this Statement

2 Cultural Heritage and Visual Amenity

2-1 The proponent shall implement the proposal to meet the following outcomes:

- (1) avoid direct disturbance of Aboriginal Heritage sites located in the exclusion zones within the development envelope that are shown in Figure 3;
- (2) subject to reasonable health and safety requirements, allow traditional owner and custodian access and connection to culturally significant areas within and surrounding the development envelope; and
- (3) allow traditional owner and custodian access to the development envelope following decommissioning of the proposal.

2-2 The proponent shall implement the proposal to meet the following objectives:

- (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**.

2-3 At least one (1) month prior to **ground disturbing activities**, the proponent shall, in consultation with the Murujuga Aboriginal Corporation and the **DPLH**, prepare and 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 and this plan shall:

- (1) specify the objectives to be achieved, as specified in condition 2-2;

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- (2) include a framework for consultation with traditional owners and custodians via the Murujuga Aboriginal Corporation and other relevant stakeholders during the life of the proposal;
 - (3) specify construction environmental management activities relevant to cultural heritage, not limited to and including noise, vehicle emissions and provide for relevant traditional owners and custodians to be invited to observe any **ground disturbing activities** during construction and take reasonable steps to facilitate the observation of those activities by those persons;
 - (4) specify operational environmental management activities relevant to cultural heritage and visual amenity;
 - (5) specify management actions that will be implemented to demonstrate compliance with the outcomes specified in condition 2-1 and the objectives specified in condition 2-2;
 - (6) specify measurable management target(s) to determine the effectiveness of the management actions;
 - (7) specify monitoring to measure the effectiveness of management actions against management targets;
 - (8) specify a process for revision of management actions and changes to activities, in the event that the outcomes, objectives, and management targets are not achieved and such process must include an investigation to determine the cause of the outcome, objective or management target(s) not being met;
 - (9) provide the format and timing to demonstrate that conditions 2-1, 2-2, and 2-3 have been met for the reporting period in the Compliance Assessment Report required by condition 8-6 including, but not limited to:
 - (a) verification of the implementation of management actions; and
 - (b) reporting on the effectiveness of management actions against the outcomes, objectives, and management target(s).
- 2-4 The proponent must not commence **ground disturbing activities** until the CEO confirmed in writing that the plan submitted under condition 2-3 satisfies the requirements of condition 2-3.
- 2-5 The proponent must implement the most recent version of the **confirmed** Cultural Heritage and Visual Amenity Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated the
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outcomes specified in condition 2-1 and objectives in condition 2-2 have been met, or are able to be met under another statutory decision-making process.

2-6 In the event that monitoring, tests, surveys or investigations indicate non-achievement of outcomes specified in condition 2-1 or management target(s) specified in the **confirmed** Cultural Heritage and Visual Amenity Management Plan, the proponent must:

- (1) report the non-achievement in writing to the **CEO**, the Murujuga Aboriginal Corporation, the **DPLH**, and the **Registrar of Aboriginal Sites** within twenty-one (21) days of the non-achievement being identified;
- (2) investigate to determine the cause of the outcome or management target(s) not being achieved;
- (3) provide a further report to the **CEO**, the Murujuga Aboriginal Corporation, the **DPLH**, and the **Registrar of Aboriginal Sites** within ninety (90) days of the non-achievement being reported as required by condition 2-7(1) which must include:
 - (a) a description of the cause of outcome or management target(s) being exceeded if known, or analysis of likely causes if not known;
 - (b) the findings of the investigation required by condition 2-6(2);
 - (c) details of revised and/or additional management actions to be implemented to prevent non-achievement; and
 - (d) relevant changes to activities.

2-7 In the event that monitoring, tests, surveys or investigations indicate that one or more management action(s) specified in the **confirmed** Cultural Heritage and Visual Amenity Management Plan have not been implemented, the proponent must:

- (1) report the failure to implement the management action(s) in writing to the **CEO**, the Murujuga Aboriginal Corporation, the **DPLH**, and the **Registrar of Aboriginal Sites** within seven days of identification;
- (2) investigate to determine the cause of the management action(s) not being implemented;
- (3) investigate to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management action(s);

- (4) provide a further report to the **CEO**, the Murujuga Aboriginal Corporation, the **DPLH**, and the **Registrar of Aboriginal Sites** within twenty-eight (28) days of the non-compliance being identified, which must include:
 - (a) cause for failure to implement management action(s);
 - (b) the findings of the investigation required by condition 2-7(2);
 - (c) relevant changes to activities; and
 - (d) measures to prevent, control or abate the environmental harm which may have occurred.
- 2-8 Without limiting condition 2-5 (implementation of the plan) and notwithstanding compliance with condition 2-6 (response to exceedance), the proponent must not cause or allow:
 - (1) a failure to implement one or more management actions specified in the **confirmed** Cultural Heritage and Visual Amenity Management Plan, and/or
 - (2) failure to comply with the requirements of the **confirmed** Cultural Heritage and Visual Amenity Management Plan.
- 2-9 The proponent, in consultation with the Murujuga Aboriginal Corporation:
 - (1) may review and revise the **confirmed** Cultural Heritage and Visual Amenity Management Plan and submit it to the CEO; and
 - (2) shall review and revise the **confirmed** Cultural Heritage and Visual Amenity Management Plan and submit it to the **CEO** as and when directed by the **CEO**.

3 Terrestrial Fauna and Weed Management

- 3-1 The proponent shall implement the proposal to meet the following environmental outcomes:
 - (1) clearing in the fauna habitat type identified as Foothills shall not exceed 18.6 ha;
 - (2) clearing in the fauna habitat type identified as Minor Drainage Lines shall not exceed 1.06 ha;
 - (3) clearing in the fauna habitat type identified as Floodplain shall not exceed 0.16 ha;
 - (4) clearing in the fauna habitat type identified as Waterbody (tidal flats) shall not exceed 1.45 ha; and

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- (5) impacts to short-range endemic fauna species are avoided, unless it is demonstrated and the **CEO** confirms in writing that it is reasonably likely that a population of the species occurs outside the development envelope in an area not under threat.
- 3-2 The proponent shall implement the proposal to achieve the following environmental objectives:
- (1) avoid where possible and otherwise minimise direct and indirect impacts to EPBC Act and BC Act listed migratory / marine birds and the Pilbara olive python within the development envelope; and
 - (2) no introduction of weeds into the development envelope, and no increase in the abundance or distribution of existing weeds within or outside the development envelope.
- 3-3 At least one (1) month prior to **ground disturbing activities** within the development envelope delineated in Figure 2, or such lesser time approved in writing by the **CEO**, the proponent shall, in consultation with the Murujuga Aboriginal Corporation submit to the **CEO** a Terrestrial Fauna and Weed Management Plan which shall:
- (1) demonstrate how the environmental outcomes in condition 3-1 and environmental objectives in condition 3-2 will be achieved;
 - (2) include details of the outcomes of a detailed short-range endemic fauna survey undertaken within the development envelope and surrounding region prior to **ground disturbing activities**;
 - (3) include provisions to avoid where practicable and otherwise minimise impacts to significant terrestrial fauna species, including short-range endemic fauna and migratory and marine birds, including, but not limited to, impacts from:
 - (a) clearing of habitat;
 - (b) lighting;
 - (c) noise and vibration;
 - (d) dust;
 - (e) vehicle and machinery movement strike;
 - (f) entrapment in trenches or ponds;
 - (g) the attraction of feral animals;
 - (h) fire; and
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- (i) the introduction and spread of weeds;
 - (4) provide for relevant traditional owners to be invited to observe any **ground disturbing activities** during construction, and take reasonable steps to facilitate the observation of those activities by those persons;
 - (5) specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent direct or indirect impacts to significant terrestrial fauna species, including short-range endemic fauna and migratory and marine birds;
 - (6) specify threshold criteria to demonstrate compliance with conditions 3-1 and 3-2;
 - (7) specify monitoring methodology to determine if trigger criteria and threshold criteria have been met;
 - (8) specify management and/or contingency actions to be implemented if the trigger criteria required by condition 3-3(5) and/or the threshold criteria required by condition 3-3(6) have not been met; and
 - (9) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that conditions 3-1 and 3-2 have been met over the reporting period in the Compliance Assessment Report required by condition 8-6.
- 3-4 The proponent must not commence **ground disturbing activities** until the **CEO** has confirmed in writing that the Fauna Management Plan satisfies the requirements of condition 3-3.
- 3-5 The proponent shall implement the most recent versions of the **confirmed** Fauna Management Plan until the **CEO** has confirmed by notice in writing that the proponent has demonstrated that the environmental outcomes in condition 3-1 and objective detailed in condition 3-2 have been met.
- 3-6 In the event that the environmental outcomes in condition 3-1 are exceeded, or monitoring or investigations at any time indicate an exceedance of threshold criteria specified in the **confirmed** Fauna Management Plan, the proponent shall:
- (1) report the exceedance in writing to the **CEO** within seven (7) days of the exceedance being identified;
 - (2) implement the management and/or contingency actions required by condition 3-3(8) within seven (7) days of the exceedances being reported as required by condition 3-6(1) and continue implementation of those actions until the **CEO** has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and

implementation of the management and/or contingency actions are no longer required;

- (3) investigate to determine the cause of the threshold criteria being exceeded;
- (4) investigate to provide information for the **CEO** to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded;
- (5) provide a further report to the **CEO** within twenty-one (21) days of the exceedance being reported as required by condition 3-6(1) which report shall include:
 - (a) details of management and/or contingency actions implemented;
 - (b) the effectiveness of the management and/or contingency actions implemented against the threshold criteria;
 - (c) the findings of the investigations required by conditions 3-6(3) and 3-6(4);
 - (d) measures to prevent the threshold criteria being exceeded in the future;
 - (e) measures to prevent, control or abate the environmental harm which may have occurred; and
 - (f) justification of the threshold criteria remaining, or being adjusted based on better understanding, demonstrating that outcomes will continue to be met.

3-7 Without limiting condition 3-5 (implementation of the plans) and notwithstanding compliance with condition 3-6 (response to exceedance), the proponent must not cause or allow:

- (1) a failure to implement one or more management and/or contingency actions, if the relevant threshold criteria have been exceeded;
- (2) the exceedance of a threshold criteria (regardless of whether the relevant management and/or contingency actions have been or are being implemented); and/or
- (3) a failure to comply with the requirements of the **confirmed** Fauna Management Plan.

3-8 The proponent, in consultation with the Murujuga Aboriginal Corporation:

- (1) may review and revise the **confirmed** Fauna Management Plan and submit it to the **CEO**; and
- (2) shall review and revise the **confirmed** Fauna Management Plan and submit it to the **CEO** as and when directed by the **CEO**.

4 Offsets

4-1 The proponent shall contribute funds to the **Pilbara Environmental Offsets Fund**, (for the implementation of offset projects preferably located in Murujuga) calculated pursuant to condition 4-2, to counterbalance the significant residual impacts to:

- (1) 'Good' to 'Excellent' condition native vegetation, including foraging habitat for EPBC Act and BC Act listed migratory / marine birds and the Pilbara olive python.

4-2 The proponent's provisional contribution to the **Pilbara Environmental Offsets Fund** shall be paid after the conclusion of the biennial reporting period specified in conditions 4-5(4) and 4-5(5), with the provisional amount to be contributed calculated based on the clearing undertaken during that biennial reporting period in accordance with the highest applicable rate specified in condition 4-3 for the relevant type of vegetation.

4-3 Calculated on the 2020–2021 financial year, the contribution rate is:

- (1) \$1,679 AUD (excluding GST) per hectare of 'Good to Excellent' condition native vegetation, including foraging habitat for EPBC Act and BC Act listed migratory and marine birds and the Pilbara olive python, cleared for the proposal within the Roebourne IBRA subregion within that financial year.

4-4 The rate in condition 4-3 changes annually each subsequent financial year in accordance with the percentage change in the **CPI** applicable to that financial year.

4-5 The proponent must prepare and submit a Yara Pilbara Fertilisers Pty Ltd Impact Reconciliation Procedure to the **CEO** prior to the **ground disturbing activities** which must:

- (1) spatially define the environmental value(s) identified in condition 4-1;
- (2) spatially define the areas in respect of which offsets required by condition 4-1 are to be calculated;
- (3) include a methodology to calculate the amount of clearing undertaken during each year of the biennial reporting period for each of the environmental values identified in conditions 4-3(1) and (2);

- (4) state that the clearing calculation for the first biennial reporting period will commence from the first date of **ground disturbing activities** in accordance with condition 4-2 and end on the second 30 June following the commencement of **ground disturbing activities**;
 - (5) state that clearing calculations for each subsequent biennial reporting period will commence on 1 July of the required reporting period, unless otherwise agreed by the **CEO**;
 - (6) indicate the timing and content of the Impact Reconciliation Reports; and
 - (7) be prepared in accordance with *Instructions on how to prepare Environmental Protection Act 1986 Part IV Impact Reconciliation Procedures and Impact Reconciliation Reports* (or any subsequent revisions).
- 4-6 The proponent must not commence **ground disturbing activities** until the **CEO** has confirmed by notice in writing that the Impact Reconciliation Procedure satisfies the requirements of condition 4-5.
- 4-7 The proponent:
- (1) may review and revise the **confirmed** Impact Reconciliation Procedure; or
 - (2) shall review and revise the **confirmed** Impact Reconciliation Procedure as and when directed by the **CEO** by a notice in writing.
- 4-8 The proponent shall submit Impact Reconciliation Reports in accordance with the **confirmed** Impact Reconciliation Procedure.
- 4-9 Despite payment of the provisional contribution, the proponent's liability to make a contribution under this condition shall be finally determined:
- (1) by the Minister upon application by the proponent in writing to the Minister to reduce in part or whole the proponent's liability under this condition where:
 - (a) a payment has been made to satisfy a condition of an approval under the EPBC Act in relation to the proposal; and/or
 - (b) the payment is made for the purpose of counterbalancing impacts of the proposal on matters of national environmental significance identified in condition 4-1; or
 - (2) to be equivalent to the provisional contribution if no application of the kind described in condition 4-9(1) is made within twelve (12) months of the conclusion of the relevant biennial reporting period.

5 Environmental Performance Report

- 5-1 The proponent shall submit an Environmental Performance Report to the Minister and the Murujuga Aboriginal Corporation every five (5) years.
- 5-2 The first Environmental Performance Report shall be submitted within three (3) months of the expiry of the five (5) year period commencing from the first date of **ground disturbing activities**, or such other time as may be approved by the **CEO**.
- 5-3 Each Environmental Performance Report shall report on proposal impacts on the following environmental values:
- (a) state of flora and vegetation;
 - (b) state of terrestrial fauna;
 - (c) state of social surroundings including cultural heritage and visual amenity; and
 - (d) state of the holistic environment.
- 5-4 The Environmental Performance Report must include:
- (a) a comparison of the environmental values identified in condition 5-3 at the end of the five (5) year period; against the state of each environmental value at the beginning of the five year period;
 - (b) a comparison of the environmental values identified in condition 5-3 at the end of the five year period; against the state of the environmental values identified in first Environmental Performance Report submitted in accordance with condition 5-2; and
 - (c) proposed management and continuous improvement strategies.
- 5-5 The Environmental Performance Report may be in whole or part prepared in conjunction with other proponents where there are cumulative impacts from their proposals.

6 Decommissioning and Rehabilitation

- 6-1 At least five (5) years prior to the forecasted completion of the operational phase of the proposal the proponent shall prepare and submit a Decommissioning and Rehabilitation Plan to the **CEO** for approval to meet the following objective:
- (1) ensure the proposal is decommissioned and rehabilitated in an ecologically sustainable manner.

- 6-2 The proponent must implement the most recent version of the **confirmed** Decommissioning and Rehabilitation Plan until the **CEO** has confirmed by notice in writing that the proponent has demonstrated that the environmental objective in condition 6-1 has been met.
- 6-3 After the submission of the Decommissioning and Rehabilitation Plan, the proponent is to include an update on the forecasted completion of the operational phase and decommissioning of the proposal in each subsequent Compliance Assessment Report required by condition 8-6.
- 6-4 The proponent:
- (1) may review and revise the **confirmed** Decommissioning and Rehabilitation Plan and submit it to the **CEO**; and
 - (2) shall review and revise the **confirmed** Decommissioning and Rehabilitation Plan and submit it to the **CEO** as and when directed by the **CEO** by a notice in writing.

7 Time Limit for Proposal Implementation

- 7-1 The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.
- 7-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

8 Compliance Reporting

- 8-1 The proponent shall prepare and maintain a Compliance Assessment Plan which is submitted to the **CEO** at least six (6) months prior to the first Compliance Assessment Report required by condition 8-6.
- 8-2 The Compliance Assessment Plan shall indicate:
- (1) the frequency of compliance reporting;
 - (2) the approach and timing of compliance assessments;
 - (3) the retention of compliance assessments;
 - (4) the method of reporting of potential non-compliances and corrective actions taken;
 - (5) the table of contents of Compliance Assessment Reports; and
 - (6) public availability of Compliance Assessment Reports.

- 8-3 The proponent shall assess compliance with conditions in accordance with the **confirmed** Compliance Assessment Plan required by condition 8-1.
- 8-4 All Compliance Assessment Reports shall be retained until the proposal is fully implemented (including decommissioning and rehabilitation) or such other period agreed in writing by the **CEO**.
- 8-5 The proponent shall advise the **CEO** of any potential non-compliance within seven (7) days of that non-compliance being known to the proponent.
- 8-6 The proponent shall submit to the **CEO** the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the **CEO**.
- 8-7 Each Compliance Assessment Report shall:
- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
 - (2) include a statement as to whether the proponent has complied with the conditions;
 - (3) identify all potential non-compliances and describe corrective and preventative actions taken;
 - (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and
 - (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 8-1.
- 8-8 The proponent:
- (1) may review and revise the **confirmed** Compliance Assessment Plan; and
 - (2) shall review and revise the **confirmed** Compliance Assessment Plan as and when directed by the **CEO**.
- 8-9 The proponent shall implement the latest revision of the **confirmed** Compliance Assessment Plan.

9 Public Availability of Data

- 9-1 Subject to condition 9-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO,

all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

9-2 If any data referred to in condition 9-1 contains particulars of:

- (1) a secret formula or process; or
- (2) confidential commercially sensitive information,

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

Table 1: Abbreviations and definitions

Acronym or abbreviation	Definition or term
BC Act	<i>Biodiversity Conservation Act 2016</i>
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of Section 48 of the <i>Environmental Protection Act 1986</i> , or the CEO's delegate.
commencement of operations	Means commencing operation of the plant infrastructure for the proposal and includes pre-commissioning, commissioning, start-up and operation of the plant infrastructure for the proposal.
confirmed	Means, at the relevant time, in relation to a plan required to be made and submitted to the CEO, the plan that the CEO confirmed, by notice in writing, meets the requirements of the relevant condition.
CPI	The All Groups Consumer Price Index numbers for Perth compiled and published by the Australian Bureau of Statistics.
DPLH	The Western Australian Department of Planning, Lands and Heritage or any successor department or agency assisting in the administration of the <i>Planning and Development Act 2005 (WA)</i> as amended or replaced from time to time.
EP Act	<i>Environmental Protection Act 1986</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ground disturbing activities	Any ground disturbing activity undertaken in the implementation of the proposal, including any clearing, civil works or construction, other than preliminary works to which approval has been given under the EP Act.
ha	Hectares
kg/day	Kilograms per day

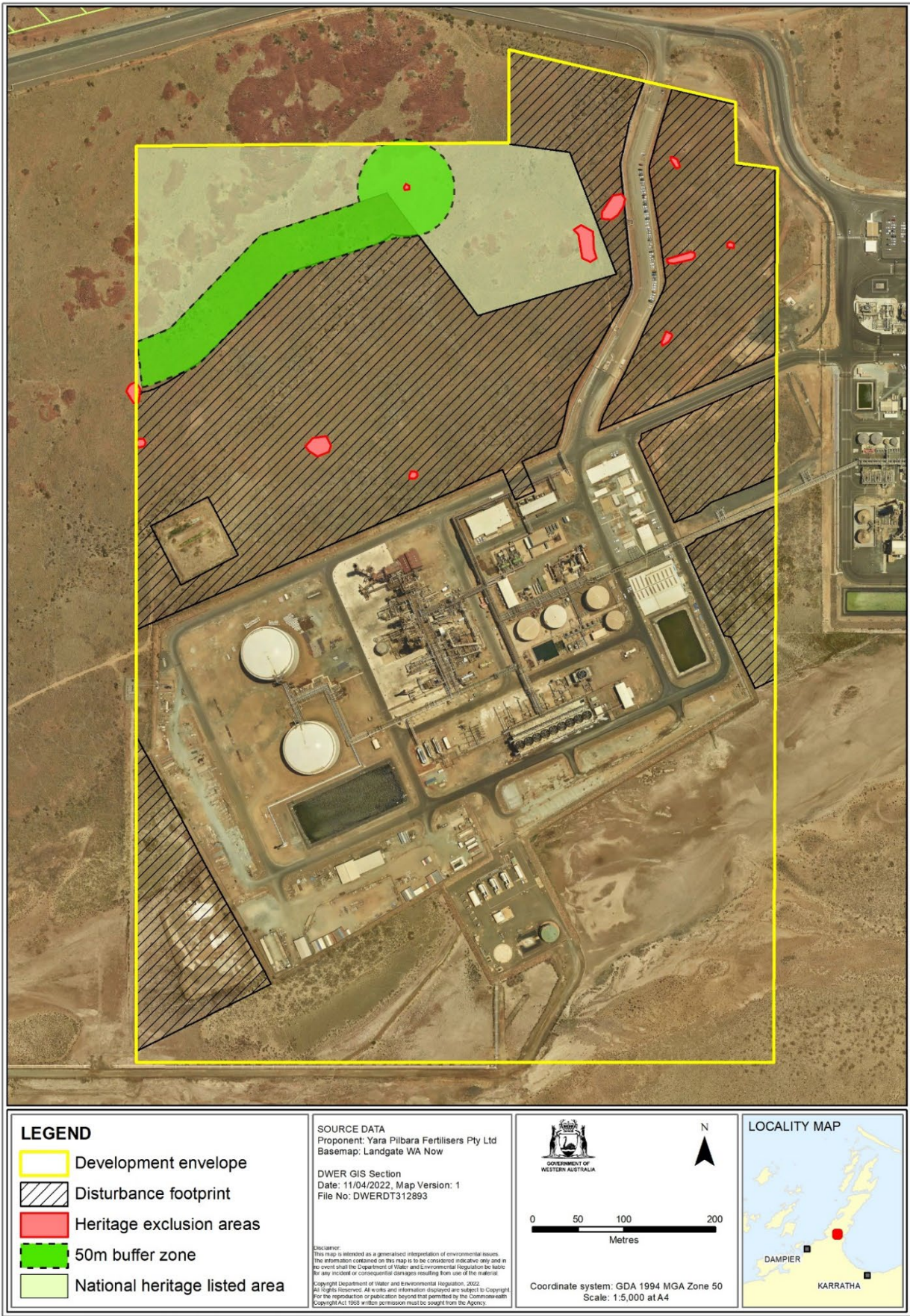
Pilbara Environmental Offsets Fund	A special purpose account created pursuant to section 16(1)(d) of the <i>Financial Management Act 2006</i> by the Department of Water and Environmental Regulation.
Registrar of Aboriginal Sites	The person appointed Registrar of Aboriginal Sites under the <i>Aboriginal Heritage Act 1972</i> (WA) or any successor entity appointed under that Act as amended or replaced from time to time.
SREs	Short-range endemic invertebrate fauna species.
Social and cultural places and activities of significance	Places and activities that are important to the Aboriginal people of the State, and are recognised through social, spiritual, historical, scientific or aesthetic values, as part of Aboriginal tradition, including Deep Gorge, Hearson Cove (and entry points), Murujuga National Park and the Dampier Archipelago.
t/day	Tonnes per day
weeds	Any plant declared under section 22(2) of the <i>Biosecurity and Agriculture Management Act 2007</i> , any plant listed on a National Weeds List and any weeds listed on the Department of Biodiversity, Conservation and Attractions Pilbara Impact and Invasiveness Ratings list as amended or replaced from time to time.

Figures (attached)





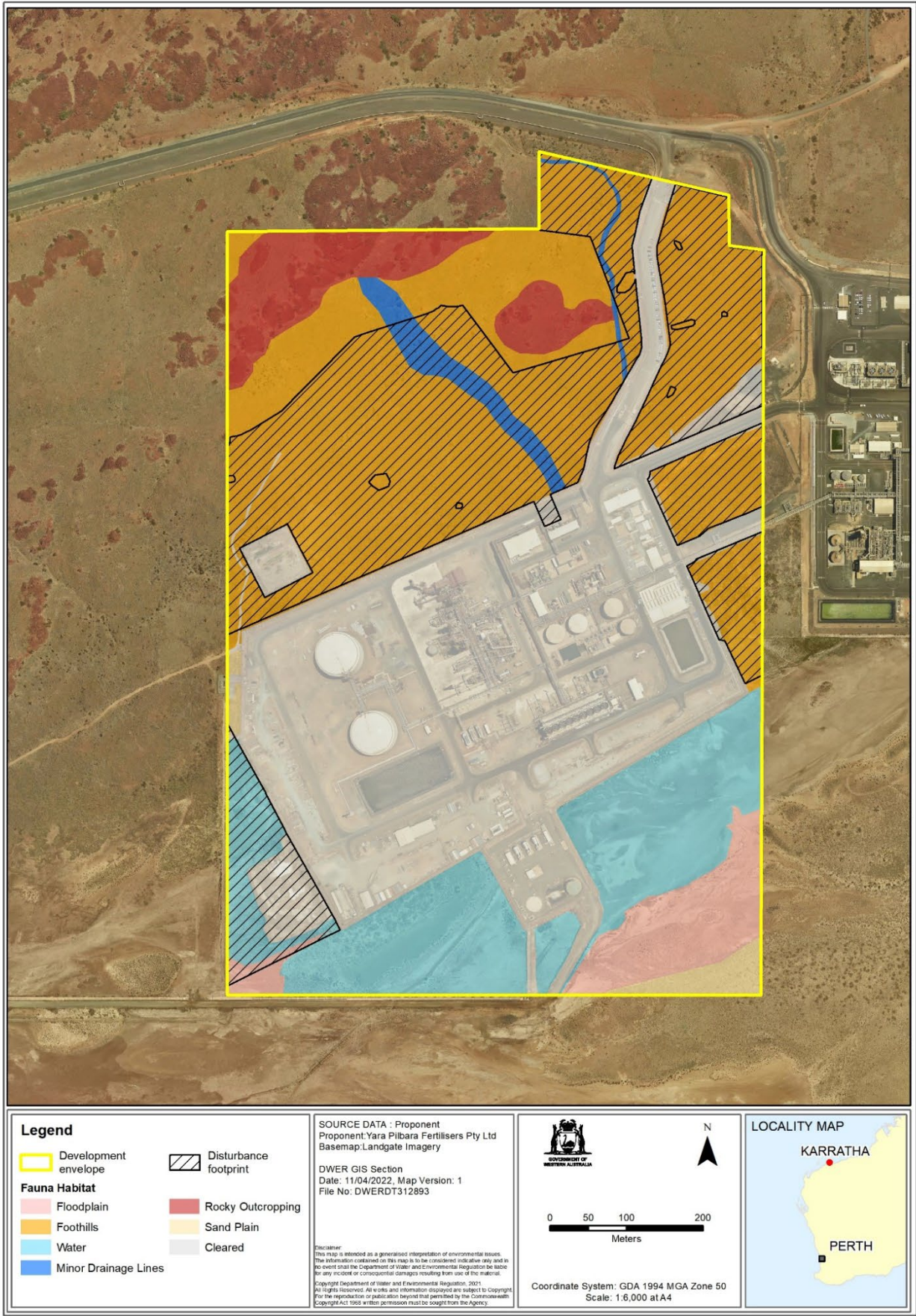
Figure 2: Development envelope for the proposal



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Unique Record ID:

Figure 3: Aboriginal heritage site exclusion zones



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Figure 4: Fauna habitat

Schedule 1

All co-ordinates are in metres, listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geocentric Datum of Australia 1994 (GDA94).

Spatial data depicting the development envelope and disturbance footprint and exclusion zones are held by the Department of Water and Environmental Regulation (Document reference: DWERDT588731).

Appendix B: Decision-making authorities

TableB1: Identified relevant decision-making authorities for the proposal

Decision-Making Authority	Legislation (and approval)
1. Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i> ¹³ – Section 18 consent to impact a registered Aboriginal heritage site
2. Minister for Environment	<i>Biodiversity Conservation Act 2016</i> – Section 40 authority to take or disturb threatened flora and fauna species
3. Chief Executive Officer, Department of Biodiversity, Conservation and Attractions	<i>Biodiversity Conservation Act 2016</i> – authority to take flora and fauna (other than threatened species)
4. Chief Dangerous Goods Officer, Department of Mines, Industry Regulation and Safety	<i>Dangerous Goods Safety Act 2004</i> – Storage and handling of dangerous goods – Approval for the operation of a Major Hazard Facility
5. Chief Executive Officer, Department of Water and Environmental Regulation	<i>Environmental Protection Act 1986</i> – Part V works approval and licence – Part V clearing permit
6. City of Karratha	<i>Planning and Development Act 2005</i> – planning approval/development approval

¹³ the *Aboriginal Cultural Heritage Act 2021* received Royal Assent on 22 December 2021. This Act will replace the *Aboriginal Heritage Act 1972* after a transitional period during which regulations and statutory guidelines and operational policies will be developed.

Appendix C: Consideration of Environmental Protection Act principles

Table C1: Consideration of principles of the *Environmental Protection Act 1986*

EP Act Principle	Consideration
<p>1. The precautionary principle</p> <p><i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i></p> <p><i>In application of this precautionary principle, decisions should be guided by –</i></p> <p>(a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p>(b) <i>an assessment of the risk-weighted consequences of various options.</i></p>	<p>The EPA has considered the precautionary principle in its assessment and has had particular regard to this principle in its consideration of social surroundings (cultural heritage), flora and vegetation and terrestrial fauna.</p> <p>Consistent with the precautionary principle, the EPA has adopted an overall cautious approach and has carefully evaluated options to avoid serious or irreversible impact to social surroundings (cultural heritage), flora and vegetation and terrestrial fauna including whether the measures proposed by the proponent are sufficient to meet the EPA's objectives.</p> <p>The EPA also notes the proponent has designed the proposal to avoid direct impacts to the Dampier Archipelago (including Burrup Peninsula) National Heritage Listed Area and identified Aboriginal heritage sites identified in the development envelope through the use of exclusion zones. The proponent has proposed a number of management measures for indirect impacts such as vibration and fly rock that the EPA consider to be appropriate to minimise impacts and maintain the EPA's objectives for social surroundings.</p> <p>The EPA notes that the proponent has designed the proposal to avoid impacts to terrestrial fauna by configuring the disturbance footprint to avoid the Burrup Peninsula Rock Pile Communities, Priority 1 PEC and the Sand Plain habitat, and reduce disturbance to other fauna habitats and conservation significant fauna.</p> <p>The EPA has also considered the precautionary principle in its consideration of the context of the existing Ammonia Plant, in particular its greenhouse gas (GHG) and air quality emissions. The EPA has noted that a section 46 inquiry is required into GHG emissions and a section 46 inquiry into air emissions may be undertaken to enable careful evaluation of those emissions to avoid, where practicable, serious and irreversible damage to the environment.</p>

EP Act Principle	Consideration
<p>2. The principle of intergenerational equity</p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	<p>The EPA has considered the principle of intergenerational equity in its assessment and has had particular regard to this principle in its assessment of social surroundings.</p> <p><u>Social surroundings (cultural heritage)</u></p> <p>The EPA notes that the proponent has designed the proposal to avoid impacts to all known Aboriginal heritage sites within the development envelope.</p> <p>By avoiding all known Aboriginal heritage sites within the development envelope and implementing measures to minimise impacts such as fly rock and dust the EPA has assessed that there will not be inconsistency from the proposal impacts on social surroundings with the health, diversity and productivity of the environment being maintained and enhanced for the benefit of future generations.</p> <p><u>Social surroundings (visual amenity)</u></p> <p>The proponent has designed the proposal to minimise impacts to visual amenity with the hydrogen plant and associated infrastructure located close to the existing Ammonia Plant and the solar PV panels located low in the landscape. The EPA notes that the residual impacts are not likely to be significant subject to conditioned minimisation measures.</p>
<p>3. The principles of the conservation of biological diversity and ecological integrity</p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	<p>The EPA has considered the principle of conservation of biological diversity and ecological integrity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation and terrestrial fauna.</p> <p><u>Flora and vegetation, and terrestrial fauna</u></p> <p>The EPA has considered to what extent the potential impacts from the proposal to flora and vegetation and terrestrial fauna can be ameliorated to ensure consistency with the principle of conservation of biological diversity and ecological integrity, including the provision of offsets. The EPA has concluded that given the nature of the impacts to the areas of vegetation and habitat for conservation significant fauna species that will be cleared, offsets are required to counter-balance the impacts of the loss of biological diversity and ecological integrity.</p>

EP Act Principle	Consideration
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(a) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(b) <i>The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement.</i></p> <p>(c) <i>The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.</i></p> <p>(d) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.</i></p>	<p>In considering this principle, the EPA notes that the proponent will bear the costs relating to implementing the proposal to achieve environmental outcomes, and management and monitoring of environmental impacts during construction, operation and decommissioning of the proposal. The EPA has had particular regard to this principle in considering the residual impacts of the proposal on flora and vegetation and terrestrial fauna.</p>

Appendix D: Evaluation of other environmental factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Sea			
Marine environmental quality	The proposal has the potential to impact on marine environmental quality through the increase in brine discharge to the Multi-User-Brine-Return-Line (MUBRL) which discharges into King Bay.	<p><u>Public comments</u></p> <ul style="list-style-type: none"> No additional desalination plant is required. However, this does not avoid impacts to the environment from an increase in brine discharge. Clarification is required regarding the mechanism used to potentially trigger an update to the Water Corporation's regulatory requirements and to address associated water quality concerns caused by volume/load increase into the MUBRL. No assessment has been undertaken regarding the possible effects of its wastewater increase on the marine environment at the outfall of the MUBRL. The MAC requests a comprehensive Environmental Quality Management Framework (EQMF) is created, including the identification of intrinsic cultural and spiritual heritage values, as informed by detailed consultation with traditional owners that represent the Ngurra-ra Ngarli for the Murujuga. Environmental Values (EVs) should be relevant to the proposal and surrounding environment, and be supported by clear, measurable, and auditable Environmental Quality Criteria (EQC) for each EQO. The EQCs should be scientifically derived to ensure the use of relevant statistical methods to interpret future monitoring data. 	<p>The Water Corporation owns and manages the MUBRL under Ministerial statements 567 and 594 in 2001 and 2002 respectively. The Water Corporation has approval to discharge up to 208 ML/d of wastewater (brine) into the marine environment of King Bay via the MUBRL. All industries that use the MUBRL are required to meet the requirements of the Water Corporation's Technical Compliance Advice Bulletin Ref. PM20992155 (22 February 2019). This ensures the ANZECC and ARMCANZ (2000) species protection level water quality guidelines within the 0.01 km² mixing zone are met.</p> <p>The proponent considers the proposal will result in 'a minor insignificant increase in the volume of brine discharge via the MUBRL' (Strategen-JBS & G 2022).</p> <p>The EPA is aware that the discharge of brine has not yet reached the 208 ML/d Ministerial statement approval discharge limit and the total discharge</p>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			<p>volumes will remain within the authorised limits.</p> <p>The discharge of brine into the MUBRL off-site is licenced by the DWER under Part V of the EP Act (L9224/2019/1). This licence will ensure water disposal meet disposal water quality criteria.</p> <p>The EPA considers that the proposal is unlikely to cause a material impact from wastewater discharge due to requirements and limits associated with disposal to the MUBRL and did not consider marine environmental quality to be a key environmental factor.</p> <p>As noted under the Other Advice section of the EPA Report 1705 – Perdaman Urea Project and in the 'Other advice' section 6 of this report the EPA has recommended that a review of the implementation conditions in Ministerial statements 567 and 594 be required to ensure adequate management measures are in place to protect the marine environmental quality values of King Bay, Mermaid Sound and Murujuga. This section of EPA Report 1705 also recommends an overarching strategic approach to managing the Murujuga sea, country and airshed.</p>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Air			
Air quality	<p>Limits for gaseous emissions from the existing Ammonia Plant such as oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), ammonia (NH₃) and volatile organic carbons (VOCs) were included in Schedule 1 of MS 586. These were removed via Section 45C of the <i>Environmental Protection Act 1986</i> (EP Act) in 2015 as they were (and remain) regulated under Part V of the EP Act.</p> <p>The proposal will not result in any additional atmospheric pollutants being discharged from the Ammonia Plant.</p> <p>The only additional air emissions from the proposal during normal operations will be oxygen (about 14,400 kg/day) and small amounts of hydrogen. The hydrogen will only be vented during start up and shutdown of the proposed plant, equating to up to 30 kg/day (assuming a daily start and stop of the</p>	<p><u>Public comments</u></p> <p>Submitters considered that the proposal hydrogen production would extend the life of the existing Ammonia Plant and therefore potentially continue the impact to rock art and subsequently impact the World Heritage Listing.</p>	<p>The addition of the hydrogen plant would not extend the life of the existing Ammonia Plant. The only additional gaseous emission produced by the proposal would be oxygen and a small amount of hydrogen.</p> <p>As part of considering the context of the existing proposal and cumulative effects, however, the EPA considered whether the conditions of existing approval MS 586 should be subject to an inquiry related to the management of proposal air emissions.</p> <p>Consistent with previous EPA 'Other advice' on the Perdaman Urea Plant proposal, and for the reasons in Section 6 ('Other advice'), the EPA recommends that a section 46 inquiry may be conducted to review whether air quality conditions should be included in MS 586 for the remaining life of the existing Ammonia Plant.</p> <p>DWER advised that the proposal (renewable hydrogen plant) may require a licence under Part V, section 56 of the EP Act if implementation will cause an emission, or alter the nature or volume of the waste, noise, odour or</p>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
	pilot plant). This small amount of hydrogen will be vented separately to the oxygen and will not pose an environmental or safety risk.		<p>electromagnetic radiation. A separate licence may be required, or the proponent may seek to include the proposal in its licence for the existing Ammonia Plant. The EPA considers that a licence would be able to regulate air emissions consistent with the EPA's objective for air quality.</p> <p>Accordingly, the EPA did not consider it appropriate to consider air quality emissions from the existing Ammonia Plant as part of this assessment. Air emissions were therefore not considered to be a key environmental factor at the conclusion of its assessment.</p>
Greenhouse gas emissions	<p>When the existing Ammonia Plant was originally assessed by the EPA its greenhouse gas emissions were estimated to be about 1.411 million tonnes of CO₂-e per annum. However, the proponent has advised the EPA that the Ammonia Plant's current nominal Scope 1 greenhouse gas emissions are about 1.497 million tonnes of CO₂-e per annum.</p> <p>Implementation of the proposal itself will reduce GHG operations from the</p>	<p><u>Public comments</u></p> <p>The proponent should reduce greenhouse gas emissions where practicable.</p>	<p>As part of considering the context of the existing Ammonia Plant and cumulative effects, the EPA considered whether the conditions of existing approval MS 586 should be subject to an inquiry related to the management of proposal air emissions. The EPA notes that the significant amendment will result in a reduction to GHG emissions.</p> <p>The EPA has already received a request from the Minister for Environment under Section 46 of the EP Act to inquire into and report on the matter of changing Condition 7 – Greenhouse Gas Management Plan – in MS 586.</p>

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
	<p>Ammonia Plant by about 16,000 tonnes of CO₂-e per annum (approximately 1.0%).</p> <p>GHG emissions from clearing for the proposal have not been estimated, however, based on recent assessments are unlikely to be more than 100,000 tonnes per annum.</p>		<p>The Response to Submissions (RTS) document states that the proponent expects a revised condition to include five yearly reduction targets down to net zero by 2050 and require implementation of the GHG management plan with associated reporting, consistent with other implementation approvals recently granted by the Minister.</p> <p>The RTS also states it is committed to updating its GHG management plan in the next six months. Accordingly, the EPA did not consider it appropriate to assess greenhouse gas emissions from the existing Ammonia Plant as part of this assessment. GHG emissions were therefore not considered to be a key environmental factor for the scope of the assessment of the proposal.</p>
People			
Human health	The proposal will supply hydrogen to the existing Ammonia Plant. No additional atmospheric pollutants that could potentially impact on human health will be generated by the proposal.	<p><u>Public comments</u></p> <p>Some submitters were concerned that given the explosion of ammonium nitrate in Beirut (in Lebanon) the precautionary principle should be used to stop further extension of ammonia and ammonium nitrate production and storage on the Burrup Peninsula using renewable hydrogen energy or LNG as the risk of explosion would be increased. If an accident were to occur it would impact the environment, rock art at Deep Gorge, and Karratha.</p>	The Department of Mines, Industry Regulation and Safety (DMIRS) advised that the following legislation applies to the proposal and the existing Ammonia Plant and Technical Ammonium Nitrate (TAN) Production Facility.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			<ul style="list-style-type: none"> • <i>Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007,</i> • <i>Dangerous Goods Safety (Security Sensitive Ammonium Nitrate) Regulations 2007</i> • <i>Dangerous Goods Safety Act 2004.</i> <p>DMIRS considers that the facility can be managed and regulated. The EPA notes that there is likely to be adequate regulation and control for dangerous goods and major hazard facilities under the above legislation and they would be able to regulate risks of explosions to human health consistent with the EPA's objective for air quality.</p> <p>Accordingly, the EPA did not consider human health to be a key environmental factor at the conclusion of its assessment.</p>

Appendix E: Relevant policy, guidance and procedures

The EPA had particular regard to the policies, guidelines and procedures listed below in the assessment of the proposal.

- *Environmental factor guideline – Social surroundings* (EPA 2016)
- *Environmental factor guideline – Flora and vegetation* (EPA 2016)
- *Environmental factor guideline – Terrestrial fauna* (EPA 2016)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2021).
- *WA Environmental Offsets Policy* (Government of Western Australia 2011).
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).
- *Statement of Environmental Principles, Factors and Objectives and Aims of EIA* (EPA 2021).
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures* (State of Western Australia 2021)
- *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016)
- *Technical guidance – Sampling of short range endemic invertebrate fauna* (EPA 2016)
- *Technical guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

Appendix F: List of submitters

7-day comment on referral

Organisations and public

- Fifty nine anonymous public submissions
- Dr John L Black
- Robin Chapple, Member for the Mining and Pastoral Region
- Friends of Australian Rock Art Inc.
- Patrons, UWA Rock Art Conservation Project
- Lyndy Scott and Associates
- Locked Out Locksmiths
- Horizon Power

Public review of proponent information

Organisations and public

- Sixty eight anonymous public submissions
- Murujuga Aboriginal Corporation
- Dr John L Black
- Robin Chapple, Member for the Mining and Pastoral Region
- Friends of Australian Rock Art Inc.
- Bob Brown Foundation
- Patrons, UWA Rock Art Conservation Project
- Tempest and Associates

Government agencies

- Department of Biodiversity Conservation and Attractions

Appendix G: Assessment timeline

Date	Progress stages	Time (weeks)
17 December 2020	EPA decided to assess – level of assessment set	
17 December 2020	EPA requested additional information	0
18 March 2021	EPA received additional information	13
9 April 2021	EPA accepted additional information	3
12 April 2021	EPA released additional information for public review	4 days
10 May 2021	Public review period for additional information closed	4
2 March 2022	EPA received proponent's draft Response to Submissions document	42
17 March 2022	EPA completed its assessment (s. 44(2b))	2
8 April 2022	EPA received final information for assessment	3
20 April 2022	EPA accepted proponent's Response to Submissions	2
29 April 2022	EPA provided report to the Minister for Environment	1
4 May 2022	EPA report published	3 days
25 May 2022	Appeals period closed	3

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the Environmental Protection Authority (EPA) decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

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