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Application for Works Approval

Part V Division 3 of the Environmental Protection Act 1986

Works Approval Number	W6875/2023/1			
Applicant	Perdaman Chemicals and Fertilisers Pty Ltd			
ACN	121 263 741			
File number	DER2023/000727			
Premises	Project Ceres			
	Part of Lot 700 on Plan 411759, Part of Lot 701 on Plan 411760, Part of Lot 706 on Plan 411760, Part of Lot 3013 on Plan 42282, Part of Lot 3014 on Plan 42282, Part of Lot 566 on Plan 28209, Part of Lot 567 on Plan 28209, Part of Lot 568 on Plan 28209, Part of Lot 571 on Plan 28209, Part of Lot 573 on Plan 28209, Part of Lot 581 on Plan 72793, Part of Lot 598 on Plan 77655, Part of Lot 599 on Plan 77665, Part of Lot 640 on Plan 29300, Part of Lot 644 on Plan 28840, Part of Lot 3000 on Plan 77070 and Part of Lot 3003 on Plan 4121422 BURRUP WA 6714 As shown by the premises map in Schedule 1 and defined by			
	the coordinates in Schedule 2 of the works approval.			
Date of report	25 June 2024			
Proposed Decision	Works approval granted			

MANAGER, PROCESS INDUSTRIES

an officer delegated under section 20 of the Environmental Protection Act 1986 (WA)

Table of Contents

1.	Decis	sion summary1			
2.	Scope	e of as	sessment	1	
	2.1	Regula	atory framework	1	
	2.2	Applica	ation summary and overview of premises	1	
		2.2.1	Urea manufacturing	3	
		2.2.2	Bulk material loading	4	
		2.2.1	Power generation	4	
		2.2.2	Seawater cooling, desalination and wastewater management	4	
		2.2.3	Sewage Treatment	5	
		2.2.1	Chemical storage	5	
	2.3	Exclus	ions to this assessment	6	
		2.3.1	Concrete batching	7	
3.	Legis	lative of	context	7	
	3.1	Dange	rous Goods Safety Act 2004	8	
Muru	3.2 juga's r	Legisla ock art	ative framework for assessing and managing potential impacts on petroglyphs	9	
	3.3	Part IV	′ of the EP Act	14	
		3.3.1	Background	14	
		3.3.2	Ministerial Statement 1180	15	
		3.3.3	Consideration of air quality impacts	18	
		3.3.4	Authorising commissioning	20	
		3.3.5	Ministerial Statement 567 and 594	22	
4.	Air en	nissio	ns	24	
	4.1	Point s	source emissions to air	24	
		4.1.1	Sources of emissions and controls	24	
		4.1.1	Comparison with best practice emissions controls:	27	
	4.2	Fugitiv	e urea dust	27	
		4.2.1	Applicant controls	27	
		4.2.2	Comparison with best practice:	28	
5.	Premise wastewater and discharges to the MUBRL			30	
	5.1	Criteria for disposal			
	5.2	Applicant controls			
		5.2.1	Stormwater management	35	
6.	Risk a	assess	ment	37	
	6.1	Locatio	on and siting	37	
		6.1.1	Siting context	37	

OFFICIAL

		6.1.2	Disturbance footprint	37
		6.1.3	Detailed site investigations	39
		6.1.1	Receptors	40
	6.2	Noise.		42
		6.2.1	Noise criteria	42
		6.2.2	Noise modelling	42
		6.2.3	Construction Noise	46
	6.3	Risk ra	atings	49
7.	Consu	ultatio	n	55
8.	Concl	usion		58
Refe	erences	5		60
Арр	endix ′	1: Sum	mary of stakeholder comments on the application	61
App cond	endix 2 ditions	2: Sum	mary of applicant's comments on risk assessment and draft	70
Table Table	e 1: Sun e 2: Rele	nmary c evant a	of reagents and chemicals stored on the premises	5 7
Table	e 3: Sun	nmary o	of State and Commonwealth legislation targeted at protecting rock art	11
Table	e 4: Sun	nmarise	ed conditions of MS 1180 relevant to Part V assessment of the proposal.	15
Table relev	e 5: Cor ant to th	nsiderat nis appl	ion of environmental management commitments in Schedule 2 of MS 59 ication	94 22
Table	e 6: Ove	erview c	of proposed flaring system	26
Table	e 7: Pro	posed e	emission concentrations compared with relevant industry benchmarks	27
Table	e 11: Su	ımmary	of waste streams discharged from the premises to the MUBRL	32
Table	e 12: Wa	astewat	ter quality criteria for discharges via the MUBRL	33
Table	e 8: Ser	nsitive h	uman and environmental receptors and distance from prescribed activity	′ 40
Table comp	e 9: Pre bared a	dicted r gainst a	noise levels (dB L _{A10}) at modelled receptors during the night and day assigned noise levels.	44
Table	e 10: Pr	edicted	noise levels (dB LA10) at boundary locations identified in Figure 5	46
Table cons	e 13: Ris truction	sk asse and op	essment of potential emissions and discharges from the premises during	49
Table	e 14: Co	onsultat	ion	55
Figur	e 1: Pro	oject Ce	eres site overview and location	2
Figur	e 2: Ure	ea prod	uction process (from Application)	4

43
43
Site F 45
normal 45

1. **Decision summary**

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction of the premises. As a result of this assessment, works approval W6875/2023/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

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

2.2 Application summary and overview of premises

Perdaman Chemicals and Fertilisers Pty Ltd (the Applicant) is proposing the develop Project Ceres (the premises); a urea manufacturing and export facility located on the Burrup Peninsula (Murujuga), approximately 5 km north of Dampier and 10 km northwest of Karratha.

The premises encompasses three areas; Site C, Site F and the port facility (Figure 1). Process infrastructure including the urea manufacturing plant and support services (e.g. power generation plant) are located on the northern site (Site C). Site F comprises of non-process infrastructure such as administration services and laydown areas. The two sites are connected via a causeway transversing the King Bay tidal area. A conveying system connects Site C to the export facility located approximately 2 km west-northwest of Site C within the Pilbara Port Authority lease area.

Key infrastructure associated with the project includes:

- Urea manufacturing plant including ammonia synthesis, urea synthesis and urea granulation;
- Urea storage shed located at Site C and transfer infrastructure (e.g. conveyor system);
- Urea export facilities including conveying infrastructure, storage shed, and ship loader located at the Dampier Port;
- Seawater cooling system and water treatment (desalination plant);
- Gas turbine power plant for supplying power to the project;
- Various chemical storage; and
- Sewage treatment.

On 7 November 2023, the Applicant submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act). The works approval application seeks authorisation for the construction, commissioning and time limited operation of the premises.

The premises relates to the categories and assessed production capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in works approval W6875/2023/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) is described below and outlined in works approval W6875/2023/1.



Figure 1: Project Ceres site overview and location

2.2.1 Urea manufacturing

The urea manufacturing process involves the reaction of ammonia (NH_3) and carbon dioxide (CO_2) to produce urea. Natural gas sourced from the nearby Woodside gas facility is used as feedstock for the process. The stages of urea production are outlined below and in Figure 2:

Syngas reforming:	Natural gas (syngas) is converted to mainly carbon monoxide (CO) and hydrogen (H ₂) using catalytic reforming at high temperature. Heat for this reaction is generated by a gas fired heater (Fired Heater).
	CO is converted to CO ₂ (carbon dioxide) to maximise the concentration of H_2 in syngas for ammonia production.
Acid gas clean up:	CO ₂ is selectively removed from the syngas using an MDEA (methyldiethanolamine) solvent and reused in urea production.
	The Nitrogen Wash Unit blends cleaned syngas (H ₂) with nitrogen to achieve the correct mixture required for ammonia synthesis. Off-gas is recovered and used in the fuel gas system to preheat process steam inside the Fired Heater.
Ammonia synthesis:	Ammonia is produced by reacting hydrogen and nitrogen over a conventional iron-based catalyst. Heat produced through the exothermic reaction is recovered as steam. 3,500 tonnes per day (tpd) of ammonia is required for urea production.
	Refrigerated ammonia is stored onsite in a cryogenic tank to ensure continuous downstream processing during upsets in the ammonia plant. All produced ammonia is used onsite with no external ammonia sale.
Urea synthesis:	Project Ceres will utilise Snamprogetti [™] urea melt technology for urea synthesis. Ammonia and CO ₂ produced in the ammonia plant are reacted via two reaction stages to form urea melt that is purified to 97%wt.
Urea granulation:	Urea melt is fed into the granulator plant to be dried and granulated.

Approximately 2 million tonnes of urea granules will be produced per year. Following granulation, urea will be stored in a 75,000 tonne capacity storage shed located at Site C prior to transfer to the port facility for export.

In addition to urea, ammonium sulphate solution will also be exported offsite as a fertiliser product. Ammonium sulphate is by-product of the ammonia scrubbing system proposed in the Granulator. It is expected that 60 m^3 /day will be collected in a common storage tank for export offsite.



Figure 2: Urea production process (from Application).

2.2.2 Bulk material loading

Urea granules will be transported from the storage shed at Site C to the port via a 3.2 km enclosed overland conveyor. On arrival at the port, granules will be stored in a fully enclosed storage shed sized to accommodate 65,000 tonnes of material. Shed openings will be fitted with air lock doors (one at each end of the shed) to ensure the system remains closed to minimise product exposure to atmosphere and reduce dust emissions.

Granules are transferred from the shed to a ship loader that delivers granules to the berthed vessels via an enclosed conveyor fed cantilever arm loader. The ship loader is slewing and luffing with a telescopic boom to allow loading without ship movement and fitted with a shrouded telescopic cascading chute to minimise dust emissions.

The design capacity of the port loading equipment will be limited by the Urea Plant production capacity of the plant, therefore 2.046 million tonnes per annum, at a maximum throughput of 2,200tph at the shiploader. It is expected that one or two ships will be loaded each week (approximately 100 ships per year) with each ship taking between 24 to 30 hours to load.

2.2.3 Power generation

All internal power requirements for the premises will be generated onsite. Power generating equipment comprises of two combined cycle gas turbine (CCGT) generators with associated Heat Recovery Steam Generator (HRSG) and a steam turbine generator (STG).

The CCGTs will be operated on natural gas under normal operations.

2.2.4 Seawater cooling, desalination and wastewater management

Seawater sourced from the Water Corporation's seawater supply pipeline is used for cooling purposes, desalination and demineralisation to meet the plant's water demands. Concentrated brine generated from desalination and demineralisation will be diluted with seawater from the cooling tower blowdown and discharged to the Water Corporation's Multi-User Brine Return Line (MUBRL). The MUBRL discharges received wastewater into the marine waters of King Bay via an ocean outfall.

Other minor wastewater streams such as process condensates and treated stormwater are also proposed be discharged to the MUBRL.

2.2.5 Sewage Treatment

A sewage treatment plant will be installed to treat domestic wastewater and sewage generated on the premises. The average feed to the plant is expected to be 24 m³/day (40 m³/day peak) based on an average of 120 people onsite per day (with a peak of 200). Treated wastewater is discharged offsite via the MUBRL. Sludge will be disposed of off-site via truck.

2.2.6 Chemical storage

Various reagents and chemicals are required to support the construction, commissioning and operation of Project Ceres. Reagents and chemicals will be strategically located across the premises within the relevant process areas (Ammonia Plant, Urea Production Plant, Urea Granulation Plant, Utilities and Chemical Warehouse). A summary of reagents and chemicals proposed to be stored on the premises is provided in Table 1.

Equipment description	Total estimated stored volume		
Ammonia Plant			
OASE Solution (amine)	1 x 1,390m ³ tank and 2 x 60m ³ tanks		
Other chemicals including phosphate, dimethyl disulphide, antifoam, lube oil	Stored separately in containers <5m ³ in size		
Urea Production Plant			
Urea solution	2 x 1,123m ³ tanks		
Urea Granulation Plant			
Formaldehyde (UF85)	2 x 218m ³ tanks		
Urea solution (recycle and collection tanks)	4 x tanks totalling 197m ³		
Ammonium sulphate (close drain tanks & associated collection tanks)	4 x tanks totalling 215m ³		
Ammonium sulphate storage tank	1,037m ³		
Sulfuric acid	2 x tanks totalling 58m ³		
Utilities			
Diesel	1 x tank totalling 144m ³		
Refrigerated ammonia	10,000 tonnes		
Ammonia water (containing ~10% ammonia used for HRSG SCR treatment. BFW conditions, etc.)	26m ³		
Other chemicals including sodium hydroxide, biocide, antiscalant, corrosion inhibitor, lube oil, etc.	Multiple storage vessels ranging between 1m ³ – 10m ³		
Chemical Warehouse			

OASE White (amine) premix/enriched	20 tonnes each in 210kg drums
Antifoam	100kg in 25kg drums
Sodium bisulfite	22 tonnes (stored in drums)
Other chemicals including sodium hydroxide, biocide, antiscalant, corrosion inhibitor, lube oil, etc.	1 – 25 tonnes stored in IBCs

In their application, the Applicant applied for Category 73 activities which are described under the EP Regulations as:

Bulk storage of chemicals, etc.: premises on which acids, alkalis or chemicals that -

- (a) contain at least one carbon to carbon bond; and
- (b) are liquid at STP (standard temperature and pressure).

Noting that the chemicals are stored in association with, or to support, another prescribed premises activity (i.e. Category 31: Chemical manufacturing), the delegated officer determined that Category 73 does not apply. It should be noted that this does not prevent chemical storage from consideration in the risk assessment. Risks associated with storage of chemicals onsite have been considered along with broader Category 31 activities and regulatory controls applied appropriately (refer to section 5).

2.3 Exclusions to this assessment

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

- Concrete batching where batching is undertaken on the premises and for the use at the premises (refer to section 2.3.1).
- Solar power generating equipment.
- Vehicle movements on public roads.
- Ground preparation works including clearing, levelling, blasting and construction of access roads and facilities unrelated to the prescribed activities such as carparks and officer buildings. It does not exclude the construction of infrastructure that could be considered a control in relation to emissions discharges such as impermeable hardstands for processing plant equipment or infrastructure for managing stormwater drainage potentially contaminated by activities on the premises.
- Construction and operation of the shipping berths including works such as jetty expansions and dredging as these works are being undertaken by the Pilbara Ports Authority and do not form part of the prescribed activity. The Dampier Cargo Wharf Extension and Landside Redevelopment Project was referred to the EPA under section 38 of the EP Act. The EPA determined not to assess the proposal noting that works were adjacent to existing port facilities within an already disturbed area. The proposal is subject to conditional approval under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC 2022/09237) which includes provisions for regulating underwater noise, dredging and light.
- Emissions associated with Category 12: screening etc. of material activities (e.g. crushing and screening of material to support construction) as these are authorised under Licence L9426/2024/1.
- Those Environmental Factors already assessed through EPA Assessment 1705 and listed in the key determinations of section 3.3 of this Decision Report.

- Ammonia storage noting that the premises is classed as a Major Hazard Facility and therefore required to adhere to regulatory controls administered by DEMIRS in relation to the storage of ammonia. Noting this, the delegated officer considers that DEMIRS is the relevant regulatory authority to assess and manage risks associated with ammonia storage.
- Safety risks associated with the premises (refer to section 3).

The works approval does not authorise future operations, including commissioning activities (refer to section 3.3.4). Commissioning and operation of the premises will be the subject of a subsequent works approval amendment and/or licence application under Part V of the EP Act. Risks associated with operation of the plant where relevant have been considered in this assessment for completeness. Further assessment of the risks associated with the commissioning and operation of the plant will occur during subsequent amendments to the works approval and/or licence.

2.3.1 Concrete batching

Although excluded from regulation under a Part V works approval and/or licence, the delegated officer notes that applicants must still comply with the Environmental Protection (Concrete Batching & Cement Product Manufacturing) Regulations 1998 (Concrete Batching Regulations). The delegated officer considers dust from the concrete batching plant to be adequately regulated through these regulations. Specifically, the equipment control requirements of r.4 to r.10, and management control of r.3(1) for the activity to "not carry on… unless it is carried on in such a manner that no visible dust escapes from the premises…".

3. Legislative context

Table 2 summarises approvals, excluding those granted under Part V of the EP Act, relevant to the assessment.

Legislation	Approval		
Part IV of the Environmental Protection Act 1986	Construction and operation of Project Ceres was authorised under Ministerial Statement (MS) 1180 while disposal of wastewater to the MUBRL is subject to conditions of MS 594 (refer to section 3.3).		
Part V of the Environmental Protection Act 1986	Works Approval W6630/2021/1 for Category 12 activities granted 14 July 2022		
Part V of the Environmental Protection Act 1986	Licence L9426/2024/1 for Category 12 activities granted 19 March 2024		
Environmental Protection (Clearing of Native Vegetation) Regulations 2004	Clearing of native vegetation was assessed and authorised under Part IV of the EP Act (MS 1180)		
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The proposal was determined to be a controlled action and subject to assessment under the EPBC Act for likely impacts to a National Heritage Place, threatened species and communities, migratory species and a Commonwealth Marine Area. The proposal was approved on 26 February 2022 (EPBC 2018/8383) subject to conditions.		
Dangerous Goods Safety Act 2004 Dangerous Goods Safety (Major Hazard Facilities)	A Dangerous Goods Licence for the storage of dangerous goods on the Premises is required under the <i>Dangerous Goods Safety Act 2004</i> . The premises is considered a Major Hazard Facility and is subject to the requirements of the <i>Dangerous Good Safety (Major Hazard Facilities) Regulations 2007</i> . The applicant has advised that a Dangerous Goods Licence application is targeted		

Table 2: Relevant approvals

Regulations 2007	for submission in September 2024. The applicant has advised that they are consulting with DEMIRS on the application process. The delegated officer notes that it is the responsibility of the applicant to obtain all necessary and relevant approvals under the <i>Dangerous Goods Safety Act 2004</i> and <i>Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007.</i>
Aboriginal Heritage Act 1972	This proposal has consent under section 18 of the <i>Aboriginal Heritage Act</i> 1972 issued on 27 January 2022.
Biodiversity Conservation Act 2016	Authorisation to take or disturb threatened species under section 40 of the <i>Biodiversity Conservation Act 2016</i> for the purpose of taking threatened fauna in a management operation to facilitate the construction and operation of a urea production plan and associated activities. This was originally approved on 28 June 2023.
Planning and Development Act 2005	The premises and surrounding area is zoned as 'Strategic Industry' in accordance with City of Karratha Town Planning Scheme No. 8, gazetted in August 2000. An application for planning and development approval (DA21261) was submitted to the City of Karratha on 23 December 2021. The application was referred to the Regional Joint Development Assessment Panel (JDAP) and approval granted on 17 March 2022. The approval is subject to conditions which include the requirement to develop management plans addressing light, stormwater management and dust.
Rights in Water and Irrigation Act 1914	S17 Permit to Obstruct or Interfere (approval PMB209045(1)), granted 21 August 2023 for the construction of a causeway to provide access between Site C and Site F of the Perdaman Urea Project.

3.1 Dangerous Goods Safety Act 2004

As a Major Hazard Facility, the premises will be subject to regulation under the *Dangerous Goods Safety Act 2004* and Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007. The Regulations required that the operator of a major hazard facility operate the facility in accordance with the safety management system outlined in an approved safety report.

The safety report must include a risk assessment of the facility that identifies:

- all hazards relating to dangerous goods;
- the probability of the hazard causing a major incident;
- the nature of harm to people, property and the environment that is likely to occur; and
- measures in place to eliminate the above risks, or as far as reasonably practicable, reduce the risk of the incident or impact occurring.

The Applicant is also required to develop a safety management system that includes procedures and policies for implementing control measures to manage identified risks.

Risks associated with the storage of dangerous goods materials, including materials that are below threshold quantities, are also regulated under the Dangerous Goods Legislation. As part of applying for a Dangerous Goods Licence, the Applicant will need to demonstrate that storage of dangerous goods will occur in accordance with the relevant standards (e.g. Australian Standard *AS 1940 The storage and handling of flammable and combustible liquids*).

Key findings: The delegated officer considers DEMIRS to be the primary regulatory authority for regulating public health risks associated with the storage and handling of dangerous goods, including the risk of explosion, catastrophic plant failure and large-scale ammonia release. Subject to DEMIRS remaining the primary agency for regulating safety risks, risks associated with storage of dangerous goods, including to ensure safe plant operation, have not been considered in this assessment.

3.2 Legislative framework for assessing and managing potential impacts on Murujuga's rock art petroglyphs

Murujuga (the Dampier Archipelago, including the Burrup Peninsula and surrounds) is a unique ecological and archaeological area containing one of the largest collections of Aboriginal engraved rock art (petroglyphs) in the world. The rock art is of continuing cultural, archaeological and spiritual significance for Aboriginal people and also has significant state, national and international heritage value. The Western Australian Government is committed to the ongoing protection of Murujuga's rock art and is working in partnership with the Murujuga Aboriginal Corporation (MAC), representing the Traditional Custodians of Murujuga, to protect and manage this important area.

In 2002, the Western Australian Government established the Burrup Rock Art Monitoring Management Committee (BRAMMC) in response to concerns about possible adverse impacts on the rock art from industrial air emissions. BRAMMC commissioned a number of independent scientific studies to investigate the possible effects of current and future industrial emissions on rock art. These studies included measurements of air quality, assessment of microclimate, dust deposition, colour change, mineral spectrometry, microbiological analyses, accelerated weathering studies and air dispersion modelling studies. The scientific reports from these studies were independently peer reviewed by international experts in relevant disciplines.

In 2009, subsequent to the review of the investigation findings, BRAMMC concluded there was no scientific evidence of any measurable impact of industrial emissions on the rate of deterioration of the Burrup rock art and recommended establishing a technical working group to replace BRAMMC, and for annual monitoring of colour contrast and spectral mineralogy monitoring of rock art for a period of ten years (subject to review after five years). The Burrup Rock Art Technical Working Group (BRATWG) was established to oversee the colour change and spectral mineralogy monitoring program and other studies between September 2010 and June 2016. The monitoring program was funded with contributions from industry on the Burrup Peninsula. The then Department of Environment Regulation managed the monitoring program from the expiry of BRATWG's tenure in June 2016 until the formation of DWER on 1 July 2017.

The methodology used and conclusions of some of the research studies and monitoring undertaken since 2004 has been subject to criticism. Independent reviews of the monitoring programs conducted on the Burrup Peninsula were subsequently commissioned by DWER which recommended redesign of the rock art monitoring program based upon well-established principles of experimental design to provide more robust, replicable and reliable information about the impacts of air emissions on the rock art.

In September 2017, the Western Australian Government released the draft Burrup Rock Art Strategy for public comment. The draft strategy established a long-term framework to protect Aboriginal rock art on the Burrup Peninsula. In September 2018 the Minister for Environment established the Murujuga Rock Art Stakeholder Reference group (MRASRG) to facilitate engagement between MAC and key government, industry and community representatives on the development and implementation of the renamed Murujuga Rock Art Strategy. The reference group is currently chaired by Dr Ron Edwards and includes representatives from MAC, the Australian Government and state government departments, the Pilbara Ports Authority, the Western Australian Museum, the City of Karratha, industry and scientists.

In February 2019, the Minister for Environment released the Murujuga Rock Art Strategy which was finalised in consultation with the MRASRG. The purpose of the strategy is for the protection of aboriginal rock art located on Murujuga from the potential impacts of anthropogenic emissions.

The strategy establishes long-term framework for the management and monitoring of environmental quality to protect the rock art on Murujuga from the impacts of anthropogenic emissions. The framework outlined in the strategy is intended to address the shortcomings in the design, data collection and analysis of the rock art monitoring program that were identified by independent reviewers. The strategy builds on previous studies and provides a transparent, risk-based and adaptive approach to deliver a scientifically rigorous approach to the monitoring and management to protect the rock art.

The scope of the strategy is to:

- 1. establish an Environmental Quality Management Framework, including the derivation and implementation of environmental quality criteria that are based on sound scientific information;
- 2. develop and implement a robust program of monitoring and analysis to determine whether change is occurring to the rock art on Murujuga;
- 3. identify and commission scientific studies to support the implementation of the monitoring and analysis program and management;
- 4. establish governance arrangements to ensure that:
 - a. monitoring, analysis and reporting are undertaken in such a way as to provide confidence to the Traditional Owners, the community, industry, scientists and other stakeholders about the integrity, robustness, repeatability and reliability of the monitoring data and results; and
 - b. government is provided with accurate and appropriate recommendations regarding the protection of the rock art, consistent with legislative responsibilities; and
- 5. develop and implement a communication strategy in consultation with stakeholders.

DWER is responsible for the day-to-day implementation of the Murujuga Rock Art Strategy in partnership with MAC and in consultation with the MRASRG. DWER and MAC are working in partnership to oversee the development and implementation of a scientific monitoring and analysis program (Murujuga Rock Art Monitoring Program) under the strategy that will determine whether the rock art on Murujuga is subject to accelerated change. MAC is the central organisation for developing and managing all research within Murujuga. The Murujuga Research Protocols have been developed by MAC as a set of governing principles and guidelines to ensure that research is conducted in a respectful and culturally appropriate manner.

The Murujuga Rock Art Monitoring Program is undertaken in close consultation with a team of national and international experts in relevant disciplines and MAC will be involved in all aspects of the monitoring program. The development and implementation of the monitoring program is informed by the findings and lessons from scientific studies and monitoring of the rock art on Murujuga, as well as information available in the scientific literature to deliver a scientifically rigorous approach to monitoring and analysis.

The scientific monitoring and analysis program will monitor, evaluate and report on changes and trends in the condition of the rock art and whether the rock art is showing signs of accelerated change to determine if anthropogenic emissions are accelerating the natural weathering/alteration/degradation of the rock art. Independent peer review processes will provide assurance that the best scientific information is available to guide management actions.

In addition to the Murujuga Rock Art Monitoring Program, the strategy provides for establishment of an atmospheric deposition network which will be established to provide data on the composition and concentration of contaminants that are potentially transferred from the atmosphere to the rock surfaces. The strategy also acknowledges that the Western Australian Government is considering establishment of a long-term coordinated ambient air quality network on Murujuga and the surrounding areas to inform decision making relating to ambient air quality in the region.

Information on monitoring and analysis of the Murujuga rock art will be published on DWER's

website. This will include the strategy, annual reports detailing the results of data collection and analysis, reports from scientific studies, the reports of independent peer reviewers and annual reports on the implementation of the strategy.

The first Monitoring Studies Technical Report outlining the results of the first year of the monitoring program was published in December 2023, following an independent peer review process. While the data did observe some spatial trends, data collected in the first year of observation did not permit any firm conclusions to be drawn about the trends in rock surface conditions and any relationship to air quality over time. Longer-term data are still needed to detect any such trends. The preliminary results from the second year of studies are expected to be released mid-2024. Table 3 below includes a summary of current legislative framework relevant to the Murujuga rock art.

Mechanism (and responsible government)	Date	Protections		
Murujuga National Park (WA)	17 January 2013	Murujuga National Park is owned in freehold by MAC. The land is leased back to the Western Australian Government as national park and is jointly managed by MAC and DBCA in accordance with the policy direction provided by the Murujuga Park Council (MPC). MPC comprises representatives from MAC, DBCA and a representative appointed by the Minister for Aboriginal Affairs.		
		Increased protection of rock art is provided by applying the provisions of the <i>Conservation and Land Management Act 1984</i> (CALM Act) to formally protect the park's values.		
		The Park is operated in accordance with the Murujuga National Park Management Plan 78 (2013) and the Murujuga Cultural Management Plan (2016) which focuses on protection and awareness of the cultural and natural values of the area.		
		The Rangers of Murujuga Land and Sea Unit (MLSU) conduct the practical management of the Park and the surrounding sea country and islands along with DBCA staff.		
Aboriginal Heritage Act 1972 (WA)	NA	Specific localities on the Burrup have been declared Protected Places under the <i>Aboriginal Heritage Act 1972</i> .		
		Consent is required from the WA Minister for Aboriginal Affairs for any activity which will negatively impact Aboriginal heritage sites.		
Burrup and Maitland Industrial Estates Agreement (WA)	January 2003	The State Government entered into the Burrup and Maitland Industrial Estates Agreement (the BMIEA) with three native title claimant groups (Ngarluma-Yindjibarndi, Yaburara-Mardudhunera and the Woon-Goo- Tt-Oo). This agreement enabled the State Government to compulsorily acquire native title rights and interests in the area of the Burrup Peninsula and certain parcels of land near Karratha.		
		The BMIEA allows for industrial development to progress across southern parts of the Burrup Peninsula and provides for the development of a conservation estate (Murujuga National Park).		
		The Department of Jobs, Tourism, Science and Innovation is the lead agency for the development of the Burrup Strategic Industrial Area and LandCorp is the estate manager.		
Burrup and Maitland Industrial Estates Agreement Additional Deed (WA) 16 January 2003 The State Government committed four-year study into the effects of t within and in the vicinity of part of Peninsula.		The State Government committed to organise and fund a minimum four-year study into the effects of the industrial emissions on rock art within and in the vicinity of part of the industrial estate on the Burrup Peninsula.		
		The four-year scientific rock art monitoring program, included:		

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Mechanism	Date	Protections	
(and responsible government)			
		 Two studies for the monitoring of ambient concentrations of air pollutants and microclimate and deposition undertaken by CSIRO Atmospheric Research; and Two further programs for artificial fumigation of rock surfaces and fieldwork on rock surface colour changes undertaken by CSIRO Manufacturing and Infrastructure Technology. Following completion of these studies, in 2009 the Burrup Rock Art Monitoring Management Committee recommended that the studies on ambient air quality and rock microbiology monitoring be suspended and only recommenced if warranted by a major increase in emissions or if evidence becomes available to require further monitoring. 	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) – Listing of the Dampier Archipelago (which includes the Burrup Peninsula) as a National Heritage place (Cth)	3 July 2007	The Dampier Archipelago was assessed by the Australian Heritage Council in 2007 and found to meet five of the eight criteria for national heritage listing under the EPBC Act. The listing of the Dampier Archipelago 'recognised the extraordinary extent, diversity and significance of petroglyphs, standing stones and circular stone arrangements of the place'. National heritage listing means that any proposed action that could have a significant impact on the National Heritage listed portion of the Burrup Peninsula must be referred to the Commonwealth Minister for the Environment as a matter of national environmental significance for assessment and decision. Project Ceres was referred to the Department of the Climate Change, Energy, the Environment and Water in December 2018 for assessment under the EPBC Act. Section 5.1.1 details the outcome of this referral.	
EPBC Act Conservation Agreements (Cth)	2007	At the time of listing on the National Heritage List, EPBC Act Conservation Agreements were signed by the then Commonwealth Minister for the Environment and Water Resources with Woodside Energy Ltd, and Rio Tinto (Hamersley Iron Pty Ltd and Dampier Salt Ltd). Under the Conservation Agreements, these companies provide funding for research, management and monitoring of the National Heritage values of the place.	
The Deep Gorge Joint Statement (DGJS) (Cth)	July 2017	The DGJS, signed by the Australian Government, Woodside and Rio Tinto, reaffirms the commitments made under each of the bilateral Conservation Agreements to support the ongoing protection, conservation and management of the National Heritage values of Murujuga and the wider Dampier Archipelago.	
Yara Pilbara Nitrates Pty Ltd EPBC Act Approval (EPBC 2008/4546) for the construction of the Technical Ammonium Nitrate Facility (Cth)	14 September 2011 (variations approved in 2013, 2014 and 2017)	 The Commonwealth Minister for the Environment determined the proposal for the construction of the TAN Plant was a controlled action under the EPBC Act for likely impacts to the National Heritage Place. The Commonwealth Minister for the Environment approved the proposed action, with conditions relating to the protection of the National Heritage Place, including: contribution of funds toward implementation of baseline rock art monitoring and public reporting of results; contribution of funds toward implementation of an ongoing rock art monitoring program or engagement of a suitably qualified person to undertake the rock art monitoring using methodology approved by the Minister and public reporting of results; undertaking a baseline ambient air quality monitoring program (NH₃, NOx, SOx and TSP) and public reporting of results; 	

Mechanism (and responsible government)	Date	Protections
		 compliance with limits set in the Part V licence issued under the EP Act; and providing the Department of the Environment and Energy (DoEE) with a management plan in the event that accelerated changes in the rock art are detected.
Woodside Energy Ltd approval for Pluto Liquefied Natural Gas Development (WA)	December 2007	Offsets package for Pluto LNG required the rehabilitation/ restoration of degraded areas that fall both outside of the lease and outside of areas of potential industrial development. The program initiated as a result of this requirement aims to rehabilitate and restore degraded areas on the Burrup Peninsula. The program includes rock art site rehabilitation and restoration.
Perdaman Chemicals and Fertilisers Pty Ltd EPBC Act approval (EPBC 2018/8383) for Project Ceres	26 February 2022 (variations approved in 2019 and 2021)	Project Ceres was determined by the Commonwealth Minister for the Environment to be a controlled action under the EPBC Act due to, among other things, potential impacts on a National Heritage Place. The proposal was approved subject to conditions including the requirement for the Applicant to comply with conditions of the approval granted under Part IV of the EP Act relating to the protection of rock art.

In addition to the legislative framework described in Table 3, a recent inquiry conducted under section 46 of the EP Act included recommendations relating to ambient air quality and the rock art on Murujuga. In April 2018, the Minister for Environment requested the EPA to review MS 870 (granted for the construction and operation of the Yara Pilbara Fertilisers Pty Ltd Technical Ammonium Nitration Plant). The request was to "*inquire into and report on the matter of changing implementation condition 5-1: Air Quality in Ministerial Statement 870 for the above proposal to protect rock art*".

As an outcome to the inquiry the EPA concluded that "the Murujuga Ambient Air Quality Monitoring Network and Murujuga Rock Art Monitoring Program (once established) would be the most appropriate overarching systems through which the monitoring on Murujuga should be coordinated regarding ambient air quality monitoring and rock art monitoring. This would ensure that the responsibility for such monitoring is shared amongst all existing and future industrial emitters in an equitable manner". Key recommendations of the EPA resulting from the inquiry included:

- Prior to the Murujuga Ambient Air Quality Monitoring Network and Murujuga Rock Art Monitoring Program being established, and when the opportunity arises, the ministerial conditions of other existing industrial facilities located on Murujuga should be changed via section 46 of the EP Act, to include a requirement to reduce the risk of impacts to rock art from air emissions.
- When the Murujuga Ambient Air Quality Monitoring Network and Murujuga Rock Art Monitoring Program have been established the ministerial statements of existing industries should be changed via section 46 of the EP Act to remove any requirements for the proponents to undertake their own individual ambient air quality monitoring and / or rock art monitoring where necessary and include a requirement for the proponent to contribute to the airshed monitoring activities.

3.3 Part IV of the EP Act

3.3.1 Background

The Perdaman Urea Project was referred to the Environmental Protection Authority (EPA) under Part IV of the EP Act on 7 May 2018 and was assessed through a Public Environmental Review (PER) assessment process. The EPA released its report and recommendation on the project (EPA Report 1705).

The assessed proposal is to construct and operate a urea production plant with a nominal production capacity of about 2 million tonnes per annum (Mtpa) on Sites C and F within the Burrup Strategic Industrial Area (BSIA) on the Burrup Peninsula.

The EPA's assessment of the proposed considered the following key environmental factors relevant to the construction and operation of the premises:

- air quality including impacts on human health and rock art;
- greenhouse gas emissions;
- flora and fauna including impacts from light, noise and dust;
- acid sulphate soils;
- surface water management;
- groundwater protection;
- light management; and
- social surroundings.

The report was subject to appeal (Appeal 034/2021), with 20 appeal submissions received relating to impacts associated with Murujuga rock art, greenhouse gas emissions, human health, amenity (including noise, light and visual), direct impacts on heritage and clearing.

In its assessment of impacts to rock art, the Appeals Convenor acknowledged that the EPA had future consideration of potential impacts to rock art, however, determined that it remains open to the Minister to consider remitting the proposal for further assessment pending the outcomes of the Murujuga Rock Art Monitoring Program. To provide assurance that rock art will be protected, and greater confidence in the robustness of these requirements, it was recommended that conditions be varied to require that baseline monitoring, trigger criteria and management/contingency responses developed by the proponent are subject to independent peer review. It was also recommended that exceedances of threshold criteria be required to be reported within a shorter timeframe than recommended by the EPA to ensure early feedback on potential risks to rock art.

In relation to impacts of air emissions on human health, the Appeals Convenor determined that while there are some shortcomings in the EPA's assessment it considered that the EPA's assessment was generally appropriate, and its conclusions were acceptable.

The Appeals Convenor also concluded that the EPA's assessment of impacts to amenity, including noise, was satisfactory.

On 21 January 2022, the Minister for Environment released its decision on the appeal which, while acknowledging uncertainties that exist with regards to impacts to rock art, determined that it was not necessary to remit the proposal for further assessment. The Minister agreed with the recommendations of the Appeals Convenor regarding the variation to conditions described above relating to independent peer review of baseline monitoring, triggers/threshold and associated management responses, and reporting of exceedances.

Ministerial Statement (MS) 1180 was subsequently granted on 24 January 2022.

3.3.2 Ministerial Statement 1180

MS1180 contains conditions that require consideration in the assessment of emissions and discharges from the premises and application of regulatory controls under Part V of the EP Act.

Conditions 3-3, 4-3, 5-3, 7-2, 8-2, 9-2 and 10-2 require revised environmental management plans and conditions 6-3 and 7-1 require supplementary studies. These documents must be submitted at least six months prior to ground disturbing activities. The applicant must not undertake the commencement of ground disturbing activities until the CEO has confirmed in writing that the management plans have been revised and satisfy the conditions.

A summary of conditions relevant to the works approval is included in Table 4.

Condition/s	Condition summary
Air quality management	Conditions of MS 1180 requires that no air emissions from the proposal have an adverse impact accelerating the weathering of rock art within Murujuga beyond natural rates.
Condition 2	Air emissions from the proposal are required to be managed in accordance with an Air Quality Management Plan (as required by condition 2-3 of MS1180) that sets out measures to achieve the above outcome and the following objectives:
	 compliance with all air quality objectives and standards (including those derived from the results of the Murujuga Rock Art Monitoring Program); and
	(2) maintain regional air quality in accordance with the National Environment Protection (Ambient Air Quality) Measure by the minimisation of air emissions from the proposal.
	Measures are to include, but are not limited to:
	 demonstrating that the proposal is consistent with industry best practice;
	 provisions for monitoring emissions, meteorology and ambient ground level concentrations that have potential to impact human health, amenity and rock art; and
	 developing scientifically valid and robust trigger and threshold criteria for comparison with established baseline monitoring data and monitoring compliance with these triggers/threshold.
	The Air Quality Management Plan is required to include a trajectory of air emission reductions for the life of the proposal and identify measures that will be implemented to minimise air emissions, including the adoption of advances in air pollution control technology to ensure consistency with industry best practice.
	MS 1180 also requires that the proponent comply with:
	the trigger or threshold criteria developed under the Air Quality Management Plan
	 requirements of the Air Quality Management Plan; and
	 any air quality objectives and standards including those derived from the Murujuga Rock Art Monitoring Program.
	In the event of exceedance of any specified trigger and threshold criteria, the Applicant is required to report the exceedance and implement response action.
	Condition 2-4 specifies that the proponent must not undertake the Commencement of Operations (which includes commissioning activities) until the CEO has confirmed in writing that the Air Quality Management Plan addresses the requirements of the MS. The Air Quality Management Plan has not yet been approved under MS 1180.
	Discussion on the delegated officer's consideration of air quality impacts in this assessment is outlined in sections 3.3.3 and 3.3.4 below.

Table 4: Summarised conditions of MS 1180 relevant to Part V assessment of the proposal.

Greenhouse gas management	MS 1180 requires that measures are taken to ensure that net greenhouse gas (GHG) emissions do not exceed a series of tapering volumes of CO_{2-e} tonnes, up until 1 July 2049 when net zero tonnes of CO_{2-e} emissions must be achieved.			
plan Condition 3	The proponent has a confirmed Greenhouse Gas Management Plan [<i>Greenhouse Gas Emissions Management Plan, Perdaman Urea Project</i> (Version PCF 5, 4 March 2022)] that that addresses the requirement of MS 1180.			
	The department's EPA Services directorate confirmed that management controls outlined in the Greenhouse Gas Management Plan adequately addresses the conditions of MS 1180 and no further regulation under Part V of the EP Act is required.			
Flora and vegetation	Conditions of MS1180 contain restrictions on the extent of clearing to meet the following environmental outcomes:			
Condition 4	 the extent of native vegetation clearing within the development envelope shall not exceed 73.05ha; 			
	(2) the extent of clearing within the vegetation community identified as Priority 1 (P1) Priority Ecological Community (PEC) – Burrup Peninsula Rock Pile Communities shall not exceed 0.16ha; and			
	(3) to minimise indirect impacts to native vegetation.			
	The applicant has a confirmed Flora Management Plan [<i>Flora Management Plan Perdaman Urea Project Burrup Peninsula, Western Australia</i> (PCF-PD 21 February 2022 – Version 3)] submitted under condition 4-3 that satisfies the requirements of condition 4-7 including provisions relevant to managing impacts to native vegetation from changes to surface water flows, changes to surface water quality and dust.			
	The department's EPA Services directorate confirmed that management controls outlined in the Flora Management Plan adequately addresses impacts to vegetation from dust and surface water and no further regulation under Part V of the EP Act is required.			
Terrestrial fauna management Condition 5	The conditions of MS1180 restrict the applicant from clearing specific vegetation species that may provide habitat to fauna and further impacts to short-range endemic fauna species are to be avoided where possible. The environmental objective specified in the MS is to minimise direct and indirect impacts to the northern quoll, Pilbara olive python and ghost bat within the development envelope (which involves the spatial scope of this application).			
	The applicant is required to implement their confirmed Fauna Management Plan [<i>Fauna Management Plan Perdaman Urea Project Burrup Peninsula, Western Australia</i> (12 May 2022, Rev PCF 4)] that satisfies the requirements of condition 5-3 including the management of impacts from lighting, dust, noise, vibration, and vehicle and machinery movement strikes.			
	The department's EPA Services directorate confirmed that management controls outlined in the Fauna Management Plan adequately address MS requirements regarding impacts to terrestrial fauna from light, noise, vibration and dust and no further regulation under Part V of the EP Act is required.			
Hydrogeological management Condition 6	Condition 6 of MS 1180 required that the proponent implement the proposal to meet the environmental objective of minimising project attributable impacts on groundwater quality, flow direction and/or depth to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.			
	In the event that dewatering is required during construction, the proponent shall prepare a Hydrogeological Management Plan.			
	In accordance with the conditions of the MS, the Applicant provided results of hydrogeological studies quantifying baseline groundwater quality, flow directions and depth which confirmed that no dewatering would be required during the construction of the project.			
Acid sulphate soils Condition 7	As per the conditions of MS1180, the applicant was required to undertake an intrusive acid sulfate soils investigation in accordance with the requirements of DWER's guideline on the <i>Identification and investigation of acid sulfate soils and acidic landscapes</i> (DER, 2015a) at least six months prior to ground disturbing activities.			
	Results from the assessment identified presence of ASS within the supratidal zones between Site C and Site F. If ASS is disturbed during the proposal, it is to be treated and managed in accordance with the requirements the guideline on the <i>Treatment and management of soil</i>			

	and water in acid sulfate soil landscapes (DER, 2015c) as per condition 7-2.
	For the scope of the activities under the assessment of this works approval, the potential risks would involve cut and fill operations including handling and stockpiling of any potential ASS material. The Surface Water Management Plan (SWMP), required by condition 8-2 of MS1180 includes measures that will manage against ASS risk during these activities. This includes the requirements below:
	 stockpiles identified to be ASS contaminated to be located on a crushed limestone 300 mm thick layer with a bunded guard of 150 mm high and will be managed in accordance with CEMP Erosion, Sediment and Surface Water Management Protocol;
	 neutralising and treatment of any stockpiles that may contain ASS;
	 ASS can be stockpiled for up to 70 hours before soil must be treated;
	 capture and management of leachate, treatment of stockpile with lime to neutralise material that will be stockpiled for longer than 70 hours; and
	 restrictions on the re-use of treated ASS material to have a field soil pH of +/-0.5 when compared to field soil pH naturally occurring in background levels.
Surface water Condition 8	Conditions of MS1180 require the implementation of the proposal to maintain the hydrological regimes and quality of surface water so that environmental values are protected.
	The confirmed Surface Water Management Plan [<i>Surface Water Management Plan Perdaman Urea Project Burrup Peninsula, Western Australia</i> (09 May 2022, Rev PCF 3)] required by condition 8-2 contains environmental management requirements for the diversion, collection, conveyance, treatment, recycling and discharge of surface water. It includes a series of specific management strategies that will be applied across the construction, operation and decommissioning phases of the project to avoid and mitigate impacts such as:
	 construction of sedimentation controls such as batters and cut-off drains throughout site;
	 diverting clean surface water from upstream of the works;
	 use of sediment traps, silt fences and other control structures;
	 developing site specific Erosion and Sediment Control Plans for each site within the development area;
	 Run-off collected from hardstand surfaces, conveyor and product storage sheds in the production plant and the port areas will be managed to minimise impacts on surrounding environments, including marine environmental quality.
	 surface water monitoring points located around Site C and Site F to be sampled monthly (during construction works) for metals, nutrients and physical parameters ;and
	 Quarterly groundwater monitoring at locations within Site C and Site F for metals, nutrients, TRH, BTEX and physical parameters.
	The SWMP does not consider the construction of port facilities (such as the jetty or infill of the coastal area for the provision of the wharf) as the Applicant indicates that this is being managed by the Pilbara Port Authority.
	Aspects of the SWMP also detail the management of hydrocarbon emissions that are considered relevant in managing the proposed construction activities, such as requirements to manage spills during refuelling activities. Controls relevant to the management of chemicals and hydrocarbons such as:
	 accidental spills prevented where possible and emergency response actions to remediate accidental spills;
	 maintain and keep spill kits in areas designated for refuelling activities;
	 proposed bunding and storage (110% containment) for fuels/chemicals;
	 containment bunding around vehicle servicing facilities, chemical/fuel storage areas; and
	 commitments that potentially contaminated stormwater (e.g. runoff which contains hydrocarbons) will not be discharged into the environment.

Cultural heritage	Conditions of MS1180 require that the implementation of the proposal achieves the following outcomes:		
Condition 9	 avoid, where possible, and otherwise minimise direct and indirect impacts to social, cultural, heritage and archaeological values within and surrounding the development envelope; 		
	 allow ongoing Traditional Owner and Custodian access to enable traditional activities and connection to culturally significant areas within and surrounding the development area; and 		
	 avoid, where possible, and otherwise minimise direct and indirect impacts to visual and amenity impacts to social and cultural places and activities. 		
	The applicant has a confirmed Cultural Heritage Management Plan [<i>Cultural Heritage Management Plan Perdaman Urea Project</i> (11 May 2022, Rev PCF 6,)] to meet the objectives specified in condition 9-1 and to the requirements of condition 9-2. The plan sets out risk-based management actions for avoiding and/or minimising impacts associated with dust, noise and visual amenity.		
	Revisions of management plans for key environmental factors specified in MS 1180 are required to be made in consultation with the Murujuga Aboriginal Corporation to ensure heritage and cultural values are continued to be considered in a holistic way.		
Light management Condition 10	MS 1180 requires that the proponent shall avoid, where possible, and otherwise use best practice technology and risk-based management actions to minimise nightglow and light overspill from the proposal so that the environmental values of amenity at sensitive locations, including, but not limited to Hearson Cove and Deep Gorge, are protected.		
	The department's EPA Services directorate advised that the applicant has a confirmed Light Management Plan [<i>Light Management Plan, Perdaman Urea Project, Burrup Peninsula, Western Australia</i> (Version PCF 2, 4 May 2022)] that meets the objective specified in condition 10 and addresses the requirements of condition 10-2. The EPA Services directorate advised that no further regulation under Part V of the EP Act is required.		

To ensure heritage and cultural values are continued to be considered in a holistic way, the EPA has recommended that Murujuga Aboriginal Corporation be consulted by the proponent when it submits and reviews management plans for key environmental factors.

3.3.3 Consideration of air quality impacts

In its assessment, the EPA acknowledged that there may be a threat of serious or irreversible damage to rock art from industrial air emissions from the proposal (in particular urea particulates and ammonia) accelerating its natural weathering. The EPA also considered that there is a lack of scientific consensus about potential residual cumulative impacts on the significant environmental values (including social surroundings values) associated with rock art within Murujuga.

Noting these risks and uncertainties, the EPA advised that in making its determination on the proposal, it had specific consideration for the precautionary principle and the principle of intergenerational equity. A cautious approach was adopted whereby the EPA considered options for avoiding serious or irreversible impact to rock art, including whether measures proposed by the Applicant to minimise emissions were adequate, whether additional measures could be applied to prevent impact to rock art, or whether it should recommend that the proposal not be implemented.

The EPA concluded that while the Applicant had demonstrated that best practice pollution control technologies would be adopted to minimise air emissions, it was not satisfied that the measures proposed by the Applicant would ensure that the proposal could be implemented to meet the EPA's objectives relating to air quality and social surroundings.

Consequently, the EPA considered whether to recommend the proposal be implemented or whether additional measures could be applied. The EPA concluded that, in order for the proposal to meet its objectives for air quality and social surroundings, the following additional

measures were required:

- a requirement that no air emissions from the proposal have an adverse impact accelerating the weathering of rock art within Murujuga beyond natural rates;
- that the Applicant be required to specify scientifically valid and robust trigger and threshold criteria for measuring compliance against the above outcome;
- that the Applicant carried out monitoring to establish a baseline against which to compare its contribution to the regional airshed and impacts on rock art from its contribution;
- that the Applicant develop management responses to be implemented in the event of an exceedance of the specified trigger or threshold criteria including the implementation of additional best practice pollution control technologies if they become available before operations commence;
- that the proposal be required to comply with the air quality criteria or standards derived from the Murujuga Rock Art Monitoring Program;
- that the existing Air Quality Management Plan (Rev 2) (AQMP) be reviewed prior to commissioning and the commencement of operations to allow consideration of results of the Murujuga Rock Art Monitoring Program and any environmental quality criteria standards derived from the monitoring program;
- that the review of AQMP demonstrate that the proposal is consistent with current best available technology (BAT), adopts advances in best practice controls where appropriate and sets out a trajectory for the reduction of emissions over the life of the proposal;
- that the AQMP be reviewed within six months of any air quality standard being amended in the future; and
- that MAC be consulted in relation to any review of the AQMP.

Being satisfied that the implementation of the above additional measures would meet the EPA's objectives for air quality and social surroundings, the EPA recommended that these measures be reflected in the conditions applied. This included a requirement for the submission and implementation of a revised AQMP that sets out measures to be implemented consistent with the above controls to ensure that the following objectives relating to the protection of rock art and human health are achieved:

- (1) that no air emissions from the proposal have an adverse impact accelerating the weathering of rock art within Murujuga beyond natural rates;
- (2) compliance with all air quality objectives and standards (including those derived from the results of the Murujuga Rock Art Monitoring Program); and
- (3) maintain regional air quality in accordance with the National Environment Protection (Ambient Air Quality) Measure by the minimisation of air emissions from the proposal,

Noting the EPA's conclusions in EPA Report 1705, the outcome of the appeal (Appeal 034/2024) and the conditions applied under MS 1180, the delegated officer considers that risks associated with impacts to rock art and human health have been appropriately considered under Part IV of the EP Act. DWER's *Guidance Statement: Setting Conditions* states that conditions imposed under Part V of the EP Act "*will not unnecessarily duplicate requirements imposed on licensees directly by the EP Act or another written law*". The delegated officer considers that MS 1180 combined with the regulatory framework established under section 3.2 of this report, are appropriate for assessing and managing potential impacts to rock art.

It recognised, however, that there is an expectation that regulatory controls be applied under Part V of the EP Act. EPA's Assessment Report 1705 identified that, in addition to controls

recommended under Part IV of the EP Act, there is a requirement for air emissions from the proposal to be regulated under Part V, on the provision that Part V regulation is not inconsistent with the conditions of MS 1180. Further advice sought from the EPA confirmed that the Part V approval should, for example include stack emission limits for all air emissions from the plant that are commensurate with any limits established from the Murujuga Rock Art Monitoring Program (if available) or, at a minimum the use of best practice technology and the proponent's proposed stack emission concentrations. The delegated officer notes that emission concentrations and the application of best practice pollution controls have been considered in the EPA's assessment and conditioned under MS 1180 which includes the implementation of the revised AQMP.

The EPA also noted that there is a requirement that any approval granted under Part V of the EP Act include a mechanism by which emission limits can be implemented promptly in response to more stringent criteria becoming available in response to the Murujuga Rock Art Monitoring Program.

The delegated officer acknowledges the EPA's advice regarding the role of Part V instruments in regulating air quality impacts, particularly in terms of its role in the implementation of the environmental quality criteria and standards derived from the Murujuga Rock Art Monitoring Program. Noting this, the delegated officer considers the primary role of the works approval, and subsequent licence, is to support the implementation of the conditions of MS 1180 to ensure that objectives regarding the protection of rock art and human health are achieved.

The delegated officer therefore considers that no assessment of risks associated with air emissions is required under Part V of the EP Act noting that this has been effectively considered by the EPA under Part IV of the EP Act. Conditions will be applied on the works approval and licence where applicable in line with the expectations outlined above and on the provision that they are not inconsistent with the conditions and requirements specified under MS 1180. Controls that may be considered under Part V of the EP Act include:

- infrastructure controls consistent with the application of best practice pollution control technology considered by the EPA;
- emission limits, consistent with the emission concentrations considered by the EPA; and
- monitoring requirements to ensure that point source emissions comply with specified limits.

3.3.4 Authorising commissioning

As part of the application, the Applicant has requested authorisation to conduct commissioning activities under the works approval. An Environmental Commissioning Plan was included in the works approval application which indicates that commissioning activities will occur from April 2026 until January 2027. Commissioning is expected to commence following mechanical completion and is broken down into the following stages:

- Pre-commissioning (functionality testing of equipment);
- Commissioning (start-up and introduction of fluid); and
- Environmental Commissioning (first 12 months of steady state operations).

Condition 2-4 of MS 1180 specifies that "The proponent must not undertake the Commencement of Operations until the CEO has confirmed in writing that the Air Quality Management Plan submitted under condition 2-3 addresses the requirements of condition 2-3."

"Commencement of Operations" is defined in MS1180 as "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."

At the time of making a determination on this works approval application, a revised AQMP had

not been submitted to the EPA under Condition 2-4. Noting the requirement of Condition 2-3 of MS 1180 which specifies that the revised AQMP is required to be submitted "not more than six months prior to the planned Commencement of Operations", submission of the revised AQMP is not expected until construction is nearing completion (and after the requirement for works approval to be obtained under Part V of the EP Act).

In accordance with DWER's *Guidance Statement: Setting Conditions*, conditions of a Part V works approval must not be "...contrary to, or otherwise than in accordance with, an *implementation agreement or decision under Part IV of the EP Act.*" Considering the requirements of MS1180, the delegated officer has determined that authorising commissioning and time limited operations would be contrary to the decision made under Part IV of the EP Act. As such, the conditions of the works approval shall only authorise the construction of plant and equipment, and does not authorise any activities (or emissions) associated with commissioning and time limited operations.

The Applicant will be required to apply to amend the works approval to request authorisation of commissioning and time limited operations. The delegated officer will not be able to make a determination on this application until condition 2-4 of MS 1180 has been met, i.e. "until the CEO has confirmed in writing that the Air Quality Management Plan submitted under condition 2-3 addresses the requirements of condition 2-3".

Key findings: In accordance with DWER's *Guidance Statement: Setting Conditions*, conditions of a Part V works approval must not be "…contrary to, or otherwise than in accordance with, an implementation agreement or decision under Part IV of the EP Act." Further, that conditions "will not unnecessarily duplicate requirements imposed on licensees directly by the EP Act or another written law."

Based on conditions applied through MS 1180, the delegated officer has determined not to unnecessarily duplicate the requirements of MS 1180, or reassess the following Environmental Factors already assessed through EPA Assessment 1705:

- Greenhouse gas emissions;
- Acid sulfate soils;
- Terrestrial fauna, including potential impacts from noise and vibration;
- Flora and vegetation, including potential impacts from dust and changes to surface water quality and/or groundwater regimes;
- Surface water management as it relates to diversion, collection, conveyance, treatment, recycling and discharge of surface water (discussed further in section 5.2.1);
- Groundwater protection as it relates to impacts from acid sulphate soils and dewatering; and
- Light management.

The delegated officer has considered the above information relating to the regulatory framework associated impacts from air emissions and has determined the following:

- There are multiple industries (including shipping within the Dampier Port) located on Murujuga and surrounds with discharges to air which could potentially have an adverse impact on rock art on Murujuga and as such a coordinated approach to regulating impacts to rock art is most appropriate.
- A comprehensive legislative framework exists for the protection of rock art which includes regulatory controls applied at both State and Federal levels.

- The Murujuga Rock Art Strategy establishes the long term basis for coordinated monitoring and analysis of changes to rock art on Murujuga and, if appropriate, implementation of management or mitigation measures. Information from the monitoring will be used to determine whether further regulation of emissions from industries operating on Murujuga and surrounds is required. Interim environmental quality criteria are expected to be delivered mid-2024.
- Impacts on rock art and human health were considered by the EPA in its assessment of the proposal and included consideration for the precautionary principle and principle of intergenerational equity.
- The EPA determined that the proposal would meet its objectives relating to air quality and social surroundings provided that additional measures are implemented. These additional measures have been conditioned under MS 1180.
- Regulatory controls applied under Part IV of the EP Act in conjunction with the legislative framework established under section 3.2 of this report, are appropriate for assessing and managing the potential impacts to rock art and human health.
- On advice of the EPA, regulatory controls relating to air emissions will be applied under Part V of the EP Act to support the implementation of MS 1180 and ensure that the environmental outcomes and objectives established under Part IV of the EP Act relating to human health and rock are achieved. However, no further assessment of risk has been undertaken.
- Commissioning activities and time limited operations are not authorised under this works approval.

3.3.5 Ministerial Statement 567 and 594

Operation of the MUBRL is regulated under MS 567 and MS 594 which were granted for the construction and operation of the Water Corporation's Desalination and Seawater Supplies Project. The proposal includes provision of desalination plants and the provision of a seawater supply system, brine discharge to King Bay (via the MUBRL), and acceptance of treated industrial and domestic wastewater into the brine discharge stream. Through MS 594, the Water Corporation is authorised to supply up to 280 ML/day of seawater and discharge up to 208ML/day of brine to King Bay. It also allows for the discharge of approximately 0.8ML/day of process water and 0.04ML/day of domestic wastewater from other industries on the Burrup.

MS 594 requires the implementation of consolidated environmental management commitments (detailed in Schedule 2 of MS 594). Commitments requiring consideration in the assessment of brine and wastewater discharge from the premises to the MUBRL are summarised in Table 5.

Reference No.	Environmental Management Commitment	Delegated Officer consideration
6	 Brine and wastewater effluent will only be accepted from industrial process plants: 1. for which licence and/or Ministerial Conditions (Part IV and V) have been issued; 2. that have provided appropriate toxicity and environmental fate data for all components of the effluent to the satisfaction of the DEP (now DWER)/EPA; and 	Discharge of treated wastewater and brine to the MUBRL was considered in EPA Report 1705 for the Part IV assessment of Project Ceres, and previously in Bulletin 1044 for the s46 assessment undertaken for upgrades to the Water Corporation's Desalination and Seawater Supplies Project. In its report, (Report 1705) the EPA stated that "EPA expects that the Part V licence for the proposed plant would include wastewater quality criteria and limits which are consistent with the requirements of the Water Corporation's acceptance

Table 5: Consideration of environmental management commitments in Schedule 2 of MS 594 relevant to this application

	 which only utilise DEP/EPA approved process additives (e.g. antiscalants, corrosion inhibitors, etc.). 	criteria in the Technical Compliance Advice Bulletin Ref: PM20992155". The risk assessment has considered the wastewater discharge and will have considerations for these controls consistent with the above advice of the EPA where necessary.
8	 Prepare an Environmental Management Plan in consultation with the system users and DEP/EPA. The Plan will encompass: Requirements for monitoring (of effluent, seawater, sediments and biota); Requirements, evaluation and reporting; and 	The Water Corporation developed the <i>Burrup</i> <i>Peninsula Desalinated Water and Seawater</i> <i>Supplies Project: Operational Marine Environmental</i> <i>Management Plan</i> (OMEMP) (BMT Oceanica 2016). The plan outlines the approach for managing discharge of combined effluent streams into the MUBRL to achieve specified environmental objectives via a programme of infield and field- based monitoring.
	 Mechanisms for joint management of the system by the proponent and system users. Implement the plan 	The specified environmental objectives are based on the EPA's Pilbara Coastal Water Quality Consultation Outcomes (DoE 2006) report which recommended setting a high level of ecological protection for King Bay in areas outside of the
12	 Brine emissions from Water Corporation desalination facilities will be controlled to the following: Effluent discharge temperature to be less than 2C above the inlet seawater temperature for 80% of the time and not exceeding a maximum limit of 5C above unless otherwise agreed with DEP; The concentration of oxidizing biocide in the effluent discharge to be less than 0.1mg/L; and The concentration of anti-scalant in the effluent discharge to be less than 2mg/L, unless otherwise agreed with the DEP. The proponent in conjunction with system users, will manage the total effluent discharge to meet the above criteria. 	MUBRL outfall mixing zone, and an area of low ecological protection within the mixing zone. The OMEMP sets end-of-pipe trigger levels which act as initial indicators that the environmental objectives may not being met. The triggers were back calculated from the high protection trigger levels (ANZECC 99% level of protection) and take into consideration the predicted dilutions achieved by the outfall at the current discharge rate. Although the OMEMP sets a framework for managing the cumulative discharge from the MUBRL and specifies water quality triggers for the combined effluent discharge, EPA Report 1705 recommends that wastewater quality criteria and limits are specified under the respective Part V licence. Noting this advice, the delegated officer has applied appropriate regulatory controls within this works approval as necessary (i.e. infrastructure requirements) and will consider ongoing regulatory controls within future works approval amendments (for commissioning and time limited operations) and operating licence as necessary.

Key Finding: Based on conditions applied through MS 567 and MS 594, the delegated officer has determined that impacts associated with cumulative discharge of wastewater from industry to King Bay via the MUBRL have been appropriately considered under Part IV of the EPA Act. The delegated officer has determined not to reassess these emissions or unnecessarily duplicate the requirements of MS 567 and MS 594.

Noting recommendations of the OMEMP and EPA Report 1705 that individual contributions to the MUBRL should be regulated under their respective Part V instruments, the delegated officer will apply necessary conditions on the works approval (where necessary) and subsequent licence for managing the Applicant's discharge, noting that commissioning activities and time limited operations are not authorised under this works approval.

Section 5 provides further discussion of the Applicant's contribution to the discharge and proposed emission controls that has informed the delegated officers determination of potential works approval and/or licence conditions.

4. Air emissions

4.1 Point source emissions to air

4.1.1 Sources of emissions and controls

Primary emissions from the premises are:

- combustion emissions such as oxides of nitrogen (NO_x), carbon monoxide (CO), sulphur oxides (SO_x), volatile organic compounds (VOCs) and particulates from the Fired Heaters, power generators and flares;
- ammonia (NH₃) and urea particulates (dust) generated from the granulation plants;
- fugitive urea dust associated with handling of urea product within storage sheds, transferring material on conveyors and ship loading.

Emissions of ammonia may also be associated with emergency venting.

Under normal operations, the proposal will account for all urea emissions in the Murujuga airshed and over 90% of ammonia emissions (EPA Report 1705).

Syngas treatment and ammonia production:

Natural gas (syngas) is converted to mainly CO and hydrogen (H_2) using catalytic reforming at high temperature. Heat for this reaction is generated by a gas fired heater (Fired Heaters) within the ammonia unit.

The process generates combustion emissions from the Fired Heater comprising of NOx and relatively low levels of CO, SO_x, VOCs and particulates. The Fired Heater is fitted with low NOx emission burner designed to achieve a NOx concentration of 134mg/m³ (referenced at 3% O₂,0 degrees Celsius and 1 Bar). Waste gas is emitted via a Common Stack 75m high stack fitted with a Continuous Emissions Monitoring System (CEMS) to continuously monitor emissions of NO₂, SO₂ and CO.

Other design elements for reducing emissions from the plant include:

- The Applicant proposes to use autothermal reforming (ATR) technology. ATR is associated with lower NOx emissions due to the smaller fired heater required compared to conventional steam reforming, and lower energy requirements.
- High integrity sealing will be used on syngas and refrigeration compressors with a nitrogen barrier to minimise fugitive ammonia loss.
- A cryogenic wash unit is included in the ammonia plant design to minimise inerts and minimise purging to fuel gas.
- The ammonia plant is designed so that there is no venting of ammonia during normal operations. Any vented ammonia is directed to the flare for thermal oxidation (combustion).
- Sulphur emissions are expected to be minimal noting the low sulphur content of the natural gas used as feed gas. Remaining sulphur contained within the feed gas must be removed to avoid damage to downstream catalysts. Sulphur compounds are hydrogenated to H₂S and removed via absorption. No H₂S streams emitted are to atmosphere; these are contained within the catalyst.

Urea production:

The primary source of emissions from the production of urea is the granulation process. Emissions of NH_3 and urea dust from each granulator train (Urea Train 1 and Urea Train 2) are discharged via individual granulator stacks (Granulator Vent Stacks 2620-X-208 and 2720-X-

208) situated 75m above ground level. Each granulator is fitted with a scrubbing system to treat waste gas to the following emission concentrations:

- NH₃ concentration of 20mg/Nm³ (with a design target of 15mg/Nm³); and
- Particulate (dust) concentration of 25mg/m³ (with a design target of 20mg/m³).

The scrubbing systems are designed by thyssenkrupp Fertiliser Technology (tkFT) and comprise of two stages dedicated to the separate treatment of NH₃ and urea dust. Process condensate and urea solution are used for the abatement of urea dust. Urea solution is recovered and recycled into the urea melt train. Acid scrubbing using sulfuric acid is used for the treatment of NH₃. Ammonium sulphate solution is a by-product of the scrubbing process and is stored onsite for sale as a fertiliser product.

Air quality modelling also considered emissions associated with the urea melt train absorber vents however the Applicant has advised that the absorber vents are no longer considered as emission sources. The selection of the SnamprogettiTM urea melt technology results in emissions associated with absorber vents being redirected to the Granulator Stacks for treatment via the scrubbing system. A result of this is a reduction in emissions of NH₃ compared to those modelled and considered by the EPA in its assessment of the proposal under Part IV of the EP Act.

Power generation:

Similar to the Fired Heater, emissions are associated with combustion of gas and are primarily NO_x with relatively small quantities of CO, SO_x, VOCs and particulates.

Exhaust from the GTGs will be emitted via two primary stacks associated with the HRSG:

- HRSG Stack of GTG 3610-TG-001-A (Unit 3600); and
- HRSG Stack of GTG 3610-TG-001-B (Unit 3600).

With the HRSG online, flue gas from the GTGs is treated via Selective Catalytic Reduction technology and dry low NO_x burners to achieve a NO_x concentration of 15ppmv. With the HRSG offline, waste gas exits via the Bypass Stack and is only subject to treatment via dry low NO_x burners. The Applicant has indicated that flue gas from the Bypass Stack is expected to be much warmer (due to the heat recovery being offline) resulting in greater buoyancy of the plume and better dispersion.

The Applicant advised that there is some ammonia slippage associated with the operation of the SCR technology (0.6g/s for each SCR). As discussed above, implementation of the Snamprogetti[™] urea melt technology has removed ammonia emissions associated with the absorber vents (1.8g/s each) and therefore, there is no overall net increase in ammonia emissions associated with operation of the SCR technology.

Both stacks are fitted with CEMS for monitoring emissions of NO_x, CO and SO_x.

Flaring

The plant has a flaring system designed to ensure the safe disposal of process gas during upset conditions, e.g. during start-up and shutdown (planned or emergency). Planned shutdowns are expected to occur every three years with emergency shutdowns expected to occur not more than five times per year. No flaring is expected at nameplate urea production or during normal operations.

The flaring system consists of 7 flares as outlined in Table 6.

Flare type	Location	Composition of gas sent to flare	Source
Syngas Flare (1)	Dedicated flare area	Fluids containing natural gas, CO ₂ and water vapour. No ammonia is directed to the Syngas Flare.	Mainly syngas and power units
Ammonia Flare (1)	With Syngas Flare on common derrick structure	Ammonia vapours. Ammonia vapours are segregated from other releases potentially contaminated with CO ₂ to reduce the risk of carbamate formation.	Ammonia synthesis loop and the ammonia refrigeration circuit
Ammonia Storage Tank Flare (1)	Ammonia storage tank area	Ammonia	Ammonia storage tank and relevant boil off gas (BOG)
Primary Urea Flare (2 in total, 1 per Urea Train)	Inside urea trains area	Ammonia, methane, inert gases, CO and water vapour.	Medium pressure (MP) vent and Vacuum Vent (in the event of granulator shutdown)
Secondary Urea Flares (2 in total, 1 per Urea Train)	Inside urea trains area	Ammonia, methane, inert gases, CO and water vapour.	Vent from various tanks as well as pure ammonia streams from safety valves in urea melt unit.

Table 6: Overview of proposed flaring system.

Venting

Vented ammonia may occur as a result of Pressure Safety Valve (PSV) releases within the Urea Trains. The Applicant has advised that the nature of this vent stream means it can't be effectively sent to flare for thermal oxidation (combustion) or treated in the Granulator scrubbers. As a result, PSV releases associated with the urea melt units will be vented via a Blowdown Stack situated 75m above ground level. Each urea train will be designed with a Blowdown Stack.

PSVs are designed to open for the safety of equipment when pressure cannot be maintained in a particular vessel. Emissions are generally short term (2-5 minutes) and a result of emergency release required for the safe operation of the plant. Releases via the blowdown stack are generally low frequency events and only expected under emergency conditions but can be associated with higher emissions than those expected during normal operations.

PSVs form a critical component of the plant's safety management system and are required to maintain safe operation of the plant and prevent major incidents.

No venting of ammonia from the ammonia synthesis unit will occur. All vented gas from the ammonia units will be directed to flare.

As discussed in section 3.1, the premises is identified as a Major Hazard Facility and subject to regulation under the *Dangerous Goods Safety Act 2004* and Dangerous Goods Safety (Major Hazard Facilities) Regulations 2007 which requires the Applicant to operate the facility in accordance with an approved safety report.

Among other things, the safety report must demonstrate that venting emissions will be managed appropriately to minimise impact on surrounding people, property or the environment, including offsite receptors. The risk assessment that forms the basis of the safety report is required to consider modelling of any plume dispersion associated with venting to determine potential impacts to receptors. In its assessment of the safety report, DEMIRS will have consideration for preventative measures in place to mitigate the likelihood of venting occurring as well as measures in place to manage potential impacts should venting be required.

The Applicant has stated that high pressure alarms will be installed to trigger at lower pressures of those set for the PSVs to alert operators of any upset in operating conditions. Alarmed ammonia sensors will also be situated at key locations to alert and activate emergency response teams. This includes installation of four ambient air analysers along the boundary fence to continuously monitor ammonia.

4.1.1 Comparison with best practice emissions controls:

In its report, the EPA assessed the proposal against current best practice technology and determined that the proposed measures and emission concentrations aligned with current best practice. Table 7 provides a summary of the emission design specifications compared against current best practice standards as considered by the EPA.

Table 7: Proposed emission concentrations compared with relevant inde	ustry
benchmarks.	

Emission source	Emission	Concentration at stack exit point	EFMA	European Commission ^[3]
Fired Heaters	NOx	134mg/Nm ³	150mg/Nm ^{3 [1]}	-
Granulator	NH ₃	20mg/Nm ³ (Target: 15mg/Nm ³)	50mg/Nm ^{3 [2]} 0.25kg/t of urea	5 – 35mg/Nm ³
	РМ	25mg/Nm ³ (Target: 20mg/Nm ³)	50mg/Nm ^{3 [2]} 0.25kg/t of urea	15 – 55mg/Nm ³
GTG	NOx	32.3mg/Nm ³ (15ppmv)	-	15 – 40mg/Nm ³

Note 1: European Fertilizer Manufacturers Association (EFMA) Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 1 of 8 – Production of Ammonia

Note 2: European Fertilizer Manufacturers Association (EFMA) Best Available Techniques for Pollution Prevention and Control in the European Fertilizer Industry Booklet No. 5 of 8 – Production of Urea and Urea Ammonium Nitrate

Note 3: European Commission Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilisers

4.2 Fugitive urea dust

Fugitive particulate (dust) emissions from the operation of the premises are likely to consist of urea dust generated from the storage and handling of urea granules. Key activities resulting in the generation of dust include storage of urea granules in stockpiles, reclaiming stockpiled material, transfer of material via conveyors and ship loading activities.

4.2.1 Applicant controls

In order to maintain product integrity, the Applicant proposes to install an enclosed urea handling circuit to ensure that urea granules remain dry throughout the storage, transfer and loading process. The enclosed system will also provide control of fugitive urea dust.

Measures proposed by the Applicant to control fugitive urea dust are listed below:

- Urea produced will be in a granular form. Granulation technology results in a stronger and more consistent urea particle size than prills and thereby is less likely to generate dust.
- Urea granules are treated with urea formaldehyde (less than 1% per mass) to improve the particle strength and reduce dust during transport.
- Stockpiled material is stored within fully enclosed sheds equipped with air-lock doors at each entry point (one at each end of the shed).

- Stacking and reclaiming of stockpiled material is automatic (unattended) and occurs within the enclosed storage shed.
- Fall height within the storage shed is limited to avoid dust formation.
- All conveyors are fully enclosed. The seaside of the conveyor 4150-CV-003 jetty gallery will feature a flexible barrier to allow the ship loader conveyor ability to traverse along its length while still containing fugitive dust.
- All conveyors will be fitted with a dual cleaning system comprising of a primary and secondary cleaner at the driver head and a V-plough return belt cleaner to minimise dust generated by carry back.
- The granulation plant will include de-dusting points on the top of the bucket elevator and vibrating screens discharge point on the first conveyor belt, and that are connected to the dust scrubbing unit located on the granulator stack.
- All transfer chutes will be enclosed and fitted with entry and exit curtains. Additionally, all transfer points will be located in a fully enclosed transfer tower. Fugitive dust generated from transfer of material is directed to a dust extraction system (bag filters with high efficiency filtration (99%) and fitted with automatic pulse air cleaning systems).
- Ship loading activities are limited to 1 2 ships per week.
- Dust generated at the boom conveyor loading point and the boom conveyor head chute will be directed to a dust collection system.
- The ship loader is slewing and luffing with a telescopic boom to allow controlled loading within the vessel.
- Transfer of product from the ship loader boom into the cargo hold will be via a telescopic cascading chute to minimise drop height and fitted with a shroud to collect dust emissions.
- Regular inspections and maintenance of dust control equipment to ensure its functionality.

4.2.2 Comparison with best practice:

In its consideration of whether best practice controls have been applied, the delegated officer has had regard for the following documents which set out a range of dust controls that can be applied to materials handling activities.

- draft Guideline: Dust Emissions (DWER 2021);
- Mines Safety Bulletin 157 Minimising dust generation during crushing, screening and conveying (DMIRS 2019); and
- Dust Control Handbook for Industrial Minerals Mining and Processing (NIOSH 2019).

The NIOSH document identifies that efforts for controlling dust emissions should follow an engineering hierarchy of controls (Figure 3). The hierarchy considers elimination of emissions as the most effective control followed by substitution and engineering controls to manage emission at the source. Managing emissions at the receptor is considered the least effective control.



Figure 3: Hierarchy of controls (NIOSH 2019)

The delegated officer has reviewed the controls proposed by the Applicant and considers that they generally align with hierarchy approach described above noting that elimination controls have been applied by incorporating enclosed storage and handling systems in the project design. This is complemented by engineering controls (e.g. dust extraction systems, etc.) and management tools such as monitoring.

As outlined in the draft *Guideline: Dust Emissions*, the selection of appropriate dust controls is dependent on site-specific features of an operation. This includes taking into consideration the technical feasibly of practically implementing certain control measures. The delegated officer notes that other dust controls commonly used at bulk handling facilities may not be practically implemented at the premises, for example, using water for suppressing dust is not possible due its impact on product quality.

The hierarchy of control also considers administrative controls that may include air quality and dust management plans and consideration of meteorology in tandem with proactive and reactive response to real-time ambient dust monitoring. In accordance with MS 1180, the Applicant is required to develop and implement a revised AQMP which includes protocols for measuring operations against specified trigger and threshold criteria and implementing management response if these are exceeded.

Key findings: The delegated officer has reviewed available information relating to air emissions and determined the following:

- As outlined in section 3.3.3, the delegated officer has not reassessed the risks associated with air emissions as this has been completed by the EPA in its assessment of the proposal under Part IV of the EP Act.
- In its consideration of the appeal on EPA Report 1705, the Appeals Convenor acknowledged that while emissions resulting from upset conditions would likely be higher, emissions from the proposal do not contribute significantly to total emissions within the airshed. Noting this advice, the delegated officer considers that emissions associated with flaring and venting have been appropriately considered under Part IV of the EP Act and as such, no further assessment of risk has been undertaken.
- The DEMIRS regulatory framework for Major Hazard Facilities appropriately manages the plant's safety systems and the risk of ammonia releases associated with venting.
- In its report, the EPA determined that the proposed ammonia and urea production technology and associated air pollution control technology generally align with expectations of best available technology.

- MS 1180 requires the Applicant to submit a revised AQMP specifying emissions concentrations and pollution controls, as well as a comparison of these with current industry best practice, with the expectation that advancements in technology will be adopted to minimise emissions.
- In relation to fugitive dust emissions, the Applicant has applied the emissions control hierarchy and the pollution control measures proposed by the Applicant generally align with industry guidance relating to the minimisation of fugitive dust.
- Noting advice provided by the EPA in its report (EPA Report 1705), the delegated
 officer has elected to include infrastructure requirements on the works approval relating
 to the control of air emissions consistent with the Applicant's proposed pollution
 controls and those considered by the EPA in its determination of the project under s38
 of the EP Act.
- Conditions may be amended in the future to align with the content of the AQMP as approved under MS 1180.

5. Premises wastewater and discharges to the MUBRL

As discussed in section 2.2.4, wastewater from seawater cooling, desalination and demineralisation is combined with other wastewater streams generated on the premises and directed to the MUBRL for disposal to King Bay via an ocean outfall.

Discharge to the MUBRL is subject to meeting water quality criteria specified by Water Corporation as a requirement of MS 594. Off spec wastewater that does not meet the specified criteria is directed to a lined storage pond (Saline Water Pond) and held for sampling and analyses prior to discharge to the MUBRL to ensure the water quality specifications are being met. If waste within the Saline Water Pond does not meet the water quality requirements, it is transferred to a second storage pond (Saline Evaporation Pond) for disposal via evaporation.

The seawater blowdown and concentrated brine provide a continuous discharge stream to the MUBRL. Other wastes that may be received by the Saline Water Pond and proposed for discharge to the MUBRL on an intermittent basis are described below:

- Stormwater from paved process areas that could be contaminated by spills and leaks from process activities (i.e. first flush from paved areas) are directed to a dedicated drainage system (Potentially Contaminated Water System) and then directed to the Saline Water Pond.
- Potentially oil-contaminated stormwater from curbed/bunded areas (e.g. in the case of rain or spillage) is collected in dedicated sumps and directed to a corrugated plate interceptor (CPI) for treatment. Treated oily water is stored in a concrete pit (Treated Water Pit) prior to discharge to the Saline Water Pond. Water is sampled to confirm it achieves a total hydrocarbon content of <5ppm prior to discharge to the Saline Water Pond.
- Ultrafiltration effluents and neutralised polishing effluents from condensate treatments.
- Incidental material from chemical sumps and pits within the Urea Units.
- Effluent from chemical pits within the urea unit.

Figure 4 provides a schematic overview of the premises wastewater circuit.

The applicant estimates that the premises will contribute approximately 58.9 ML wastewater to the MUBRL per day (excluding intermittent releases from filter backwashing). This volume is based on the plant operating for 330 days per year, taking into consideration periods when the plant is not operating due to planned or unplanned shutdowns. Seawater blowdown associated with plant cooling makes up the majority of the discharge volume. Individual waste streams that make up the discharge are outlined in Table 7.

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Figure 4: Wastewater schematic showing monitoring point locations

Description of discharge	Fate of discharge	Frequency of discharge	Estimated flowrate ³ / volume
Seawater cooling tower blowdown	Discharge is normally directed to the MUBRL.	Continuous	2218 m ³ /hr
Brine from desalinisation/ demineralisation	Discharge is normally directed to the MUBRL. If water quality criteria not met, redirected to the Saline Water Pond.		75 m ³ /hr
Potentially contaminated stormwater from paved areas ¹	First flush is collected in dedicated sumps and then directed to the Saline Water Pond.	Intermittent	110 m ^{3/} hr 2,750 m ³ (total first flush event)
Potentially contaminated oily water from curbed areas (bunded areas) ¹	Collected and treated via the oily water treatment package, then stored in the Treated Water Pit prior to discharge to the Saline Water Pond	Intermittent	55 m ³ /hr 110 m ³ is the working capacity of the Treated Water Pit
Ultrafiltration and neutralised polishing effluents ²	Directed to the Final Observation Basin prior to disposal to the MUBRL	Intermittent	500 m ³ (35m ^{3/} hr)
Filter backwashing	Directed to the Saline Water Pond	Intermittent	300 m ³ /hr (average)
Incidental runoff from chemical sumps / pits within the Urea Units	Directed to the Saline Water Pond	Intermittent – when pits and sumps are full	16.5 m ³ /hr (33 m ³ total)
Treated sewage	Discharge is normally directed to the MUBRL. Treated water that does not meet water quality criteria will be redirected back to the Sewage Balance tank for reprocessing.	Continuous	24 m ³ /day (40 m ³ /day peak)

Table 7: Summary of proposed waste streams discharged from the premises to the MUBRL.

Note: 1: As proposed at the time of assessment and subject to further review between the Applicant and the Water Corporation.

Note 2: Polishing neutralised effluents are generally <10,000 TDS (mostly sodium sulphate) while ultrafiltration concentrates comprise of seawater with solids removed and small amounts of cleaning chemical salts (sodium sulphate).

Note: 3: Estimated flow rates for intermittent discharges are associated with working capacity of associated infrastructure (i.e. collection systems, transfer pumps, etc.).

Water contaminated with MDEA (amine) will not be disposed of to the MUBRL. Amine contaminated water will be contained in a dedicated underground drainage system for reuse within the plant or disposed of offsite. Carriage and disposal of wastes offsite is subject to the requirements of the Environmental Protection (Controlled Waste) Regulations 2004.

Process condensates generated by the ammonia and urea units are collected in dedicated storage containers/tanks for reuse within the plant. Condensate which does not meet specifications is stored separately and directed to polishing units to enable reuse. Waste effluents from the polishing units are discharged to the Saline Water Pond.

5.1 Criteria for disposal

Discharge of wastewater via the MUBRL is managed by Water Corporation and is subject to requirements of MS 594 (refer to section 3.3.5). The *Burrup Peninsula Desalinated Water and*
Seawater Supplies Project: Operational Marine Environmental Management Plan (OMEMP) developed by Water Corporation, as required by MS 594, outlines the approach for managing the discharge of combined effluent to the MUBRL to achieve specified environmental objectives via a program of in-field and field-based monitoring.

The specified ecological objectives in the OMEMP are based on the *Pilbara Coastal Water Quality Consultation Outcomes* (DoE 2006) report which recommended setting a high level of ecological protection for King Bay in areas outside of the MUBRL's 40 m outfall mixing zone, and an area of low ecological protection within the mixing zone (1 ha). End-of-pipe trigger levels have been set through the OMEMP and act as initial indicators that the environmental objectives may not being met (Table 9). Triggers for certain toxicants such as ammonia and metals (with the exception of Arsenic (III) and (V), Cadmium, Mercury and Selenium) were back calculated from the high protection trigger levels (ANZECC 99% level of protection) and take into consideration the predicted dilutions achieved by the outfall at the current discharge rate.

In its report, the EPA noted that the quality of wastewater discharged to the MUBRL is required to meet the requirements of the Water Corporation's *Technical Compliance Advice Bulletin Reg. PM20992155* (Water Corporation 2019) which are derived from the OMEMP.

Parameter	Units	Water Corp OMEMP Triggers
Ammonia	µg/L	<1,700
Arsenic III	µg/L	<140
Arsenic V	µg/L	<275
Cadmium	µg/L	<36
Chromium III	µg/L	<459
Chromium IV	µg/L	<8.5
Cobalt	µg/L	<61
Conductivity	μS/cm	<75,000 (55,000mg/L)
Copper	µg/L	<11
E. coli	MPN/100 mL	13,000
Lead	µg/L	<134
Mercury	µg/L	<1.4
Nickel	µg/L	<427
Oxidation-reduction potential	mV	<228
рН	pH units	6.9 - 8.3
Selenium	µg/L	<183
Silver	µg/L	<49
Turbidity	NTU	<63
Temperature	°C	Effluent discharge temperature to be less than 2 °C above the inlet seawater temperature for 80% of the time and not exceeding a maximum limit of 5 °C above
Thermotolerant coliforms	CFU/100mL	<910
Vanadium	µg/L	<3050
Zinc	µg/L	<419

 Table 8: Wastewater quality criteria for discharges via the MUBRL.

5.2 Applicant controls

Advice from Water Corporation is that wastewater discharged to the brine MS 594 must comply with limits specified in Table 9, and that wastewater must be withhold discharging wastewater from the premises to the MUBRL that would breach the wastewater quality specification in Table 9, and if necessary treat the wastewater to ensure complies with the criteria in Table 9 prior to discharging to the MUBRL.

The Applicant has advised, where water does not comply with the above criteria, it will be directed to the Saline Water Pond. Water within the Saline Water Pond will be tested to assure MUBRL criteria will be fully met after mixing with other continuous streams directed to MUBRL during normal operation.

The Applicant has advised that sampling of the Saline Water Pond takes place at a sampling point on the pump discharge line. The pump will be operated in recirculation mode for sampling and also for mixing the pond contents. If it is deemed possible to meet the MUBRL limits after mixing with the overall discharge from site, it will be diverted to MUBRL. This operation is carried out every time the saline pond contents are planned to be transferred to MUBRL.

If it does not meet the criteria it will be directed to the Saline Water Evaporation Pond for evaporation disposal. Alternatively, discharge to the MUBRL will be delayed until wastewater is diluted by the receipt of additional wastes. Wastewater within the pond would be subject to retesting to verify it conforms with set criteria prior to discharge.

Continuous monitoring will be conducted at the MUBRL tie in point via on online monitor (for conductivity (TDS), Turbidity (suspended solids), ammonia, pH, temperature and oxidation reduction potential), and weekly sampling of the MUBRL tie in is also proposed that includes the full suite of parameters listed in Table 9. As seawater blowdown and concentrated brine form the continuous discharge stream to the MUBRL, the applicant advises that should TDS of brine stream exceed expected levels, brine will be automatically diverted to the Saline Water Pond.

Sampling of the Saline Water Pond is proposed to be conducted prior to any planned discharge event, analysed for the range of parameters listed in Table 9, with sample analysis to occur at the onsite laboratory for the parameters listed in Table 9. The Applicant indicates that analysis will be completed within a few hours and that additional discharge to the Saline Water Pond during this time that would result in a significant change in the wastewater composition is unlikely. In the event that additional waste is accepted, sampling will be repeated. The applicant has advised that water from the Saline Water Pond will only be discharged to the MUBRL once it is confirmed that water within the pond meets the acceptance criteria for discharge (after mixing with other continuous streams directed to the MUBRL during normal operation).

Should water within the Saline Water Pond not meet acceptance criteria (following any dilution from other wastewater streams into the Saline Water Pond, the water will be transferred to the Saline Water Evaporation Pond for disposal via evaporation.

Further, the applicant has advised that should wastewater within the Saline Water Pond continue to exceed the criteria for disposal to the MUBRL, the urea production plant will be shut down until effluent quality can be managed to meet discharge criteria. To verify the ongoing quality assurance of the onsite laboratory, the applicant has committed to 6 monthly QA/QC sampling verification with a NATA accredited laboratory.

Monitoring Point	Monitoring frequency	Parameters
C – Tie in to the MUBRL	Continuous	Temperature, pH, Conductivity, Redox potential, Ammonia
	Weekly	Temperature, pH, Conductivity, Redox potential, Ammonia

		Parameters listed in Table 9. Free chlorine will also be monitored.
1 – Saline Water Pond outlet	Prior to scheduled discharge to MUBRL	Same as above for the MUBRL tie in.
2 – Sewage treatment plant outlet	Continuous	Free chlorine and pH
	Weekly	Biochemical oxygen demand (BOD), Chemical oxygen demand (COD), Total Suspended Solids (TSS) and Thermotolerant coliforms.
3 – Site F stormwater back-up pond outlet	During and after rainfall event	Per Surface Water Management Plan
3 – Site C runoff water collection pond outlet		
4 – Oily water treatment system outlet	Prior to scheduled discharge to Saline Water Pond	Total recoverable hydrocarbons

5.2.1 Stormwater management

Stormwater management practices are outlined in the confirmed Surface Water Management Plan developed in accordance MS 1180. Stormwater is managed onsite to ensure that potentially contaminated streams are segregated, treated and disposed as appropriate. Infrastructure for diverting and segregating uncontaminated stormwater will be installed in accordance with the Surface Water Management Plan along with controls for managing erosion and sedimentation.

Uncontaminated stormwater from Site C and Site F will be directed to dedicated storage ponds (Clean Stormwater Ponds) for reuse within the seawater cooling circuit. During extreme rainfall events, excess stormwater within the Clean Stormwater Ponds will be pumped to the Saline Water Pond and Saline Evaporation Pond. In the event that stormwater will exceed the total design capacity of the ponds, emergency overflow spillways will also be provided to direct excess clean stormwater to the adjacent supratidal flats between Site C and Site F. Discharge from the Site C overflow will be via a dedicated spillway to the environment, while overall from Site F will be directed to a perimeter ditch and then to the supratidal flat.

Monitoring of the discharges via the spillways and receiving environment (i.e. supratidal zone) occurs in accordance with the approved Surface Water Management Plan. Sampling from the spillways will occur during after rainfall events for various parameters including, among other things, pH, dissolved oxygen, turbidity, metals/toxicants and nutrients. The Surface Water Management Plan includes trigger/threshold levels for determining presence of contaminants in discharge.

5.2.2 Port area stormwater management

The applicant has advised that stormwater management at the port and associated facilities will be designed and managed to capture rainwater and stormwater and direct to retention basins. Due to the design of the conveyor, storage shed and ship loading infrastructure urea is expected to be contained and prevented from entering the environment.

Final design elements for port stormwater infrastructure are also expected to be managed and developed with the Pilbara Ports Authority and any requirements within EPBC 2022/09237 (wharf and jetty infrastructure requirements).

Key findings: The delegated officer has considered information relating to the management of wastewater on the premises, including discharge to the MUBRL and determined the following:

- The Surface Water Management Plan includes specific controls for managing stormwater including stormwater diversion infrastructure, erosion and sedimentation controls, and measures in place for managing and monitoring discharges from dedicated stormwater diversion and containment infrastructure. The delegated officer considers that regulatory controls relating to the implementation of these stormwater management measures are adequately conditioned under Part IV of the EP Act and should not be duplicated on the works approval.
- While the Surface Water Management Plan includes broad commitments relating to the management of potentially contaminated stormwater from process areas, the delegated officer considers that there is sufficient regulatory gap warranting the application of specific controls relating to the management of potential contaminated stormwater on the works approval. As such, risks associated with potentially contaminated stormwater impacting the environment have been considered further in Table 12.
- The OMEMP sets a framework for managing the cumulative discharge from the MUBRL and specifies water quality triggers for the combined effluent discharge. EPA Report 1705 and the OMEMP recommend that the discharge from individual contributors should be regulated under the respective approval under Part V of the EP Act.
- Wastewater discharged to the MUBRL will be required to meet the discharge criteria specified in the OMEMP. Limits will be applied on future instruments authorising commission and operations (i.e. amended works approval and subsequent licence).
- Limits applied under Part V of the EP Act will align with the OMEMP as recommended by EPA Report 1705.
- The delegated officer notes that the final composition of wastewater discharged to the MUBRL, including those proposed within this works approval is subject to further consideration by Water Corporation. The delegated officer is also aware that Water Corporation is in the process of modelling the future combined waste stream to understand any potential changes that may be required to the OMEMP to accommodate the additional waste stream from the premises. This work will determine whether adjustments are required to the water quality criteria specified within the OMEMP to ensure that an appropriate level of environmental protection is achieved to maintain the environmental values of King Bay.

The works approval does not currently authorise discharge of waste to the MUBRL during commissioning and time limited operation. The Applicant is required to seek authorisation in the future to undertake these activities. The delegated officer will take into consideration any updates to the OMEMP, including updates to specified water quality criteria, in its assessment of any future request to allow discharge to the MUBRL and its application of regulatory controls relating to discharge to the MUBRL. Any future assessment will also take into consideration the waste streams approved for disposal to the MUBRL, and any subsequent requirements imposed. The delegated officer notes that the Applicant may be required to implement additional infrastructure controls to meet any updated water quality criteria or disposal requirements.

6. Risk assessment

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

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

6.1 Location and siting

6.1.1 Siting context

Project Ceres is located on the Burrup Peninsula within the Burrup Strategic Industrial Area, a heavy industrial estate. Non-industrial land to the north and south of the premises form part of the Murujuga National Park (and the Dampier Archipelago National Heritage Listed Place), which is recognised for its cultural significance and ecological and biological diversity. Other industrial premises immediately adjacent to Project Ceres include Yaras ammonia and ammonium nitrate plants, and a desalination plant (not operational) owned by the Water Corporation. Other major industrial premises are located within the Burrup Strategic Industrial Area.

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

6.1.2 Disturbance footprint

Figure 5, Figure 6 and Figure 7 demonstrate the proposed infrastructure areas within Site C, Site F and the Port and provide a general extent of where the processing plant and associated infrastructure will be constructed.



Figure 5: Proposed infrastructure layout Site C



Figure 6: Proposed infrastructure layout Site F



Figure 7: Proposed infrastructure layout for port facilities

6.1.3 Detailed site investigations

As part of detailed site investigations for the premises, the applicant commissioned consultant Tetra Tech Coffey to undertake a baseline contamination assessment on the premises. The results of this investigation (Tetra Tech Coffey 2022) are summarised below.

Groundwater

- detection of following major nutrients: Ammonia (two samples exceeded assessment criteria adopted at 3.64 mg/L and 9.19 mg/L), Nitrate, Nitrite, Total Nitrogen (TN), Total Kjeldahl Nitrogen (TKN) and Total Phosphorous (TP);
- detection of per- and polyfluoroalkyl substances (PFAS) in sampled groundwater monitoring bores exceeded the PFAS NEMP interim marine 99% species protection limits and Australian and New Zealand Water Quality Guidelines (ANZECC & ARMCANZ 2000) Marine Water 95% species protection toxicant default guideline values (DGVs);
- exceedances of soluble Cu, Fe, Mg and Zn; and
- out of 9 samples, 3 detected concentrations of total recoverable hydrocarbons (TRH) above assessment levels adopted.

Other chemicals of potential concern (CoPC) concentrations were below the laboratory limit of reporting. It was suggested that external or upgradient industries are possibly contributing to the sampling results obtained. Further it is noted that due to the depth to groundwater within Site C and Site F where construction activities will take place, interception of groundwater is considered unlikely.

Surface Water

Concentrations of TP, ammonia, TN and TKN were detected but below the assessment criteria

adopted. PFAS compounds were detected in both surface water samples collected from within the supratidal zone and hydraulically down gradient from neighbouring industries however results did not exceed criteria specified in the PFAS NEPM.

The delegated officer notes that surface water and groundwater at the premises, including the baseline contamination assessment has been considered through the Surface Water Management Plan (as required by condition 8-2 of MS1180). This plan specifies ongoing surface water and groundwater monitoring and includes trigger and threshold criteria for determining the effectiveness of management actions implemented.

<u>Soil</u>

Soil samples obtained during the baseline site investigation from several locations across the proposed prescribed premises were taken at varying intervals of ground depth. Most CoPCs were not detected in soil samples apart from several exceedances of heavy metals (As, Cr, Cu, Pb, Ni, Zn).

PFAS compounds were not detected in most samples except three locations taken at ground surface level. Concentration of PFAS compounds detected at these three sites were low range detections (0.0004 mg/kg, 0.0003 mg/kg and 0.0003 mg/kg), and below the Health Investigation Level (commercial and industrial scenario) (HEPA 2020) of 50 mg/kg and ecological direct exposure limit of 10 mg/kg. It is also noted that the three samples that had detected PFAS compounds do not occur within the proposed cut and fill areas (as shown in Figure 2 and 3 above).

6.1.1 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation. Table 9 provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

Table 9: Sensitive human and enviro	onmental receptors a	nd distance from	prescribed
activity			

Human receptors	Distance from prescribed activity
Neighbouring industrial premises within the Burrup Strategic Industrial Area zoned "Strategic Industry" under City of Karratha Planning Scheme No.8	Yara Pilbara Fertilisers / Yara Pilbara Nitrates (Yara) directly east of Site C.
	Pilbara Port Authority lease area (multiple users) including Pilbara Port Authority, Toll Energy Logistics and ammonia loading facilities 1 km west of Site C and adjacent to the port facility.
	Woodside Pluto NNG Project 800m northwest of Site C and 1.2 km east of the port facility.
	Woodside Onshore Gas Treatment Plant (North West Shelf Project) 3 km north of Site C and 3.2 km north east of the port facility.
Ngajarli (Deep Gorge) (recreational site)	1 km southeast of the Site C boundary
(zoned conservation recreation and natural/ landscapes City of Karratha Planning Scheme No.8)	

Hearson Cove (recreational site)	Approximately 2 km east of the Site C boundary
(zoned conservation recreation and natural/ landscapes City of Karratha Planning Scheme No.8)	
Dampier townsite (nearest residential receptor)	Approximately 5.7 km southwest of Site C and 5.4 km southwest of Site F
Karratha townsite (nearest residential receptor)	Approximately 11.5 km southwest of Site C and 10.7 km southwest of Site F
Specified ecosystems	Distance from prescribed activity
Murujuga National Park	400 m from the boundary of Site C to the north, 170 m from the boundary of Site F to the south and 1.3 km to the east.
Threatened Ecological Communities and Priority Ecological Communities	A number of Priority Ecological Community (PEC) have been identified within 3 km of the premises. These include the Burrup Peninsula rock pile and rock pool communities (both Priority 1).
Biological component	Distance from prescribed activity
Threatened/Priority Fauna	27 conservation significant fauna species have been identified as being "known to occur" or are considered "likely to occur" within a 10 km buffer of the Project area. This includes the Ghost Bat (<i>Macroderma gigas</i>), Northern Quoll (<i>Dasyurus</i> <i>hallucatus</i>) and Olive Python (<i>Lialis olivaceus barroni</i>). 32 migratory bird species are also known to, or likely to occur within the project area 10km buffer, of which five are listed as threatened species. Another two bird species, the Bar-tailed Godwit (Baueri) (<i>Limosa lapponica bauera</i>) and Northern Siberian Bar-tailed Godwit (<i>Limosa lapponica menzbieri</i>), are also listed as threatened but are not considered to be migratory.
Threatened/Priority Flora	Three priority species have been recorded within 5 km of the project; <i>Terminalia supranitifolia</i> (Priority 3), <i>Stackhousia clementii</i> (Priority 3) and <i>Rhynchosia bungarensis</i> (Priority 4).
Other relevant environmental values	Distance from prescribed activity
Cultural heritage sites	The proposal's development envelope boundary intersects with 38 registered Aboriginal sites and 37 lodged Aboriginal heritage places (advice received in January 2024; refer to Table 13). Other nearby sites include Fish Thalu and Yatha Aboriginal heritage sites, and NHL Site ID 9439.
King Bay	A supratidal flat is located directly adjacent to the premises boundary to the south.
	Mangrove community is located 1,000 m east.
	The waters of King Bay are afforded a high level of ecological protection with the exception of a one hectare area surrounding the MUBRL outfall, where industry discharges occur in King Bay and the surrounding Mermaid Sound. These areas have been afforded a low level of ecological protection and moderate level of ecological protection respectively (DoE 2006).
National Heritage Listed place – Dampier Archipelago (including the Burrup Peninsula) (ID 105727)	The Dampier Archipelago including the Burrup Peninsula is listed on the National Heritage List due to the presence of rock engravings and other Aboriginal heritage sites such as stone arrangements.

Groundwater	Two units have been identified as being present beneath the site; an unconfined granophyre bedrock aquifer overlain by a shallow superficial aquifer. Both are unconfined and hydraulically connected.
	Groundwater flow is generally towards the supra-tidal area with discharge to the supratidal area and eventually into King Bay. Groundwater is generally shallow near the supra-tidal area with increasing depth moving north and south (maximum 13.96mbgl). Groundwater levels and flow direction are likely to be influenced by tidal movements with flow direction likely to be reversed during periods of high tide.
	Due to the influence of tidal movements, groundwater is generally highly saline with Total Dissolved Solids concentrations greater than seawater (40,000 – 50,000 mg/L) and circum-neutral (pH ranging from 6.56 to 7.76).

6.2 Noise

Noise generated by from the premises during construction, commissioning and operation has potential to impact on the health and amenity of nearby sensitive receptors including humans and local fauna.

As determined in section 3.3.2, the delegated officer determined that noise impacts on terrestrial fauna have been adequately considered under Part IV of the EP Act, and therefore have not been considered further in this assessment.

6.2.1 Noise criteria

Assigned levels for the proposal were determined by the Applicant in accordance with the Environmental Protection (Noise) Regulations 1997 (Noise Regulations) noting that sensitive receptor locations are not associated with residential areas but rather recreational, cultural and industrial uses.

When considering impacts of noise on Hearson Cove, the modelling assessment used a noise criteria of 45dB L_{A10} which is based on an aspirational target previously recommended in EPA in EPA Bulletin 1077. Internal advice sought previously in relation to this goal confirmed that it is no longer relevant and that noise levels at Hearson Cove could be appropriately managed by ensuring that all nearby industrial facilities apply appropriate noise attenuation to reduce noise levels at their respective plant boundaries to below the 65dB(A) specified in the Noise Regulations.

6.2.2 Noise modelling

Noise modelling was carried out by Lloyd George Acoustics (LGA 2019) to predict estimated noise levels at nearby human receptors including Hearson Cove, Deep Gorge (Ngajarli) and neighbouring industrial premises (Figure 7). Modelling also predicted noise levels at certain locations along the boundary of the premises (Figure 8).



Figure 7: Sensitive receptor locations considered in noise modelling.



Figure 8: Modelled boundary locations.

In its report, Lloyd George Acoustics acknowledged that the predicted noise levels are based on preliminary plant design and indicative sound power levels. Considering this, the following assumptions were made in the modelling assessment:

- Sound power levels used in the modelling reflect whole plant processes rather than single items of plant with all sources modelled as point sources.
- · Sound power levels were based on a previous urea project and adjusted where

practicable by the Applicant based on their experience with these type of plant.

- All noise sources are assumed to be operating simultaneously.
- The urea storage shed was assumed to be of metal construction and approximately 6m high. It was also assumed that the building will adequately attenuate and noise sources inside the shed.
- All urea conveyors, drives and transfer stations will be enclosed with standard 0.42mm base metal thickness (BMT) steel and close fitting joints.

In terms of noise from 'upset' conditions, modelling simultaneous operation of all sources was considered a conservative approach, noting the use of the flare would be mutually exclusive of full plant load. Furthermore, it was noted that the source noise level of the flare is lower than the most significant pieces of plant and therefore, noise from 'upset' conditions may be lower than under normal operations.

The results of modelling indicate that, under worst case meteorological conditions, assigned noise levels will comply with the assigned noise levels at nearby sensitive receptor locations including Hearson Cove and Deep Gorge (Table 10, Figure 9 and Figure 10). Predicted noise levels are also estimated to be below the aspirational goal of 45 dB(A) at Hearson Cove. Although not considered specifically in the noise assessment carried out by the Lloyd George Acoustics, modelling suggests that the assigned noise level of 65dB(A) will be achieved at other nearby cultural sites such as the Fish Thalu and Yatha Aboriginal heritage sites, and NHL Site ID 9439 within Site F.

Receiver	Night (dB L _{A10})	Day (dB L _{A10})	Assigned noise level ^[1]
Hearson Cove 'South'	41	40	60 (45 ^[1])
Hearson Cove 'Mid'	41	40	60 (45 ^[1])
Hearson Cove 'North'	41	40	60 (45 ^[1])
Deep Gorge	43	42	60
Yara Plant Boundary	64	64	65
Industrial Estate (west)	59	59	65

Table 10: Predicted noise levels (dB L_{A10}) at modelled receptors during the night and day compared against assigned noise levels.

Note 1: Aspirational noise goal for Hearson Cove recommended in EPA Bulletin 1077.



Figure 9: Noise contour plot showing predicted noise levels to the east of Site C and Site F under normal operations.



Figure 10: Noise contour plot showing predicted noise levels to the west Site C under normal operations.

While noise levels generally comply with the Noise Regulations, noise modelling predicts exceedance of the assigned levels at various boundary locations at Site C (Table 11). Figure 9 and Figure 10 show that the extent of the exceedance is limited to areas directly adjacent to the premises which do not contain any sensitive receptors.

The potential for exceedance on the eastern boundary was considered by the EPA in EPA Report 1705. The EPA concluded that the exceedance is not expected to be significant noting that the predicted exceedance is located within an infrastructure corridor located between the premises and Yara's ammonia plant where no sensitive receptors are present. The EPA also concluded that noise emissions from the premises are not likely to adversely impact recreational activities at Hearson Cove or cultural and tourist activities at Deep Gorge (Ngajarli).

Receiver	Predicted Levels	Receiver	Predicted Levels (dB
	(dB L _{A10})		L _{A10})
B1	67	B8	65
B2	66	B9	67
B3	58	B10	68
B4	75	B11	67
B5	78	B12	65
B6	72	B13	70
B7	63		

Table 11: Predicted noise levels (dB L_{A10}) at boundary locations identified in Figure 8.

The delegated officer has identified potential for variation to source levels used in the modelling associated with design changes (e.g. change in stack heights), which may affect overall model results. Noise from port operations (i.e. handling within the storage shed, conveyor transfer to shiploaders and shiploading activities) were also excluded from the noise model. It is acknowledged that the predicted noise levels are based on preliminary plant design and indicative sound power levels, with Lloyd George Acoustics stating that detailed plant design would provide opportunity to identify noise controls and ensure noise emissions are kept as low as reasonably practicable. The effect of these uncertainties on predicted noise levels is unknown however the delegated officer considers it unlikely to impact noise received at sensitive receptors noting the distance to these receptors.

The Applicant has committed to undertaken further noise modelling prior to the commencement of commissioning once more detailed design is available to verify that the proposal will achieve the relevant assigned levels. Full details of noise mitigation measures that are included in final design will be provided.

Noise controls currently proposed by the Applicant include:

- Partially or completely closed structures to limit noise propagation from the main compressors while ensuring safety and ventilation requirements;
- Silencers on the HRSG stacks;
- Pipe lagging and insulation; and
- Physical noise barriers/panels.

6.2.3 Construction Noise

Noise and vibration emissions during construction of the plant are expected during a range of civil, structural and mechanical installation activities, mobile plant and equipment operation and materials movements. Noise and vibration emissions are also likely from blasting activities and the use of vibratory equipment. Noise emissions during construction activities are required to comply with the Noise Regulations, and specifically that:

- the construction work is carried out in accordance with control of environmental noise

practices set out in section 4 of AS 2436-2010 Guide to noise and vibration control on construction, maintenance and demolition sites; and

- the equipment used on the premises was the quietest reasonably available; and
- any requirements under an approved noise management plan (if required).

The applicant has advised that construction activities on the premises will be conducted under the Construction Environmental Management Plan (as required under the confirmed Cultural Heritage Management Plan under MS1180), requirements within the confirmed Cultural Heritage Management Plan and a Noise Management Protocol. Controls specified within these plans include:

- the use of noise reduction devices on equipment used on the premises;
- regular inspections and maintenance of plant and equipment;
- works within the development envelop to occur to during daylight hours where practicable;
- investigation of noise complaints;
- use of temporary noise barriers;
- the use of non-vibrating or lower vibrating construction methodologies and/or operate plant as far as practicable from sensitive receptors;
- broadband reversing alarms on mobile plant; and
- the use of noise monitors during construction activities.

Key findings: The delegated officer has considered the above information relating to noise emissions and found:

- The premises is required to comply with the assigned noise levels specified in the Noise Regulations.
- Ensuring industrial facilities in proximity of Hearson Cove achieve noise levels below 65 dB(A) will minimise the likelihood of ambient noise impacting on amenity at this location.
- Results of modelling show that assigned noise levels will be achieved at Deep Gorge (Ngarli), Hearson Cove and nearby cultural heritage sites.
- Noise levels are predicted to comply with the 65 dB LA10 assigned noise level for industrial premises at the neighbouring Yara Ammonia Plant.
- Impacts on amenity from noise at sensitive receptors has been considered under Part IV of the EP Act. In its report, the EPA concluded that "noise emissions from the proposed urea plant are unlikely to adversely affect recreational activities at Hearson Cove or cultural and tourist activities at Deep Gorge (Ngajarli)". Furthermore, the EPA found that "residual noise impacts to cultural heritage values from the proposal...are likely to be consistent with the EPA's objective to protect social surroundings from significant harm". Conditions of MS 1180 require the implementation of a Cultural Heritage Management Plan that includes measures for addressing amenity impacts on social and cultural sites. As such, the delegated officer considers that impacts from noise on sensitive receptors is appropriately managed under MS 1180.
- Although noise will comply with the Noise Regulations at receptor locations, modelling predicts marginal exceedances of the assigned noise levels at the boundary of the premises. Predicted exceedances are limited to areas directly adjacent to the boundary, and while they present a low risk due to the lack of

receptors present, represent a technical exceedance of the Noise Regulations and will be required to be addressed by the Applicant prior to the commencement of commissioning.

- The delegated officer acknowledges that there is a level of uncertainty regarding the predicted noise levels at the boundary of the premises considering that noise modelling was conducted prior to final design.
- The proponent has committed to completing updated noise modelling following final design in 2025 (prior to commissioning). This will be considered by the department in its assessment of any application to amend the works approval to authorise commissioning and time limited operations.
- If updated modelling does not sufficiently demonstrate compliance with the Noise Regulations, the Applicant will be required to implement measures to reduce noise levels.
- Conditions have been included on the works approval requiring the submission of updated modelling and a plan outlining measures for implementing additional noise controls should predicted noise levels exceed the Noise Regulations.
- Noise monitoring during commissioning and operation may be required to verify model predictions and confirm that noise from the premises will achieve the assigned levels at the boundary of the premises. Where it is not demonstrated that the assigned noise levels can be achieved, the Applicant will be required to implement further measures for noise reduction for compliance with the Noise Regulations.
- Noise emissions during construction activities are required to comply the Noise Regulations, and the Construction Environmental Management Plan (including Noise Management Protocol) as required through Cultural Heritage Management Plan (MS1180).
- As per the Noise Regulations, should construction works be required out at times other than that specified in the Noise Regulations that are likely to result in noise emissions that fail to meet the assigned levels specified in the Noise Regulations, the applicant will be required to conduct the construction work in accordance with a noise management plan that is approved by the CEO.

6.3 Risk ratings

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

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

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 12.

Works approval W6875/2023/1 that accompanies this decision report authorises construction only. The conditions in the issued works approval, as outlined in Table 12 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015). The Applicant will be required to apply to amend the works approval to seek authorisation for commissioning and time limited operation (as required). A licence is required to authorise emissions associated with the ongoing operation of the premises (post commissioning and time limited operation). A risk assessment for certain operational activities has been included in this decision report, however conditions associated with commissioning and time limited operation of the premises will not be finalised until the department assesses the works approval amendment and licence applications.

Table 12: Risk assessment of potential emissions and discharges from the premises during construction and operation

Risk events			Risk rating ¹	Applicant	Conditions ²			
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval	
Construction			•			•	·	
		Air / windborne pathway causing impacts to fauna & vegetation health	Terrestrial flora and fauna	N/A – Managed under Part IV conditions 4 and 5 vi	a the implementation o	of the Flora Man	agement Plan and	l Fauna Management Plan.
Construction works including earthworks, machinery movements, etc. (excluding preparatory works such as clearing, leveling and blasting)	Dust	Air / windborne pathway causing impacts rock (abrasion)	Rock art	 Construction activities expected to be short-term (18 months). Bulk earthworks are underway (via L9426/2024/1). Implementation of the Cultural Heritage Management Plan which includes the following requirements for dust suppression: vehicle speeds will be reduced where necessary; dust suppression applied (e.g. water trucks) on unsealed roads, access tracks, cleared areas and other locations with a high risk of dust generation; dust suppression will be implemented where dust is visible; and clearing, grubbing and earthworks during high winds (>40km/hr) will be avoided. Preparation and implementation of the Construction Environmental Management Plan (CEMP) Construction Dust Management Procedure (required by the CEMP Air Quality Management Protocol) that includes the following requirements for dust monitoring: 6 dust deposition monitoring gauges (installed) located near the sensitive receptors within the prescribed premises; installation of 4 dust monitors (a telemetry network of 'near real-time' data using ETS Tp-2510 Dust Concentration Sensors) to monitor PM₁₀ and PM_{2.5} data as a 10min average µg/m³ value A proposed trigger value of 80 µg/m³ will alert supervisory/management staff to implement management actions including: increase to dust suppression activities; reducing work on site to only essential tasks, decreasing speed of plant and movement of 	C = Severe L = Rare High Risk	Y	Conditions 16 - 23.	The delegated officer has determ the highest rating, in recognition of as the uncertainty of the impacts interim guidelines from the MRAM. The delegated officer considers the are associated with site preparati As discussed in section 2.3, prep scope of this assessment. Addition crushing and screening are reguli assessment of dust emissions du limited to minor dust events associated plant installation, including pond i Additional factors considered by the the temporary nature of c that material being disturt sulphur- or nitrous-rich are and controls proposed by the table. The delegated officer notes that to outlined in the confirmed Cultural and has therefore elected not to c vehicle speeds will be r dust suppression (e.g. cleared areas and area dust suppression to be Avoiding clearing, grub The Applicant has committed to u the premises to enable detection management actions will be imple relating to boundary monitoring a crushing and screening activities. expected timeframe for crushing have been duplicated on the worl implementation of appropriate res the project. A summary of trigger following completion of constructi

Reasoning
ined the consequence of impacts of dust emissions to be severe , of the high conservation and cultural value of the rock art, as well caused by dust emissions to rock art and in the absence of <i>I</i> /P.
hat the majority of dust emissions generated during construction on works such as bulk earthworks, crushing and screening, etc. aratory works, including bulk earthworks, are not included in the nally, emissions associated with site preparatory works such as ated via Licence L9426/2024/1. Noting the above, the ring construction was considered by the delegated officer to be ciated with vehicle movements and excavations associated with nstallation.
he delegated officer in its determination of risk include:
onstruction works;
bed is generally granophyte/ sand/ alluvium material and are not id therefore unlikely associated with acidic corrosion of rock art;
applicant for managing dust during construction as listed in this
he following Applicant controls are consistent with commitments Heritage management Plan required to be implemented MS 1180 Juplicate these requirements on the works approval:
educed where necessary;
water carts) to be used on unsealed roads, access tracks, s of high dust risk;
implemented when dust is visible; and
bing and earthworks during high winds (>40km/hr).
Indertaken dust monitoring during construction at the boundary of of high dust events. Short term dust trigger levels are set and emented in the event that triggers are exceeded. Conditions re included on the existing Licence (L9426/2024/1) relating to Noting that construction of the plant may extend beyond the and screening activities, conditions relating to dust monitoring as approval to ensure that monitoring of dust emissions, and sponsive controls, occurs during the entire construction phase of exceedances and actions taken is required to be reported on activities.

Risk events			Risk rating ¹	Applicant	Conditions ²			
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval	
	Air / windborne	Air / windborne	Industrial sites adjacent to premises	 equipment and potentially ceasing work during excessively high readings; monitoring of levels until there is no longer an exceedance; and identification of high-risk weather conditions (faster winds / warmer temperature). 	C = Minor L = Possible Medium Risk	N	Conditions 16 – 23.	The delegated officer considers t construction activities are sufficie dust monitoring and trigger respo and not for the activities at the po construction of the urea storage s the potential to generate dust em monitoring and trigger response of emissions at the port. In this rega is required at the port area to ens
		impacts to health and amenity	Residential receptors 5.4km away		C = Slight L = Unlikely Low Risk	Y	N/A	The delegated Officer considers of potential exposure, no addition
			Recreational sites Hearson Cove and Deep Gorge	N/A – Managed under Part IV condition 9 via the im management activities relevant to cultural heritage restricting vehicle speeds, applying dust suppressio	nplementation of the Co including construction on and avoiding clearin	ultural Heritage emissions and a g / grubbing / ea	Management Plan air quality. Controls arthworks during h	n. The Cultural Heritage Managemen s included in the Cultural Heritage N igh winds.
			Recreational sites Hearson Cove and Deep Gorge	 N/A – Managed under Part IV condition 9 via the im heritage including noise. Measures in place to minin Maintaining equipment in good condition; Operating machine at low speeds where Where machines are found to produce ex The Environmental Protection (Noise) Regulations 	plementation of the Commise noise as outlined practical and turning o ccessive noise compar 1997 also apply.	ultural Heritage in the Cultural H ff machinery/eq ed to industry bo	Management Plan leritage Managem uipment when not est practice, they v	which is required to specify constru- ient Plan include: in used; will be removed from site or stood d
	Noise	Air / windborne pathway causing impacts to health and amenity	Industrial sites adjacent to premises. Residential receptors 5.4km away.	Equipment will be checked to ensure it is operating in good condition. Where equipment is identified as generating excessive noise, it will be stood down for repair. Broadband reversing alarms installed on mobile plant. Temporary noise barries provided where warranted, e.g. impact hammers / rock breakers shrouded around the hammer mechanisms or mobile plant. Clearing and blasting activities will only occur during daylight hours. Machines will be operated at low speed where practicable and will be switched off when not in use. Utilise noise dampening equipment where practicable. Works are to be carried out in daylight hours where practicable. Any required night works shall be in accordance with the Out of Hours Noise Management Plan. Noise monitoring conducted near the premises with noise monitoring equipment able to send alerts if limits are being exceeded. All construction work will be carried out in accordance with environmental noise control practices set out in Section 4.5 of AS 2436-2010 <i>Guide to Noise Control on Construction.</i> <i>Maintenance and Demolition Sites</i> .	C = Minor L = Possible Medium Risk	Y	Condition 9, 10, 11	Noise emissions associated with construction of facilities not associated this risk assessment. The remaining construction works subject to the requirements of the The delegated officer considers t construction are appropriate (noti emissions are appropriately moni monitoring devices to ensure that Should noise emissions during co Regulations, noise emissions will Regulations, that may include the
		Air / windborne pathway causing impacts to fauna & vegetation health	Fauna/ Flora	N/A – Managed under Part IV conditions 4 and 5 vi	a the implementation c	of the confirmed	Flora Managemer	nt Plan and Fauna Management Pla

Reasoning

that the proposed controls for managing dust emissions for ent to manage the risk. The delegated officer notes however that onse controls are concentrated on activities at Site C and Site F oort. As construction activities at the port area (namely the shed, conveyor infrastructure and ship loading infrastructure) have missions, the delegated officer considers it necessary that dust dust control conditions are extended to control potential dust ard, the delegated officer considers that additional dust monitoring isure that dust emissions are managed appropriately.

that due to the distance to nearest residential receptors and type nal regulatory controls are required beyond those conditioned.

ent Plan is required to specify construction environmental Management Plan for managing dust during construction include

ruction environmental management activities relevant to cultural

down for repair / modification.

site preparatory works including clearing, leveling and ciated with the prescribed activities have not been considered in

ks are expected to be temporary (approximately 18 months) and le Noise Regulations.

that the proposed controls to manage noise emissions during ting the distance to residential receptors). To ensure that noise nitored, the delegated officer has conditioned the use of noise at noise emissions are monitored.

onstruction activities exceed assigned levels within the Noise I be required to be managed in accordance with the Noise e development of an approved Noise Management Plan.

an.

Risk events					Risk rating ¹	Annligent	Conditions ²			
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval			
	Sediment laden stormwater	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	King Bay supra tidal	N/A – Managed under Part IV condition 8 via the implementation of the confirmed Surface Water Management Plan which includes prov controls during construction.						
	Disturbance to acid sulfate soils and other contaminants (e.g. PFAS)	Overland flow impacting surface water quality. Infiltration causing soil and groundwater contamination.	area Depth to groundwater 0.4mbgl	NA – Managed by Surface Water Management Plan and requirements of condition 7 of MS 1180 that requires the investigation of acid sulfate s Table 4).						
Operation ³										
Category 31: Chemical manufacturing Includes the manufacturing, handling and storage of urea.	Light	Air / windborne pathway causing impacts to health and amenity	Recreational visitors Terrestrial fauna Marine fauna (turtles)	N/A - MS 1180 requires that lighting is to meet best are managed through the Fauna Management Plar In its report (EPA Report 1705), the EPA stated tha delegated officer considers that conditions of MS 1	N/A - MS 1180 requires that lighting is to meet best practice to minimise impacts of light on the amenity of people visiting the area including H are managed through the Fauna Management Plan required under condition 5 of MS 1180. In its report (EPA Report 1705), the EPA stated that it "considers it is unlikely that the proposal would have a significant impact on Marine Fau delegated officer considers that conditions of MS 1180 are sufficient for managing impacts of light on people and fauna, including marine faur					
	Noise	Air / windborne pathway causing impacts to health and amenity	Industrial site adjacent to premises Residential receptors 5.4km away Recreational sites Hearson Cove and Deep Gorge	Equipment designed with general consideration of achieving 85dB(A) at one meter. Ensure equipment is appropriately maintained. Conveyors, conveyor drives and transfer stations will be enclosed. Materials handling will occur inside the enclosed storage shed. Ongoing monitoring of noise at sensitive receptors to commence within one year of the commencement of operations. Specifics of monitoring program to be confirmed through commissioning.	C = Minor L = Possible Medium Risk	Ν	Condition 1 <u>Condition 12</u> to 15	The delegated officers considers to determine the impacts from op In accordance with the <i>Guideline</i> Consequence Criteria for human "Moderate" is applied. Noting the this area, the delegated officer co therefore has applied a conseque The delegated officer is aware the demonstrating predicted noise let appropriate noise controls are ins requires the submission of the up specified in the Noise Regulation the Noise Regulations, the Applic implemented to reduce noise to c Noise monitoring during commiss levels and confirm that the premis measures may be applied should levels are not being achieved.		
	Breach of wastewater containment (seepage)	Seepage to ground impacting soils and infiltrating groundwater and nearby tidal marine environment	King Bay supra tidal area Depth to groundwater 0.4mbgl	Saline Water Pond and Saline Evaporation Pond comprise single layer of HDPE liner. Quarterly groundwater monitoring will occur in accordance with the approved Surface Water Management Plan. HDPE liners will be regularly inspected using via a geoelectrical leak detection survey. The Final Observation Basin and Treated Water Pit will be concrete lined and fitted with high level and high-high level alarms and include 500mm freeboard. Environmental hazardous materials, waste materials and Dangerous Goods stored within bunded and impervious containment areas.	C = Moderate L = Unlikely Medium Risk	Y	Conditions 1, 4, 5, 6, 7 and 8	Infrastructure controls have been requirements for the storage pon and Saline Water Evaporation Po- requirements relating to Critical C relating to compliance reporting in installed appropriately prior to it r The delegated officer notes that g Surface Water Management Plan the monitoring program is genera prescribed activities. To avoid du monitoring will not be included or results may be required in the fut trends occurring in response to p The delegated officer notes the g Management Plan excludes MDE in the event of a failure of the cor an operational requirement as a n monitoring impacts associated wi during baseline investigations, or instruments (works approval or lid attributable to the premises. This <i>Sites Act 2003.</i>		

for implementing and installing drainage, erosion and sediment

soils and subsequent management requirements (as specified in

earson Cove and Deep Gorge. Impacts of light on terrestrial fauna

na and that the impacts to this factor are Manageable". The a.

that methods and conclusions of the noise modelling completed perational noise are generally correct and appropriate.

e: Risk Assessments (DWER 2020), where a Specific a health is at risk of being met, a Consequence rating of is e extent of the area of exceedance and lack of receptors present in onsiders that the actual level of impact is likely to be lower and ence rating of "Minor".

hat revised noise modelling will be available prior to commissioning evels following completion of details design. To ensure that stalled prior to commissioning commencing, the works approval podated modelling providing evidence that assigned noise levels is with be achieved. Where noise modelling shows exceedance of cant is required to submit a plan detailing measures to be comply with the Noise Regulations.

sioning and/or operation may be required to verify predicted noise ses is achieving assigned noise levels. Additional noise mitigation I results of modelling or monitoring show that assigned noise

a conditioned on the works approval specifying construction ds. Noting that material to be stored within the Saline Water Pond and is likely to contain contaminants, these facilities are subject to Containment Infrastructure which includes specific requirements in order to demonstrate that containment infrastructure has been receiving any waste.

groundwater monitoring will be conducted in accordance with the approved under MS 1180. The delegated officer considers that ally appropriate for detecting impacts to groundwater from plication with MS 1180, conditions requiring groundwater a the works approval, however, requirements to report monitoring ture to allow the delegated officer oversight of any groundwater rescribed activities.

proundwater monitoring program specified in the Surface Water EA, which is stored on the premises and can impact groundwater ntainment infrastructure. Monitoring of MDEA may be imposed as means of detecting potential leaks or containment structures or ith potential spills. Noting that PFAS was detected in groundwater ngoing monitoring for PFAS may also be considered on future cence) to observe trends and detect any additional contamination will also be informed by investigations under the *Contaminated*

Risk events				Risk rating ¹	Applicant	Conditions ²		
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval	
	Breach of wastewater containment (overflow)	Direct discharge to ground impacting soils and infiltrating groundwater and nearby tidal marine environment		Stormwater and wastewater ponds constructed to retain 1:100 year, 24 hour storm events (as per specifications with the Surface Water Management Plan under MS1180). The Saline Water Pond shall be maintained with a 350mm freeboard & Saline Evaporation Pond shall be maintained with a 500mm freeboard. Water is pumped from the Saline Water Pond to the Saline Evaporation Pond via 2 x 400m ³ /hr pumps once the high/level or freeboard level is reached. The Saline Water Pond shall be equipped with High and High-High water level alarms. Discharge to the Saline Water Pond shall cease if the High- High water level alarm is triggered. Quarterly groundwater monitoring will occur. The Final Observation Basin and Treated Water Pit will be fitted with high level and high-high level alarms and include 500mm freeboard.	C = Moderate L = Unlikely Medium Risk	Y	Conditions 5, 6, 7 and 8	The delegated officer considers th associated with the potential over conditioned on the works approva
	Breach of chemical storage containment (excluding ammonia storage)	Direct discharge to ground impacting soils and infiltrating groundwater and nearby tidal marine environment		Storage of dangerous goods in accordance with dangerous goods legislation and relevant Australian Standards (AS 3780 and AS 1940). Storage of materials within concrete bunding sized with a volume of 110% of the capacity of the tank, or if more than one tank is contained, 110% of the largest tank. The Chemical Warehouse will be constructed with concrete bunding designed to contain the whole volume of any IBC / ISO container rupture. Urea solution and ammonia sulphate stored in closed drain tanks installed within concrete sumps. Contaminant capacity 110% of tank capacity. Quarterly groundwater monitoring will occur to detect potential leaks.	C = Moderate L = Unlikely Medium Risk	Y	Condition 1	The delegated officer considers the associated with the release of ma goods) and infrastructure controls The storage of dangerous goods Dangerous Goods and Major Haz associated with storage of danger storage, handling, or transfer of st managed under the general provi (Unauthorised Discharges) Regul offsite will be subject to requireme Regulations 2004 and any regulat
	Storage of waste including spent catalysts, commercial wastes, etc.		Hazardous wastes will be segregated and stored to ensure no discharge to the environment. Wastes will be removed from site by a Controlled Waste contractor for disposal.	C = Minor L = Unlikely Medium Risk	Y	Condition 1		
	Discharge to marine waters via MUBRL	Direct discharge to marine water impacting marine ecosystems.		 Wastewater will achieve water quality criteria specified by Water Corporation in its OMEMP to ensure appropriate levels of protection are being achieved within King Bay. Monitoring of the MUBRL discharge to verify that wastewater is meeting discharge criteria as follows: Continuous monitoring for temperature, pH, conductivity, redox potential and ammonia; and Weekly monitoring of above parameters and other water quality toxicants (e.g. metals and nutrients). Water quality monitoring prior to discharge from the Saline Water Pond to the MUBRL to ensure wastewater achieves water quality criteria. Wastewater sample analysis will occur in the onsite laboratory to ensure minimal time between sampling and discharge and resampling will occur should additional wastes be received in the pond prior to results being received. 	N/A – The delegated section 5 however, i discharged to the M commission and ope	d officer conside t is recognised ti UBRL will be rec erations (i.e. ame	rs that the risks as hat approvals und quired to meet the ended works appro	ssociated with discharge to the MUB er Part V of the EP Act regulate and discharge criteria specified in the O oval and subsequent licence) that al

nat the controls proposed are sufficient to manage the impacts
flow of containment infrastructure. These controls have been
al.

that the Applicant controls are sufficient for managing impacts aterial from chemical storage containers (excluding dangerous s have been applied to the works approval.

is is regulated under the *Dangerous Goods Safety Act 2004* via the izard Facility licence. To avoid regulatory duplication, risks erous goods has not been considered. Emissions associated with solid wastes and environmentally hazardous materials can be visions of the EP Act and the Environmental Protection ulations 2004. Disposal of spent catalysts and process wastes nents under the Environmental Protection (Controlled Waste) atory requirements which apply to the offsite waste disposal site.

BRL are adequately managed under MS 594. As detailed in d specify discharges from individual contributors. Wastewater DMEMP. Limits will be applied on future instruments authorising align with the OMEMP as recommended by EPA Report 1705.

Risk events				Risk rating ¹	Applicant	Conditions ²			
	Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval	
					Wastewater that does not meet the specifications will be transferred to the Saline Evaporation Pond for disposal or retested. An oil skimmer shall be installed on the Saline Water Pond to remove hydrocarbons from discharge. No MDEA discharged to the MUBRL or Saline Water Pond.				
		Stormwater contaminated with urea and other materials (e.g. hydrocarbons)	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality		Clean stormwater shall be diverted around the premises. To maintain product integrity urea granules are kept dry and segregated from stormwater. First flush (15mm) of stormwater from paved areas within the urea processing plant (aside from granulation unit) will be collected in dedicated sumps/pits, treated via steam stripping and reused in the process plant. The granulation unit is fully covered and bunded and will not generate stormwater runoff. Potentially contaminated stormwater is directed to the Saline Water Pond for disposal via the MUBRL (if it meets disposal and acceptance criteria) or the Saline Evaporation Pond. Potentially oil-contaminated stormwater from curbed areas will be collected in dedicated sumps and transferred to a treatment package (CPI) for removal of hydrocarbons prior to discharge to the Saline Water Pond for disposal. Discharge shall be monitored to ensure hydrocarbon content is <5ppm. Uncontaminated stormwater captured onsite within Clean Stormwater Ponds will be reused for cooling. Monitoring of surface water and groundwater in accordance with the Surface Water Management Plan.	C = Minor L = Unlikely Medium Risk	Y	Conditions 1 and 4	The works approval includes infra and/or discharge of stormwater th Controls applied are consistent wi The delegated officer considers th given that materials processing ar requirements placed on the works equipment (e.g. shed, conveyors, ingress/egress of water (such as s As per above, the Saline Water P Containment Infrastructure and su compliance reporting. Discharge via spillways from the C Management Plan which includes receiving surface water. To avoid EP Act, conditions relating to disc on the works approval.
		Storage of wastewater within Saline Water Pond and Saline Evaporation Pond	Health impacts to birds and other fauna caused by ingestion of or contact with wastewater.	Conservation significant fauna including birds and bats (refer to Table 9)	Visual inspections of storage ponds. Maintaining a fauna interaction / sightings / translocation register for recording interactions with conservation significant fauna. Use of larvicides and adulticides will be avoided (where possible) for the control of mosquitos on water storage ponds. Structures and apparatus to deter birds from entering water storage ponds.	C = Minor L = Possible Medium Risk	Y	Condition 1	The delegated officer acknowledg for minimising potential contact of water storage ponds. The Project Environmental Manage on water storage ponds to deter b Management Plan, and therefore the delegated officer has determin included this control on the works The ponds will be inspected, and Fauna Management Plan.
		Spillage to marine waters	Spillage to marine waters Direct discharge to marine water		Ship loading infrastructure only operated by trained personnel. To maintain product integrity urea granules are kept dry and segregated from rainwater and	C = Minor L = Rare Low Risk	Y	Condition 1 and 2	Given that product handling infras
	Category 58: Bulk loading Includes the transport, handling, storage and loading (into ships) of urea.	Stormwater contaminated with urea	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	King Bay situated adjacent to port area.	stormwater. Product stockpiles are situated within a fully enclosed storage shed. All conveyors at port are enclosed and therefore not exposed to weather (rain). Spillage is captured within the conveyor gallery. Conveyor belts are fitted with a dual cleaning system to reduce product carry back. Daily cleaning around stockpiles and conveyors	C = Minor L = Rare Low Risk	Y	Condition 1 and 2	that there is a low risk that produc from stormwater is also unlikely g Conditions of the works approval defined in the works approval to e the environment and the ingress/e

R	eas	son	ing

astructure requirements relating to the segregation, treatment hat may be potentially contaminated with hazardous materials. *v*ith those proposed by the Applicant.

hat the likelihood of urea entering the stormwater network is low ind handling will occur within an enclosed system. Infrastructure s approval specify that enclosures of materials handling , transfer stations, etc.) must prevent the escape of product and stormwater).

Pond and Saline Evaporation Pond are considered to be Critical ubject to specific requirements relating to construction and

Clean Stormwater Ponds is managed under the Surface Water s measures for monitoring any discharge and monitoring quality of duplication with regulatory controls applied under Part IV of the charge from the Clean Stormwater Ponds have not been included

ges that the Fauna Management Plan does not include measures f fauna, especially birds, with wastewater contained within the

agement Plan (Cardno 2020), states that structures will be installed birds. Noting that this commitment is not specified in the Fauna e falls outside the scope regulatory control applied under MS 1180, ined that this can be regulated under Part V of the EP Act and has s approval.

fauna interactions managed and recorded in accordance with the

structure will be fully enclosed, the delegated officer considers ct will enter the marine environment. Secondary contamination given the closed nature of the storage and loading equipment. specify that enclosures shall be fully enclosed. Enclosures are ensure that they are designed to prevent the release of product to 'egress of water (e.g. stormwater or wash water).

Risk events					Risk rating ¹ Applicant		Conditions ²	
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood	controls sufficient?	of works approval	
				 will occur after completion of handling operations. Routine housekeeping in and around product transfer infrastructure (cleanup of spilled materials, removal of debris and accumulated materials, sweeping/vacuuming etc.) No water will be used for washdown of conveyor equipment (due to solubility of urea) Stormwater collected from impermeable surfaces within port area will captured via a drainage system for transfer to a final collection pit. 				
Category 85: Sewage treatment	Odour	Public amenity impacts	Neighbouring industries, Hearson Cove (2km east) and Ngajarli (Deep Gorge) (1km southeast)	Carbon filters canisters will be included on Balance Tank and Sludge Holding Tank vents. Wastewater monitoring to verify plant performance.	C = Slight L = Rare Low Risk	Y	Condition 1	The delegated officer has determ be sufficiently low that it is unlike
	Spills, leaks and overtopping of overtopping of containment infrastructure	Direct discharge to ground impacting soils and infiltrating groundwater and nearby tidal marine environment	King Bay supra tidal area Depth to groundwater 0.4mbgl	Designed to prevent stormwater entering the system. System fitted with high level alarms for detecting failures and preventing overflows.	C = Minor L = Unlikely Medium Risk	N	Condition 1	The proposed sewage treatment 40m ³ /day. Conditions have been measures are in place to manage. The delegated officer notes that a subject to regulation under the H Waste) Regulations 1974.

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

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

Note 3: The risk assessment for operational risk events for operational aspects as considered during this works approval assessment. It is noted however that elements regarding operations, including updates to the premises Air Quality Management Plan and discharges to the MUBRL are subject to further operational review and will be considered within future amendments to the works approval (as required) and the assessment for Licence in due course.

Reasoning	g
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nined that odour emanating from the sewage treatment plant will ely to impact on nearby receptors.

t plant is relatively small with a maximum design capacity of n applied on the works approval to ensure that appropriate ge the risk of spills, leaks and overflows.

construction and operation of the sewage treatment plant is also Health (Treatment of Sewage and Disposal of Effluent and Liquid

7. Consultation

Table 13 provides a summary of the consultation undertaken by the department. All stakeholders were advised of the proposal on 8 January 2024.

Consultation method	Comments received	Department response				
Application advertised on the department's website on 8 January 2024	Two submissions were received including com Australia (CCWA). A summary of comments ar Appendix 1.	ments from Conservation Council Western nd the department's response is provided in				
Friends of Australian Rock Art (FARA)	A summary of comments and the department's	summary of comments and the department's response is provided in Appendix 1.				
The Save Our Songlines group						
Yara Pilbara Fertilisers Pty Ltd / Yara Pilbara Nitrates Pty Ltd	No comments received.	N/A				
Murujuga Aboriginal Corporation	No comments received.	N/A				
Water Corporation	Water Corporation confirmed that it would accept up to 59.70ML/day of wastewater from the premises for discharge to the MUBRL, including seawater cooling water, desalination wastes, water collected from spillages and washdown of the facility and treated sewage, subject to wastewater criteria outlined in Table 8. It was also noted that the Applicant is required to withhold discharging wastewater from its premises to the MUBRL that would breach these wastewater criteria and specifications. Water Corporation acknowledged that the plant design was not fully finalised and indicated that it would require further information from the Applicant to confirm if the proposal meets the criteria specified in Table 8. It advised that the proposed program for monitoring inputs into the MUBRL appear to align with requirements of the agreement reached between it and the Applicant.	The delegated officer has considered measures in place to manage discharge to the MUBRL in sections 5 and 6.3. The Applicant has indicated that waste discharged to the MUBRL will achieve the limits specified in Table 8 and proposes to implement a water quality monitoring program to verify the quality of any discharged wastes. The delegated officer understands that further review and discussion between the Applicant and Water Corporation is currently in progress regarding final approved wastewater discharges to the MUBRL. Any alterations to the approved wastewater discharges to the MUBRL will be considered in due course during future amendments to the works approval. As noted in Section 5, commissioning and time limited operations are not authorised under this works approval at this time. The Applicant will be required to apply to amend the works approval at a later stage to authorise commissioning and operation of the premises. Limits will be set on the works approval for the discharge to the MUBRL consistent with criteria specified by Water Corporation to ensure the objectives relating to the protection of the environmental values of King Bay are achieved. Monitoring				

Table 13: Consultation

		requirements to confirm that limits are being achieved will also be applied.
Local Government Authority	The City of Karratha advised that the development application (DA21261 and DAP/21/02155) was approved by the Joint Regional Development Assessment Panel on 15 March 2022. It was acknowledged that the components of the proposal (pertaining to a portion of the conveyor and port facilities) within the Pilbara Ports Authority (PPA) cadastral boundary were a 'public work' and were exempt from requiring development approval but would require approval through the relevant PPA processes. This would include referral to the City in accordance with s.6 of the <i>Planning and Development Act 2005</i> . It was also noted that approval is required from the Department of Health for the sewage treatment plant and any other wastewater treatment and disposal system (e.g. washdown bays).	The delegated officer notes Condition 1 of the Development Approval that states that if the development is not substantially commenced within four years from the date of issue [15 March 2022], the approval shall lapse. Noting this, the delegated officer has elected to set a duration on the works approval aligned with the Development Approval (i.e. the works approval shall expire on 14 March 2026). The Applicant may apply to extend the works approval once it is demonstrated that the proposal has been "substantially commenced".
Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)	DEMIRS advised that at the time of being notified of the works approval application, an application under the <i>Dangerous Goods</i> <i>Safety Act 2004</i> has yet to be received however DEMIRS had been liaising with the Applicant noting that the facility was likely to be classified as a Major Hazard Facility and it was likely that a dangerous good licence would be required.	Noted. As detailed in section 4 of this decision report, the delegated officer considers the DEMIRS regulatory framework for Major Hazard Facilities appropriately manages the plant's safety systems and the risk of ammonia releases associated with venting. As these approvals are yet to be finalised, the delegated officer also considers that aspects relating to ammonia releases, and any relevant ongoing monitoring, may need to be considered during future amendments to the works approval (for any amendment sought for commissioning and time limited operations) or the premises licence to ensure all aspects relating to potential ammonia releases are adequately regulated and potential impacts to relevant receptors are mitigated.
Department of Planning, Lands and Heritage (DPLH)	 DPLH confirmed that the proposed development envelope intersects 38 registered Aboriginal sites and 37 lodged Aboriginal heritage places. The development enveloped is subject to the Yindjibarndi and Ngarluma Native Title Determination areas. Section 18 consent with conditions was granted under the <i>Aboriginal Heritage Act</i> 1972 for the project over 21 Aboriginal sites. Approval under the Aboriginal Heritage Act 1972 is required for any proposed activity within any other Aboriginal sites or heritage places. Ongoing consultation with Traditional Owners was encouraged to ensure best practice management and protection of the cultural heritage of the area. 	Noted. The Delegated Officer considers that direct impacts to rock art are appropriately managed under Part IV of the EP Act including requirements for consultation with Traditional Owners in relation to managing impacts to cultural heritage.

Department of Biodiversity, Conservation and Attractions (DBCA)	No comment was provided additional to those submitted in relation to the assessment of the proposal under Part IV of the EP Act. Comments submitted in relation to the referral under s38 of the EP Act relate to impacts from noise, vibration, dust, odour and / or other emissions and visual amenity on nearby recreational / tourism sites and cultural activities within Murujuga.	As discussed in section 3, impacts on social surroundings from amenity including visual impacts have not been considered in this report as they have been appropriately addressed under Part IV of the EP Act. The delegated officer has had some consideration for noise as discussed in section 6.2, noting that there is a marginal exceedance of the assigned levels specified in the Noise Regulations at the boundary of the premises. Noise has been considered under Part IV of the EP Act and determined that impacts to receptors, including recreational and tourism sites, would be low as assigned noise levels would be achieved in these areas. As outlined in section 3.3.3, the delegated officer has not considered risks associated with impacts from air emissions. Conditions have been applied on the works approval to support the implementation of MS 1180 to achieve the environmental outcomes and objectives specified in relation to the protection of rock art and human health.
Department of Jobs, Tourism, Science and Innovation (DJTSI)	No comment received.	N/A
Pilbara Port Authority	Pilbara Ports confirmed that it has agreed to a Construction Licence Agreement and a Port Lease and Licence for the Applicant to construct, maintain, operate and lease a urea storage shed on Port Land. Pilbara Ports has also advised that it has informed the Applicant via conditional Development Approval (which approval the Applicant must obtain from Pilbara Ports pursuant to the Construction Licence Agreement before any works on Port Land can commence) that further details are required prior to the Applicant being authorised to commence construction works on Port Land. In relation to the works approval application, Pilbara Port noted that limited detail had been provided in the Application relating to the design of infrastructure on Port land (e.g. conveyors, storage shed ship loader) and associated controls for emissions (e.g. dust, stormwater, product spillage). Further, that key management plans have not yet been developed to a site-specific level as required by Pilbara ports, however, Pilbara Ports will continue to work with the Applicant through its Development Approval process to develop the level of detail required.	The delegated officer notes comments relating to the approvals required for works on Port Land. The delegated officer's consideration of specific comments relating to the assessment of emissions and discharges are provided Appendix 1.
Applicant was provided with draft documents on 10 May 2024 and provided comments on 29 May 2024	Refer to Appendix 2	Refer to Appendix 2

8. Conclusion

In granting the works approval the delegated officer has taken into consideration conditions applied under Part IV of the EP Act through MS 1180, and DWER's *Guidance Statement: Setting Conditions*. In keeping with DWER's published guidance, the delegated officer has determined that the following environmental factors are managed through the Ministerial Statement (MS1180) and therefore require no further regulation under the Part V licence:

- Greenhouse gas emissions;
- Acid sulfate soils;
- Terrestrial fauna, including potential impacts from dust, noise and vibration;
- Flora and vegetation, including potential impacts from dust and changes to surface water quality and/or groundwater regimes;
- Surface water management as it relates to diversion, collection, conveyance, treatment, recycling and discharge of "clean" surface water;
- Groundwater protection as it relates to impacts from acid sulphate soils and dewatering; and
- Light management.

The assessment report has considered environmental risks associated with the construction and operation of the prescribed activities described in works approval W6875/2023/1. Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements. Where necessary, and to ensure appropriate regulatory controls are in place, additional requirements have been conditioned on the works approval relating to noise, dust emissions during construction and specific infrastructure controls as discussed in Table 12.

Noting constraints under Part IV of the EP Act outlined in section 3.3.4, the works approval only provides authorisation for the construction of infrastructure, and does not authorise commissioning or operation of the assessed prescribed activities. The Applicant may submit an application to amend the works approval at a later date seeking authorisation for commissioning and time limited operations. In its assessment of the application, the delegated officer will consider and apply regulatory controls necessary for managing emissions during commissioning and operation.

The delegated officer considers that cumulative discharges from the MUBRL to King Bay are appropriately managed under the existing framework implemented by Water Corporation through the OMEMP developed under MS 564 and MS 597. As discussed in section 5, the delegated officers acknowledges recommendations that individual discharges should be managed under Part V of the EP Act and will apply conditions on any future instrument(s) authorising commissioning and/or operation aligned with the objectives and requirements of the OMEMP.

As discussed in section 3.3, risks associated with emissions to air have not been assessed in this report as the delegated officer determined that air emissions have been appropriately considered under Part IV of the EP Act. The delegated officer considers that the primary purpose of the works approval is support the implementation of the conditions of MS 1180 to achieve the specified environmental objectives and outcomes. On this basis, the delegated officer has issued the works approval with the following infrastructure controls:

- Implementation of ATR technology on the ammonia plant;
- Fired Heaters to be fitted with low emissions burners to achieve a NOx concentration of 134m/m³;

- Gas power turbines equipped with SCR technology and Dry Low NOx burners to achieve a NOx concentration of 15ppmv under normal operating conditions;
- Implementation of Snamprogetti[™] technology for the urea melt trains which negates the need for an absorber vent stack;
- Granulators equipped with a dual scrubbing system for treatment of NH₃ and urea dust to achieve the following design specifications:
 - NH₃ concentration of 20mg/Nm³; and
 - Particulate (dust) concentration of 25mg/m³.
- Specifications for stack heights and appropriate sampling port aligned with AS 4323.1;
- Requirements for CEMS to be installed for continuous emissions monitoring in accordance with the CEMS Code; and
- Specific dust control measures for containing fugitive dust associated with product handling including the installation of enclosed conveyors and transfer points fitted with dust extraction, enclosed storage sheds, belt cleaning systems, etc.

The above requirements are based on information available at the time of this assessment and as considered by the EPA in its assessment under Part IV of the EP Act. MS 1180 requires that the revised AQMP includes a comparison of expected emissions and pollution control technology against international industry best practice at the time that operations are proposed to commence. There is also an expectation that the Applicant will adopt advances in pollution control technology for the minimisation of air emissions to ensure consistency with industry best practice. The delegated officer notes the conditions of the works approval are dependent on the outcomes of the peer review required under MS 1180 and EPA approval of the revised AQMP and may be subject to change if advancements in best practice technology are identified. The works approval may be amended under section 59 of the EP Act to execute changes to conditions relating to air emissions controls.

As noted above, the works approval authorises construction of plant and equipment associated with the prescribe activities but does not, at this stage, authorise commissioning and/or time limited operations. In its assessment of any application seeking authorisation of commissioning or time limited operation, the delegated officer will have consideration for commitments of the approved revised AQMP. The type of conditions that may be imposed include:

- Specifying the location of emission points;
- Specifying emission limits consistent with the design specifications provided in the revised AQMP;
- Monitoring requirements aligned with commitments relating to inclusion of CEMS on discharge points. Conditions will have consideration for quality control procedures to ensure measured data is accurate and aligned with relevant guidelines and standards (e.g. CEMS Code and AS 4323); and
- Other infrastructure and/or operational controls to ensure the effective operation of relevant pollution control equipment.

References

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- 16. Perdaman 2022c, Surface Water Management Plan Perdaman Urea Project Burrup Peninsula, Western Australia (Version PCF 3);
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Appendix 1: Summary of stakeholder comments on the application

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
Conservation Council WA (DWERDT900772)	1.	 The proposal will produce impacts to conservation significant flora and fauna. 1. CCWA raised concerns regarding impacts to flora and fauna from clearing and habitat disturbance, and requested that alternatives to environmental offsets via the Pilbara Environmental Offsets Fund be considered to provide replacement habitat within Murujuga and to counterbalance the effects of clearing native vegetation that contains habitat for conservation significant fauna. 2. Impacts to fauna interacting with wastewater stored in Saline Water Pond and Saline Evaporation Pond has not been addressed in the Fauna Management Plan. 	 The delegated officer acknowledges comments regarding adequ clearing and provisions for environmental offsets have been esta and therefore, amending these requirements is outside of the so Act. Noted. The delegated officer acknowledges comments relating to relating to wildlife exclusion from the water storage ponds. The of management controls for addressing impacts to fauna from entr condition 5-3 of MS 1180 with additional measures relating to ad a. Visual inspections of storage ponds; Maintaining a fauna interaction / sightings / translocation conservation significant fauna; Fauna egress will be installed on open excavations; and d. Use of larvicides and adulticides will be avoided (where p storage ponds. It is acknowledged that the Fauna Management Plan does not s excluding wildlife from the pond, however commitments for instal included in the Project Environmental Management Plan (Cardn specified in the Fauna Management Plan, and therefore falls ou MS 1180, the delegated officer has determined include this requ officer recommends that the Fauna Management Plan is revised protocols.
	2.	 The proposal will produce impacts to inland and marine waters. Following new information regarding potential contamination at the site, CCWA requests additional controls relating to the potential mobilisation of PFAS to manage further spread and mobilisation associated with construction and clearing activities, including extended surface water sampling to better defined PFAS contamination within the development envelope. CCWA notes that PFAS was not considered by EPA in the setting of environmental controls for the proposal and requires further assessment and review. CCWA also recommended that the WA Contaminated Sites Database be updated to reflect the identified contaminants (including PFAS) at the Yara and Perdaman sites. CCWA noted that the application did not adequately address discharge of product to the marine environment from spillage or contamination of stormwater. It was noted that the application does not specially state that storage sheds will be rain or stormwater proof. CCWA recommended that the granular storage area at the port should be reviewed for water impermeability under seasonal rain/flood conditions. CCWA raised concern regarding the potential for construction within tidal flats to alter hydrological regimes. Contamination was also identified as a risk associated with construction occurring within the tidal zone. CCWA notes that the Surface Water Management Plan does not adequately address strategies to avoid interruption of hydrological regimes or contamination risks. 	 Crushing and screening activities to support the construction of L9426/2024/1 (granted on 19 March 2024). Emissions associate including risk associated with mobilisation of PFAS via cut and f Licence L9426/2024/1. In its assessment of the Licence, the delegated officer considered Licence to mitigate and manage dust emissions from the crushin requirements under MS1180 will be adequate in managing this is elevated levels of PFAS and therefore the delegated officer const through dust associated with construction activities. Furthermore, it was noted that the requirements for surface wate regulated via the Surface Water Management Plan (as required report for Licence L9426/2024/1 (available from https://www.derapprovals/current-licences), detailed site investigations for this p locations: avoid potential ASS locations and cut and fill activities; are not considered likely to intercept groundwater; and soil samples obtained during baseline site investigation i low concentrations (below health investigation levels ecc Dewatering during construction activities is also subject to condi investigations undertaken in accordance with MS1180 indicate t required and therefore it is considered that mobilisation of PFAS be required, the Applicant is required to develop a Hydrogeologi.

uacy of offset requirements. Authorisation for ablished under Part IV of EP Act via MS 1180 cope of the assessment under Part V of the EP

to limitations of the Fauna Management Plan confirmed Fauna Management Plan provides apment within storage ponds as required by ccidental poisoning. Measures include:

register for recording interactions with

possible) for the control of mosquitos on water

specifically consider deterrents or measures for allation of structures for deterring birds is no 2020). Noting that this commitment is not tside the scope regulatory control applied under uirement on the works approval. The delegated d to incorporate these relevant management

the premises were authorised under Licence ed with crushing and screening activities, fill, have been considered in the assessment of

ed that the controls conditioned within the ng and screening activities, along with the risk. It is noted that soil samples did not contain siders it unlikely that PFAS will be mobilised

er sampling and monitoring is currently by MS1180). As documented in the decision r.wa.gov.au/our-work/licences-and-workspremises indicate that the proposed cut and fill

indicate that PFAS is not present or present at ological direct exposure limits).

itions under MS1180. Detailed site that dewatering during construction is not S in groundwater is unlikely. Should dewatering ical Management Plan in accordance with the

Stakeholder	ltem no.	Summary of stakeholder's comment	Departi	ment's response
Stakeholder	no.	Summary of stakeholder's comment	Departu re Th su lai Ci 2. Th m In ap in: cc m 3. Th of m Pl ac di W inv ris	ment's response equirements of MS1180. The delegated officer notes that areas of land directly adjacent to apratidal flats, are currently registered under the <i>Contaminated</i> and within the proposed premises boundary (including Lots 700 <i>ontaminated Sites Act 2003.</i> The Applicant has advised that to maintain product integrity, ure aterials handling equipment will be fully enclosed to prevent m frastructure controls requiring full enclosure of materials handl oproval. Additional controls in place to manage product spillag stallation of dual belt cleaning system on conveyors to reduce ompletion of handling operations. The delegated officer consid anaging risks associated with product spillage. The delegated officer notes that the EPA considered interruption the project under Part IV of the EP Act. Condition 8 of MS 113 aintain the hydrological regimes so that environmental values an has been developed in accordance with MS 1180 setting of chieved. As outlined in the Surface Water Management Plan, to version infrastructure and culverts on the causeway to maintaid fith regards to contamination risks during construction, the Sur cludes requirements to maintain manage hydrocarbons, imple sks associated with the potential contamination of surface water
			Co CC Th ris Wi	ontamination risks associated with disturbance of ASS and dependent of a second dependent of the secon
	3.	 <u>The proposal will produce residual and cumulative impacts from emissions.</u> CCWA noted that noise controls applied are designed to protect human health under the Environmental Protection (Noise) Regulations rather than fauna. CCWA recommended that fauna behaviour monitoring be implemented to ensure no impact from noise, light or other emissions. CCWA indicates that the application does not sufficiently detail the best practice technology that will be implemented in relating to managing light emissions from flares. Air emissions will contribute to air quality on Murujuga impacting human amenity (from nuisance levels of ammonia) and cultural heritage, including rock art. CCWA noted that the proposal will produce risks from storage of hazardous chemicals including waste. CCWA indicates that chemical management controls at the neighbouring Yara sites was inadequate and therefore recommend stringent controls for Project Ceres. 	 As re m th 11 ur fro 2. Th ar im th 3. Ro 4. No aq ac co Aş 	s discussed in section 3.3.2, impacts to fauna were considered equired to implement the confirmed Fauna Management Plan w anagement impacts to fauna from noise and vibration. The dep at management controls outlined in the Fauna Management P 180 regarding impacts to terrestrial fauna from light, noise, vibr nder Part V of the EP Act is required. Noting this advice, the de om noise are appropriately regulated under Part IV of the EP A ne Applicant has a confirmed Light Management Plan develop nd light overspill from the proposal are avoided or minimised. T apacts to fauna and human receptors have been considered ur erefore have not been considered further in this assessment. efer to responses item 5 below in relation to impacts on rock a egarding nuisance levels of ammonia, the delegated officer no o ammonia is vented to atmosphere. oted. As outlined in sections 3.1 and 6.3, the delegated officer cluding waste, is adequately regulated under the <i>Dangerous</i> C afety (Major Hazard Facilities) Regulations 2007. Requirement opropriate secondary containment and in accordance with relev Dangerous Goods Licence whereby the Applicant will need to opticant controls for managing storage of hazardous materials
			cc	 insidered in section 6.3. Controls include: installing curbing and bunding to provide secondary con

to the prescribed premises, including the *d Sites Act 2003*. Further classification of the 0 and 701) are subject to provisions of the

ea granules must be kept dry and therefore all noisture (rainfall) impacting product quality. ling equipment has been included on the works within the enclosed systems include carry back and clean-up of material following lers that these controls are appropriate for

ns to the hydrological regime in its assessment 80 requires that the proposal is implemented to are protected. A Surface Water Management but measures to ensure this objective is the Applicant proposes to implement stormwater in the natural drainage patterns of the area.

face Water Management Plan that also ment spill response measures and manage er from hydrocarbons and ASS at the premises.

watering during construction, were also butlined in Table 4.

80 are sufficient for managing contamination of conditioned additional regulatory controls

d under Part IV of the EP Act. The Applicant is which is required to include measures for partment's EPA Services directorate advised Plan adequately address the requirements of MS ration and dust and that no further regulation elegated officer considers that impacts to fauna Act via MS 1180.

ed under MS 1180 to ensure that the nightglow The delegated officer considers that lighting nder Part IV of the EP Act via MS 1180 and

art and human health.

otes that the ammonia plant is designed so that

determined that storage of dangerous goods, *Goods Safety Act 2004* and Dangerous Goods ts include storage of dangerous goods with evant standards. The premises will be subject to demonstrate that adequate storage and

other than dangerous goods have been

ntainment for storage of materials;

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
			 contaminated wastewater will be segregated and containor reuse within the plant; the Saline Water Pond and Saline Evaporation Pond arrinspections and geoelectrical leak detection surveys; groundwater and surface water monitoring in accordance detect impacts to ground and surface water quality. The delegated officer considers that the above controls are app and has applied infrastructure controls on the works approval. It is also noted that emissions associated with storage, handling environmentally hazardous materials can also be managed und Environmental Protection (Unauthorised Discharges) Regulation process wastes offsite will be subject to requirements which apply
	4.	The proposal will produce significant greenhouse gas emissions which will produce climate impacts which will in turn indirectly impact rock art and cultural heritage of Murujuga.	As required by MS 1180, the Applicant has a confirmed Greenhouse for reducing GHG emissions to net zero by 1 July 2049. As outlined in determined not to unnecessarily duplicate the requirements of MS 11 assessed through EPA Assessment 1705, which includes GHG emiss
	5.	The proposal will produce impacts from acidic emissions. CCWA raised that there is still sufficient uncertainty regarding the impacts to rock art from air emissions to warrant further evaluation. In light of these uncertainties, and sufficient research evidence to support rock art protection, it was recommended that the proposal should not proceed.	The delegated officer's consideration of the potential for air emissions 3.3.3. The delegated officer concluded that the risk of air emissions in considered under Part IV of the EP Act and such, risks relating to rock assessment. The delegated officer determined that the regulatory framwhich includes the Murujuga Rock Art Strategy and MS 1180, is apprimpacts, however, as discussed in sections 3.3.3 and 3.3.4, the delegate works approval to support the implementation of MS 1180 in achie objectives relating to the protection of rock art. Infrastructure controls commitments made by the Applicant which were determined by the E
	6.	 The proposal will affect World Heritage Values of Murujuga and have impacts on visual amenity. The EPA's consideration of World Heritage values was limited to impact on rock art and did not consider World Heritage values associated with the broader cultural and physical landscape, including the interconnections between this landscape and its biological elements – forming the Songlines. CCWA suggested that the Applicant's Landscape Visual Impact Assessment did not appropriately consider potential impacts on amenity and should be reviewed indicating that proposal will have unacceptable impacts on visual amenity. 	 Impacts to Aboriginal heritage have been considered by the EPA in its the EP Act. In its assessment, the EPA acknowledged that the propose impact on Aboriginal heritage, and the Murujuga Cultural Landscape Heritage Listing. As discussed in section 3.3, the EPA also has conside human health from air emissions. The EPA determined that the object could be met by the imposition of conditions. As outlined in Table 4, the confirmed Cultural Heritage Management I following specific objectives of MS 1180 relating to cultural heritage: avoid and minimise direct and indirect impacts to social, cultural and surrounding the proposed development;
	7.	The proposal will produce impact to cultural values including rock art, areas of cultural significance and Song lines. The assessment under Part IV of the EP Act did not consider principles of Free, Prior and Informed Consent and did not address the impacts on other cultural heritage values from a very large, noisy, polluting and visually dominating industrial facility amongst the most densely concentrated area of Aboriginal heritage sites in Western Australia	 allow ongoing Traditional Owner and Custodian access to e culturally significant areas; and avoid and minimise visual and amenity impacts to social an The assessment was informed by consultation with the Murujuga Aborspecify requirements for ongoing consultation and collaboration with Murujuga Aboriginal Corporation and other relevant stakeholders. The delegated officer considers that impacts to cultural heritage, incluhave been adequately considered under Part IV of the EP Act.

ined prior to transfer to the Saline Water Pond

re both HDPE lined and subject to visual

ce with the Surface Water Management Plan to

ropriate for managing risks of contamination

g, or transfer of solid wastes and der the general provisions of the EP Act and the ns 2004. Disposal of spent catalysts and e Environmental Protection (Controlled Waste) to the offsite waste disposal site.

Gas Management Plan that sets out measures n section 3.3, the delegated officer has 80, or reassess Environmental Factors already sions.

s to impact on rock art is outlined in section mpacting on rock art has been sufficiently ik art have not been considered further in this mework described in in sections 3.2 and 3.3, ropriate for assessing and managing potential gated officer has elected to apply conditions on eving the specified environmental outcomes and applied on the works approval align with EPA to be consistent with industry best practice.

is assessment of the proposal under Part IV of sal has the potential to directly and indirectly which is currently under nomination for World deration for specific impacts to rock art and ctives for social surroundings and air quality

Plans sets out measures to achieve the

Itural, heritage and archaeological values within

enable traditional activities and connection to

d cultural place and activities.

original Corporation and conditions of MS 1180 Traditional Owners and Custodians via the

uding visual, amenity and air quality impacts,

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
FARA DWER Record: DWERDT900602	8.	FARA maintained that the conditions of MS 1180 are inadequate and that the works approval should set stronger conditions to reduce acidic emission for the protection of rock art. FARA requested that emissions from the proposal are reduced to near zero.	 The delegated officer acknowledges comments regarding emissions from the plant, the delegated officer considered that: DWER's <i>Guidance Statement: Setting Conditions</i>, states that or "contrary to, or otherwise than in accordance with, an implem of the EP Act."; in its report, the EPA advised that it is expected that emission I commensurate with best practice pollution control technology; the emission concentrations from air emission sources such as were considered in the EPA's assessment as outlined in Table the EPA has considered the pollution controls proposed by the concentrations, in its assessment and determined that they ger pollution control technology. Noting the above, the delegated officer determined to specify design of from the gas turbines, granulator and fired heaters consistent with the Act. It is noted however that design emission concentrations may be reading the timeframe for submission of the revised AQMP, it is expected not more for any air quality standards derived from the MRAMP and/or revised standards should be applied, the works approval will be amended to revised standards should be applied, the works approval will be amended to revised standards should be applied, the works approval will be amended to revised standards should be applied.
	9.	 The conditions of the works approval must not be subjective or ambiguous to ensure that compliance with conditions can be effectively monitored and evaluated with fine or negative consequences applied should non-compliance be determined. 1. The emission point(s) for urea particles and dust need to be clearly and specifically identified. 2. Selective Catalytic Reduction (SCR) systems and Dry Low NOx burners must be installed on gas turbines for the control of NOx emissions. 3. The maximum permitted emission rate for NOx from the SCR must be set at 5mg/m³. FARA indicated that was achievable using existing Yara SCR technology. 4. More detailed information is required on the method to be used to remove urea particles from the granulation towers. 5. More detail is required in relation to the design of controls to be implemented on the conveyor belt transporting urea to port for preventing urea particles entering the environment, including during malfunctions of the conveyor system while it is moving large volumes of urea (>2,000 tonnes per hour). 6. Any future source of gas for Project Ceres must be rigorously analysed, including producing a greenhouse gas management plan, to show that/how CO₂ equivalent emissions will be reduced to net zero by 2049 (the level stated in MS 1180). 	 In setting conditions on the works approval the delegated officer has h <i>Guidance Statement: Setting Conditions</i> which states that conditions senforceable, worded clearly, clear and precise on the outcome to be a for compliance are clear. Any potential non-compliance is investigated, and action taken in accord <i>Compliance and Enforcement Policy</i> (DWER 2021). Noted. Conditions of the works approval clearly specify emission urea particles. Infrastructure controls for minimising urea particles are also conditioned. This includes specifications for emission conscrubber). Noted. Condition 1 of the works approval specifies that SCR tech installed on the gas turbines for the control of NOx emissions. As per the response above, emission concentrations for point sort works approval consistent with those considered under Part IV of 4. Noted. Details of the pollution control technology to be installed is granulator will be treated via a wet scrubbing system designed to with a target of 20mg/m³. The scrubbing systems are designed by the separate treatment of NH₃. Emissions from the granulator s CEMS to verify emission controls are operating effectively. Fugitive dust emissions from the bucket elevator and vibrating sort plant will be equipped with de-dusting points that are connected to removal. All handling equipment will be fully enclosed with dust e minimise emissions of dust associated product handling. Noted. Specific details relating to the design of the conveying net measures has been supplied by the Applicant and conditioned or following requirements:

from the plant. In setting the design specification

conditions of a works approval must not be mentation agreement or decision under Part IV

limits set under Part V of the EP Act would be

s the gas turbines, granulator and fired heaters e 7; and

e Applicant, and the resulting emission enerally align with best practice pollution air

concentrations for point source air emissions e determination made under Part IV of the EP revised through the submission of the revised nore than six months prior to commissioning.

ted that the revised document will have and, if applicable, any advances in pollution d AQMP indicate that more stringent emission maintain consistency.

had consideration for the department's set under Part V of the EP Act shall be achieved and worded so that the requirements

ordance with the department's Policy:

n points from the granulator associated with es from the granulator and measuring emissions oncentrations and pollution controls (e.g. wet

hnology and Dry Low NOx burners shall be

burce air emissions have been specified on the of the EP Act.

is provided in section 4. Emissions from the o achieve particulate concentration of 25mg/m³ by tkFT and comprise of two stages dedicated to ate and urea solution are used for the abatement ea melt train. Acid scrubbing using sulfuric acid stacks will be continuously monitored using

creen discharge point within the granulation to the wet scrubbing unit for particulates extraction installed on transfer points to

etwork including proposed dust control on the works approval. This includes the

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
Public submission DWER Record: DWERDT898214	10.	 <u>NOx emissions</u> 1. The works approval must require that SCR technology is installed at each NOx emission point and that the maximum permittable rate is 5mg/m³. 2. A significant source of emissions from the premises is associated with burning natural gas for power generation with the Applicant sourcing 5% of their electricity from solar sources. NOx emissions could be substantially reduced if all electricity was produced from renewable sources located away from Murujuga. The works approval should specify requirements for using solar for power generation to reduce NOx emissions. 3. Emission points for urea particles should be clearly stated on the works approval 	 conveyor shall be fitted with a dual-cleaning system for re conveyors shall be enclosed fully within a conveyor galley the seaside section of the shiploader transfer conveyor (4 the conveyor gallery and allow traversing of the shiploade transfer chutes will be enclosed with curtains fitted at entr transfer chutes will be situated within a fully enclosed tra The proposed pollution control measures generally align with inc dust. With respect to urea entering the environment by other means (e that the proposed Applicant controls, which includes handling of appropriate for mitigating associated risks (refer to Table 12) As required by MS 1180, the Applicant has a confirmed Greenho measures for reducing GHG emissions to net zero by 1 July 204 officer has determined not to unnecessarily duplicate the require Factors already assessed through EPA Assessment 1705, which proposal that would alter GHG emissions and implementation cc managed under Part IV of the EP Act. Additionally, condition 3-4 confirmed Greenhouse Gas Management Plan every five years. Noted. Condition 1 of the works approval specifies that SCR tecl installed on the gas turbines for the control of NOx emissions. The proposal has been assessed and approved under Part IV of power generation using combined cycle gas turbines (100MW) a proposal, the EPA considered emissions associated with onsite MS 1180 requires the submission of a revised AQMP. In addition industry best practice for controlling air emissions, the Plan is re emissions, including adoption of advances in air pollution control emissions reductions for the life of the project. As discussed in section 3.3.3, the delegated officer considers th been appropriately considered and conditioned under Part IV of assessed in this report. The delega
	11.	 <u>Urea particles and dust particles</u> 1. Although de-dusting points and procedures are discussed for the urea granulation towers, the exact operations to remove all particulate urea emissions from the towers need to be fully explained in the Works Approval documents. 2. The conveying system is of particular concern in relating to potential for releasing emissions to the environment noting its long length and high tonnage rates. The works approval should be altered to include a conveying system that provents and uran particular being amitted to the environment. 	 The delegated officer notes comments regarding the removal of As discussed in the response to item 9 above, the delegated offic concentrations for point source air emissions from the gas turbin the determination made under Part IV of the EP Act. Granulation concentration of urea dust of 25mg/m³ with a target design of 20 conditions on the works approval. Noted. As discussed in response to item 9 above, the Applicant generally align with industry best practice. This includes full encl all conveyors and transfer stations) and installation of dust extra
		 System that prevents any urea particles being emitted to the environment. Concern was raised relating to the potential environmental impact of mechanical failure of the conveying system. Noting it has an operating rate of 36 tonnes per minute, a break in the system could result in the deposition of 	3. Noted. As above, the works approval requires that the conveying

educing carry back on the return conveyor;

y or within the enclosed storage sheds;

4150-CV-003) will have a flexible curtain to seal er conveyor;

ry and exit points; and

ansfer tower and fitted with dust extraction.

dustry guidance relating to minimising fugitive

e.g. spillage), the delegated officer considers urea within a fully enclosed system, is

buse Gas Management Plan that sets out 49. As outlined in section 3.3, the delegated ements of MS 1180, or reassess Environmental h included GHG emissions. Changes to the ponditions specified under MS 1180, will be 4 o MS 1180 includes provisions for revising the

hnology and Dry Low NOx burners shall be

f the EP Act. The approved proposal includes and solar (3.5MW). In its assessment of the power generation.

n to demonstrating that the proposal aligns with equired to outline measures to minimise all air I technology and include a trajectory for

at risks associated with emissions to air have the EP Act and have therefore not been further tions on the works approval to support the sistent with industry best practice. Regulatory gn with the revised AQMP as required.

n points from the granulator associated with es from the granulator and measuring emissions oncentrations and pollution controls (e.g. wet

all particulate urea emissions from the towers. icer determined to specify design nes, granulator and fired heaters consistent with n towers are designed to achieve a 0mg/m³. These design specifications have been

has applied pollution control measures that losure of the urea handling network (including ction systems and belt cleaning stations.

g system is fully enclosed.

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
		a large volume of urea before the conveyor is stopped. The works approval should include a requirement that the conveying system is fully enclosed to prevent urea entering the environment.	
	12.	Gas supply The Gas Sale and Purchase Agreement between Perdaman and Woodside made unconditional on 26 April 2023 states that gas will be provided to Perdaman for a term of 20 years commencing upon commissioning of the urea plant. However, the Ministerial Statement and works approval application state that the urea plant will operate for 80 years. The works approval documentation must provide evidence of the alternative source of gas once the agreement with Woodside has expired.	The assessment under Part V of the EP Act does not expressly consi supply. The delegated officer notes however that any changes to the result of changes to gas feed being processed may trigger section 53 would result in a risk-based assessment of potential impacts to the er Changes to the proposal that alter the implementation conditions spe- under Part IV of the EP Act.
	13.	<u>CO₂ equivalent reduction</u> The works approval must include a greenhouse gas management plan that explicitly shows exactly how CO ₂ equivalent emissions will be reduced from 3.25 million t/year at commissioning to zero by 1 July 2049 as specified in MS 1180.	As required by MS 1180, the Applicant has a confirmed Greenhouse for reducing GHG emissions to net zero by 1 July 2049. As outlined in determined not to unnecessarily duplicate the requirements of MS 11 assessed through EPA Assessment 1705, which includes GHG emiss
Save Our Songlines group (DWERDT901216)	14.	Access to culturally significant and sensitive places close to the project area is restricted.	The delegated officer notes the comments relating to restricted access heritage have been considered under Part IV of the EP Act and are m Heritage Management Plan. Specifically, one of the objectives specifi the proposal is implemented to "allow ongoing Traditional Owner and and connection to culturally significant areas within and surrounding the
	15.	There is a lack of transparency regarding the relocation of cultural sites and information regarding the location of sites should be made publicly available.	Direct impacts to cultural heritage sites, including their relocation, is m and the confirmed Cultural Heritage Management Plan. As noted by t Applicant has conditional approval under section 18 of the <i>Aboriginal</i> of selected heritage sites. In accordance with that approval, the Applic Registrar of Aboriginal Sites outlining the extent of salvage works incl relocated to. Access to data submitted to the Registrar is managed by Heritage.
	16.	Concern was raised regarding the impacts of existing and future dust from the premises on human health, flora and fauna and rock art.	As detailed in the decision report, the delegated officer has considered construction and operation. Risks associated with construction dust enoting that Licence L9426/2024/1 and the Cultural Heritage Managen controlling dust, and that dust emissions during construction are short with plant installation. The delegated officer also determined that impacts to human health from dust considered unlikely noting the distance to the town of Dampier.
			The delegated officer's consideration of the potential for air emissions operation of the project is outlined in section 3.3.3. The delegated offi impacting on rock art has been sufficiently considered under Part IV of have not been considered further in this assessment. The delegated of described in in sections 3.2 and 3.3, which includes the Murujuga Roc assessing and managing potential impacts to rock art and human heat has been undertaken in this report. To support the implementation of environmental outcomes and objectives relating to the protection of roc apply conditions on the works approval aligned with commitments mat the EPA to be consistent with industry best practice. Specific controls management of dust during operation are outlined in section 4.
	17.	Concern was raised regarding the potential impact of disruption of tidal flows.	Impacts associated with potential interruptions to tidal flows were con project under Part IV of the EP Act. Condition 8 of MS 1180 requires to hydrological regimes so that environmental values are protected. The has been developed in accordance with MS 1180 setting out measure

ider contractual arrangements relating to gas emissions / discharges from the premises as a of the EP Act requiring further approvals that nvironment associated with the proposal. cified under MS 1180, will also be managed

Gas Management Plan that sets out measures n section 3.3, the delegated officer has 80, or reassess Environmental Factors already sions.

is to cultural heritage sites. Impacts to cultural hanaged through MS 1180 and the Cultural ied in condition 9-1 of MS 1180 is to ensure that Custodian access to enable traditional activities he development envelope".

nanaged under the *Aboriginal Hertiage Act* 1972 the Stakeholder in their submission, the *Heritage Act* 1972 authorising the disturbance cant is required to provide a report to the uding the location that the material was y the Department of Planning, Lands and

ed dust emissions from the premises during emissions have been considered in Table 12 nent Plan include management measures for t term and limited to minor emissions associated acts to flora and fauna associated with of the EP Act and are effectively managed st generated during construction were

s, including dust, to impact on rock art during the icer concluded that the risk of air emissions of the EP Act and such, risks relating to rock art officer determined that the regulatory framework ck Art Strategy and MS 1180, is appropriate for alth, and as such, no further assessment of risk MS 1180 in achieving the specified ock art, the delegated officer has elected to ade by the Applicant which were determined by the to be implemented by the Applicant for the

sidered by the EPA in its assessment of the that the proposal is implemented to maintain the confirmed Surface Water Management Plan es to ensure this objective is achieved. As

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
			 outlined in the Surface Water Management Plan, the Applicant proporensure that tidal flows are not impacted by the construction project: The causeway will be designed with culverts so that the struct The causeway culverts will be designed to ensure that flow with the timeframe for construction of the causeway will be reduct work areas will be rehabilitated to reinstate surface flow patter Monitoring of culvert flow velocities will occur to asset
	18.	The proposal will result in an increase of shipping vessels. The assessment should consider intangible cultural heritage relating to songlines associated with marine animals	The delegated officer acknowledges the comments regarding increases impacts associated with vessel movements are outside the remit of P considered in the assessment. Impacts to marine fauna from increases assessments of the proposal under Part IV of the EPA. The EPA dete fauna associated with increased shipping movements was not likely t increase in shipping numbers would be overshadowed by the typical existing and future industries". Impacts to cultural heritage have been considered under Part IV of the and the confirmed Cultural Heritage Management Plan.
	19.	There has been an absence of consultation directly from the Applicant.	The delegated officer acknowledges the comments with regards to compare granting of works approval W6630/2021/1, the department updated it that opportunities were afforded to stakeholders to make comment or Plant. Comments submitted during the assessment of this works approvers. Consideration. Obligations within MS1180 also require the applicant to consult and endowners. Beyond this engagement, the Murujuga Roack Art Strategy we by the Department in partnership with the Murujuga Aboriginal Corpor Murujuga (Burrup Peninsula and Dampier Archipelago) and in consult community and industry. The Murujuga Rock Art Stakeholder Reference Group, an advisory green gagement between the Murujuga Aboriginal Corporation and key Grepresentatives on the development and implementation of the Muruj Reference Group is also the primary forum for stakeholders to inform strategic issues relating to the monitoring and protection of the rock and the state of the state of the rock and the strategic issues relating to the monitoring and protection of the rock and the state of the state of the state of the rock and the state of the state of the rock and the state of the rock and the state of the rock and the state of the state of the rock and the state of the rock and the state of the rock and the state of the state of the rock and the state of the state of the rock and the state of the state of the rock and the state of the state of the rock and the state of the state of the rock and the state of the s
Pilbara Ports Authority	20.	Pilbara Ports is not recognised in Table 1-3 of the Application as a human receptor. Marine / port waters are also excluded as environmental receptors.	Noted. The delegated officer has had consideration for the Pilba environmental receptors in its consideration of risk (refer to Table 9).
	21.	Limited detail has been included on the design of Project infrastructure on Port land (e.g. conveyors, storage shed ship loader) and associated controls for emissions (e.g. dust, product spillage). It is therefore difficult to assess and validate the statements in section 8.2 of the Application relating to the risk of impacts to marine environmental quality or terrestrial environment from spills or leaks from process activities, particularly urea spills, that may contaminate stormwater.	The delegated officer notes comments regarding risks associated with product spillage impacting the marine environment. The delegated officer infrastructure as it related to dust, stormwater and product spillage is and marine discharges) and 5.2.2. (stormwater and product spillage). the works approval for the management of these emissions.
	22.	The Solid and Liquid Waste Management Plan presents limited detail on the proposed management of solid and liquid wastes which may be generated during the operation and maintenance of Project infrastructure on Port lands, for example: • product spills below conveyors (e.g. arising from product carry back.	

ses to implement the following measures to

cture does not impede on tidal action;

elocities are less than 1m/s;

erns;

in specifications are achieved; and

ess impacts to vegetation health.

sed shipping movements and considers that Part V of the EP Act and have therefore not been ed shipping was considered by the EPA in its ermined that the incremental risk to marine to be significant noting that that the "small variability in shipping numbers associated with

e EP Act and are managed through MS 1180

onsultation. Following the assessment and is list of direct interest stakeholders to ensure in approval assessments for the Perdaman Urea roval are welcome and have been taken into

engage with various groups including traditional was finalised in 2019 and is being implemented tration, representing the traditional custodians of Itation with stakeholders, including the

roup established in 2018, is facilitating Government, industry and community juga Rock Art Strategy. The Stakeholder the Government's broader consideration of art.

ara Port Authority and marine environment as

h dust, marine discharges, stormwater and ficer's consideration of the design of port provided in sections 4.2 (dust), 5 (wastewater . Infrastructure controls have been specified on

Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
		 overfilling or surges, accumulation of fugitive dust emissions); product spills at ship-loader directly to marine environment; product spills at transfer stations (e.g. chute blockages, or dust accumulation); process water from conveyor, transfer stations ship-loader and shed (e.g. produced through conveyor / transfer station washdown, belt wash at conveyor ends / transfer stations); and 	
		 contaminated stormwater along conveyor, transfer stations, ship-loader and the shed catchment. Pilbara Ports notes that stormwater contaminated by Urea product is considered to be within the scope of the Solid and Liquid Waste Management Plan; however, Part 9 of the Works Approval application, potentially contaminated stormwater, is incorrectly identified to be not a potential "emission, discharge or waste" from the Project. 	
	23.	 Section 6.7 Marine Environmental Quality (p32) Operation of Project Ceres has the potential to impact on marine environmental quality due to: the discharge of saline water (brine) and wastewater into King Bay via the existing Water Corporation MUBRL. deposition of air emissions (urea dust from Site C) and spillages of urea product and fugitive urea. dust during ship loading and conveying of urea from the storage shed to the ship loader entering the marine environment. surface water from stormwater run-off from hardstand areas which has the potential to cause erosion and the transport and deposition of sediments into King Bay via the supratidal flats. The document identifies risks to marine environmental quality however it is unclear how this key environmental factor will be managed and monitored for impacts in the context of Port land. 	
	24.	Section 9.3 incorrectly reference activities conducted by Pilbara Ports at the Port of Dampier. Pilbara Ports does not carry out fugitive dust monitoring at the Port of Dampier as stated in Section 9.3.1.1. Reference to dust monitoring at the Port should be removed. The monitoring mentioned in 9.3.2.1 does not account for fugitive dust emissions and appears to be referring to a separate study.	Noted. Fugitive dust emissions during construction activities have be Further consideration of fugitive dust emissions during operations wil works approval, or operating licence.
	25.	Section 9.4.2.6 references activities conducted by Pilbara Ports at the Port of Dampier. Pilbara Ports conducts quarterly sampling of marine water and annual sampling of sediments under the Marine Environmental Quality Monitoring Plan for the Port of Dampier. Pilbara Ports notes that this monitoring program is not designed as a "monitoring" program to support the proponent's works approval application.	Noted. Dust emissions, wastewater and sediment discharges during Table 13 of this decision report. Further consideration of these emiss future amendments to the works approval, or operating licence. requirements for ongoing monitoring.
	26.	Section 9.10.1.1 - Drainage Management During Operations at Dampier Port, Perdaman shall comply with the PPA Part V Licence obtained by the PPA for Category 58 Bulk Material Loading or Unloading. Pilbara Ports notes this statement is incorrect. The proponent is required to obtain all necessary statutory environmental approvals for the construction and operation of infrastructure, as detailed in Works Approval application W6875/2023/1.	Noted. The works approval subject to this assessment includes Categoria conditioned that include the management of dust emissions, product

een considered in Table 13 of this decision report. ill be considered during future amendments to the

g construction activities have been considered in ssions during operations will be considered during This will include where relevant any additional

gory 58 activities, with infrastructure requirements t spillage and wastewater.
Stakeholder	ltem no.	Summary of stakeholder's comment	Department's response
	27.	Pilbara Ports has received Commonwealth environmental approval for the Dampier Cargo Wharf Extension and Landside Redevelopment Project (EPBC2022/09237), a multi-user facility that will be utilised by the Applicant for the export of Urea. The approval includes conditions in relation to management of artificial light sources on the wharf, which is positioned immediately adjacent to the proposed Urea Storage Shed. Pilbara Ports will work with the Applicant to ensure there is consistency in management between its EBPC Act approval and Perdaman Light Management Plan during both construction and operation.	Noted.



Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
Condition 1 (Table 1)	Requested minor changes to correct unintentional errors to listed infrastructure components listed in Table 1.	Noted and updated.
	Clarification of WWTP tank capacity, and location of activated carbon filter cannisters.	Noted and updated.
	Requested minor changes to wording for controls for chemical/condensate storage to include consideration of potentially alternative controls developed through HAZOP and the Major Hazard Facility Safety Case.	The delegated officer considers this request acceptable and has adjusted the specification of the condition, however only to the extent that the outcome of this condition (suitable containment) is still achieved. Condition wording has been updated to reflect the requested flexibility but has retained the original intent.
Condition 5 (Table 3)	Requested the removal of specified storm event capacity requirements for the Saline Water Pond and Saline Evaporation Pond, noting that these are considered to be specified by the Part IV approval.	Noted. The delegated officer has updated the table to remove the references to ARI storm capacity. Total volume specifications remain specified in the works approval and are consistent with that proposed in the works approval application.
	Requested the change in specified freeboard from 350mm to 200mm for the Saline Water pond.	The delegated officer notes that during the assessment, the applicant specified that the working freeboard of the Saline Water Pond is set at 350 mm, the height specified as the trigger value for the transfer pumps to automatically engage and pump water to the evaporation pond. Given this, the delegated officer considers this the highest practical level at which water will reach and therefore has conditioned this as the working freeboard for the Saline Water Pond.
Condition 19 (Table 6)	Provision of an additional dust monitoring location at the port to enable dust emissions during construction activities to be monitored.	Noted and updated with works approval.

General	Requested other minor edits to correct unintentional formatting and drafting errors.	Noted and updated.
	Clarification to shiploader design capacity.	Noted.
	Provision of updated maps, coordinates and figures for inclusion in the works approval as requested.	Noted and included in final works approval
Decision Report	Summary of applicant's comment	Department's response
Section 2.2.3	Minor clarification to process description provided in draft.	Noted and updated.
Section 2.2.6	Minor clarifications to listed storage quantities within table 1.	Noted and updated.
Section 4.1.1	The applicant requests that the nominated design targets for each granulator train (for NH3 and particulates) for not appropriate targets for inclusion in the works approval.	Noted. The delegated officer acknowledges that the inclusion of design targets was not intended within the works approval condition but rather the specified performance criteria for the granulator. The works approval has been updated accordingly. Notwithstanding this, the specified design targets remain an important indicator of the plant's performance, were a relevant inclusion in EPA Assessment Report 1705 and remain a valid reference for the consideration of infrastructure to be installed on the premises. As a result, detail regarding the design targets will remain in the decision report.
Section 5 (Table 8)	Minor updates and clarifications provided for the nominated discharge volumes specified in the table.	Noted and updated.
Section 5.2	Minor clarifications to the text in the decision report regarding the Saline Water Pond sampling location.	Noted and updated.
Section 6.3 (Table 13)	Minor clarifications to the specified applicant controls within the table (regarding first flush for the granulation building).	Noted and updated.
General	Requested other minor edits to correct unintentional formatting and drafting errors	Noted and updated.