

Assessment Report 93

Assessment by referral information

Project Caymus Bulk Fuel Storage Facility
Crowley Australia Pty Ltd
November 2021

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It describes the outcomes of the NT EPA's assessment of the Project Caymus Bulk Fuel Storage Facility proposed by Crowley Australia Pty Ltd at East Arm, Darwin.

This assessment report documents potential environmental impacts and risks identified during the environmental impact assessment process, focusing on those that could be significant, and the measures and recommended conditions required to address potentially significant impacts.

In accordance with section 65 of the EP Act the assessment report is for the Northern Territory Minister for Environment to consider when making a decision about whether to approve the action under the EP Act.



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NT EPA Chairperson

24 November 2021

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Summary

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). This assessment report and the draft environmental approval (EA) are provided to the Minister for Environment (Minister) for consideration in deciding whether to grant an environmental approval for the Project Caymus bulk fuel storage facility (proposal).

Crowley Australia Pty Ltd (proponent) proposes to construct and operate the proposal primarily at Section 5720, Hundred of Bagot, East Arm, Darwin. The proposal would receive, store and supply aviation turbine (jet) fuel to provide additional storage and capacity to support the Australian and United States (US) defence operations and industry in the region, and to meet the forecast increase in demand. The proposal location is adjacent to the Darwin Harbour marine environment which is considered to be a sensitive environmental receptor.

The NT EPA assessed the proposal in accordance with the requirements of the EP Act and Environment Protection Regulations 2020 (EP Regulations). The assessment method was by referral information as set out in regulation 117 of the EP Regulations. The environmental impact assessment examined the potential for significant direct, indirect and cumulative environmental impacts.

The NT EPA identified two environmental factors with the potential to be significantly impacted; marine environmental quality due to the potential for contaminants to impact water quality in Darwin Harbour; and air quality due to the estimated emissions of volatile organic compounds (VOCs) from the fuel storage facility, including cumulative impacts to the regional airshed.

To address potentially significant impacts of the proposal on air quality and marine environmental quality, the NT EPA has recommended conditions for the Minister to consider, if an environmental approval is granted. The proponent and statutory decision makers were consulted on the draft environmental approval as required by regulation 160 of EP Regulations.

The NT EPA's assessment concludes that the proposal can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted subject to the conditions recommended in Appendix 1.

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1. Introduction

This assessment report has been prepared by the Northern Territory Environment Protection Authority (NT EPA) pursuant to section 64 of the *Environment Protection Act 2019* (NT) (EP Act). It provides an evaluation of the potential significant environmental impacts of the Project Caymus Bulk Fuel Storage Facility (proposal).

This assessment report and the draft environmental approval (EA) are provided to the Minister for Environment (Minister) for consideration in deciding whether to grant an environmental approval for the proposal; and concludes the NT EPA's environmental impact assessment process.

1.1. Proponent

The proponent is Crowley Australia Pty Ltd (Australian Company Number 654 468 836). This changed from Crowley Government Services, Inc. (CGSI) during the course of the assessment. CGSI is a business unit of Crowley Maritime Corporation, which is a subsidiary of Crowley Holdings Inc., based in Alaska, United States (US).

1.2. Location and context

The bulk fuel storage facility would be located on Section 5720 Hundred of Bagot on Berrimah Road, East Arm. The site is reclaimed, freehold land owned by the Land Development Corporation and is zoned for industrial development. Adjacent land uses include fuel storage and railway infrastructure. The site is adjacent to Darwin Harbour Site of Conservation Significance, fringed by mangrove ecosystems, which grow along the foreshore north towards Charles Darwin National Park.

Access to the bulk fuel storage site is by Salloo Street with an access road to the site to be constructed off O'Sullivan Circuit on Section 5673, adjacent to the railway station carpark, and via Section 6350, part of which would include a laydown area.

A pipeline between the bulk fuel storage site and East Arm Wharf 4 (bulk liquids berth) would be constructed within Section 5719 behind the Vopak Terminal to connect with an existing pipe rack and pipeline easement from the Vopak Terminal to the wharf precinct.

The nearest residence to the bulk storage facility is at the Haileybury Rendell School, approximately 4.5 km north-east of the proposal. The nearest residential suburb is Bayview located approximately 5.5 km north-west. The Darwin central business district and Stuart Park are located approximately 5 km and 5.5 km respectively, north-west of the ship loading facility at berth 4.

Darwin has a tropical monsoonal climate with a distinct dry season (May to September) and wet season (October to April). The onset and duration of the wet season varies between years, however most rainfall in the Northern Territory is associated with monsoonal troughs and/or from isolated convective storms. High precipitation rates are commonly experienced during storm events in the wet season.

The average annual rainfall for Darwin is 1,723.1 mm. Most of the annual rainfall occurs between November and March. The maximum 24-hr rainfall recorded at Darwin Airport is 367.6mm on 16 February 2011. On average, two to three cyclones form in NT water each season, with one to two crossing the coast.¹

¹ Australian Government Bureau of Meteorology, 2021. Northern Territory Weather and Warnings Summary. Available at: <http://www.bom.gov.au/nt/?ref=hdr>

Synoptic winds during the dry season tend to be dominated by the southeast trade winds, while light west to north-westerlies predominate during the wet season. Sea breezes from the northwest occur on most afternoons throughout the year.

2. Proposal

The proponent proposes to construct and operate a new bulk fuel storage facility at East Arm. Table 1 describes the major components of the development and Figure 1 shows the preliminary site plan with key aspects. A detailed description of the proposal is presented in section 3 of the referral main report.

Table 1 Proposal description

Aspect	Description
Proposal summary	Construct and operate a new bulk fuel storage terminal to receive, store and distribute up to 330 ML flammable and combustible jet fuels.
Construction works	<ul style="list-style-type: none"> • Earthworks and civil construction • Construct tank foundations and concrete bund walls • Construct stormwater management system • Fabricate tanks • Construct pumps, pipes and safety systems.
Jet fuels (kerosene based)	<ul style="list-style-type: none"> • Military kerosene type aviation turbine fuel with flash point of 38 degrees Celsius (°C) conforming to US Military Specification <ul style="list-style-type: none"> ○ North Atlantic Treaty Organisation (NATO) Code F34 (referred to hereafter as F34) ○ also known as JP-8 (Jet Propellant 8) • Military kerosene type aviation turbine fuel with flash point of 60°C conforming to US Military Specification <ul style="list-style-type: none"> ○ NATO Code F44 (referred to hereafter as F44) ○ also known as JP-5 (Jet Propellant 5) • The fuel specification would determine additives that would be blended into the fuel and in what ratio • Additives required may include antioxidants, metal deactivator, corrosion inhibitor/lubricity improver, fuel system icing inhibitor, thermal stability improver and static dissipater.
Tanks	<ul style="list-style-type: none"> • Construct and operate 11 x 30 ML bulk fuel storage tanks (20 m high, 45 m diameter), including: <ul style="list-style-type: none"> ○ Four 30 ML tanks (total 120 ML capacity) for flammable F34 jet fuel storage ○ Seven 30 ML tanks (total 210 ML capacity) for combustible F44 jet fuel storage • Tanks would have a variety of fixed and geodesic roofs • Construct bulk storage compounds with large welded steel tanks, bunds, concrete retaining walls, and flooring designed to contain spills • Construct fire water tanks and additive tanks.

Aspect	Description
Pipelines	<ul style="list-style-type: none"> • Connection to existing Port of Darwin pipeline • Use of existing pipe network and extension from adjacent Vopak termination point • Construct two new purpose-built pipelines (if existing unused pipelines are not available) along existing pipeline rack and easement which has capacity for the additional pipes • New carbon steel fully welded pipeline would utilise the existing pipe supports and road crossing culverts as the existing pipelines • Pipeline would be used to load and unload fuel shipping tankers.
Fuel receipt	<ul style="list-style-type: none"> • After the initial terminal fill, about 120 ML/annum is expected to be received (4 ships).
Port of Darwin	<ul style="list-style-type: none"> • Receipt of fuels by ship at the existing Wharf 4 berth • Shipments are 30 ML each • Ship loading rate will be 1,400 m³/hr from proposal • Ship tankers servicing the proposal would include medium range and long range vessels • Construction and operation of a marine loading arm on the berth for connecting to ships • Automated pumping to transfer fuels between ships and the terminal, tanker – 1,400 m³/hr; barge – 320 m³/hr.
Truck loading gantry	<ul style="list-style-type: none"> • Construction and operation of a truck loading gantry for transfer of fuels to road tankers for transport off-site • Delivery and dispatch of fuels by road tankers • Capacity to load two triple road trains at a rate of 36,000 L (36 KL) per trailer per hour.
Ancillary infrastructure	<ul style="list-style-type: none"> • Office/control room • Access road • Emergency and crane access • Oily water separation system • Warehouse storage/space • Pump house.
Design working life	<ul style="list-style-type: none"> • 50 years.

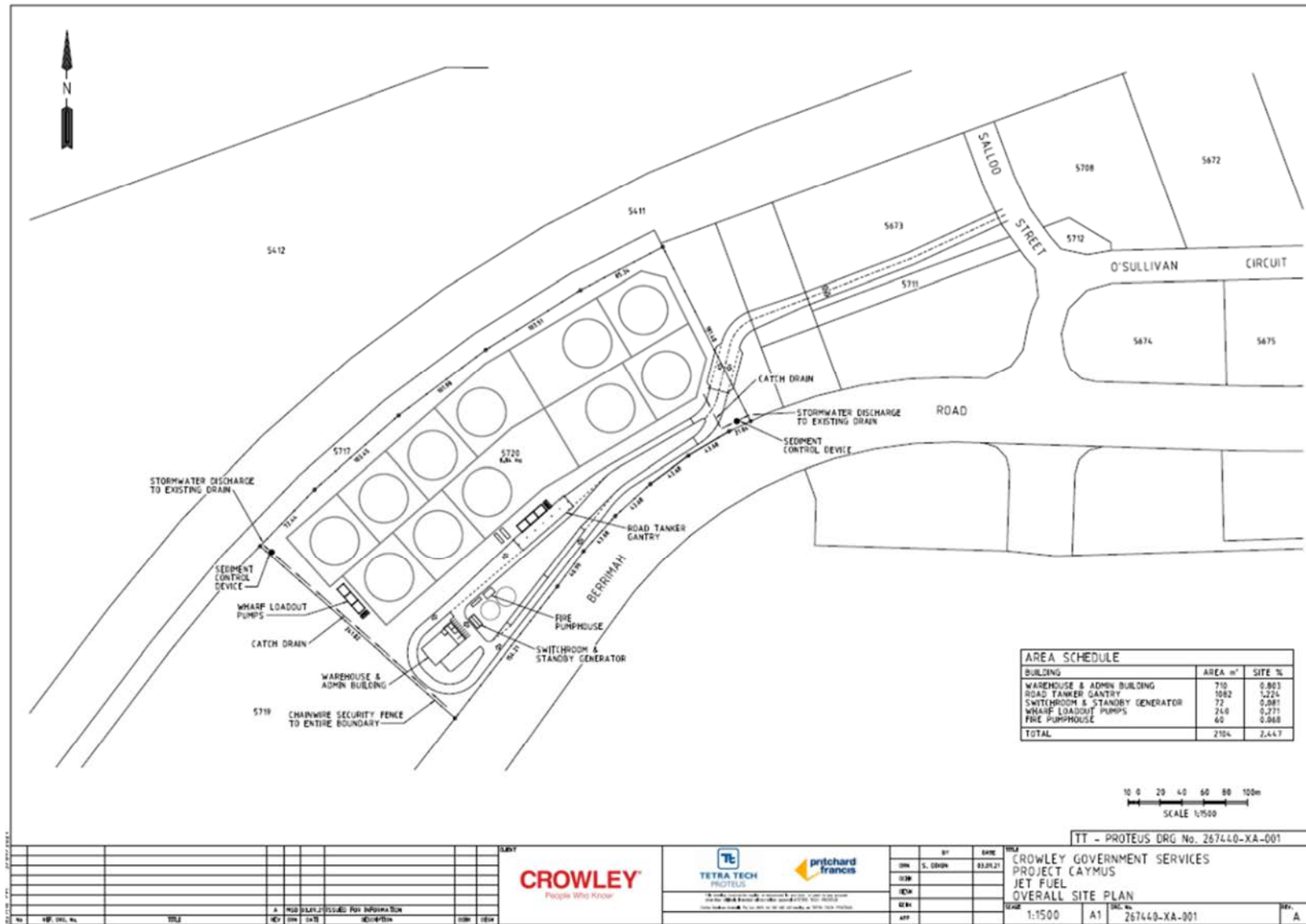


Figure 1 Preliminary site plan (Source: Submission from Department of the Chief Minister and Cabinet Major Projects Commissioner)

3. Strategic context

3.1. Consistency of proposal with strategic planning

The proposal is consistent with the NT Government's commitment to creating jobs and economic growth, and with strategic plans and initiatives including:

- **Darwin Regional Plan** - identifies high level characteristics and needs that will shape development, management of growth and regional infrastructure
- **Land Development Corporation Bulk Liquids Area** - reserves strategic land adjacent to East Arm Wharf for bulk liquids storage for parties participating in the Australian and US Government fuel storage processes
- **NT Economic Development Framework** - establishes the directions and actions needed to accelerate the Territory's economic development, informs long term decision making and aims to deliver policy and regulatory certainty for investors
- **The Territory's Economic Reconstruction** - the Territory Economic Reconstruction Commission sets out a blueprint to diversify the NT's industry base and take advantage of post-COVID global market trends to accelerate the growth of its economy and lead the national economic recovery
- **NT Defence and National Security Strategy** - aims to establish a strong national security presence in the NT integrated with community and supported by industry, and recognises the importance of national security, defence and fuel security resilience.

3.2. Proposal benefits

The proposal would provide long term benefits for the community and business in the local area through:

- creation of about 400 jobs during construction, and 20 jobs during operation
- improved reliability and capability for fuel supply in Northern Australia
- improved operational efficiency through ability to import larger volumes of fuel
- minimising the effect of impacts on the international supply chain through increased supply security.

3.3. Proposal alternatives

The proponent considered the potential for an alternative proposal site and concluded that there was no suitable alternative site available given that the proposed site is suited to, and has been reserved for, bulk liquids storage due to its proximity to port loading facilities and existing pipeline infrastructure.

4. Statutory context

4.1. Overview

The proposal requires assessment by the NT EPA under the EP Act. The Northern Territory Minister for Environment is the approval authority.

This assessment report and the draft environmental approval (Appendix 1) are available for the Minister to consider in making a decision on whether to grant or refuse an environmental approval for the proposal and conditions of the approval.

Pursuant to section 61 of the EP Act, the purpose of the environmental approval is to manage the potentially significant environmental impacts of a proposal during all phases. This includes planning, design, construction or carrying out of works, operation, rehabilitation, remediation and closure of the proposal.

Approvals requiring separate applications and processes are required for the proposal. It is the responsibility of the proponent to obtain all approvals that may be required. These may include, but are not limited to:

- a development permit from the Development Consent Authority under the *Planning Act 1999*
- a major hazard facility licence under the *Work Health and Safety (National Uniform Legislation) Act 2011* (WHS Act).

A range of other approvals may be required under NT legislation, including a trade waste licence under the *Water Supply and Sewerage Services Act 2000*, a waste discharge licence (WDL) under the *Water Act 1992*, bore work permits and permits to work within a road reserve.

4.2. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the following information in accordance with regulation 157 of the EP Regulations:

- referral information
- additional information provided under EP Regulation 40
- submissions on the referral information
- any other information the NT EPA considers relevant under EP Regulation 157(2)(c).

The NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act (addressed in Appendix 2) including consideration of:

- the objects (EP Act, section 3)
- the principles of ecologically sustainable development (EP Act, Part 2 Division 1)
- the environmental decision-making hierarchy (EP Act section 26)
- the waste management hierarchy (EP Act section 27)
- ecosystem-based management
- impacts of a changing climate.

5. Consultation

The NT EPA published the referral for comment between 26 July 2021 and 23 August 2021. No public submissions were received. Nine submissions from government authorities were received and are available on the NT EPA website.

The NT EPA considered the submissions in making its decision to require a standard environmental impact assessment by the referral information method.

In preparing this report, matters raised in the submissions were considered in relation to the proposal's potential environmental impacts. The issues raised in submissions are discussed in more detail in section 6 below.

The NT EPA consulted with, and invited submissions from, the proponent and statutory decision makers who may have a view on the draft environmental approval. Submissions were received from the proponent, delegate under the *Planning Act 1999*, and Director of Technical Services, NT Worksafe, on the *WHS Act*. The NT EPA considered the submissions in finalising its recommendations to the Minister.

The NT EPA acknowledges that the proponent has committed to continued engagement with relevant stakeholders during implementation of the proposal, should approval be granted.

6. Assessment of key environmental factors

6.1. Overview

The NT EPA identified that the proposal has the potential to have a significant impact on environmental values associated with two environmental factors (Table 1).

Table 1 Key environmental factors²

THEME	FACTOR	ENVIRONMENTAL OBJECTIVE
SEA	Marine environmental quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.
AIR	Air quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.

The NT EPA considered other environmental factors during its consideration of the referral; however, the impact on those factors was not considered to be significant.

6.2. Marine environmental quality

6.2.1. Environmental values

Darwin Harbour and its catchment extends south between Charles Point in the west and Gunn Point in the east and covers approximately 3,230 km². The area includes the tributaries and estuarine areas of Cox Peninsula, West Arm, Middle Arm, East Arm and Shoal Bay. Several river systems drain to the estuary (Darwin, Blackmore, Elizabeth and Howard). Darwin Harbour and its estuaries are fringed by extensive mangroves, mudflats, reefs and seagrasses and are home to dolphins, dugong, sea turtles, shorebirds and a large variety of fish. The harbour is a tropical macro-tidal estuary with semi-diurnal tides which reach a maximum of close to 8 metres, producing strong tidal movements which transport sediment within and across the harbour's boundaries³.

The Darwin Harbour estuary has good water quality despite high turbidity levels. The mangrove communities fringing the harbour are largely undisturbed and, at present levels of development, the Darwin Harbour ecosystem remains generally healthy. The East Arm Peninsula is the centre

² [NT EPA Guide to Environmental Factors and Objectives](#).

³ Darwin Harbour Advisory Committee, 2020. [Darwin Harbour strategy 2020 – 2025: A contemporary strategy for the sustainable management of the Darwin Harbour region](#). Palmerston, Northern Territory.

of port and marine services and development in Darwin Harbour, with large industry developments a feature at both East and Middle Arm Peninsulas. East Arm receives urban stormwater runoff from the city of Darwin and there is a small discharge of treated wastewater from the Berrimah plant into Bleasers Creek. Although mangroves have been cleared for industrial development, intact mangrove habitats still remain along approximately half the coastline of East Arm Peninsula.⁴

Under the *Water Act 1992*, beneficial uses for the marine surface water of Darwin Harbour have been declared for protection of the environment, culture and aquaculture. Locally derived water quality objectives have been developed for some physico-chemical indicators and potential stressors, and guideline values for toxicant indicators are sourced from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018).⁵

6.2.2. Investigations and surveys

The proponent did not undertake water quality sampling or investigation and did not provide a summary of existing available data to characterise the marine water quality in the receiving environment.

The water quality of Darwin Harbour is assessed annually by the NT Government against the guidelines of the Darwin Harbour Water Quality Objectives, across nine zones representing different physical environments in the harbour, which feature diverse marine life such as seagrass beds, coral reefs and mangroves.

Water quality data was collected in 2020 by the Department of Environment, Parks and Water Security and supplemented by monitoring data from Power and Water Corporation (PWC) and Santos Ltd. Data collected from the East Arm zone indicated no change in water quality from the previous 2019 reporting year, and no change in the long-term trends since the 2012 reporting year. Water quality in the East Arm zone is considered to be very good as judged by consideration of indicators for algae, dissolved oxygen, nutrients and water clarity.

6.2.3. Consultation

Matters raised during consultation relating to potentially significant impacts to marine environmental quality include:

- the requirement for an erosion and sediment control plan (ESCP) to be submitted to the consent authority for acceptance prior to works commencing
- the potential for discharge of contaminants via surface water to Darwin Harbour and associated water quality impacts
- management of hydrocarbon spills during fuel transfer.

A submission from the Department of the Chief Minister and Cabinet (DCMC) Major Projects Commissioner⁶ includes:

- information about stormwater management and discharge
- information about future sampling to inform management of existing contamination present in groundwater and soil underlying the proposal

⁴ Department of Environment, Parks and Water Security, 2021. [Darwin Harbour region report cards - 2020 water quality report - Zone 2: East Arm](#). Palmerston, Northern Territory.

⁵ ANZG 2018. [Australian and New Zealand Guidelines for Fresh and Marine Water Quality](#). Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.

⁶ The [submission from the DCMC Major Projects Commissioner](#) includes a report prepared by Jacobs: *East Arm Bulk Fuel Storage Facility Advice to the NT Government in relation to Project Caymus*

- the need for consultation with the Darwin Port about oil spill contingency planning to minimise the impact of any marine oil pollution emergency caused by the proposal
- the need for environmental management plans for both the construction and operations phases of the proposal to manage potential surface water and groundwater impacts.

6.2.4. Potentially significant impacts

There is potential for the proposal to result in a significant environmental impact to the marine environmental quality of Darwin Harbour and its beneficial uses, due to the proposal location and potential pathways for contamination.

Construction would require regrading of existing surfaces, excavation and backfill, alteration to the existing drainage network, installation of new drainage infrastructure and construction of bunds, tanks and other proposal infrastructure. These works could potentially result in increased runoff volumes and surface water quality impacts.

During operations, the proposal has the potential to result in surface water and groundwater quality impacts via the release of hydrocarbons and other waste products to the receiving environment, including potential seepage of contaminants and migration to Darwin Harbour.

Any major release of bulk fuels or wastes from the proposal could add to the toxicant loading of Darwin Harbour, potentially impacting the marine environmental quality around the East Arm area. This could compromise the environmental values established under the Darwin Harbour Water Quality Protection Plan for sustainable development of the Darwin Harbour region.

6.2.5. Avoidance and mitigation of impacts

Stormwater

The proposal would increase stormwater discharges given the expanded impervious hardstand areas. Stormwater runoff that does not come into contact with fuel storage, transfer or containment areas is proposed to be diverted via culverts and drains, through sediment control devices prior to discharge to existing drains at the eastern and western corners of the site.

Potentially significant water quality impacts from soil erosion and sedimentation during construction would be avoided through the proponent's commitments to implement best practice erosion and sediment controls⁷ to minimise disturbance and prevent sediment-laden water entering Darwin Harbour.

Potentially contaminated stormwater is proposed to be intercepted, contained and treated prior to release to the environment. The proposal stormwater system includes a 50 kL underground oily water tank connected to an oily water separator adjacent to the truck loading gantry.

The referral indicates that potentially contaminated stormwater (wastewater) is proposed to be treated prior to discharge to the environment, if reuse on site is not practicable. Wastewater generated on site from fuel storage, transfer or containment areas and washdown facilities would potentially contain a range of contaminants, notably hydrocarbons, other chemicals (fuel additives and firefighting foam) and sediment. Any unplanned release of wastewater would potentially mobilise contaminants to the receiving environment. The contaminants that would be present in wastewater is uncertain as is the likely concentration after treatment.

To avoid or mitigate potential impacts on marine environment quality, the NT EPA has recommended conditions that include best practice design; avoiding the release of contaminants

⁷ International erosion and sediment control association (IECA) Australasia, 2008. Best Practice Erosion and Sediment Control. Picton, NSW.

and waste to the environment; and managing stormwater on-site and monitoring prior to its release from the premises to ensure stormwater meets relevant water quality discharge criteria (Appendix 1, condition 10).

Application of the waste management hierarchy under section 27 of the EP Act requires that the proponent takes reasonable measures to minimise the generation of waste and subsequent discharge to the environment through an approach to avoid, minimise, re-use, recycle, recover, treat and dispose of waste, in that order of priority. If, despite application of the waste management hierarchy, wastewater discharge to the environment is proposed, wastewater would require treatment to an acceptable standard. If controlled discharge of wastewater to the environment is proposed, a Waste Discharge Licence may be required pursuant to section 74 of the *Water Act 1992*.

The NT EPA considers that the proponent should investigate whether there are available options to discharge wastewater as trade waste⁸ to the PWC sewerage system under Section 82(2) of the *Water Supply and Sewerage Services Act 2000*, or to transfer wastewater to a licensed waste handler for treatment.

Groundwater

Previous investigations undertaken for the site identified groundwater concentrations of a number of potential contaminants of concern above relevant criteria including perfluorooctanesulfonic acid (PFOS), ammonia, copper, lead, nickel, zinc. Soil sampling results indicated that the site is not contaminated and is therefore suitable for the proposal⁹.

The proponent has not proposed to install groundwater monitoring wells or conduct groundwater monitoring prior to or during the proposal.

The NT EPA has recommended a condition requiring the proponent to conduct groundwater monitoring, including collection of baseline data over an appropriate time period, to enable the detection of leaks and the potential for migration of contaminants to the marine environment, as an additional precaution in case leak detection or containment systems fail.

Spill containment and leak detection

The proponent committed to comply with AS 1940:2017 to ensure effective management of flammable and combustible liquids to mitigate the potential for significant impact on the receiving environment, or environmental harm. This includes installing operational controls such as impervious bunding containment systems, leak detection systems and oily water separation for areas where there is a risk of spills or leaks of hydrocarbons or other chemicals including tanks, pipelines, product storage, maintenance, transfer, loading and unloading areas¹⁰. If properly designed, installed, operated and maintained, the NT EPA considers that this would avoid the uncontrolled release and mobilisation of contaminants to the marine environment. The proponent would also comply with the API standards for tanks, American Society of Mechanical Engineers (ASME) codes for piping, API 1581 Specifications and Qualification Procedures for Aviation Jet Fuel Filter/Separators and Unified Facilities Criteria (UFC) as a guide for US Department of Defense facilities.

⁸ Refer to the Power Water Corporation website for information about the Trade Waste Management System and the Trade Waste Code, including trade waste discharge acceptance guidelines

⁹ Site investigation results discussed in the submission from the DCMC Major Projects Commissioner.

¹⁰ According to the following report, the road tanker load/unload gantry area would be covered with a roof to prevent rainwater ingress and minimise the amount of wastewater generated: Jacobs, 2021. East Arm Bulk Fuel Storage Facility - Advice to the NT Government in relation to Project Caymus (provided as part of submission from the NT Major Projects Commissioner).

If a new liquid pipeline is required between the storage tanks and the wharf it would be designed, constructed, tested, operated and maintained in accordance with the ASME codes for piping and would include design features such as isolation valves, surge control, and pressure and flow monitoring. This would reduce the likelihood of a major spill during fuel transfer. The liquid pipeline would be constructed above ground on an existing pipe rack between the tank storage and the wharf. Any leaks would likely be contained within the area and inspections would be undertaken on a regular basis.

If a major spill or leak occurs, then contamination of Darwin Harbour would be a significant issue requiring a rapid management response to prevent further release from the proposal to the environment. The NT EPA expects that the proponent would implement contingency measures in the event of a spill, or where monitoring results show that discharge criteria have been exceeded, or the 'slightly to moderately disturbed' (95%) level of species protection is not being met.

For aspects of the proposal carried out at the Darwin Port, the NT EPA notes there is a requirement that port users adhere to environmental standards set out in the Darwin Port Environmental Management Plan. All port users must also comply with the Minimum Environmental Expectations for operations within the Port or its facilities. Cargo vessels would be double hull tankers and would be required to comply with the *Ports Management Act 2015* and meet the International Convention for the Prevention of Pollution from Ships (MARPOL).

6.2.6. Conclusion against the NT EPA objective

With the implementation of relevant management plans and recommended conditions identified in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objective for marine environmental quality is likely to be met.

6.3. Air quality

6.3.1. Environmental values

The proposal is located within an industrial area adjacent to the Port of Darwin. The nearest receivers are neighbouring industrial premises, and the nearest residence is located at the Haileybury Rendall School about 5.5 km northwest of the proposal. The proposal is 6 km southwest of the city of Darwin.

The NT Government monitors ambient air quality in the Darwin region in accordance with the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM). Monitoring results indicate that concentrations of carbon monoxide, oxides of nitrogen, ozone and sulfur dioxide are very low in the NT, with fine particles from vegetation burning the exception. Volatile organic compounds (VOCs¹¹) are not monitored as part of the NT Government's ambient air quality monitoring. Reporting under the publicly available National Pollutant Inventory (NPI) includes Total VOC emissions from 98 facilities in the NT. Oil and gas extraction activities account for about 68% of the VOC emissions from facilities in the NT that are required to report under the NPI.

6.3.2. Investigations and surveys

Section 12.2 of the referral includes a calculation assessment for VOC emissions from the two fuels to be stored at the bulk storage facility. The calculation was made using the method from

¹¹ Volatile organic compounds are defined by the World Health Organisation as organic compounds (all chemicals containing carbon and hydrogen) with boiling points between 50°C and 260°C, excluding pesticides.

AP42: Compilation of Air Emissions Factors, Fifth Edition, Volume I Chapter 7: Liquid Storage Tanks (US EPA).

6.3.3. Consultation

Matters raised during consultation relating to potentially significant impacts and risks to air quality include:

- direct and cumulative volume of hydrocarbon emissions
- whether emissions controls are required to avoid any potential for significant impact such as a requirement to install vapour recovery unit/s
- identification of additional VOC emissions sources from the proposal
- advice about relevant guidance relating to air impact assessment and design
- the physical and chemical characteristics of fuels to be stored at the facility.

A submission from the DCMC Major Projects Commissioner includes:

- VOC calculation assessments using engineer's basis of design, API 650 tank data sheet and an iteration/scenario including further refinement using Darwin meteorological data and tank design drawings and materials
- benchmarking of proposal VOC emissions against NPI reporting facilities.

6.3.4. Potentially significant impacts

The proposal could affect achievement of the NT EPA's environmental air quality objective through VOC emissions (such as benzene and toluene) from:

- tank breathing (standing loss) and planned operational loss (working loss)
- ship loading and unloading
- transfer of fuel from tanks to trucks at the truck loading gantry
- fugitive emissions from leaks and spills.

VOCs are compounds that disperse quickly from the emission source; therefore, the most accurate way to monitor VOCs in air is to measure them at the source. Some individual VOCs, such as benzene and toluene, are toxic and can be hazardous to human health, and some VOCs, in the presence of sunlight, and through a series of chemical reactions, can react with ground-level ozone and other compounds to form photochemical smog.

The National Environment Protection Council (NEPC) identifies benzene as a principal air toxic given its potential impacts on human health, hence the measurement and reporting of benzene is often required separately to the reporting of total VOCs.

The referral estimates that a total of 1,000 tonnes per annum (t/a) of VOCs could be emitted from the storage facility during operations. The individual VOC species likely to be emitted were not provided in the referral and it was not clear that the estimate included all potential sources of emissions from the proposal. The contribution of 1,000 t/a of VOCs from the facility would result in the proposal being the second largest source of VOCs in the Darwin region compared to facilities in the NT that are required to report under the NPI.

There is the potential for air quality impacts at a local level from toxic air pollutants; however, there are limited sensitive receptors in the area of the proposal. At a regional level, there is a risk to the Darwin regional air shed of potentially significant cumulative impacts to air quality from multiple sources of VOC emissions discussed below.

6.3.5. Avoidance and mitigation of impacts

The NT EPA considers there is potential for the proposal to significantly impact air quality of the Darwin region, primarily associated with VOC emissions to air from the bulk fuel storage facility and during transfer of the fuels between infrastructures.

The referral included a commitment to design the bulk fuel storage facility in accordance with relevant national and local safety, health and environmental requirements, and concluded that VOC emissions would result in a negligible impact to the environment. An air quality impact assessment (AQIA) was not conducted to determine the potential for impacts from the proposal on local or regional air quality. There is uncertainty about the design of the proposal as pollution controls, including avoidance and mitigation measures and best available technology, have not been proposed in the referral.

There are significant sources of VOC emissions arising from land uses adjacent to the proposal including the Vopak fuel terminal (590 t/a), and from regional sources including the INPEX LNG facility (2,800 t/a¹²) and Darwin LNG facility (210 t/a¹³). Without appropriate emission controls, the proposal's VOC emissions could significantly contribute to the cumulative VOCs emitted to the Darwin air shed.

The NT EPA considers that avoidance and mitigation measures are required and can be implemented in the design of the proposal in accordance with the waste management hierarchy and environmental decision-making hierarchy.

The submission from the DCMC Major Project Commissioner estimates that a total of 895 t/a of VOCs could be emitted from the storage facility during operations. As indicated in Table 14 of the submission, with the inclusion of internal floating covers inside the fixed roofs on tanks storing F34 jet fuel, and the same number of turnovers per year, total VOC emissions are greatly reduced to an estimate 38 t/a. A further refinement to the estimated emissions includes a reduction in turnovers to one per year and consideration of Darwin's meteorological data, resulted in a VOC emission estimate of 4.5 t/a.

The NT EPA recommends conditions to avoid the majority of the VOC emissions through installation of internal floating roofs on tanks storing F34 jet fuel. In the case more than one turnover per year is required to meet the demand of the US Defense Force, the NT EPA has recommended a condition that VOC release mitigation measures (not incineration) are required to be installed. To address the potential for significant impacts to air quality from the action beyond the boundary of the premises at loading / unloading points, the NT EPA recommends a condition to require a vapour recovery system at the loading / unloading points if indicated by the AQIA.

The NT EPA recommends audits are undertaken both of the constructed facility to ensure design criteria are met, and the operating facility to determine the effectiveness of safeguards, with further audits as required by the regulatory authority.

The NT EPA considers that the measures recommended in Appendix 1 (condition 11), will avoid or considerably reduce VOC emissions from the major emissions sources associated with the proposal; identify whether any additional sources from the proposal may contribute to air quality impacts, and ensure transparency of environmental controls and reporting.

¹² <http://www.npi.gov.au/npidata/action/load/emission-by-individual-facility/result/criteria/state/NT/year/2020/jurisdiction-facility/NT545>

¹³ <http://www.npi.gov.au/npidata/action/load/emission-by-individual-facility-result/criteria/state/NT/year/2020/jurisdiction-facility/NT291>

The NT EPA is of the view that these measures, in conjunction with implementation of best available technologies and management, are likely to mitigate environmental impacts to air quality such that they are not significant.

With the implementation of appropriate best available techniques in the design of the proposal as recommended in conditions in the draft environmental approval (Appendix 1), VOC and, in particular, benzene emissions from the proposal are unlikely to add significantly to the local or regional emissions. Therefore, the NT EPA considers that the proposal will not result in significant cumulative impacts to air quality in the Darwin region.

6.3.6. Conclusion against NT EPA's environmental factor objective

With the implementation of recommended conditions in Appendix 1, the NT EPA considers that the proposal could be conducted in such a manner that its objective for air quality is likely to be met.

7. Whole of environment considerations

The NT EPA has considered connections and interactions between the key environmental factors (marine environmental quality and air quality) together with other environmental factors, (including inland water environmental quality, terrestrial environmental quality and atmospheric processes), in its consideration of impacts to the whole of environment. The NT EPA is of the view that these impacts would not lead to any substantial effect on achievement of the NT EPA's environmental objectives.

The referral does not propose closure and remediation. The NT EPA has recommended conditions requiring closure planning, which would involve the removal of all tanks and associated infrastructure from the site; and the site will be non-polluting, remediated and not contaminated (condition 12).

8. Conclusion and recommendation

The NT EPA has considered the proposal by Crowley Australian Pty Ltd to develop Project Caymus Bulk Fuel Storage Facility at East Arm, Darwin. The NT EPA's assessment of the proposal identified potentially significant environmental impacts associated with the environmental factors of marine environment quality and air quality.

The NT EPA considers that the proposal can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted subject to the conditions recommended in Appendix 1.

Appendix 1 – Draft Environmental Approval

Draft Environmental Approval

SECTION 65 OF THE ENVIRONMENT PROTECTION ACT 2019

Approval number EP2021/008 – 001

Approval holder Crowley Australia Pty Ltd

Australian Company Number (ACN) 654 468 836

Registered business address Crowley Australia Pty Ltd
Level 1, 8 Beulah Road
Norwood, South Australia 5067

Primary contact Sean Thomas
+1.907.777.5542
Sean.Thomas@crowley.com

Action To construct and operate a bulk fuel storage facility and ancillary infrastructure for the transfer and storage of jet fuel, East Arm, Darwin (Appendix 1).

Address of premises 740 Berrimah Road, East Arm NT 0822,
Sections 5720, 5673, 6350, and 5790 Hundred of Bagot

NT EPA Assessment Report number 93

Decision maker

NOT FOR SIGNING

Hon Eva Dina Lawler MLA,
Minister for Environment

Date of approval

General Conditions

1. Commencement of action

- a. This approval expires two (2) years after the date on which it is granted, unless substantial work has physically commenced on or before that date.
- b. The approval holder must notify in writing the Chief Executive Officer of the Department of Environment, Parks and Water Security (the CEO) of the date of commencement of the action, within 10 business days after the date of commencement of the action.

2. Proposal implementation

The action must be carried out:

- a. In accordance with the *Environment Protection Act 2019*;
- b. In accordance with this approval;
- c. In a competent manner; and
- d. Wholly within the premises as identified in Appendix 1.

3. Change of contact details

The approval holder must notify the CEO of any change of its name, physical address, postal address and contact details for the serving of notices or other correspondence within 10 business days of such change.

4. Operation and maintenance of plant and equipment

The approval holder must ensure any plant and equipment used in conducting the action:

- a. Is fit for the purpose and use to which it is put;
- b. Is maintained;
- c. Is operated by a person trained to use the plant and equipment; and
- d. Is calibrated in accordance with Australian Standard methods.

5. Environmental management

- a. Prior to commencement of operation, the approval holder must develop and implement an environmental management system (EMS) that applies specifically to the action, and is consistent with the Australian Standard AS/NZS ISO 14001 Environmental Management Systems, as amended from time to time.
- b. The approval holder must ensure that the action is designed, constructed, maintained and operated in accordance with industry best practice, and as a minimum:
 - (i) all applicable Australian Standards, including but not limited to AS1940 and AS1692, as amended from time to time.
 - (ii) all applicable American Petroleum Industry (API) standards, including but not limited to API650 and API1581, as amended from time to time.

6. Compliance assessment reporting

- a. The approval holder shall prepare and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 6f, or prior to implementation of the action, whichever is sooner.
- b. The Compliance Assessment Plan shall indicate:

- (i) the frequency of compliance reporting;
 - (ii) the approach and timing of compliance assessments;
 - (iii) the retention of compliance assessments;
 - (iv) the method of reporting of potential non-compliances and corrective actions taken;
 - (v) the table of contents of Compliance Assessment Reports; and
 - (vi) public availability of Compliance Assessment Reports.
- c. After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 6b the approval holder shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 6a.
- d. The approval holder shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 6a and shall make those reports available when requested by the CEO.
- e. The approval holder shall advise the CEO of any potential or actual non-compliance within seven (7) days of that non-compliance being known.
- f. The approval holder shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this approval addressing the twelve (12) month period from the date of issue of this approval and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.
- g. The Compliance Assessment Report shall:
- (i) have the company seal affixed and be endorsed by the approval holder's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;
 - (ii) include a statement as to whether the approval holder has complied with the conditions;
 - (iii) identify all potential non-compliances and describe corrective and preventative actions taken;
 - (iv) be made publicly available in accordance with the approved Compliance Assessment Plan; and
 - (v) indicate any proposed changes to the Compliance Assessment Plan required by condition 6a.

7. Monitoring and auditing

- a. The approval holder must design and implement a monitoring program, to the satisfaction of the CEO, which demonstrates compliance with condition 10g and 10l of this environmental approval. The monitoring program must include:
- (i) the collection of baseline data over an appropriate time period;
 - (ii) appropriate monitoring of relevant parameters in accordance with Appendix 2 of this approval;
 - (iii) a system for recording and maintaining monitoring details and data records; and
 - (iv) a quality assurance and quality control system.
- b. The approval holder must develop and implement an environmental audit program for the site. The program must:

- (i) be developed by a qualified person, and approved by the CEO prior to commissioning of the action;
 - (ii) verify that the safeguards specified in this environmental approval are implemented and maintained;
 - (iii) evaluate the effectiveness of the safeguards for the protection of the environment applied or adopted in relation to the action;
 - (iv) evaluate compliance with the conditions of this environmental approval; and
 - (v) verify that environmental monitoring, maintenance and record keeping are being undertaken in accordance with the Compliance Assessment Reporting process required under condition 6, and the approval holder's EMS.
- c. The audit program must include an audit within two (2) months of the completion of construction of the action, and an audit within two (2) months after the first year following commissioning of the action. Thereafter, auditing of the action will be conducted at a frequency determined by the CEO.
- d. The approval holder must ensure that, within 20 business days of conclusion of each environmental audit, it provides to the CEO:
- (i) a written report on the environmental audit required by condition 7c that is prepared and signed by the qualified person who conducted the audit; and
 - (ii) a written report from the approval holder that responds to each potential and actual non-compliance identified in the written audit report.

8. Notification of environmental incidents

Notification of environmental incidents must be in accordance with Part 9 Division 8 of the *Environment Protection Act 2019* and Part 10 of the *Environment Protection Regulations 2020*.

In an emergency, the **NT EPA Pollution Response Hotline** should be notified in the first instance by telephoning **1800 064 567**.

9. Public availability of data

Subject to confidentiality of information requirements under Part 13, Division 3 of the *Environment Protection Act 2019*, within six (6) months of commencement of the action and for the remainder of the life of the action, the approval holder is required to publish and make publicly available, in the form and manner approved by the CEO, all available environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), monitoring records, management plans, reports and audits relevant to the assessment of the action and implementation of the environmental approval.

Environmental Conditions

10. Marine environmental quality

The approval holder must ensure there are no attributable impacts from the action on the following environmental outcome:

Protect the quality and productivity of water, sediment and biota in Darwin Harbour so that environmental values are maintained.

To demonstrate that the outcome in condition 10 is met, the approval holder must:

- a. Take all reasonably practicable measures during the planning, design, construction, operation, remediation and closure of the action to avoid and mitigate impacts

attributable to the action on the quality and productivity of water, sediment and biota beyond the boundary of the premises.

- b. Ensure there is no migration or overflow of a contaminant or waste beyond the boundary of the premises, which causes or may cause environmental harm.
- c. Ensure all fuel storage tanks are designed and constructed in accordance with API Standard 650 Welded tanks for oil storage, and must include:
 - (i) impermeable sub-grade release prevention barriers; and
 - (ii) undertank leak detection systems.
- d. Ensure that storage tanks and bunds on the premises are designed and constructed to minimise the potential for overflow of containment structures from dynamic pressure and product wave in the event of catastrophic tank failure.
- e. Take all reasonably practicable measures to ensure that stormwater within the premises does not come into contact with a contaminant, which causes or may cause environmental harm.
- f. Maintain capacity at all times to contain stormwater that has the potential to be contaminated within the boundary of the premises up to a 2% Annual Exceedance Probability 24-hour rainfall event. The height of bund walls must not be less than 3 metres.
- g. Ensure that any stormwater that has the potential to be contaminated with hydrocarbons is retained on the premises and treated through an oily water separation device to a quality in accordance with Table 1 of Appendix 2 of this approval.
- h. Ensure and be able to validate that any water (including stormwater) discharged from the premises does not contain a contaminant or waste, except as specifically authorised by another condition of this approval.
- i. Ensure that wastewater (not including sewage) is not discharged from the premises unless all other reasonably practicable measures for re-use or controlled removal of wastewater from the premises have been excluded, in accordance with the waste management hierarchy.
- j. Ensure any discharge of wastewater to the environment from the premises, after consideration of condition 10i, must:
 - (i) be controlled, such as through a pipe, in a manner that does not cause erosion;
 - (ii) be recorded, including details of the date, time, discharge point location, name of the person monitoring the discharge, and the volume and rate of discharge; and
 - (iii) be of a quality that meets 95% species protection for marine water under the Australian & New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018), except as specifically authorised by another condition of this approval.
- k. Implement best available practices for:
 - (i) Handling, transport, storage, use and disposal of firefighting foams containing PFAS; and
 - (ii) Phasing out use of firefighting foams containing PFOA, PFOS, PFHxS, and precursor compounds to PFOA, PFOS, and PFHxS where this does not compromise safety requirements.
- l. The approval holder must conduct surface water and groundwater quality monitoring within the premises, in accordance with the monitoring program under condition 7 that measures the parameters listed in Appendix 2.

11. Air quality

The approval holder must ensure there are no attributable impacts from the action on the following environmental outcome:

Protect air quality and minimise emissions and their impacts on the Darwin airshed so that environmental values are maintained.

To demonstrate that the outcome in condition 11 is met, the approval holder must:

- a. Take all reasonably practicable measures during the planning, design, construction, operation, remediation and closure of the action to avoid and mitigate impacts attributable to the action on air quality beyond the boundary of the premises.
- b. Plan, design, construct, operate, remediate and close the action using best available techniques to minimise emissions of volatile organic compounds to air.
- c. Within 20 business days after the commencement of construction of the action, complete:
 - (i) a Level 1 air quality impact assessment (AQIA) of the operational design of the action; and
 - (ii) if required following completion of the Level 1 assessment, a Level 2 (refined dispersion modelling) AQIA for operation of the action.
- d. Undertake the AQIA in accordance with Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (State of NSW and Environment Protection Authority [EPA] 2016 or latest version), to the satisfaction of the CEO. An AQIA report must be provided to the CEO within 20 business days of completing the AQIA.
- e. Ensure control equipment for tanks storing jet fuel includes:
 - (i) in tanks with F34 flammable jet fuel, a floating cover constructed of material impervious to vapour that, under normal operating conditions, floats on the surface of the liquid inside a fixed roof; and
 - (ii) if the AQIA undertaken in accordance with conditions 11c and 11d indicates that there is the potential for significant impacts to air quality from the action beyond the boundary of the premises, a vapour recovery system (no incineration) at loading / unloading points.
- f. Implement emission mitigation measures for volatile organic compounds (no incineration) if the turnover of the total volume of 300 million litres (ML) of stored jet fuel on the premises is exceeded in any year.
- g. Undertake annual monitoring for total volatile organic compounds and BTEX at the boundary of the operating premises in accordance with approved air emission monitoring techniques in the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA 2016), or latest version, to the satisfaction of the CEO. The results from annual monitoring must be evaluated as part of the Compliance Assessment Reporting process required under condition 6.
- h. Within the period of the first turnover and during a period in which the action is operating under predicted maximum emission levels (i.e. during tank filling), undertake a sampling program to confirm the air emission performance of the premises. The sampling program must measure, as a minimum:
 - (i) organic vapours concentration at point source discharge point/s such as tank vents or vapour recovery systems using the appropriate test method/s.
- i. Within six weeks of sampling referred to in condition 11h (unless otherwise agreed by the CEO), provide a written verification report to the CEO. The report must:

- (i) include all analytical results of sampling required for all discharge points (any external report must be reproduced in full);
 - (ii) include all the information listed in section 4 (meteorological data) of the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016), or latest version;
 - (iii) describe all the operational parameters during sampling;
 - (iv) compare analytical results from sampling against final design emission specifications and modelled emission parameters in the AQIA required under conditions 11c and 11d.
- j. Ensure that where any comparison under condition 11i identifies measured emission concentrations or rates above the emissions characteristics in the revised AQIA or the Protection of the Environment Operations (Clean Air) Regulation 2021 standards of concentration:
- (i) re-assess and evaluate both the emission concentrations against the relevant NSW Clean Air Regulation standards of concentrations and the impacts against the relevant impact assessment criteria in the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA 2016), or the latest version; and/or
 - (ii) identify and record as part of the EMS measures to be implemented to reduce emissions of air pollutants to no greater than those predicted in the AQIA (required under condition 11c and 11d).
- k. Ensure the final design, installation and operation of the plant does not preclude the ability for air pollution emissions controls to be retrofitted.

12. Closure of action

- a. The approval holder is required to assess the premises for contamination in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (as amended from time to time). If the premises is contaminated, it must be remediated in accordance with the CRC CARE National Remediation Framework prior to closure of the action, or as otherwise specified to the satisfaction of the CEO.
- b. The approval holder must submit to the CEO a plan for closure of the action within a period not less than three (3) years prior to closure of the action, or within a period determined by the CEO if the environmental approval is revoked by the Minister.

Definitions

The terms used in this approval have the same meaning as the terms defined in the *Environment Protection Act 2019* and *Environment Protection Regulations 2020*.

Best available techniques	Techniques specified in Best Available Techniques Reference Document (BREF) 2006 'Emissions from storage' by the European Commission carried out under Article 16(2) of Council Directive 96/61/EC (Integrated Pollution Prevention Control Directive).
BTEX	Air toxics - benzene, toluene, ethyl-benzene, xylene
CEO	Chief Executive Officer of the Department of Environment, Parks and Water Security
Environmental harm	Environmental harm means direct or indirect alteration of the environment to its detriment or degradation, of any degree or duration, whether temporary or permanent.
Jet fuel	F34 (or JP-8) flammable jet fuel and F44 (or JP-5) combustible jet fuel stored at the premises.
Material environmental harm	Environmental harm that is not trivial or negligible in nature and is less serious than significant environmental harm.
Plant and equipment	All material items used in association with the activity, including (but not limited to) storage vessels and containers, pipe work and hosing, vehicles (including vessels), tools, and measuring equipment.
Premises	The premises identified in this approval which includes equipment, plant and structures, whether stationary or portable, and the land on which premises are situated.
Qualified person	A registered environmental auditor; or a registered environmental practitioner; or a person or class of persons, who have the qualifications and experience determined by the CEO for the purpose of this definition.
Significant environmental harm	Environmental harm that is of major consequence having regard to the context and intensity of the harm; and the sensitivity, value and quality of the environment harmed, and the duration, magnitude and geographic extent of the harm.
Stormwater	Water flowing over ground surfaces, in natural streams and drains as a direct result of rainfall over a catchment and consists primarily of rainfall runoff.
Turnover	The complete replacement of jet fuel stored in all tanks on the premises.
Waste	A solid, a liquid or a gas; or a mixture of such substances, that is or are left over, surplus or an unwanted by-product from any activity (whether or not the substance is of value) and includes a prescribed substance or class of substances.
Wastewater	Water that contains a contaminant or waste (excluding sewage in the case of this approval)
Water	Surface water, groundwater and tidal waters; and coastal waters of the Territory, within the meaning of the <i>Coastal Waters (Northern Territory Powers) Act 1980</i> (Cth); and water containing an impurity.

Appendix 1 Approved extent

The Proposal includes the development and operation of a bulk aviation turbine (jet) fuel storage facility on section 5720 Hundred of Bagot, within the East Arm precinct.

The fuel stored would include:

- JP-8 (Jet Propellant 8) – to meet the requirements of US Military Specification MIL-T-83188D - North Atlantic Treaty Organisation (NATO) Code F34
- JP-5 (Jet Propellant 5) – to meet the requirements of US Military Specification MIL-PRF-5624S Grade JP-5 - NATO Code F44

Fuel will be received and issued from ships berthed at East Arm Wharf via an extension to the pre-existing pipeline rack and pipeline, and from triple road trains via a load/unload gantry.

The Proposal includes:

- Construction of an access road
- Extension of an existing pipeline rack and pipeline
- Eleven jet fuel tanks with a total storage capacity of 330 million litres (ML) comprising
 - Four 30 ML tanks will store up to 111 ML of lower flash point (38°C) kerosene based jet fuel (F34).
 - Seven 30 ML tanks will store up to 190 ML of high flash point (>60°C) kerosene based jet fuel (F44)
- Storage compounds with concrete retaining walls, and flooring designed to contain spills
- Unsealed paved areas around storage compounds to allow emergency and crane access
- A common user facility incorporating:
 - a tanker loading gantry
 - additional park-up area required for triple road tankers
 - combined warehouse and administration building
 - firewater tanks/pumps
 - oily water separation.

The environmental approval applies to the premises as defined in the table below.

Table 1: Location of physical and operational elements

Element	Location
Bulk fuel storage facility	Section 5720 Hundred of Bagot, Freehold, Town Planning Zone DV, 740 Berrimah Rd.
Access road	Part Section 5673 Hundred of Bagot, Freehold, Town Planning Zone DV, 3 Salloo Street
Access road/laydown area	Part Section 6350 Hundred of Bagot, Freehold, Town Planning Zone MZ, 740 Berrimah Rd
New pipeline easement	New pipeline easement: Section 5719 (right of way behind Vopak), Hundred of Bagot, Freehold, Town Planning Zone MZ, 740 Berrimah Rd

All coordinates are in metres, listed in Map Grid of Australia Zone 51 (MGA Zone 51), datum of Geocentric Datum of Australia 1994 (GDA94). Coordinates defining the:

- development envelope
- indicative underground pipeline route
- indicative disturbance footprint

are held by the Department of Environment, Parks and Water Security, Document Folder Reference NTEPA2021/0104.



Figure 1 Location and extent of action

Appendix 2 Water quality monitoring parameters

Table 1 - Discharge water quality monitoring parameters

Parameter ¹	Units of measure	Concentration limit	Frequency	Sampling method
Total Recoverable Hydrocarbons	milligrams per litre	10	Weekly during any discharge	Grab sample
pH	pH	7.0-8.5	Weekly during any discharge	Grab sample
Total Suspended Solids	milligrams per litre	30	Weekly during any discharge	Grab sample

¹Any water discharged to the environment must not contain any floating debris, oil, grease, petroleum hydrocarbon sheen, scum, or litter; or cause or generate odours which would adversely affect the use of surrounding waters.

Table 2 - Groundwater monitoring parameters

Parameter	Units of measure	Concentration limit	Frequency	Sampling Method
Standing water level	metres	-	Quarterly	In situ
Benzene	micrograms per litre	-	Quarterly	Representative sample
Ethyl benzene	micrograms per litre	-	Quarterly	Representative sample
pH	pH	-	Quarterly	Representative sample
Polycyclic aromatic hydrocarbons	micrograms per litre	-	Quarterly	Representative sample
Toluene	micrograms per litre	-	Quarterly	Representative sample
TPH	milligrams per litre	-	Quarterly	Representative sample
TPH C10-C14 Fraction	micrograms per litre	-	Quarterly	Representative sample
TPH C15-C28 Fraction	micrograms per litre	-	Quarterly	Representative sample
TPH C29-C36 Fraction	micrograms per litre	-	Quarterly	Representative sample
TPH C6-C9 Fraction	micrograms per litre	-	Quarterly	Representative sample
Xylene	micrograms per litre	-	Quarterly	Representative sample
PFAS (per and poly-fluoroalkyl substances)	µg/L	-	Quarterly	Representative sample

¹Trigger investigation levels for toxicants at 95% species protection level (Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018)

- Detected in sample (above the limit of detection).

Appendix 2 – Matters taken into account during the assessment

Matters taken into account during the assessment	Consideration
<i>Objects of the EP Act</i>	
To protect the environment of the Territory	The proponent's referral and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposal.
To promote ecologically sustainable development so that the wellbeing of the people of the Territory is maintained or improved without adverse impact on the environment of the Territory	The NT EPA's consideration of the principles of ecologically sustainable development in relation to the proposal is addressed below.
To recognise the role of environmental impact assessment and environmental approval in promoting the protection and management of the environment of the Territory	The NT EPA recognises the importance of the environmental impact assessment and approval processes in the protection and management of the environment of the Territory. The NT EPA has assessed the potential environmental impacts of the proposal to inform an environmental approval decision by the Minister that, in the NT EPA's view, promotes the protection and management of the Territory.
To provide for broad community involvement during the process of environmental impact assessment and environmental approval	The NT EPA's public consultation undertaken during its assessment of the proposal provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposal have been taken into account in the preparation of the recommended conditions for an environmental approval.
To recognise the role that Aboriginal people have as stewards of their country as conferred under their traditions and recognised in law, and the importance of participation by Aboriginal people and communities in environmental decision-making processes.	The NT EPA recognises the role of Aboriginal people as stewards of their country and the importance of participation by Aboriginal people and communities in environmental decision-making. The public consultation process provided an opportunity for interested persons to make a submission in relation to the proposal.
<i>Principles of ecologically sustainable development</i>	

Matters taken into account during the assessment	Consideration
<p>Decision-making principle</p> <p>(1) Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.</p> <p>(2) Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.</p>	<p>The NT EPA has considered the decision-making principle in its assessment and has had particular regard to this principle in its assessment of marine environmental quality and air quality.</p> <p>The NT EPA notes the interconnectedness between environmental factors and recognises that the mitigation measures to avoid and minimise impacts on marine environmental quality may also reduce the significance of impacts on other factors including marine ecosystems.</p> <p>The NT EPA acknowledges that design requirements are a combination of the application of the environmental decision-making hierarchy under section 26 of the EP Act, the waste management hierarchy under section 27 of the EP Act, and the principles of ESD.</p> <p>The NT EPA has recommended conditions for environment protection outcomes to be achieved through design, construction, operation and maintenance and appropriate disposal of waste. The NT EPA notes that air quality and human health would also be regulated through the <i>Work Health and Safety (National Uniform Legislation) Act 2011</i>.</p> <p>The NT EPA considers that its environmental impact assessment and recommended conditions for an environmental approval have identified and mitigated both short-term and long-term environmental impacts, and that this has not resulted in any compromise between short and long term environmental and equitable considerations.</p> <p>The community has been provided the opportunity for involvement in the environmental impact assessment process during public consultation on the proposal, and the submissions received have been taken into account in the preparation of this report and the recommended conditions to inform the Minister’s decision on environmental approval.</p>
<p>Precautionary principle</p> <p>(1) If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>(2) Decision-making should be guided by:</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on the environmental factors of marine environmental quality and air quality.</p> <p>The proponent has identified measures to avoid or minimise impacts including avoiding impacts to marine environmental quality, groundwater quality and implementing appropriate containment systems, leak detection and spill response protocols.</p> <p>The NT EPA has considered these measures during its assessment. The NT EPA considers that there may be a remote risk of serious or irreversible harm to marine environmental quality given the possibility of a major loss of hydrocarbon containment, which may cause additional</p>

Matters taken into account during the assessment	Consideration
<p>(a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and</p> <p>(b) an assessment of the risk-weighted consequences of various options.</p>	<p>contamination of Darwin Harbour which could result in direct toxicity impacts to marine life and smothering effects.</p> <p>The NT EPA has recommended conditions for environment protection outcomes to be achieved. From its assessment of this proposal the NT EPA has concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments are implemented.</p>
<p>Principle of evidence-based decision-making</p> <p>Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.</p>	<p>The NT EPA has considered the available evidence during the course of its assessment of the proposal, and this scientific evidence provides the foundation for its decision making and recommended conditions. In its assessment of the proposal, where the NT EPA considered that further evidence is required to inform the management of potentially significant impacts to air quality or marine environmental quality, the NT EPA has recommended conditions requiring the proponent to undertake additional work to provide further evidence about proposed measures or technology to demonstrate how the impact would be effectively mitigated.</p>
<p>Principle of intergenerational and intragenerational equity</p> <p>The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.</p>	<p>The NT EPA acknowledges that it is important to protect the sensitive environmental and water resource values of Darwin Harbour for the benefit of future generations. It considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values and not constrain the ability of future generations to continue to access the harbour for a range of beneficial uses.</p> <p>The NT EPA acknowledges that the proposal would contribute to the overall VOC emissions in the NT and that VOCs are primary pollutants that react with nitrogen oxides in complex photochemical processes to generate a range of secondary pollutants, notably ozone. The NT EPA considers that the proposal would constitute a very small contribution towards ozone formation at both the regional and national scale.</p> <p>The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment. From the assessment of this proposal the NT EPA has concluded that the environmental values will be protected and that the health, diversify and productivity of the environment will be maintained for the benefit of future generations.</p>
<p>Principle of sustainable use</p>	<p>The NT EPA acknowledges the importance of sustainable use of resources and has considered this principle during the environmental impact assessment process. It considers that this principle</p>

Matters taken into account during the assessment	Consideration
Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.
<p>Principle of conservation of biological diversity and ecological integrity</p> <p>Biological diversity and ecological integrity should be conserved and maintained.</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal on the environmental values of Darwin Harbour. In considering this principle, the NT EPA notes that marine environmental quality could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.</p> <p>Biological diversity and ecological integrity are likely to be conserved due to the avoidance, minimisation and mitigation measures that will be implemented by the proponent and the conditions recommended by the NT EPA to ensure that environmental protection outcomes are achieved.</p> <p>From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.</p>
<p>Principle of improved valuation, pricing and incentive mechanisms</p> <p>(1) Environmental factors should be included in the valuation of assets and services.</p> <p>(2) Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement.</p> <p>(3) Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.</p> <p>(4) Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop</p>	<p>This principle was considered by the NT EPA when assessing the impacts of the proposal. The NT EPA notes that the proponent would bear the costs relating to containment of contaminants, avoidance and abatement of pollutants to the marine and air environment.</p>

Matters taken into account during the assessment	Consideration
solutions and responses to environmental problems.	
<i>Environmental decision-making hierarchy</i>	
<p>(1) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must apply the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> (a) ensure that actions are designed to avoid adverse impacts on the environment; (b) identify management options to mitigate adverse impacts on the environment to the greatest extent practicable; (c) if appropriate, provide for environmental offsets in accordance with this Act for residual adverse impacts on the environment that cannot be avoided or mitigated. 	<p>In its assessment of the proposal, the NT EPA considered the extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposal and the proposed measures to avoid and then mitigate significant impacts. Where the NT EPA was not satisfied that this hierarchy had been applied, it has recommended conditions requiring that the proponent take reasonable measures to avoid and/or mitigate impacts.</p> <p>With regard to waste and pollution that would be generated by the proposal, the NT EPA has focussed on strategies to avoid the generation and disposal of waste and pollution, in particular for discharges to water and emissions to air.</p> <p>The NT EPA did not identify any residual impacts that would require offsetting.</p> <p>The NT EPA has had regard to this hierarchy during the assessment of the proposal.</p>
<p>(2) In making decisions in relation to actions that affect the environment, decision-makers, proponents and approval holders must ensure that the potential for actions to enhance or restore environmental quality is identified and provided for to the extent practicable.</p>	<p>The proposal is located in an area of reclaimed land and is highly disturbed with existing low levels of contamination. Proposed landscaping around the site, and drainage and erosion controls, will improve the site and adjacent environmental quality.</p> <p>The NT EPA has recommended conditions requiring site remediation prior to closure of the action and revocation of the environmental approval, to ensure that environmental quality is enhanced or restored to the extent practicable.</p>
<i>Waste management hierarchy</i>	

Matters taken into account during the assessment	Consideration
<p>(1) In designing, implementing and managing an action, all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</p> <p>(2) For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority:</p> <ul style="list-style-type: none"> (a) avoidance of the production of waste; (b) minimisation of the production of waste; (c) re-use of waste; (d) recycling of waste; (e) recovery of energy and other resources from waste; (f) treatment of waste to reduce potentially adverse impacts; (g) disposal of waste in an environmentally sound manner. 	<p>The NT EPA has considered the waste management hierarchy in its assessment and has had particular regard to this principle in its assessment of marine environmental quality and air quality. Where the NT EPA considered that the proponent's application of the waste management hierarchy was not sufficient, it has recommended conditions requiring that the proponent implement further measures to avoid and/or minimise waste from the proposal. This includes a condition requiring that discharge of wastewater is only undertaken after options for reuse or removal for treatment have been considered in accordance with the waste management hierarchy; and a condition requiring that all reasonable and practicable measures are taken to minimise emissions of volatile organic compounds to air during operations.</p> <p>From its assessment of this proposal the NT EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected areas.</p> <p>The NT EPA has had regard to the waste management hierarchy during the assessment of the proposal, and recommended conditions to ensure that the waste management hierarchy is applied by the proponent for the duration of the proposal.</p> <p>The NT EPA has had particular regard to this order of priority in its assessment of the proposed measures to manage waste and wastewater generated by the proposal.</p>
<i>Ecosystem-based management</i>	
<p>Management that recognises all interactions in an ecosystem, including ecological and human interactions.</p>	<p>The NT EPA acknowledges the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals. With consideration of the link between inland waters (surface water and groundwater inputs) and marine environmental quality, the NT EPA also considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment.</p> <p>The NT EPA formed the view that the impacts from this proposal can be managed to be consistent with the NT EPA's environmental factors and objectives.</p>
<i>The impacts of a changing climate</i>	

Matters taken into account during the assessment	Consideration
The effects of a changing climate on the proposal and resilience of the proposal to a changing climate	The NT EPA considered the long working design life of the proposal (more than fifty years) in the context of resilience to climate change, and how climate change may impact the proposal. The NT EPA had regard to building controls relating to storm surge and cyclonic conditions. The NT EPA considered that specific conditions did not need to be recommended to address this requirement. The NT EPA had regard to this matter during its assessment of the proposal.

Appendix 3 – Environmental impact assessment timeline

Date	Assessment stages
21 June 2021	Referral information received
1 July 2021	Proponent directed to give NT EPA additional information in relation to referral
20 July 2021	Referral information accepted
26 July to 23 August 2021	Submission period
14 October 2021	NT EPA decided environmental impact assessment required - assessment by referral information
22 October 2021	Australian Government decided action not a controlled action under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>
15 to 16 November 2021	Consultation with proponent and statutory decision makers
24 November 2021	Assessment report and draft environmental approval provided to the Minister