Assessment Report 108

Assessment by supplementary environmental report

Phase 2 Expansion of the Arnhem Space Centre
Equatorial Launch Australia Pty Ltd
November 2024

ntepa Northern Territory Environment Protection Authority

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* (EP Act). It describes the outcomes of the NT EPA's assessment of the phase 2 expansion of the Arnhem Space Centre.

The proposed action is for the expansion of launch pads and associated facilities at the Arnhem Space Centre located on NT Portion 1646 approximately 20 km south of Nhulunbuy in the East Arnhem local government area. The NT EPA's method for assessment of the proposed action is by supplementary environmental report.

The 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 Lands, Planning and Environment to consider when making a decision about whether to approve the action under the EP Act.

Dr Paul Vogel AM

NT EPA Chairperson

20 November 2024

Northern Territory Environment Protection Authority
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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* (EP Act). This Assessment Report and the draft Environmental Approval are provided to the Minister for Lands, Planning and Environment (Minister) for consideration in deciding whether to grant an environmental approval for the phase 2 expansion of the Arnhem Space Centre (proposed action).

Equatorial Launch Australia Pty Ltd (the proponent) proposes to expand the Arnhem Space Centre (ASC), located on NT portion 1646, approximately 20 km south of Nhulunbuy in East Arnhem local government area.

The proposed expansion includes:

- an additional 14 launch pads including supporting infrastructure:
  - mission support buildings
  - fuel storage and pumping facilities
- 100 megalitre capacity water dam
- internal access roads
- clearing of 120 ha intact native vegetation and 26 ha of native regrowth
- where practicable, activities to recover any returning waste materials and debris from launched rockets from within NT land and coastal waters.

The NT EPA assessed the proposed action by supplementary environmental report in accordance with the EP Act. The environmental impact assessment examined the potential for significant direct, indirect and cumulative impacts on the environment.

The NT EPA identified and examined potential significant impacts on the following four environmental factors:

1. Terrestrial ecosystems
2. Air quality
3. Community and economy
4. Culture and heritage.

To address potential significant impacts of the proposed action on the key environmental factors, the NT EPA has recommended conditions for the Minister to consider in deciding whether to grant or refuse an environmental approval for the proposed action. The proponent and statutory decision-makers were consulted on the draft Environmental Approval as required by regulation 160 of the Environment Protection Regulations 2020.

The NT EPA's assessment concludes that the proposed action can be implemented and managed in a manner that is environmentally acceptable and therefore recommends that environmental approval be granted, subject to the recommendations and conditions detailed in the draft Environmental Approval (Appendix 1).

Contents

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* (EP Act). It provides an evaluation of the potential significant environmental impacts of the phase 2 expansion of the Arnhem Space Centre (the proposed action).

The proponent of the proposed action is Equatorial Launch Australia Pty Ltd (ELA) (Australian Business Number 11 605 364 234), which was founded in 2015 to develop multi-user commercial space launch capacity in Australia.

The NT EPA assessed the proposed action by supplementary environmental report (SER) in accordance with the EP Act and Environment Protection Regulations 2020 (EP Regulations).

The purpose of this assessment report is to:

- assess the potential significant environmental impacts of the proposed action
- make recommendations for avoiding, mitigation and managing those impacts
- assess whether the proposed action is likely to meet the NT EPA's environmental objectives
- advise the Minister as to the acceptability of the proposed action.

The assessment report must assess the potential environmental impacts and risks of the proposed action and whether there are any significant residual impacts remaining after all reasonable measures to avoid and then mitigation and manage the risks have been taken. Matters identified in the EP Act which have been taken into account during the assessment are tabulated in section 8.1.

This Assessment Report, and the draft Environmental Approval (Appendix 1) are provided to the Minister for Lands, Planning and Environment (the Minister) for consideration in deciding whether to grant an environmental approval for the proposed action, and conclude the environmental impact assessment process. An environmental impact assessment timeline is provided at Appendix 2.

2. Proposed action

2.1. Overview

The proposed expansion of the Arnhem Space Centre (ASC) includes:

- an additional 14 launch pads including supporting infrastructure:
  - mission support buildings
  - fuel storage and pumping facilities
  - helipad
  - accommodation facility
- 100 megalitre capacity water dam
- internal access roads
- clearing of 120 ha intact native vegetation and 26 ha of native regrowth

- where practicable, activities to recover any returning waste materials and space debris from launched rockets from within NT land and coastal waters (collectively referred to as downrange recovery areas).

The proponent's proposed action does **not**:

- include a liquid oxygen manufacturing plant
- include fuels containing mercury
- include a landfill/s
- include wastewater release or disposal to the environment
- include groundwater extraction
- involve potential significant impacts from radiation.

Operation of the ASC multi-user commercial launch facility will require a valid Launch Facility Licence under the Commonwealth *Space (Launches and Returns) Act 2018* (SLR Act). Each launch from the ASC will also require an Australian Launch Permit under the SLR Act. The SLR Act is administered by the Australian Space Agency (ASA). The proposed action will develop the final and preferred primary launch site that will provide a comprehensive suite of services to support the launching of modern small to medium sized launch vehicles with a payload of up to 1500 kg.

Figure 1 to **Figure 3** below show the lease area, total affected area, site layout, the total clearing for the proposed action and the indicative suborbital and orbital launch vehicle downrange recovery areas.

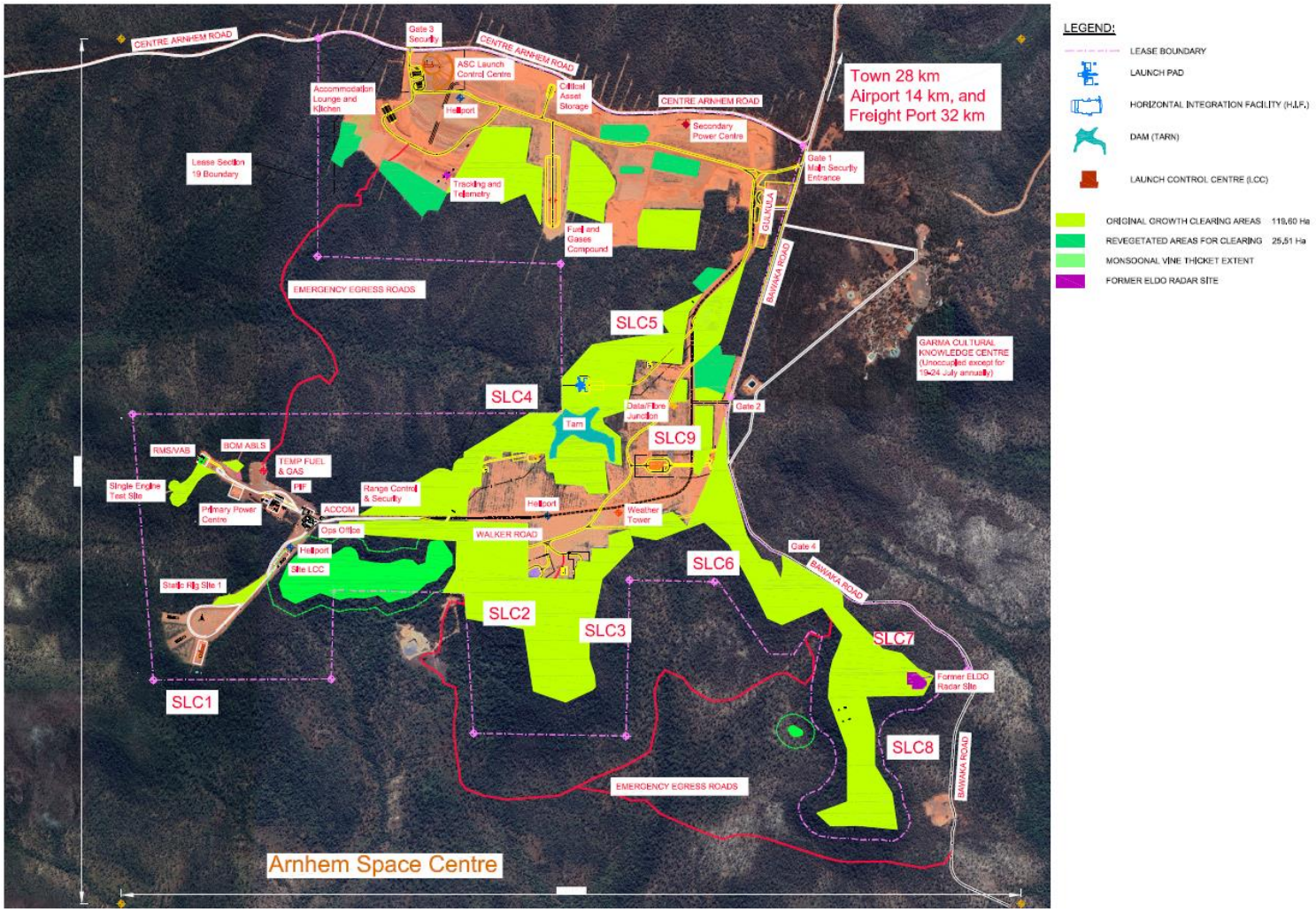

Figure 1 **Phase 2 lease area and vegetation clearance required within the affected area (*source: ELA Additional information*)**[1]

[1] Locations of monsoon vine thicket require verification by vegetation survey.

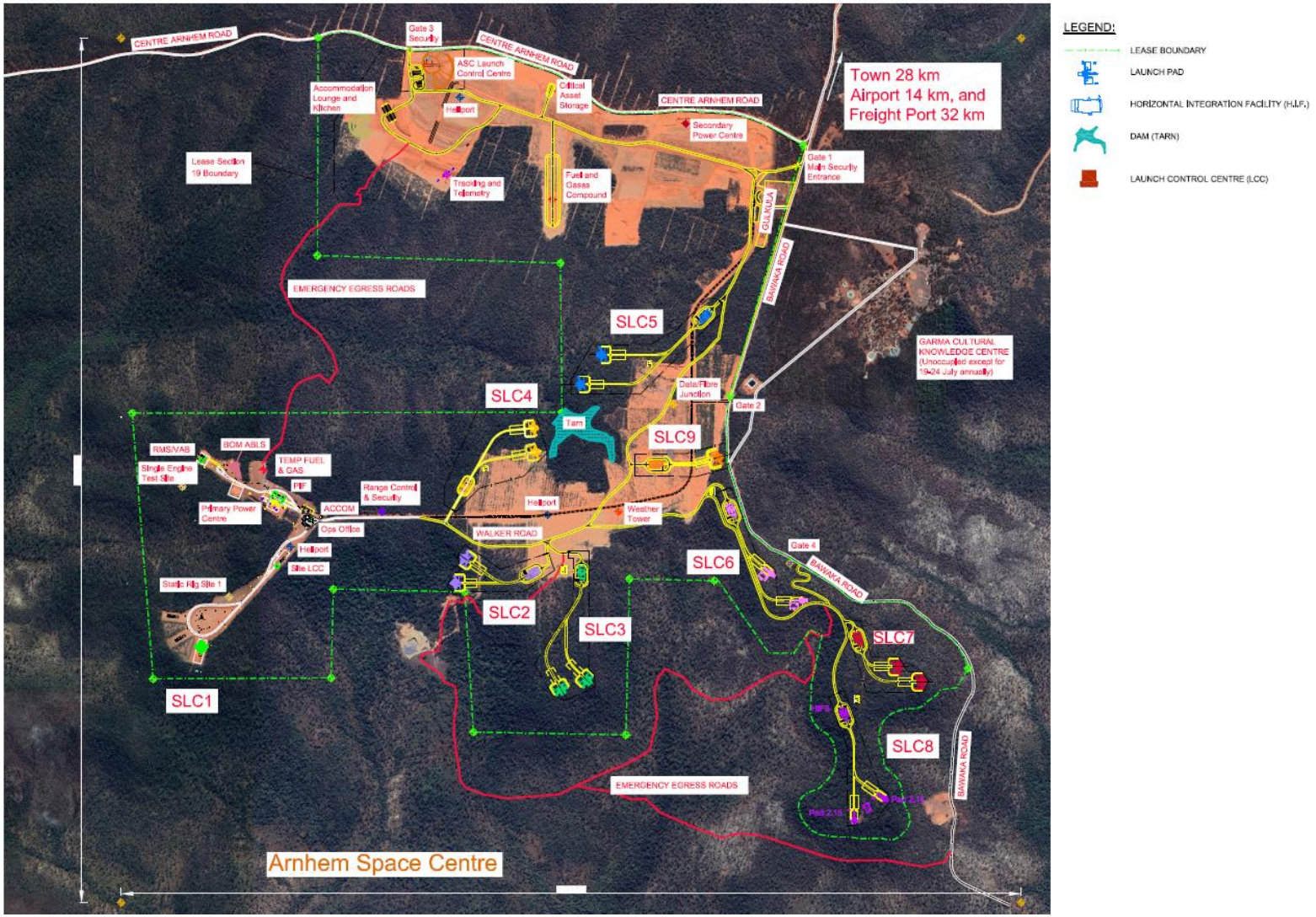

Figure 2 **Arnhem Space Centre and proposed phase 2 site layout (*source: ELA Additional Information*)**

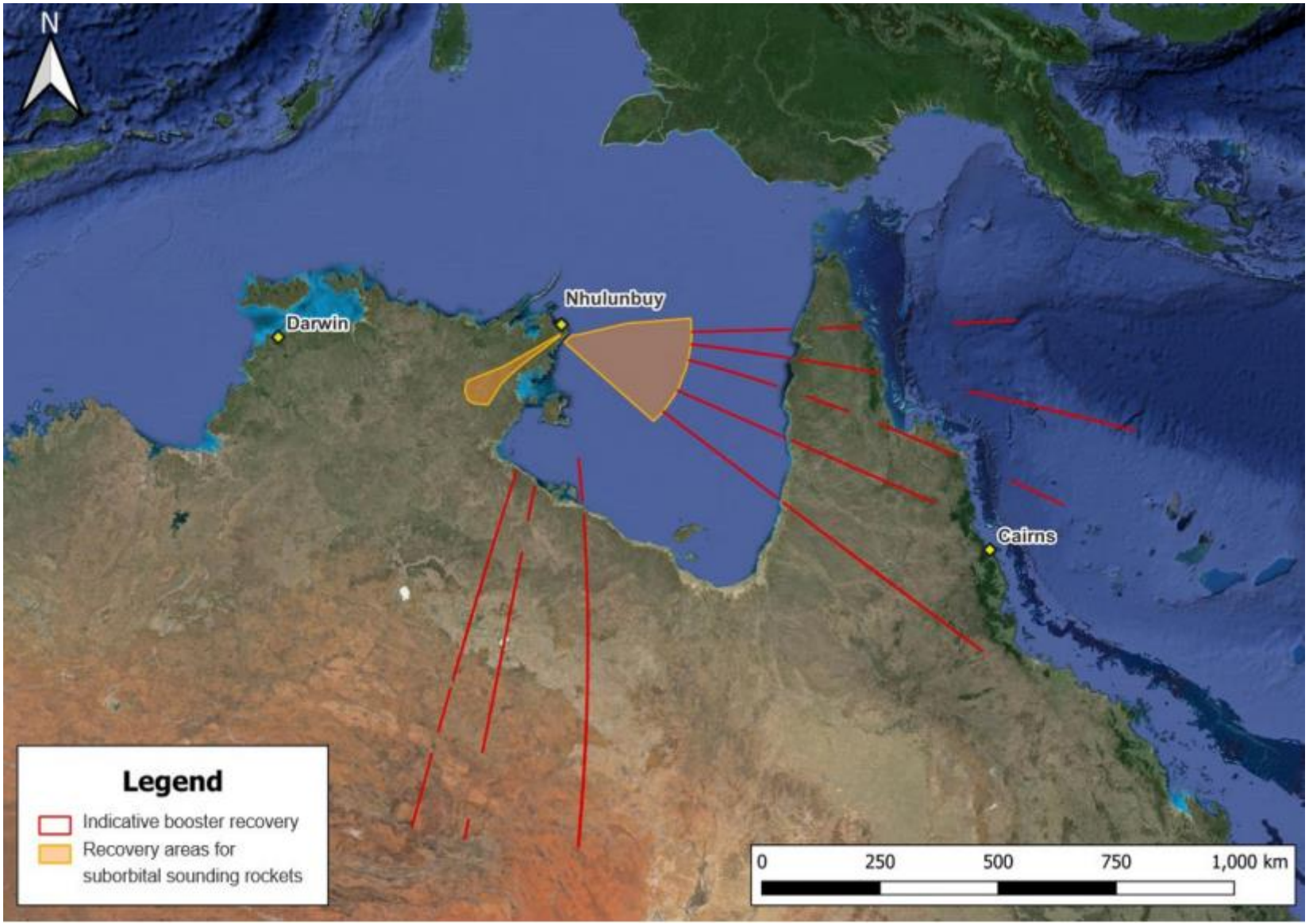

Figure 3 **Hypothetical suborbital and orbital launch vehicle recovery areas (*source: ELA SER*)**

2.2. Local context

The proposed action is located on the Dhupuma Plateau, Gove Peninsula, north east Arnhem Land approximately 20 km south of Nhulunbuy in the NT. The ASC site is within the Dhimurru Indigenous Protected Area which comprises approximately 550,000 ha of Yolngu land and sea country.

The proposed action tenure is freehold Aboriginal Land (Portion 1646) held by the Arnhem Land Aboriginal Land Trust and administered by the Northern Land Council. The land is unzoned. The proponent holds a lease for 60 ha (the area of phase 1 of the ASC), and will expand this to 630 ha, with activity occurring on ~250–300 ha (subject to expanding the lease under section 19 of the *Aboriginal Land Rights (Northern Territory) Act 1976*).

The phase 1 development included the construction of a launch pad, temporary mission support buildings (i.e. launch control, mission control, range control and administration), vehicle assembly building, payload integration facility, staff accommodation, amenities and caretakers accommodation.

The proposed action (phase 2 expansion) will occur on the area which includes the Dhupuma Plateau Bauxite Mine and the European Launcher Development Organisation Gove Down Range Guidance and Telemetry Station.

Areas of permanent or temporary human habitation in the region of the proposed action include:

- Garma Institute and Garma Cultural Centre (collectively referred to as the Gulkula Ceremonial Site) (approximately 700 m east of the nearest launch pad to the nearest building on the Garma Institute Site. The furthest boundary is approximately 1.3 km east of the closest proposed launch)
- Gove airport (~10 km north)
- Bawaka (homeland) (~15 km south)
- Dhalinybuy (homeland) (~36 km west)
- Garahan - Macassan Beach (homeland) (~14 km east east)
- Ganami (Wonga Creek) camping ground (~12 km south west)
- Giddy River Campground (Guwatjurumurru) (~14 km west)
- Goanna Lagoon (tourist) (~8 km north west)
- Memorial Park (Gapuru) (~24 km south)
- Oyster Beach (Lurrupukurru) (tourism) (~8 km east)
- Nhulunbuy (~20 km north)

Identified areas of cultural significance include (noting that at the time of writing this report, an archaeological heritage survey is yet to be undertaken):

- Wurrurrwuy Macassan Stone Pictures (~13 km north east)
- other archaeological sites (~16 km north west).

The proposed action is within the Groote subregion of the Arnhem Coast bioregion[2]. The Arnhem Coast bioregion comprises an area of 33,022 km^2 (or 2.46% area in the NT) that includes a coastal

2 Baker, B., Price, O., Woinarski, J., Gold, S., Connors, G., Fisher, A. & Hempel, C (2005). *Northern Territory Bioregions – Assessment of Key Biodiversity Values and Threat*. Palmerston: Department of Natural Resources, Environment and the Arts, Northern Territory Government.

strip extending east of Coburg Peninsula to just north of the Rode River in south eastern Arnhem Land, and many offshore islands. The coastal vegetation present comprises heathlands, mangroves and saline flats, with sparse floodplain and wetland areas. Inland from the coast the dominant vegetation is eucalypt open forest with smaller areas of monsoon vine thicket and eucalypt woodlands.

The proposed action is also within the Gove Peninsula and north east Arnhem Coast Site of Conversation Significance. The site is of international significance and spans 150 km north to south and covers an area of approximately 2,280 km^2.

2.3. Alternatives

The referral highlights that alternative locations for the proposed action were not considered due to:

- the substantial research already conducted in phase 1 justifying strategic and operational strengths of the location
- the success of phase 1 NASA launches proving the area safe
- already having sited the ASC footprint within disturbed areas (previously mined areas), limiting impacts from further clearing of native vegetation.

3. Strategic context

3.1. Government strategic plans and initiatives

The proposed action is consistent with the NT Government's commitment to rebuild the economy and create jobs by diversifying the NT's industry base, with strategic plans and initiatives including the **NT Space Strategy 2022-2026 -** the framework to grow the size, scope, capability and commercial sustainability of the Territory's space sector, and to support Australia within the global space industry. The Territory Government is committed to growing the space industry in the areas of space launch, high altitude pseudo-satellites, ground stations and earth observations.

3.2. Proposed action benefits

The proposed action will contribute to the economic development of the East Arnhem Region. Ongoing economic benefits include: salaries and wages, trainee and apprenticeship opportunities, employee spending, launch companies spending, and increased tourism in Nhulunbuy and the region.

The proponent has committed to ensuring Traditional Owners of the ASC site and East Arnhem Land community can benefit from the economic and educational opportunities that the proposed action will bring to the region. The proponent has agreed to pay the Yolngu people royalties based on launch revenue.

4. Statutory context

4.1. Northern Territory

The proposed action requires assessment by the NT EPA under the EP Act. The NT Minister for Lands, Planning and Environment (the Minister) 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 proposed action and conditions of the approval.

Pursuant to section 61 of the EP Act, the purpose of the environmental approval is to manage the potential significant environmental impacts of a proposed action during all phases. Pursuant to section 92 of the EP Act, if an environmental approval under the EP Act is granted, it will prevail over other NT statutory authorisations that the proponent is required to obtain. It is the responsibility of the proponent to obtain all relevant statutory authorisations which may include, but are not limited to:

- clearing of native vegetation permit(s) under the *Planning Act 1999*
- approval(s) to carry out work on a heritage place or object under the *Heritage Act 2011*
- approval to interfere with a water way under the *Water Act 1992*
- licence to transport scheduled wastes under the *Waste Management and Pollution Control Act 1998*.

4.2. Commonwealth

Aspects of the proposed action situated outside of the NT EPA's jurisdiction were referred under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This includes the downrange recovery area actions within Commonwealth Marine Areas of the Gulf of Carpentaria and the Coral Sea Marine Park. The delegate of the Australian Government Minister for the Environment and Water decided under section 75 and section 87 of the EPBC Act that the proposed action is a controlled action and, as such, requires assessment and an approval decision due to the potential for significant impact on Matters of National Environmental Significance (MNES). It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and ecological communities (sections 18 & 18A)
- Listed migratory species (sections 20 & 20A)
- Commonwealth marine areas (section 23 & 24A).

The relevant controlling provisions under the EPBC Act that are beyond the jurisdiction of the EP Act are not considered in this assessment. The proposed action will require assessment and approval (separate to the NT assessment and approval) under the EPBC Act before it can proceed.

The ASC is a multi-user commercial facility that is required to be licensed under the SLR Act administered by the ASA. In addition, launches at the facility require permits under the SLR Act; and any attempted return to Earth of an object from beyond 100 km above mean sea level, require authorisations under the SLR Act.

4.3. Mandatory matters for consideration

In preparing this assessment report, the NT EPA considered the referral, submissions received on the referral, the SER, submissions received on the SER, additional information and submissions received on the draft environmental approval, in accordance with regulation 157 of the EP Regulations.

In carrying out its assessment, the NT EPA took into account the purpose of the environmental impact assessment process under section 42 of the EP Act 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
- the impacts of a changing climate.

Refer to section 8 for further detail about matters that the NT EPA has taken into account during its assessment.

5. Consultation

The NT EPA invited public and government authority comments on the proponent's referral information during the consultation period from 26 October to 22 November 2023. Four government submissions and two public submissions were received. The NT EPA considered the accepted referral information and submissions received, and on 9 January 2024 decided that the proposed action would require assessment by SER under the EP Act.

The NT EPA published the SER for comment from the 15 July to 20 August 2024. Four government submissions and four public submissions were received. On 13 September 2024, the NT EPA directed the proponent to provide additional information, including some matters raised in submissions on the SER. The information was received 27 September 2024 and the NT EPA invited government authorities to comment. Four submissions were received.

In preparing this assessment report, matters raised in the submissions on the referral and SER were considered in relation to the potential significant environmental impacts of the proposed action. The issues raised in submissions are detailed in sections 6.2.2, 6.3.2, 6.4.2 and 6.5.2.

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, in line with EP Regulation 160. Submissions were received from:

- the proponent
- AAPA
- ASA
- Controller of Water Resources
- DCCEEW
- Flora and Fauna Division of Department of Lands, Planning and Environment (DLPE)
- Heritage Branch of DLPE.

The NT EPA considered these submissions in finalising its recommendations to the Minister.

The proponent has committed to further engagement with the Gumatj Corporation Ltd to develop a variety of resources and communication materials, in both English and Yolngu matha, to assist further consultations throughout the East Arnhem Region through the Northern Land Council.

The proponent will continue to consult with stakeholders in accordance with its stakeholder engagement plan (SEP), which includes procedures to consult with stakeholders in relation to the downrange recovery areas prior to each launch once the area is identified.

6. Assessment of environmental factors

6.1. Overview

The NT EPA identified that the proposed action has the potential to have a significant impact on environmental values associated with four environmental factors[3] (**Table 1**).

Table 1 Environmental factors

Theme	Factor	Environmental objective
LAND	Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.
AIR	Air quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.
PEOPLE	Community and economy	Enhance communities and the economy for the welfare, amenity and benefit of current and future generations of Territorians.
	Culture and heritage	Protect culture and heritage.

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

In considering these environmental factors and the recommended conditions in Appendix 1, the NT EPA took into account other statutory regimes that can avoid or mitigate the potentially significant impacts of the proposed action on the environment.

6.2. Air quality

6.2.1. Environmental values

The referral states:

- *due to the remote location of the activity, the local air quality is likely to be relatively unaffected by anthropogenic air pollutants.*
- that the *relatively good air quality* is largely controlled by maritime winds that disperse salt spray and dust, and the low population density in the region.
- local air quality may be already affected by particulate matter including aluminium oxide arising from local bauxite mining, and by emissions from the Gove airport.

The proponent did not undertake background ambient air quality monitoring for the proposed action. The NSW Approved Method for the Modelling and Assessment of Air Pollutants (as adopted by the NT EPA) require a minimum of 12 months ambient air monitoring and corresponding meteorological monitoring.

[3] NT EPA Environmental factors and objectives

It is reasonable to expect that bushfires would contribute particulates to ambient air quality as well.

The nearest sensitive receptor to the site is the Gulkula Ceremonial Site 700 m east of the closest proposed launch pad). A detailed list of areas of permanent or temporary human habitation in the region of the proposed action have been included in section 2.2.

6.2.2. Consultation

The submissions on the referral information and SER raised the following issues in relation to air quality:

- inadequate modelling of exhaust plumes for all types of launch vehicles
- concerns the SER fails to identify potential impacts from rocket fuels, oxidisers and emission types
- air quality monitoring proposed is inadequate as it fails to assess cumulative impacts or longer-term ambient concentration impacts
- inadequate information provided on the impacts and therefore mitigation measures from the proposed action on stratospheric ozone concentration
- concerns there has been no attempt to include human health impacts of various pollutants to be used for the proposed action.

6.2.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor and objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings and recommended conditions of approval are presented in **Table 2**.

6.2.4. Conclusion against the NT EPA objective

With the implementation of the recommended conditions identified in the draft Environmental Approval (Appendix 1), the NT EPA considers that the proposed action can be conducted in such a manner that its objective for air quality is likely to be met.

Table 2 Assessment for air quality and recommended conditions

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
Arnhem Space Centre			
The combustion of rocket fuels and the subsequent burn up of rocket components during launch and re-entry will result in the generation and emission of gaseous and solid contaminants. The proponent reports that pollutants of concern from rocket exhaust includes: • Carbon monoxide (CO) • Nitrogen dioxide (NO_2) • Sulfur dioxide (SO_2) • Hydrogen chloride (HCl) • Particulates (including aluminium oxide (Al_2O_3). Section 7.3.1.1 of the SER outlines the general human health impacts from exposure to carbon monoxide, nitrogen dioxide, hydrogen chloride and aluminium oxide. Pollutant dispersion modelling was undertaken using AERMOD to predict ground-level concentrations of air pollutants	**Avoid** The proponent has developed an "air emissions protocol" that will apply to all operations. The protocol defines the maximum emission rates of air pollutants that a rocket can produce and not exceed the proposed ground level air quality criteria at the nearest sensitive receptor. **Mitigate and manage** The proponent mitigates risks to human health by preventing access to the launch pads for ~30 minutes after a launch to allow for dissipation of exhaust fumes and minimise exposure. The proponent will employ a "deluge system" that uses high pressure water to capture ignition exhaust pollutants. The deluge system also acts as a buffer to fire, heat and sound. The proponent has committed to establishing an air quality	The SER justifies the use of the AERMOD dispersion model by stating that "there are no complex terrain, or other features, in the surrounding area that would result in the AERMOD dispersion model underestimating ground-level concentrations of air pollutants." However, the site is on the Dhupuma Plateau situated ~100 m "above the valley floor below" (Appendix 2 Veg and Habitat Assessment). Additional information from the proponent explains that the topographical features and climate of the Dhupuma Plateau was spatially modelled using TAPM and that the use of AERMOD is appropriate as the plateau is flat and the source of pollutants is not a static smokestack. The air quality criteria proposed by the proponent is supported. The proposed criteria aligns with:	**Condition 2: Air quality** • Take all reasonably practicable measures during the construction, operation, remediation and closure of the action to avoid and mitigate impacts attributable to the action on air quality beyond the approved extent. **Condition 3: Meteorological and air quality monitoring** • Obtain 12 months continuous ambient air quality monitoring data and results for CO, NO_2, HCl, SO_2, $PM_{2.5}$, and PM_{10} from an appropriately located air quality monitoring station. • Obtain 12 months of meteorological condition information in proximity to the approved extent. • Submit an ambient air quality report to the Minister within 12 weeks of completing the monitoring to obtain the

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
(both short-term and long-term concentrations) resulting from the proposed action. Site specific meteorology for input into the dispersion modelling was generated by TAPM. Models assume one of each launch vehicle type would be launched every hour over a year (8,760 launches per year). This is significantly greater than the proposed 60 launches/year. The proponent proposed the following ground level concentration limits: • 1-hour ground level concentration for HCl as per NSW EPA (140 µg/m^3); • 15-minute ground level concentration for HCl as per Safe Work Australia (7,500 µg/m^3); • 1 year ground level concentration for HCl as per VIC EPA (20 µg/m^3) to be applied as the 24-hour averaging period; • 24-hour ground level concentration for Al_2O_3 as	monitoring station at the Gulkula Ceremonial Site to measure CO and HCl (the two air pollutants most likely to be of concern) before, during and after each launch.	• the National Environment Protection (Ambient Air Quality) Measure limits • the NSW EPA impact assessment criteria and • the VIC EPA air pollution assessment criteria. These criteria are risk-based concentrations that help identify emissions likely to pose unacceptable risk to human health and the environment. The use of the Victorian EPA 1 year ground level concentration for HCl for a 24-hour averaging period is supported as it is a conservative limit that, if not exceeded, will meet the NT EPA's air quality objectives. Modelling results and figures indicate that the air quality criteria proposed by the proponent will be met at the nearest sensitive receptor (Gulkula Ceremonial Site) and no exceedances are predicted. There is uncertainty about whether the meteorological inputs modelled in TAPM accurately reflect the conditions at the ASC. The	ambient air quality and meteorological data. • Monitor pollutant concentrations (CO, NO_2, HCl, SO_2, $PM_{2.5}$ and PM_{10}) at the Gulkula Ceremonial Site at least 24 hours before, during and at least 24 hours after a launch. • The proponent must not exceed the air quality standards stipulated in condition 5. **Condition 5: Air quality standards** • Monitored concentrations must not exceed the ambient air quality National Environment Protection (Ambient Air Quality) Measure limits for: ○ 24-hour and 1 year ground level concentrations for PM_{10}; ○ 1-hour and 1 year ground level concentrations for NO_2;

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
PM_{10} as per Air NEPM (50 µg/m^3); • 1-hour ground level concentration for CO as per NSW EPA (30,000 µg/m^3); • 8-hour ground level concentration for CO as per NSW EPA (11,000 µg/m^3) • 1-hour ground level concentration for NO_2 as per Air NEPM (164 µg/m^3) The modelling and pollutant dispersion figures indicated no ground level exceedances of the criteria were predicted at the identified sensitive receptors. The modelling and pollutant dispersion figures indicated that the maximum predicted emissions for the following three concentrations would be 50% - 60% of the limit: • 15-minute ground level concentration for HCl, • 24-hour ground level concentration for Al_2O_3 as PM_{10}; and,		proponent has committed to installing and operating a meteorological monitoring station within the lease boundary and ambient air monitoring prior to substantial implementation of the operation is recommended to validate (or indicate otherwise) that meteorological inputs are accurate and inform sensitivity analysis of the modelled pollutant dispersion. There is no NT recommended land use separation distance for launch facilities (nor airports). A level of uncertainty remains- regarding the potential impacts from emissions on environmental receptors, including heritage sites, flora, fauna, water or soils. This is particularly the case for sensitive or significant vegetation types within the pollutant dispersion modelled plumes. However, the proponent's pollution dispersion modelling is conservative, based on 8,760 launches per year rather than 60. Furthermore, the exhaust plume exits the rocket at ~1,500°C and is expected to disperse higher	○ 24-hour and 1 year ground level concentrations for $PM_{2.5}$; ○ 1-hour and 24-hour ground level concentration for SO_2. • Monitored concentrations must not exceed the impact assessment criteria provided in the Approved Method for the Modelling and Assessment of Air Pollutants in NSW published by the NSW Environment Protection Authority (September 2022) for: ○ 1-hour ground level concentration for HCl; and ○ 1-hour and 8-hour ground level concentration for CO. • Monitored concentrations must not exceed the air pollution assessment criteria provided in the Guideline for Assessing and Minimising Air Pollution in Victoria published by the VIC Environment Protection Authority (February 2022) for:

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
• 8-hour ground level concentration for CO The combustion of rocket fuel will also produce small quantities of the greenhouse gas nitrous oxide (N_2O) (less than 94 tonnes per year).		in the air column resulting in greater dilution before reaching ground level (and therefore less concentrated at ground level). The proponent has committed to installing an air quality monitoring station at the Gulkula Ceremonial Site. The proponent has committed to continuous monitoring and adjusting launch operations as necessary to ensure compliance with air quality standards. The proponent proposes to monitor for carbon monoxide and hydrogen chloride only. As there is uncertainty about whether the meteorological inputs modelled in TAPM accurately reflect the conditions at the ASC, uncertainty as the modelling didn't include exhaust plumes for all types of launch vehicles and didn't include SO_2, and that the proposed air quality monitoring is inadequate for assessing and determining cumulative impacts - the proponent should be required to: provide a minimum of 12 months contemporaneous data to use as ambient background; monitor all	○ 1 year ground level concentration for HCl (to be applied as the 24-hour averaging period). **Condition 4: Air quality modelling** • Update the pollutant dispersion model using the ambient meteorological and air quality data; and air quality data from launches. **Regulation by other statutory decision-makers** Launch permits are required under the SLR Act. The permitting process requires the proponent to provide an environmental plan that details pollution control and air quality matters.

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		contaminants of concern (CO, NO_2, SO_2, HCl, PM_{10} & $PM_{2.5}$) and continue to refine the models based on observed meteorological and air quality data. The proponent's commitment to monitoring air quality at the nearest sensitive receptor (Gulkula Ceremonial Site) is supported. If after five years or the first 10 launches, the monitoring evidence shows the air quality criteria proposed by the proponent is met at the nearest sensitive receptor (Gulkula Ceremonial Site) and no exceedances are predicted, there are provisions in the EP Act available to the proponent to apply to the Minister to amend an environmental approval (if an approval is granted).	
The proposed action will contribute to particulate matter accumulating in the stratosphere. Particulate matter can accumulate (for up to several years), absorb solar radiation and warm the surrounding air.		It is anticipated that impacts from particulate matter accumulation from 60 launches per year (noting not all launches will involve hybrid solid and liquid fuelled motors) will be primarily localised within the atmosphere surrounding the ASC. Cumulative impacts from rocket launches could lead to significant	Nil

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		accumulation of particulate matter in the stratosphere and any future expansion would need to assess the cumulative impacts.	

6.3. Terrestrial ecosystems

6.3.1. Environmental values

The ASC lies within the inland areas of the Gove Peninsula and north – east Arnhem Coast Site of Conservation Significance (SOCS) comprised of "deeply weathered granite plains, associated lateritic and bauxitic plains and plateau that are distinctive to the region, as well as intervening alluvial plains"[4].

The vegetation is typically eucalypt tall open forest, dominated by *Eucalyptus miniata* and *E. tetrodonta*, with numerous patches of monsoon vine thicket <10 ha, which can be associated with springs and riparian zones. There are 15 patches of monsoon vine thicket >100 ha that are considered significant within the SOCS, although these large patches are not present within the ASC area.

Threatened fauna species or species habitat that have the potential to occur within the ASC include:

- partridge pigeon (eastern) (*Geophaps smithii smithii*; Vulnerable EPBC Act and *Territory Parks and Wildlife Conservation Act 1976* (TPWC Act))
- black-footed tree-rat (*Mesembriomys gouldii gouldii*; Endangered EPBC Act and TPWC Act)
- fawn antechinus (*Antechinus bellus*; Vulnerable EPBC Act and Endangered TPWC Act)
- northern brush-tailed phascogale (*Phascogale pirata;* Vulnerable EPBC Act and Endangered TPWC Act)
- northern brushtail possum (*Trichosurus vulpecula arnhemensis*; Vulnerable EPBC Act)
- northern quoll (*Dasyurus hallucatus;* Endangered EPBC Act and Critically Endangered TPWC Act)
- pale-field rat (*Rattus tunneyi*; Vulnerable TPWC Act)
- Mertens' water monitor (*Varanus mertensi;* Endangered EPBC Act and Vulnerable TPWC Act)
- northern blue-tonged skink (*Tiliqua scincoides intermedia;* Critically Endangered EPBC Act)

The SER highlights that there will be two discrete downrange recovery areas (one terrestrial and one marine) for suborbital sounding rockets and three hypothetical areas running north – south from the launch site to areas north of Alice Springs where booster recovery is expected to occur (see **Figure 3**). No further details have been provided on the environmental values within these areas.

6.3.2. Consultation

Submissions on the referral information and SER raised the following issues in relation to terrestrial ecosystems:

- uncertainty regarding the extent of regrown and intact vegetation that will be impacted by the proposed action
- lack of up to date terrestrial ecology survey data within the proposed extent

[4] Harrison L, McGuire L, Simon W, Fisher A, Pavey C, Fegan M, Lynch B (2009). *Gove Peninsula and north-east Arnhem coast*. Northern Territory, Department of Natural Resources, Environment, The Arts and Sport.

- uncertainty regarding potential impacts to several threatened species due to lack of up to date survey data
- uncertainty if groundwater dependant ecosystems, riparian vegetation or wetland vegetation occurs within some locations of the proposed action
- possible trajectories for the launched missiles are considered expansive and span multiple jurisdictions and potentially, areas of high ecological value
- risks to marine and terrestrial life and ecosystems from rocket debris
- inadequate information provided in relation to the proposed dam (e.g. unknown location, water capacity etc.)
- inadequate information provided about noise and light pollution from rocket launches and the potential impacts to fauna.

6.3.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor and objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings and recommended conditions of approval are presented in **Table 3**.

6.3.4. Conclusion against the NT EPA objective

With the retention of native vegetation buffers, implementation of the proponent's proposed management measures, commitments, and recommended conditions for avoiding and mitigating impacts identified in the draft Environmental Approval (Appendix 1), the NT EPA considers that the proposed action can be conducted in such a manner that its objective for terrestrial ecosystems is likely to be met.

Table 3 Assessment for terrestrial ecosystems, recommendations and conditions of approval

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
Arnhem Space Centre			
The proposed expansion will cover an area of approximately 305 ha and will require the clearing of approximately 120 ha of intact native vegetation, as the site sits within the footprint of the previously disturbed Dhupuma Plateau bauxite mine. The SER identified the following potential impacts: • clearing of potentially suitable habitat for nine threatened species, (listed in section 6.3.1) • disturbance to significant vegetation types including monsoon vine thicket • introduction / spread of weeds and pests.	**Avoid** The proponent has committed to: • not clear monsoon vine thicket • applying a non-clearing buffer of at least 50 m to the outer edge of the monsoon vine thicket community. However, there may be a small area which goes no closer than 30 m • applying a non-clearing buffer of at least 20 m from the edge of the plateau. **Mitigate and manage** The proponent has committed to: • only undertake vegetation clearance and site stabilisation during the dry season • ensuring the area of vegetation to be cleared is defined to prevent over clearing and to prevent clearing of monsoon vine thicket	The proponent conducted a desktop assessment and a vegetation and habitat field assessment to: • detect and document vegetation (including sensitive or significant vegetation, weeds) and habitat • determine the likelihood of occurrence of threatened species. The proponent's assessment identified that there is a low likelihood of occurrence for any threatened flora or fauna species to occur within the ASC due to: • low quality threatened species habitat due to regular late season fires, particularly from the south, and strong winds and cyclones • no opportunistic sightings of threatened flora or fauna species were recorded during field surveys.	**Condition 1: Limitations and extent** Limitations and extent to limit the area of land clearing at the ASC facility, including: • No monsoon vine thicket vegetation to be cleared **Condition 7: Vegetation management and monitoring plan (VMMP)** To protect monsoon vine thicket to maintain environmental values including biodiversity, ecological integrity and ecological functioning the proponent must prior to substantial implementation develop, implement, and comply with a VMMP for the ASC. The VMMP must be informed by: • Survey by a qualified ecologist to identify monsoon vine thicket in and within 250 m of the approved extent; and • Survey by a qualified ecologist to provide a baseline condition

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	• implementing a Vegetation and Weed Management Plan which includes ongoing site management and procedures for weed surveillance and control • revegetating exposed soils with appropriate native species where possible • developing a comprehensive erosion and sediment control plan for the life of the proposed action • developing a comprehensive fire control plan • requiring all non-local construction vehicles to be pressure washed before coming onto site • using local fill at the site for construction and not importing fill from offsite unless needed for specific civil structural foundation requirements • revegetating disturbed areas where not required for operational or infrastructure purposes.	No targeted fauna surveys have been undertaken to confirm presence of fauna species. Maps provided by the proponent in the additional information incorrectly identified the location of a patch of monsoon vine thicket. The map in Appendix N, provided by the consultant, and the map provided by the Flora and Fauna Division are consistent. The proponent has committed not to clear any monsoon vine thicket and to maintain a 50 m buffer. The 50 m distance is consistent with the recommended buffer for the protection of low value sensitive/ significant vegetation detailed in the NT Land Clearing Guidelines. A draft condition is recommended to identify a buffer in consultation with, and to the satisfaction of, the Flora and Fauna Division of DLPE. An additional draft condition is recommended to limit the extent of clearing proposed and **Figure 1** of the draft environmental approval purports to show the location of monsoon vine thicket and	of vegetation within 250 m of the approved extent. The VMMP must: • include survey results including field-verified maps of dry and wet monsoon vine thicket in and within 250 m of the approved extent, showing the edge of the monsoon vine thicket and a buffer, that are to form the no-go area for vegetation clearing • detail measures and procedures to protect no-go areas from vegetation clearing including: ○ marking of no go areas on the ground; ○ erosion and sediment controls to avoid indirect impacts to monsoon vine thicket and buffers; ○ any other measures to prevent indirect impacts to monsoon vine thicket and buffers; and ○ include a detailed monsoon vine thicket monitoring program to detect negative

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		associated buffers – however these are to be ground-truthed. Where existing clearing has encroached on the proposed 50 m buffer, the proponent has committed to maintaining a 30 m buffer. This is supported to ensure the protection of monsoon vine thicket. However, the potential indirect impacts due to edge effects (from increased weed prevalence, fire, feral animal intrusion, erosion and sedimentation) and adjacent land uses may result in reduction in the area of wet and dry monsoon vine thicket adjacent to the proposal. A draft condition is recommended to identify a buffer in consultation with, and to the satisfaction of, the Flora and Fauna Division of DLPE. The proponent has committed to implement a Vegetation and Weed Management Plan to mitigate and manage impacts, however, the plan must be revised to identify the appropriate management, mitigation and monitoring actions to protect the remaining patches of Monsoon vine thicket from edge effects and	changes from the baseline condition. • Be submitted to the Minister no later than one month prior to commencement of substantial implementation. **Regulation by other statutory decision-makers** The proposed action may require a permit to clear under the *Planning Act 1999*. Obligations to manage weeds are established by the *Weeds Management Act 2001*. Obligations to avoid and manage fires are established by the *Bushfires Management Act 2016*. Requirement for approval to interfere with a water way under the *Water Act 1992*.

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		threatening processes. The NT EPA proposes that the Vegetation and Weed Management Plan is replaced with a Vegetation Management and Monitoring Plan (VMMP) to be developed to the satisfaction of the Flora and Fauna Division of DLPE. Consultation with the Controller of Water Resources identifies that construction of the dam would require approval to interfere with a waterway under the *Water Act 1992*. The duration of rocket launches is very short (the Black Brant IX rocket takes approximately five seconds to reach an altitude of 2 km) and impacts to fauna associated with noise are expected to be short term.	
There is the potential for short term impact to vegetation near the launch pads from acidic deposition from rocket exhaust.	**Mitigate and manage** The deluge system will capture a proportion of the initial ignition exhaust pollutants.	The extent of acidic deposition effects on vegetation within the ASC remains unclear. However, it is considered unlikely that the proposed action would significantly impact vegetation.	**Condition 7: Vegetation management and monitoring plan** • To protect monsoon vine thicket to maintain environmental values including biodiversity, ecological integrity and ecological functioning the proponent must:

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		The deluge system will capture a proportion of the ignition exhaust pollutants. The effects of the deposition are likely to be transient and no long-term effects on vegetation or the environment are expected. However, there is the potential for cumulative impacts on patches of monsoon vine thicket from a range of sources, including fire, feral animals, weeds, erosion and sedimentation, and emissions from operations on the launch pads.	○ identify monsoon vine thicket within 250 m of the approved extent; ○ develop, implement and comply with the VMMP; and ○ include a detailed monsoon vine thicket monitoring program to detect negative changes from the baseline condition.
Downrange recovery areas			
The landing of any rocket vehicle assets to earth will be under a parachute. There is the potential for terrestrial ecosystems to be impacted through disturbance for access roads to recover rocket vehicle assets.	The SER mentions that client demand and requirements will determine the trajectory followed by each launch, the number of launches, and requirements and subsequent optimisation for safety and environmental constraints set by the proponent. The required trajectory and technical specifications of a launch vehicle and its payload will be known approximately 9 months prior to a launch. The trajectory is controlled and distance travelled is	The mission optimisation process outlines a procedure that the proponent will follow to identify and avoid areas of high ecological value. The procedure includes a desktop assessment, consultation with local stakeholders and engagement of a third party subject matter expert to undertake a review on whether the proposed action is within the scope of the environmental approval in force. The decision to conduct ecological surveys of downrange recovery	**Condition 10: Flight Planning and down range landing and hardware recovery** • Develop a launch planning procedure that: ○ avoids impacting, to the extent reasonably practicable, sensitive environmental values (which includes cultural values) and other areas of local or regional significance identified through

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	known. The potential recovery area can be calculated and mapped with 99.7% certainty. The proponent has committed to obtain all required environmental permits, approvals, and/or licences during a 13-month launch planning process under the SLR Act. **Avoid** The proponent has developed a Mission Optimisation Process and Stakeholder Engagement Plan to determine whether the proposed action is within the scope of the environmental approval in force. The procedure includes the identification of the launch trajectory and the preliminary landing area. A desktop study of the landing areas is undertaken to identify areas of significance, including areas of high ecological value and known heritage and archaeological places. The trajectory can then be altered to avoid areas of significance. Where these areas are unavoidable, the proponent commits to undertaking surveys to ground-truth the desktop	area will be risk-based, informed by the desktop assessment and consultation. If surveys are required these will be conducted by a qualified subject matter expert. The mission optimisation process will allow the proponent to determine whether a significant variation is required (i.e. it is a check against the conditions of a current, valid environmental approval). The NT EPA does not support the mission optimisation process as proposed as it does not set adequate operating conditions to ensure areas of high environmental value are avoided. Furthermore, the regulation of the mission optimisation process as proposed would be onerous, as a variation to the environmental approval would be required in every instance the landing sites encroach on an area of high environmental value. The NT EPA recommends an alternative approach where site specific management measures are developed and applied during the hardware recovery action to	consultation with down range stakeholders ○ includes methods for how impacts to sensitive environmental values and areas holding local or regional significance will be avoided, mitigated or managed in line with the environmental decision-making hierarchy. • Prepare and submit an annual report that: ○ specifies the number of launches undertaken in the previous 12 months ○ specifies how compliance has been achieved to avoid impacting sensitive environmental values and areas holding local or regional significance to the extent reasonably practicable ○ evaluates the performance of avoidance, mitigation and management actions ○ identifies any remediation actions undertaken.

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	studies. The process includes stakeholder consultation to ensure that local knowledge contributes to identifying areas of significance. The proponent has also committed to accessing recovery areas via helicopter or utilising existing access roads /tracks where possible. **Mitigate and manage** Measures to mitigate potential impacts from the return and recovery process include: • Principles and protocols for Land Sea Access Recovery which includes the involvement of Aboriginal ranger groups to assist in recovery activities • Unexpected finds process • Stakeholder engagement plan • Return Authorisation under the SLR Act. The proponent has established the Safety and Retrieval Committee (SRC) to inform, consult and work with direct stakeholders including Traditional Owners. All identified stakeholders will be invited to participate in the SRC forum where	mitigate impacts on areas of high environmental value.	**Regulation by other statutory decision-makers** • Launch permits are required under the SLR Act. • Return Authorisations are required under the SLR Act. • Approval is required under the EPBC Act relating to avoiding, mitigating and managing matters of national environmental significance and Commonwealth marine areas.

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	they will have the opportunity to provide feedback to the proponent prior to launch operations. The SRC acts to address general awareness as well as public health and safety of the community.		

6.4. Culture and heritage

6.4.1. Environmental values

Inspections undertaken for the previous Gulkula mine development in the ASC area with Traditional Owners and elders determined that there were no sacred sites, objects, or other areas of heritage significance within the mine site area, since covered by phase 1 of the ASC.

The proponent was issued an Authority Certificate by the Aboriginal Areas Protection Authority (AAPA) for the ASC facility under the *Northern Territory Aboriginal Scared Sites Act 1989* on 22 August 2024. The Gulkula Ceremonial Site is a publicly known sacred site located approximately 700 m east of the nearest launch pad.

The proponent in consultation with the Heritage Branch of DLPE, undertook a search of the NT Heritage Register for known archaeological places located within and in proximity to the proposed action. The nearest registered heritage site is 13 km north east of the ASC, and no heritage places or objects are recorded within the ASC area. However, the occurrence of unrecorded Aboriginal or Macassan archaeological places was assessed as possible.

A risk assessment considering features that may generally be associated with heritage items was conducted by the proponent. No archaeological surveys were undertaken by the proponent.

Sacred sites, archaeological sites and traditional uses may be present/occur in downrange recovery areas. Due to the large area of potential downrange recovery areas, no surveys have been conducted and no AAPA certificate/s have been obtained.

6.4.2. Consultation

The submissions on the referral information and SER raised the following issues in relation to culture and heritage:

- inadequate stakeholder engagement with relevant Aboriginal corporations and the Northern Land Council throughout the assessment process
- concern that the SER relies on historic cultural heritage survey data (obtained for the original mine development in the ASC area) and has not taken into account the impacts from this proposed action
- it is unknown if sacred sites are present along creek lines or if groundwater dependant sacred sites are located within the ASC area
- inadequate information regarding direct and cumulative impacts on cultural heritage within the ASC and how these impacts are going to be avoided and/or mitigated
- authority certificates for the down range recovery areas have not been issued. Therefore, the presence of Aboriginal sacred sites is uncertain.

6.4.3. Factor assessment and recommended regulation

The potential significant impacts of the proposed action on cultural and heritage values have been considered. In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor and objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings and recommended conditions of approval are presented below in **Table 4**.

6.4.4. Conclusion against the NT EPA objective

With the implementation of the recommended conditions for avoiding, monitoring and mitigating impacts identified in the draft Environmental Approval (Appendix 1), and regulation under the *Northern Territory Aboriginal Sacred Sites Act 1989* and *Heritage Act 1991*, the NT EPA considers that the proposed action can be conducted in such a manner that its objective for the culture and heritage factor is likely to be met.

Table 4 Assessment for culture and heritage, recommendations and conditions of approval

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
Arnhem Space Centre			

The proponent does not anticipate potential significant impacts to sacred sites or areas and objects of heritage value.	**Avoid**
	The proponent has obtained an Authority Certificate from AAPA which includes the ASC operational area.
	The proponent has engaged with DLPE Heritage Branch to develop a scope of works for an archaeological survey to be undertaken in consultation with Traditional Owners. The survey and assessment will be conducted to identify any unknown heritage items or places and inform measures require to meet legislative obligations.
	The proponent's Environment Policy commits to ensuring environmental impacts, including impacts to cultural heritage, are either avoided or kept to an acceptable level.
	Manage
	The proponent has committed to complying with the advice received
		Sacred sites are present within and in the vicinity of the proposed action. The proponent has obtained an AAPA Authority Certificate and no residual significant impact is expected.
		No baseline archaeological surveys of the ASC site have been conducted and there is limited information to inform a risk assessment. The proponent has committed to undertaking an archaeological survey prior to any ground disturbing works within the ASC area.
		The Heritage Branch supports this approach, and is satisfied that the scope will provide sufficient information to manage potential impacts appropriately.
		The CHMP will identify and mitigate the impacts to Aboriginal or Macassan archaeological places and objects, if present.
		Safety protocols / operational procedure have been developed to
			Condition 1: Limitations and extent
			• Limitations and extent to limit the area of land clearing at the ASC facility, in conjunction with the conditions below, will protect sacred sites and, areas and objects of heritage value outside of the approved extent.
			Condition 9: Culture and heritage
			• Requires the proponent to undertake an archaeological survey. The survey must:
			  ○ be undertaken in accordance with the scope of works developed to the satisfaction of the CEO
			  ○ be undertaken prior to any ground disturbance within the archaeological survey area
			• Develop a CHMP, if heritage values are found during the archaeological survey.
			• The CHMP must identify the actions to be implemented to avoid or minimise impacts to

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	from the Heritage Branch, which includes implementation and compliance with a cultural heritage management plan (CHMP) to be developed by an independent and experienced qualified archaeologist. The proponent has developed an Unexpected Finds Protocol that details the steps to be undertaken in the event cultural items, heritage items or human remains are identified during construction or recovery activities. If the proponent becomes aware of a potentially impacted sacred site both the Land Council and AAPA will be notified and activities will cease until guidance from the Land Council and AAPA is given.	ensure launch failure occurs in a safe and controlled manner.	sacred sites and heritage sites, including Aboriginal or Macassan archaeological places and objects. **Regulation by other statutory decision-makers** • Sacred sites are protected under the *Northern Territory Aboriginal Sacred Sites Act 1989*. • Archaeological places and objects are protected under the *Heritage Act 2011*. The proponent has an obligation to report unexpected heritage finds to the Heritage Branch, DLPE. • The SLR Act requires the proponent's emergency response protocols to account for potential failure scenarios and for the proponent to make the area safe and remediate damage including impacts on culture heritage sites.
Downrange recovery areas			
The proponent did not identify any impacts to culture and heritage	**Avoid** The proponent has:	The landing and subsequent recovery of rocket vehicle assets has the potential to cause	**Condition 10: Flight planning and down range landing and hardware recovery**

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
values within the potential landing and recovery areas.	• committed to apply for an Authority Certificate from AAPA if consultation and planning for a specific launch operation identifies that rocket vehicle assets will need to be retrieved on land within the NT. • through the SRC, established protocols for identify areas of culture and heritage values within Arnhem Land landing and recovery areas. • sought to extend the protocol with the Central Land Council and other relevant stakeholders. • developed and committed to complying with the proponents Mission Optimisation Process . This plan includes identifying and avoiding NT cultural heritage and Commonwealth (EPBC Act) world heritage properties and national heritage places. **Mitigate and Manage** The proponent has developed an Unexpected Finds Process that details the steps to be undertaken in	irreversible damage to a sacred site, and cultural and heritage objects or places in the recovery area (if present). The proponent will undertake a risk hazard analysis and a detailed assessment of the selected trajectory and landing site to identify potential impacts on environmental matters prior to each launch. The proposed Mission Optimisation Process will allow the proponent to avoid and minimise impacts to known heritage and archaeological places. The Heritage Branch identified registered shipwrecks and aircraft on the National Shipwreck Database. The implementation of the Mission Optimisation Process includes measures to avoid impacts to these heritage items. The NT EPA supports the proponent's commitment to obtain AAPA Authority Certificates as this would avoid potentially significant impacts to sacred sites. The implementation of the Mission Optimisation Process includes	• Develop a launch planning procedure that: ○ avoids impacting, to the extent reasonably practicable, sensitive environmental values (which includes cultural values) and other areas of local or regional significance identified through consultation with down range stakeholders ○ includes methods for how impacts to sensitive environmental values and areas holding local or regional significance will be avoided, mitigated or managed in line with the environmental decision-making hierarchy. • Prepare and submit an annual report that: ○ specifies the number of launches undertaken in the previous 12 months ○ specifies how compliance has been achieved to avoid impacting sensitive

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	the event cultural items, heritage objects or artefacts, or human remains are identified during recovery activities. This includes consultation with Traditional Owners and AAPA and reporting of these findings to the Heritage Branch, DLPE. If the proponent becomes aware of a potentially impacted sacred site both the Land Council and AAPA will be notified and activities will cease until guidance from the Land Council and AAPA is given. The proponent has committed to conducting a de-briefing session with the SRC and AAPA (where required), at the completion of each recovery to identify improvements to protocols for future launches. The proponent's Mission Optimisation Process will allow the proponent to identify risk within the down range recovery area early and manage potential impacts during the recovery phase.	appropriate measures to mitigate and manage unknown finds.	environmental values (including cultural values) and areas holding local or regional significance to the extent reasonably practicable ○ evaluates the performance of avoidance, mitigation and management actions ○ identifies any remediation actions undertaken. **Regulation by other statutory decision-makers** • Sacred sites are protected under the *Northern Territory Aboriginal Sacred Sites Act 1989*. • Archaeological places or objects are protected under the *Heritage Act 2011*. The proponent has an obligation to report unexpected heritage finds to the Heritage Branch, DLPE.

6.5. Community and economy

6.5.1. Environmental values

The nearest permanent or temporary human habitations to the proposed action include:

- The Gulkula Ceremonial Site 700 m east of the closest proposed launch pad, and
- Gove airport (~10 km north of the proposed action).

Potentially affected people (e.g. landowners or managers, pastoralists etc.) within the recovery zones have not been defined.

6.5.2. Consultation

The submissions on the referral information and SER raised the following issues in relation to community and economy:

- inadequate information provided on potential social and economic impacts to residents of the Gove Peninsula
- inadequate information provided on local employment and procurement opportunities
- uncertainty regarding potential impacts or residual impacts at end of the life which has the potential to impact legacy planning.

6.5.3. Factor assessment and recommended regulation

In assessing whether the residual impacts of the proposed action will meet the NT EPA environmental factor and objective, and whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings and recommended conditions of approval are presented in **Table 5.**

6.5.4. Conclusion against the NT EPA objective

With implementation of the proponent's proposed management measures, commitments, and recommended conditions for avoiding and mitigating impacts identified in the draft Environmental Approval (Appendix 1**)**, the NT EPA considers that the proposed action can be conducted in such a manner that its objective for community and economy is likely to be met.

Table 5 Assessment for community and economy, recommendations and conditions of approval

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
Arnhem Space Centre			
The construction phase of the proposed action will provide 80 jobs. The operational phase will initially provide 40 jobs and this is projected to increase to 100 once mature in 2027/28. Staff will either reside onsite or in Nhulunbuy during launch periods. The SER identified the following impacts to people residing within local proximity of the ASC, including users of the Gulkula Ceremonial Site (which includes the Garma Institute and Garma Cultural Knowledge Centre): • competing demand on local infrastructure (from ~100 employees, plus clients and tourists), such as Central Arnhem Road and Gove Peninsula access, services such as medical and other logistical services to the region.	**Avoid** • Stakeholder consultations, notifications and safety provisions will commence 9 months prior to launch. Consultation with stakeholders will continue to be undertaken in accordance with the Stakeholder Engagement Plan[5] up until the point of each launch. • Launch operations will discontinue for the duration of the Garma Festival (scheduled annually in July / early August). • Prior to and during road closures there will be warnings for motorists, transport companies and provisions will be made for emergency services.	• The stakeholder engagement plan incorrectly lists a number of Aboriginal corporations as Traditional Owners. • The proponent has not demonstrated it consulted on the potential social and economic impacts on: ○ Traditional Owners ○ users of the Gulkula ceremonial site (which includes the Garma Institute and Garma Cultural Knowledge Centre) ○ services such as medical and logistical services to the region from increased demand / use ○ other businesses particularly during peak visitor periods ○ community cohesion and	**Condition 11: Stakeholder engagement plan** • The approval holder must develop a stakeholder engagement plan that identifies all affected stakeholders including but not limited to: ○ Traditional Owners ○ Aboriginal corporations ○ land councils ○ users of the Gulkula ceremonial site ○ other people or organisations determined to be Aboriginal stakeholders ○ services such as medical and logistical services to the region ○ other businesses that may be affected during peak visitor periods to the region.

[5] Additional information to the SER. Attachment D – Stakeholder engagement plan. 5 April 2024

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
• potential impact to public health and safety • potential impact on environmental health • closure of Bawaka Road to the east of the proposed action for 15-30 minutes for security reasons during some of the launches.	**Mitigate** The SRC acts to address general awareness as well as public health and safety of the community. **Manage** The proponent proposes to manage impacts through ongoing stakeholder engagement in accordance with their stakeholder engagement plan throughout the launch operations stage.	○ recreation and cultural activities. • The proponent has identified the broader potential positive and negative impacts of the proposed action but has not: ○ demonstrated consultation on these matters ○ provided details of the process used to identify these perspectives. • The ASC Stakeholder Engagement Plan summarises the consultation undertaken to date. Consultation has been limited and, whilst stakeholders have been given the option to provide feedback in relation to the site development and site operation of the ASC, further consultation for the proposed action is required. • The area of interest granted to the Gumatj Corporation Ltd under section 19 of the *Aboriginal Land Rights (Northern Territory) Act 1976*, and sub-let to the proponent, must be expanded, requiring the Arnhem	• The approval holder, through the stakeholder engagement plan, must demonstrate that affected stakeholders have been consulted on: ○ potential social and economic impacts from the action; and ○ broader potential positive and negative impacts of the action, including details of the process used to identify these impacts. **Regulation by other statutory decision-makers** • Launch permits are required under the SLR Act. To obtain a permit the proponent must engage (notify in this case) stakeholders of the ASC (and downrange) area. • *The Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) mandated the establishment of Land Councils in the NT. Land Councils such as the Northern Land Council and Central Land Council are the key bodies responsible for facilitating

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
		Land Aboriginal Land Trust to vary the existing lease. This process is facilitated by the Northern Land Council.	consultation with traditional landowners to ensure informed consent is given prior to any action being undertaken on Aboriginal land affected by the proposal (including the ASC and landing and recovery operations).
Downrange recovery areas			
Potential impacts to individuals and communities near proposed landing and recovery sites will be defined 6 – 9 months before the proposed launch.	**Avoid** The proponent has committed to: • implementing the Stakeholder Engagement Plan which includes the requirements for consultation with relevant stakeholders within the downrange recovery areas. Stakeholder consultations, notifications and safety provisions will commence 9 months prior to launch, and will continue up until the point of launch. The planning process includes the determination of launch trajectories and potential recovery area of the first stage rockets launched. The trajectory is controlled and distance travelled is known. The potential	The proponent will conduct an internal assessment to identify downrange stakeholders 12 to 9 months prior to launch. Consultation with affected stakeholders will commence 9 months prior to launch once launch trajectories are known. Identified stakeholders, including Aboriginal landowners will be invited to participate in the SRC forum where they will have the opportunity to provide feedback to the proponent prior to launch operations. In line with the mission optimisation process, the proponent will undertake an internal impact assessment prior to launch which will evaluate potential impacts to	**Condition 11: Stakeholder engagement plan** • The stakeholder engagement plan must require that stakeholders identified within the down range landing and hardware recovery site, including but not limited to, Traditional Owners, leaseholders, land councils and AAPA are informed and consulted with during the launch planning process prior to each launch. **Regulation by other statutory decision-makers** • The proponent will be required to comply with Commonwealth guidelines for assessments and approval under the EPBC Act. These include the requirements

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	recovery area can be calculated and mapped with 99.7% certainty • implementation of the Mission Optimisation Process which assesses the potential impacts from the launch trajectory including potential impacts to community events • identifying and avoiding any inhabited areas during the mission optimisation process • obtain all required environmental permits, approvals, and/or licences during a 13-month launch planning process under the SLR Act. **Mitigate** • The SRC acts to address general awareness as well as public health and safety of the community. **Manage** • The proponent proposes to manage impacts through ongoing stakeholder engagement in accordance with	community events. This will include identifying any inhabited areas within the landing areas. If any populations are detected within the landing zone, the trajectory will be adjusted. There is still a level of uncertainty whether the stakeholder engagement plan in its current format is robust enough to clearly identify all relevant stakeholders, including those within the down range landing and hardware recovery sites, and take into consideration the concerns of those stakeholders during flight planning.	for engagement with first nation's people and communities. • Launch permits are required under the SLR Act. To obtain a permit the proponent must notify stakeholders of the ASC and downrange area. • *The Aboriginal Land Rights (Northern Territory) Act 1976* (Cth) mandated the establishment of Land Councils in the NT. Land Councils such as the Northern Land Council and Central Land Council are the key bodies responsible for facilitating consultation with traditional landowners to ensure informed consent is given prior to any landing and recovery action being undertaken on Aboriginal land.

Potentially significant impact	Proponent's measures to avoid, mitigate and manage impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
	its stakeholder engagement plan throughout the launch operations stage.		

7. Whole of environment considerations

The NT EPA considered connections and interactions between environmental factors in its consideration of impacts to the whole of environment.

When the separate environmental factors of the proposed action were considered together in a whole of environment assessment, the NT EPA formed the view that the impacts from the proposed action would not alter its views about whether the proposed action could meet its factor objectives.

The NT EPA considers that environmental performance reporting (EPR) is required from the proponent within 12 months of substantial implementation of any component of the action and every five years thereafter (a total of nine EPRs over 40 years). This is considered reasonable and proportional to manage potential significant environmental impacts including consideration of the confidence in information provided, that the space industry is relatively new in the NT, and to provide the proponent and the Minister with an evaluation of the performance of the proposed action with respect to actual impacts on environmental values over the life of the action compared to those predicted during the environmental impact assessment process.

7.1. Decommissioning and closure

Planned decommissioning, closure and rehabilitation at the end of the project life would occur after approximately 40 years of operation. However, a range of scenarios could necessitate earlier decommissioning or closure (e.g. insolvency of the company, dormancy of the operation or not meeting requirements of an environmental approval). In assessing whether reasonable and appropriate regulatory conditions can be imposed, the assessment findings and recommended conditions of approval are presented in **Table 6**.

Table 6 Assessment - decommissioning and closure

Potentially significant impact	Proponent's measures to avoid and mitigate impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
Arnhem Space Centre			
The ASC will include infrastructure that's been exposed to particulates and pollutants of concern over time, and the deluge system will comprise a large hardstand area and a significant volume of concrete. There is potential for soil and/or water contamination over time. There are likely logistical or waste capacity issues associated with the volume and types of materials at a remote site.	**Manage** The proponent has committed to: • Decommissioning and removing all infrastructure unless requested by the landowners that some or all infrastructure be retained for their purposes. This will be determined through consultation and agreement. • Remediation of any soil contamination at fuel or chemical storage areas if necessary. • Revegetation of exposed soils to reduce dust production, including with location native species where appropriate.	Planned decommissioning, closure and rehabilitation at the end of the project life would occur after approximately 40 years of operation. The NT EPA recommends that proponent develops and implements a decommissioning and rehabilitation plan that includes methods for decommissioning of project infrastructure and remediation and rehabilitation of disturbed areas.	**Condition 8: decommissioning and rehabilitation plan** • Develop and implement a decommissioning and rehabilitation plan. The plan must: ○ define closure objectives and criteria developed in consultation with traditional owners, leaseholders and relevant government agencies ○ include provisions for unplanned and planned decommissioning and dormancy of operation ○ describe methods for decommissioning, rehabilitation and remediation of the ASC site in accordance with National Environment Protection (Assessment of Site Contamination) Measures ○ be reviewed by an independent qualified person

Potentially significant impact	Proponent's measures to avoid and mitigate impacts	Assessment finding	Recommended conditions and/or regulation by other statutory decision-makers
			○ be submitted to the Minister within 12 months of commencing the action ○ must be revised and submitted to the Minister within 2 months of notifying the Minister of decommissioning or dormancy.

8. Matters taken into account during the assessment

8.1. Environment Protection Act 2019

The NT EPA's assessment also took into account the purpose of environmental impact assessment process (section 42 of the EP Act) (Table 7).

Table 7 Purpose of environmental impact assessment process

Matters taken into account during the assessment	Consideration
Objects of the EP Act	
To protect the environment of the Territory	The proponent's referral, SER, additional information and this assessment report, including the NT EPA's recommended conditions for an environmental approval, provide detail about how the environment of the Northern Territory would be protected from potentially significant environmental impacts that could occur as a result of implementation of the proposed action. Where mitigation measures are necessary to protect the environment, the NT EPA has recommended conditions of the approval.
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 is satisfied the development can be carried out in a manner consistent with the principles of ecologically sustainable development (ESD) (refer below for further detail on how individual ESD principles have been taken into account).
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 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 proposed action to inform an environmental approval decision by the Minister that, in the NT EPA's view, promotes protection and management of the environment.
To provide for broad community involvement during the process of environmental impact assessment and environmental approval	The public consultation on the referral and SER provided for broad community involvement. There have been two opportunities for public interested persons to makes submissions to the NT EPA during statutory consultation periods. The NT EPA's public consultation undertaken during its assessment of the proposed action provides for community involvement during the environmental impact assessment process. Submissions received in relation to the proposed

Matters taken into account during the assessment	Consideration
	action have been taken into account in the NT EPA's assessment and the preparation of the recommended conditions for an environmental approval. Outside these opportunities the proponent has undertaken consultation and engagement with stakeholders within the ASC area. The proponent will conduct an internal assessment to identify downrange key stakeholders 12 to 9 months prior to launch. Consultation with affected downrange stakeholders will commence nine months prior to launch once launch trajectories are known in accordance with the stakeholder engagement plan.
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 proposed action. The NT EPA has received submissions from the AAPA and the Northern Land Council. These submissions have been taken into account in the preparation of this report and the recommended conditions to inform the Minister's decision on environmental approval. Protection of cultural heritage is promoted through the NT EPA's recommended conditions for archaeological surveys, recognising that the proponent has obtained an AAPA Authority Certificate for the ASC facility and there is a process and commitments for engaging with AAPA, land councils, native title holders prior to finalising launch trajectories. In addition, the NT EPA recognise that there are requirements for the proponent to obtain an Australian Launch Permit and returns authorisation under the Commonwealth's SLR Act prior to each launch.
Principles of ecologically sustainable development	
Decision-making principle 1. Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations. 2. Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.	The NT EPA has considered the decision-making principle in its assessment and has had particular regard to this principle in its assessment of terrestrial ecosystems, air quality, community and economy and culture and heritage. The NT EPA considers that its environmental impact assessment and recommended conditions have identified and mitigated both short-term and long-term environmental impacts. The community has been provided the opportunity for involvement in the environmental impact assessment process during public consultation on the proposed action, and the submissions received have been taken into account in the preparation of this report and the recommended

Matters taken into account during the assessment	Consideration
	conditions to inform the Minister's decision on environmental approval. The proponent's processes and the recommended conditions of the environmental approval will ensure ongoing community engagement in decision-making and management of the proposed action.
Principle of proportionality Decision-making processes should ensure that decisions or actions directed at minimising harm or a risk of harm or impact to the environment are proportionate to the harm or risk of harm or impact that is being addressed.	This principle was considered when assessing the impacts of the proposed action on the key environmental factors. The proponent has identified measures to avoid or minimise impacts on the environment in relation to each factor at the ASC facility and has provided a high level assessment of potential impacts within the downrange recovery areas. The high level assessment of the down range recovery areas provides the NT EPA with less certainty about the potential impacts from the proposed action in comparison to the assessment of the ASC facility. The NT EPA recognises; however, that the proponent has processes and procedures in place for the down range recovery areas (e.g. Mission Optimisation Process, Flight Hardware Recovery Plan) which include methods for the launch planning and recovery phases as well as measures to avoid and minimise potential impacts to the environment. During the launch planning the trajectory is controlled and distance travelled will be known. The potential recovery area can be calculated and mapped with 99.7% certainty. A physical disturbance footprint of 10 m x 2 m from the launch vehicle is anticipated. The recommended conditions provide for the proportionate management of risk of harm or impact to the environment. In addition, the NT EPA recognises Commonwealth legislation requirements that further minimise harm or risk of harm to the environment. ELA is required to obtain an Australian Launch Permit under the Commonwealth's SLR Act prior to each launch. The Application process includes the preparation of a Flight Safety Plan which includes the proposed launch vehicle flight path and means to conduct the operation safely.
Precautionary principle 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.	This principle was considered by the NT EPA when assessing the impacts of the proposed action on the key environmental factors. The proponent has identified measures to avoid or minimise impacts on the environment. The NT EPA has considered these measures during its assessment, and has recommended conditions for environment protection. From its assessment of this proposed action the NT EPA has

Matters taken into account during the assessment	Consideration
2. Decision-making should be guided by: (a) careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and (b) an assessment of the risk-weighted consequences of various options.	concluded that the environmental values will be protected provided its recommended conditions, and the proponent's commitments, are implemented. The proposed action may result in some irreversible impacts associated with loss of vegetation from clearing; however, those residual impacts are not considered significant. The precautionary principle has been applied for the assessment of areas containing sensitive or significant vegetation. Monsoon vine thicket was identified within close proximity to the ASC disturbance area. Assessment undertaken by the proponent identified this habitat to be of low value. The proponent has committed to a vegetation buffer of 50 m from the outer edge of the monsoon vine thicket, consistent with the NT Land Cleaning Guidelines[6] . However, larger buffers are required where the value of the monsoon vine thicket is considered moderate or high. A draft condition is recommended to identify a buffer to the satisfaction of the CEO. In the absence of archaeological surveys, the NT EPA has recommended conditions requiring archaeological surveys prior to commencement of the proposed action and to inform whether a CHMP is required.
Principle of evidence-based decision-making Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.	The NT EPA has considered the available evidence during the course of its assessment of the proposed action, and this scientific evidence provides the foundation for its decision-making and recommended conditions. In its assessment of the proposed action, where the NT EPA considered that further evidence is required to inform the management of potentially significant impacts on terrestrial ecosystems, air quality, community and economy and culture and heritage, conditions are recommended requiring the proponent to undertake additional work to provide further assurance that the impacts would be effectively avoided and/or mitigated.
Principle of intergenerational and intragenerational equity The present generation should ensure that the health, diversity and productivity of the environment	It is important to minimise adverse impacts to all environmental factors for the benefit of future generations. The NT EPA considers that the recommended conditions for an environmental approval would provide an appropriate degree of protection for these values. The NT EPA has considered the principle of intergenerational equity and intragenerational equity in its assessment. From the assessment of this proposed action the NT EPA has

[6] NT Land Clearing Guidelines

Matters taken into account during the assessment	Consideration
is maintained or enhanced for the benefit of present and future generations.	concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations. The NT EPA has recommended approval conditions for a Decommissioning and Rehabilitation Plan including appropriate rehabilitation to meet the closure objectives and criteria developed in consultation with Traditional Owners, the leaseholder and relevant government agencies.
Principle of sustainable use Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	The NT EPA has considered the importance of sustainable development and use of resources and this principle during the environmental impact assessment process. The NT EPA considers that this principle is closely linked to the principles of intergeneration and intragenerational equity, and conservation of biological diversity and ecological integrity.
Principle of conservation of biological diversity and ecological integrity Biological diversity and ecological integrity should be conserved and maintained.	This principle was considered when assessing the impacts of the proposed action on the environmental values, particularly in relation to terrestrial ecosystems. The assessment of these impacts is provided in this report. 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.
Principle of improved valuation, pricing and incentive mechanisms 1. Environmental factors should be included in the valuation of assets and services. 2. Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement. 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. 4. Established environmental goals should be pursued in the most cost-effective way by	This principle was considered by the NT EPA when assessing the impacts of the proposed action, including recommendations for monitoring pollutants. The NT EPA notes that the proponent would bear the costs relating to containment of contaminants, avoidance and abatement of pollutants to the terrestrial and air environment. The NT EPA has recommended approval conditions for a Decommissioning and Rehabilitation Plan. The proponent has committed to removing infrastructure and remediating and rehabilitating the ASC site.

Matters taken into account during the assessment	Consideration
establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems.	
Environmental decision-making hierarchy	
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: (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.	The extent to which the proponent has applied the environmental decision-making hierarchy in its design of the proposed action and the proposed measures to avoid and then mitigate significant impacts has been considered (refer Tables 2 to 6). Where it was considered necessary, the NT EPA has recommended conditions requiring that the proponent take further reasonable measures to avoid and/or mitigate impacts. The NT EPA has had regard to this hierarchy during the assessment of the proposed action and identified that residual adverse impacts to terrestrial ecosystems, air quality, community and economy and culture and heritage would be managed through the conditions of the environmental approval which includes the requirements for a vegetation management and monitoring plan and CHMP (pending archaeological survey results). The NT EPA has had regard to this hierarchy during the assessment of the proposed action and did not identify any significant residual impacts that would require an offset.
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.	The proponent holds a 40-year lease for 60 ha, and will expand on this to 630 ha, with activity occurring on ~250-300 ha (subject to expanding the lease under section 19 of the *Aboriginal Land Rights (Northern Territory) Act 1976*). The expansion is largely located within previously disturbed and rehabilitated land historically used for Gulkula South Mine and Gulkula North Mine. The proponent is required to develop and implement a Decommissioning and Rehabilitation Plan. The Plan is to include rehabilitation and remediation to meet the closure objectives and criteria developed in consultation with Traditional Owners, the leaseholder and relevant government agencies.

Matters taken into account during the assessment	Consideration
	The NT EPA has also taken into account that the proposed action will develop and support Australia within the global space industry in accordance with the *NT Space Strategy 2022-2026*[7].
Waste management hierarchy	
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. 2. For subsection (1), waste should be managed in accordance with the following hierarchy of approaches in order of priority: (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.	The proponent has considered the waste hierarchy in its assessment and has had particular regard to this principle in its assessment of terrestrial ecosystems, air quality, community and economy and culture and heritage. The proposed action will not require discharge of wastewater to the environment, nor a landfill. The proponent is required to develop and implement a Decommissioning and Rehabilitation Plan, which includes provisions about removal of site infrastructure.
Ecosystem-based management	
Management that recognises all interactions in an ecosystem, including ecological and human interactions.	The NT EPA considered the importance of ecosystem-based management for achieving both sustainable development and biodiversity protection goals.

[7] NT Space Strategy 2022-2026

Matters taken into account during the assessment	Consideration
	With consideration of the link between atmospheric processes, terrestrial ecosystems, and culture and heritage, 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. The NT EPA formed the view that the impacts from this proposed action can be managed to be consistent with the NT EPA's environmental factors and objectives.
The impacts of a changing climate	
The effects of a changing climate on the proposed action and resilience of the proposed action to a changing climate	The NT EPA considered the working design life of the proposed action (approximately 40 years) in the context of resilience to climate change, and how climate change may impact the proposed action. The NT EPA had regard to measures and controls relating to extreme weather events such as high intensity rain events. The proponent identified that the GHG emissions from the proposed action do not trigger the thresholds in the NT government large emitter policy and do not trigger requirements of the Australian Government's Safeguard mechanism

9. Conclusion and recommendation

The NT EPA has considered the phase 2 expansion of the ASC proposed action by ELA. The NT EPA's assessment of the proposed action identified potentially significant environmental impacts associated with four environmental factors:

- Terrestrial ecosystems
- Air quality
- Community and economy
- Culture and heritage

The NT EPA considers that with the recommended conditions, the proposed action 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

ntepa Northern Territory Environment Protection Authority

Draft Environmental Approval

PURSUANT TO SECTION *69* OF THE *ENVIRONMENT PROTECTION ACT 2019*

Approval number	EP2023/031-001
Approval holder	EQUATORIAL LAUNCH AUSTRALIA PTY LTD
Australian business number (ABN)	11 605 364 234
Registered business address	Level 10 99 Queen Street Melbourne VIC 3000
Action	Phase 2 Expansion of the Arnhem Space Centre

Action overview

Expansion of launch pads and associated facilities at the multi-user commercial Arnhem Space Centre located on NT Portion 1646 in the East Arnhem local government area, within the area of interest granted to the Gumatj Corporation Ltd under section 19 of the *Aboriginal Land Rights (Northern Territory) Act 1976*, and sub-let to the approval holder. Operation of the expanded area includes up to 60 launches per year. The action includes:

- clearing approximately 120 ha of intact native vegetation and 26 ha of regrowth
- an additional 14 launch pads and supporting infrastructure:
    - mission support buildings
    - fuel storage and pumping facilities
- 100 megalitre capacity water dam
- helipad
- accommodation facility
- emergency egress roads.

No wastewater release or disposal is proposed.

No groundwater extraction is proposed.

The action includes conducting activities to recover any returning waste materials and space debris from launched rockets from within NT land and coastal waters to the maximum extent reasonably practicable.

The action is projected to operate for 40 years in line with the duration of the lease, and any extension, granted under section 19 of the *Aboriginal Land Rights (Northern Territory) Act 1976*. Decommissioning and rehabilitation is part of the action and will be undertaken prior to the expiration of the lease.

The action is described further in the **Supplementary Environmental Report (SER)** (comprising the Referral, main **SER** document and appendices and additional information dated 27 September 2024). The action includes implementation of the environmental management measures,

commitments and safeguards documented in the SER. If there is an inconsistency between the SER and this environmental approval, the requirements of this environmental approval prevail.

Advisory notes

i. All statutory authorisations as required by law must be obtained and maintained as required for the action. No condition of this environmental approval removes any obligation to obtain, renew or comply with such statutory authorisations.

ii. Requirements to meet the conditions of this approval are to be conducted by appropriately trained, experienced and qualified personnel.

iii. Notification of environmental incidents must be made to the **CEO** in writing and within 24 hours of becoming aware of the incident, in accordance with Part 9 Division 8 of the **EP Act** 2019 and Part 10 of the Environment Protection Regulations 2020. Notification to **pollution@nt.gov.au** is considered notification to the **CEO**.

iv. Submission of all notices, reports, documents or other correspondence required as a condition of this approval, including notification to the **CEO** or **Minister**, must be provided in electronic form by emailing environmentalregulation@nt.gov.au . All documents should be in electronic form suitable for on-line publication.

Primary address of action	**Arnhem Space Centre** launch site – NT Portion 1646, Dhupuma Plateau, intersection of Central Arnhem Road, Dhupuma Road and Bawaka Road.
NT EPA Assessment Report number	108
Person authorised to make decision	Hon Joshua Burgoyne MLA Minister for Lands, Planning and Environment
Signature	NOT FOR SIGNING
Date of decision	

Recommended environmental approval conditions

1 Limitations and extent

1-1 All **Arnhem Space Centre (ASC)** facility activities and launches must be carried out within the **approved extent** (**Figure 1**).

1-2 Activities at the ASC must not exceed the limitations in **Table 1**.

Table 1 Limitations and extents

Action element	Map	Limitation or maximum extent
Arnhem Space Centre (ASC)	Figure 1	• No more than 120 ha of intact native vegetation to be cleared • No more than 26 ha of regrown native vegetation to be cleared • No monsoon vine thicket vegetation to be cleared

Arnhem Space Centre activities

2 Air quality objectives

2-1 The approval holder must ensure the action achieves the following environmental objective:

(1) Protect air quality and minimise emissions and their impacts on **sensitive and significant vegetation**, sacred sites, archaeological sites and nearby offsite human receptors so that these values are maintained.

2-2 To support achievement of the environmental objective stated in condition **2-1**, the approval holder must:

(1) Take all reasonably practicable measures during the construction, operation, remediation and closure of the action to avoid and mitigate impacts attributable to the action on air quality beyond the **approved extent**.

3 Meteorological and air quality monitoring

3-1 To support achievement of the environmental objective stated in condition **2-1,** the approval holder must:

(1) prior to commencing the first launch, obtain 12 months continuous ambient air quality monitoring data and results for carbon monoxide (CO), nitrogen dioxide (NO_2), hydrogen chloride (HCl), sulfur dioxide (SO_2), $PM_{2.5}$, and PM_{10} from an appropriately located air quality monitoring station;

(2) prior to commencing the first launch, obtain 12 months of meteorological condition information in proximity to the **approved extent;**

(3) collect the meteorological condition information required by condition **3-1(2)** over the same period as the ambient air quality monitoring required by condition **3-1(1)**;

(4) submit an ambient air quality report to the **Minister** within 12 weeks of completing the monitoring required by condition **3-1(1)** and **3-1(2)**. The air quality report must at a minimum include:

(a) the information obtained as a requirement of condition **3-1(1);**

(b) the information obtained as a requirement of condition **3-1(2);** and

(c) evidence that monitoring was undertaken in accordance with the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (as amended).

(5) monitor pollutant concentrations at the **Gulkula Ceremonial Site** including carbon monoxide (CO), nitrogen dioxide (NO_2), hydrogen chloride (HCl), sulfur dioxide (SO_2), $PM_{2.5}$, and PM_{10}. The monitoring must:

(a) commence at least 24 hours before each rocket launch, continue for 24 hours the day of each rocket launch and end 24 hours after each rocket launch, for the **life of the action**; and

(b) be undertaken in accordance with the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (as amended).

(6) pollutant concentrations from direct, indirect and cumulative impacts of the action must not exceed the air quality standards required by condition **5** at the **Gulkula Ceremonial Site.**

4 Air quality modelling

4-1 Five years after the commencement of the first launch or within 12 weeks of completing the tenth launch (whichever is first) the approval holder must update the pollutant dispersion model using the ambient meteorological and air quality data as required by condition **3-1(1)** and **3-1(2)**.

4-2 The updated pollutant dispersion model required by condition **4-1** must include modelling of carbon monoxide (CO), nitrogen dioxide (NO_2), hydrogen chloride (HCl), $PM_{2.5}$, and PM_{10}, sulfur dioxide (SO_2) concentrations, and be assessed against the air quality standard values stipulated in condition **5**.

4-3 The pollutant dispersion model required by condition **4-1** must be undertaken:

(1) in accordance with the Approved Method for the Modelling and Assessment of Air Pollutants in NSW (as amended); and

(2) in a manner that determines whether the standards in condition **5** are achievable.

5 Air quality standards

5-1 Air quality monitored concentrations at the **Gulkula Ceremonial Site** required by condition **3-1(5)** must not exceed:

(1) the standards for pollutants stated in schedule 2 of the National Environment Protection (Ambient Air Quality) Measure for:

(a) 24-hour and 1 year ground level concentrations for PM_{10};

(b) 1-hour and 1 year ground level concentrations for NO_2;

(c) 24-hour and 1 year ground level concentrations for $PM_{2.5}$; and

(d) 1-hour and 24-hour ground level concentration for SO_2.

(2) the impact assessment criteria provided in the Approved Method for the Modelling and Assessment of Air Pollutants in NSW published by the NSW Environment Protection Authority (September 2022) for:

(a) 1-hour ground level concentration for HCl; and

(b) 1-hour and 8-hour ground level concentration for CO.

(3) the air pollution assessment criteria provided in the Guideline for Assessing and Minimising Air Pollution in Victoria published by the Victorian Environment Protection Authority (February 2022) or the latest version for:

(a) 1 year ground level concentration for HCl (to be applied as the 24-hour averaging period).

6 Terrestrial ecosystems objective

6-1 The approval holder must ensure the action achieves the following environmental objectives:

(1) Protect monsoon vine thicket to maintain environmental values including biodiversity, ecological integrity and ecological functioning.

7 Vegetation management and monitoring plan

7-1 To support achievement of the environmental objective required by condition **6-1**, the approval holder must, prior to **substantial implementation**, develop a vegetation monitoring and management plan (**VMMP**) for the **ASC.** The **VMMP** must be informed by:

(1) survey by a **qualified ecologist** to identify monsoon vine thicket in and within 250 m of the **approved extent**; and

(2) survey by a **qualified ecologist** to provide a baseline condition assessment of monsoon vine thicket within 250 m of the **approved extent**.

7-2 The **VMMP** required by condition **7-1** must:

(1) identify the areas surveyed and include the methodology and results (including field verified maps and shp files) of the vegetation surveys required by conditions **7-1(1)** and **7-1(2)**;

(2) identify the location and extent of monsoon vine thicket in and within 250 m of the **approved extent** based on the vegetation surveys required by conditions **7-1(1)** and **7-1(2)**;

(3) identify a buffer that forms the **no-go areas** for vegetation clearing;

(4) detail measures and procedures to protect monsoon vine thicket including:

(a) marking of **no-go areas** on the ground for the duration of the action;

(b) erosion and sediment controls to avoid indirect impacts to monsoon vine thicket and buffers; and

(c) any other measures, including remedial actions, to prevent impacts to monsoon vine thicket from edge effects.

(5) set out a detailed monsoon vine thicket monitoring program to:

(a) detect any negative change in the condition of the monsoon vine thicket relative to the baseline identified by the survey required by condition **7-1(2)**; and

(b) identify triggers for the remedial actions required by condition **7-2(4)(c).**

(6) be revised in accordance with the requirements of condition **12**.

7-3 The VMMP required by condition **7-1** must be submitted to the **Minister** no later than one month prior to commencement of **substantial implementation**.

8 Decommissioning and rehabilitation plan

8-1 The approval holder must ensure the action achieves the following environmental objectives:

(1) Protect the quality of land, soil and water such that the environmental values of the terrestrial environment are maintained.

8-2 To support achievement of the environmental objective required by condition **8-1**, the approval holder must develop and implement a decommissioning and rehabilitation plan (**DRP**) for the **ASC**.

8-3 The **DRP** required by condition **8-2** must:

(1) define closure objectives and criteria which have been developed in consultation with Traditional Owners, the leaseholder and relevant government agencies.

(2) include provisions for unplanned and planned decommissioning and **dormancy** of operation;

(3) describe the methodology (including any applicable standards, such as the National Environment Protection (Assessment of Site Contamination) Measure (2013) or latest version) and staging for dismantling and removal of infrastructure, rehabilitation and remediation of the **ASC**;

(4) include the approach for post-decommissioning monitoring and additional identified remediation actions;

(5) be reviewed by an **independent qualified person** to ensure it achieves the requirements of conditions **8-3(1)** - **8-3(4)**; and

(6) be submitted to the **Minister** with the comments from the independent reviewer required by condition **8-3(5)** and a statement from the approval holder addressing how the reviewer's findings have been addressed, within 12 months of **substantial implementation**.

8-4 The approval holder must notify the **Minister** in writing within two weeks of the proposed decommissioning or **dormancy** of activities, unplanned or otherwise.

8-5 Any revisions made to the information in the DRP that addresses the requirements of conditions **8-3(1)**, **8-3(2)**, **8-3(3)** and **8-3(4)** must:

(1) be reviewed by an **independent qualified person** to ensure the revisions meet the requirements of conditions **8-3(1)** - **8-3(4)**; and

(2) be submitted to the **Minister** within two months after submitting a notice under condition **8-4,** with comments of the independent reviewer required by condition **8-5(1)** and a statement from the approval holder addressing how the reviewer's findings have been addressed.

8-6 The approval holder must decommission any part of the project infrastructure that will not, or will no longer, be required for use as soon as reasonably practicable after completion of its use.

9 Culture and heritage

9-1 The approval holder must ensure the action achieves the following environmental objectives:

(1) Protect Aboriginal sacred sites.

(2) Protect Aboriginal cultural values.

(3) Protect heritage values**.**

9-2 To support the achievement of the environmental objectives required by condition **9-1** the approval holder must complete an archaeological survey:

(1) in accordance with a scope of works developed in consultation with and to the satisfaction of the **CEO**; and,

(2) prior to any ground disturbance within the archaeological survey area.

9-3 Two weeks prior to ground disturbance within the archaeological survey area, the approval holder must provide the **CEO** with an archaeological survey report. The archaeological survey report must include:

(1) the results of the survey;

(2) the areas surveyed (including field verified maps and shp files);

(3) procedures to mitigate impacts to unexpected heritage objects, including an unexpected finds protocol.

9-4 Should the archaeological survey required by condition **9-2** identify the presence of **heritage values**, the approval holder must develop and implement a cultural heritage management plan (**CHMP**) at the **ASC** for the **life of the action**.

9-5 The **CHMP** required by condition **9-4** must:

(1) be developed in consultation with, and to the satisfaction of the **CEO**;

(2) include a register of cultural and heritage values;

(3) identify the actions that will be implemented to avoid or minimise impacts to known **heritage values**;

(4) be submitted to the **Minister** no later than one month prior to commencement of **substantial implementation**.

Down range activities

10 Flight planning and down range landing and hardware recovery

10-1 The approval holder must to the extent reasonably practicable ensure that actions within the **down range landing and hardware recovery site** achieves the following environmental objectives:

(1) Protect terrestrial habitats to maintain environmental values.

(2) Protect **listed threatened species** and their habitats.

(3) Protect vegetation quality.

(4) Protect the quality of land, soils and waters.

(5) Protect Aboriginal sacred sites.

(6) Protect Aboriginal cultural values.

(7) Protect heritage values.

10-2 To support achievement of the environmental objectives required by condition **10-1**, the approval holder must develop and implement a launch planning procedure to ensure that the **down range landing and hardware recovery site** for each launch avoids impacting, to the extent reasonably practicable:

(1) sensitive environmental values (which includes cultural values); and

(2) any other areas identified, through consultation, in line with the **down range landing and hardware recovery site** requirements of the stakeholder engagement plan (**SEP**) required by condition **11-2** with relevant down range stakeholders, as holding local or regional significance.

10-3 The procedure identified in condition **10-2** must be prepared by a suitably qualified person and submitted to the **Minister** three months before the first launch.

10-4 The procedure must be implemented for each launch and include:

(1) desktop methods to identify sensitive environmental values and areas holding local or regional significance; and

(2) methods for how impacts to sensitive environmental values and areas holding local or regional significance will be avoided, mitigated or managed in line with the environmental decision-making hierarchy.

10-5 On the 12 month anniversary of first launch, and each 12 months after, the approval holder must prepare and submit a report to the **Minister**. The report must:

(1) specify the number of launches undertaken in the previous 12 months;

(2) specify how compliance with condition **10-2** has been achieved;

(3) evaluate the performance of the avoidance, mitigation and management actions required by condition **10-4(2)**; and

(4) identify any remediation actions undertaken.

General conditions

11 Stakeholder engagement plan

11-1 The approval holder must to the extent reasonably practicable ensure the action achieves the following environmental objective:

(1) Protect the health and welfare of current and future generations of Territorians.

11-2 To support the achievement of the environmental objective required by condition **11-1,** the approval holder must develop a **SEP** for the management of the action at the **ASC** and the **down range landing and hardware recovery site.**

11-3 The **SEP** required by condition **11-2** must:

(1) be developed in accordance with the International Association for Public Participation's Quality Assurance Standard for Community and Stakeholder Engagement[1] or the latest version; identify all affected stakeholders including but not limited to:

(a) Traditional Owners;

(b) Aboriginal corporations;

(c) land councils;

(d) users of the **Gulkula ceremonial site**;

(e) other people or organisations determined to be Aboriginal stakeholders;

(f) services such as medical and logistical services to the region; and

(g) other businesses that may be affected during peak visitor periods to the region.

(2) demonstrate that affected stakeholders have been consulted on:

(a) potential social and economic impacts from the action; and

(b) broader potential positive and negative impacts of the action, including details of the process used to identify these impacts.

(3) require that stakeholders identified within the **down range landing and hardware recovery site**, including but not limited to, Traditional Owners, leaseholders, land councils and the Aboriginal Areas Protection Authority are informed and consulted with during the launch planning process prior to each launch;

(4) be reviewed by an **independent qualified person** to ensure that the SEP meets the requirements of **11-3(1)**, **11-3(2)** and **11-3(3)**; and

(5) be submitted to the **Minister** with the comments from the independent reviewer required by condition **11-3(4)** and a statement from the approval holder addressing how the reviewer's findings have been addressed, at least one month prior to the first launch.

[1] International Association for Public Participation (IAP2) (2015). Quality Assurance Standard for Community and Stakeholder Engagement.

11-4 The environmental performance report (**EPR**) required by condition **13-1** must include a summary of significant issues raised by the community and stakeholders during the consultation process and how they were resolved.

12 Revision of plans

12-1 The approval holder may revise any management plan required by this approval and must provide the following to the **Minister** at least one month prior to any material amendment(s) being implemented:

(1) the revised plan(s);

(2) a tabulated summary of the amendment(s) with document references;

(3) reasons for the amendment(s); and

(4) an assessment of environmental risks and potential environmental impacts associated with the amendment(s).

12-2 The approval holder must implement the action to comply with the latest revision of management plans required by this approval.

13 Environmental performance reporting

13-1 The approval holder must prepare an **EPR** that reports on the environmental performance of the action and evaluates compliance with the conditions of this environmental approval.

13-2 The **EPR** required by condition **13-1** must:

(1) be submitted to the **Minister** on the first anniversary of **substantial implementation** of any component of the action and every five years thereafter;

(2) be endorsed by the approval holder or a person delegated to endorse on the approval holder's behalf;

(3) be reviewed and endorsed by an **independent qualified person**;

(4) include a statement as to the extent the approval holder has complied with each condition of this approval;

(5) provide an interpretation of all monitoring data required by the conditions of this approval;

(6) provide an analysis and interpretation of monitoring data to demonstrate whether compliance with the requirements of conditions has been achieved; and

(7) identify all non-compliances and describe corrective and preventative actions taken to date and actions that will be taken.

13-3 The approval holder must maintain records demonstrating compliance with the conditions of this environmental approval for the **life of the action**.

14 Provision of environmental data

14-1 All environmental monitoring data required to be collected or obtained under this environmental approval must be retained by the approval holder for a period of not less than ten years commencing from the date that the data is collected or obtained.

14-2 The approval holder must, as and when directed by the **Minister**, provide any environmental data (including sampling design, sampling methodologies, empirical data and derived information products such as maps) or information relevant to the assessment of the action and implementation of this environmental approval, to the **Minister** in the form and manner and at the intervals specified in the direction.

15 Change of contact details

15-1 The approval holder must notify the **Minister** in writing of any change of its name, physical address or postal address for the serving of notices or other correspondence within ten business days of such change.

16 Commencement of action

16-1 This approval expires five years after the date on which it is granted, unless there is **substantial implementation** on or before that date.

16-2 The approval holder must provide notification in writing to the **Minister,** at least two months prior to **substantial implementation**.

17 Breach of condition

17-1 A breach of condition/s of this approval must be reported to the **Minister** within 24 hours of the approval holder becoming aware of the breach. The report to the **Minister** must be in electronic form by emailing environmentalregulation@nt.gov.au

Acronyms

Term	Definition
ASC	Arnhem Space Centre
CEO	Chief Executive Officer
CHMP	Cultural heritage management plan
DLPE	Department of Lands, Planning and Environment
DRP	Decommissioning and rehabilitation plan
EP Act	*Environment Protection Act 2019*
EPR	Environmental performance report
NT EPA	Northern Territory Environment Protection Authority
SEP	Stakeholder engagement plan
SER	Supplementary environment report
VMMP	Vegetation monitoring and management plan

Definitions

Some of 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.

Term	Definition
approved extent	The extent includes the area of clearing required to accommodate the approved expansion to the **Arnhem Space Centre** (**Figure 1**).
Arnhem Space Centre	The area defined in Figure 1 of this approval, and spatial data held by DLPE at record 33-D24-8109: ASC phase 2 approved extent.
Chief Executive Officer	Has the same meaning as in section 4 of the **EP Act.**
dormancy	in a state of long term rest or inactivity (greater than 5 years).
down range landing and hardware recovery site	has the same meaning as both a "drop zone" and "landing site" as per the Australian Space Agency Flight Safety Code, and the access to those sites. NB – both the "drop zone" and "landing site" are characterised as a three-standard deviation (three-sigma) area around the nominal impact point of debris or scheduled debris.
Gulkula ceremonial site	includes and collectively refers to the ceremonial site, the Garma Institute and Garma Cultural Knowledge Centre.
heritage values	Heritage places and heritage objects as defined under the *Heritage Act 2011* and includes Aboriginal or Macassan archaeological places and objects**.**
independent qualified person	A qualified person as defined under section 4 of the EP Act; and who also meets the following requirements: a) was not involved in the preparation of the approval holder's referral, **SER** or additional information; and b) is independent of the personnel involved in the design and implementation of the action.
life of the action	The period of time from the **substantial implementation** of the action until the issue of a closure certificate under section 213 of the **EP Act**, or revocation of the environmental approval by the **Minister** at the request of the approval holder under section 114 of the **EP Act.**
listed threatened species	Species listed as critically endangered, endangered, or vulnerable under the *Territory Parks and Wildlife Conservation Act 1976* or the Environment *Protection and Biodiversity Conservation Act 1999*.
Minister	The **Minister** responsible for administering the **EP Act**.
no-go areas	Areas where vegetation clearing is prohibited in order to protect impacts to **sensitive and significant vegetation**.

Term	Definition
qualified ecologist	Person who has professional qualifications, training, skills and/or experience related to the potential impact using the relevant protocols, standards, and methods, and who has obtained written approval from the **CEO**, on the advice of the Executive Director of the NT **DLPE** Flora and Fauna Division to be the qualified ecologist.
sensitive and significant vegetation	Vegetation communities defined as sensitive and significant by the Northern Territory Planning Scheme Land Clearing Guidelines[2].
substantial implementation	The commencement of the action including ground disturbing activity, such as vegetation clearing or the construction of infrastructure to accommodate the approved expansion to the **Arnhem Space Centre**.

Location and extent of action

Spatial data is held by **DLPE** as follows:

- record 33-D24-8109: ASC phase 2 approved extent

[2] Northern Territory planning scheme land clearing guidelines

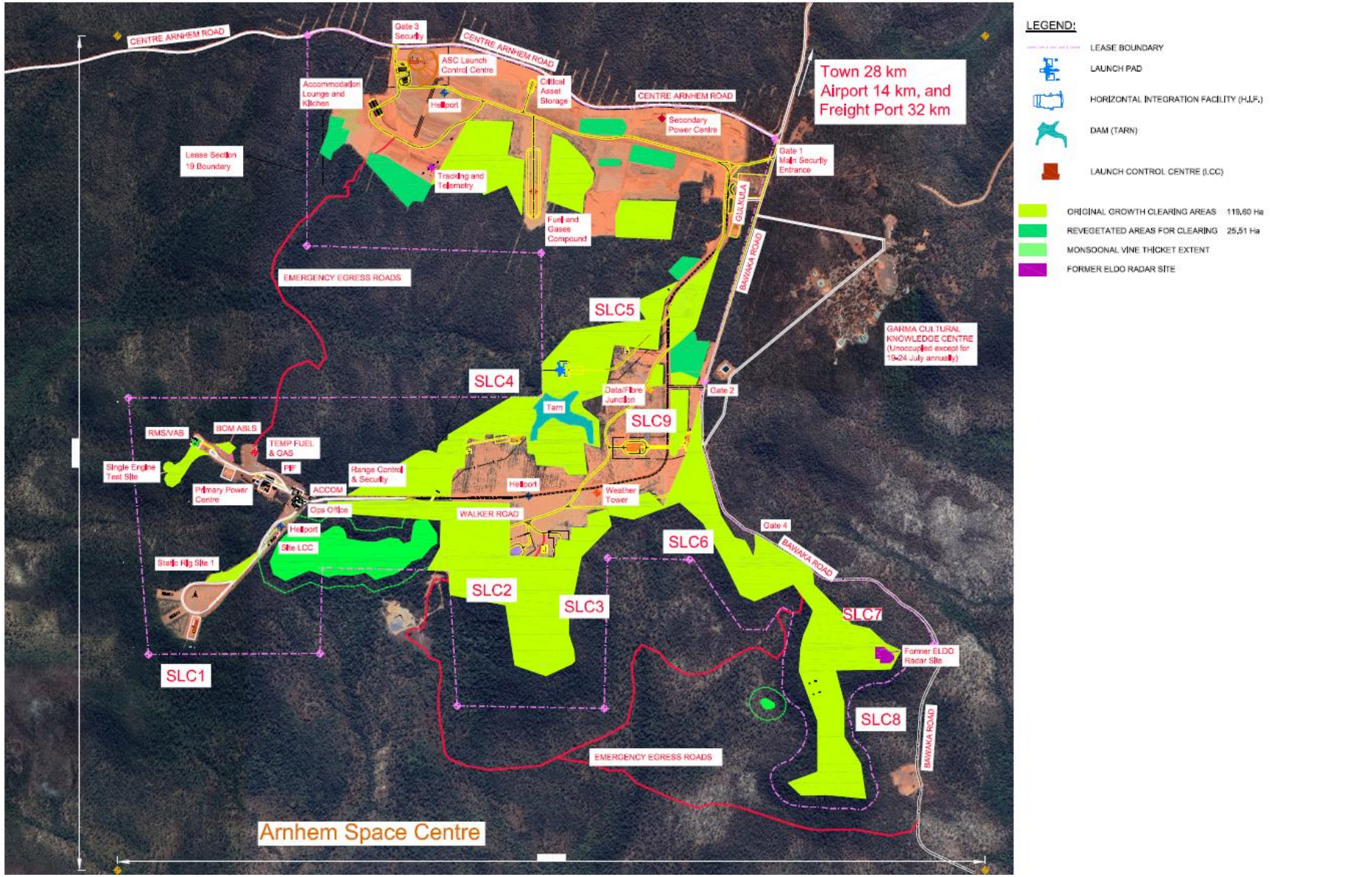

Figure 1: Arnhem Space Centre

Appendix 2 – Environmental impact assessment timeline

Date	Assessment stage
18 October 2023	Referral accepted.
26 October to 22 November 2023	Public consultation on referral.
9 January 2024	NT EPA decided environmental impact assessment required by supplementary environmental report (SER) method.
6 February 2024	NT EPA directed the proponent to provide additional information in the SER.
16 July to 20 August 2024	Public consultation on the SER.
13 September 2024	NT EPA directed the proponent to provide additional information.
30 September 2024 to 7 October 2024	Government authority consultation on additional information to the SER.
28 October to 11 November 2024	Consultation on draft environmental approval. (Proponent and select statutory decision-makers – regulation 160 of the Environment Protection Regulations 2020).
20 November 2024	NT EPA provided assessment report and draft environmental approval to Minister.
Within 30 business days after receiving the NT EPA's assessment report and draft environmental approval	Minister's decision on the environmental approval. (If the Minister does not make a decision within 30 business days the Minister is taken to have accepted the NT EPA's recommendation for approval).